

WRSE Draft Regional Plan Strategic Environmental Assessment Environmental Report

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Abbreviations

AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Areas
BAU	Business as Usual
BNG	Biodiversity Net Gain
CAMS	Catchment Abstraction Management Strategy
CCRA	Climate Change Risk Assessment
CFMP	Catchment Flood Management Plans
CPRE	Campaign for Rural England
CROW	Countryside and Rights of Way
CO₂	Carbon Dioxide
DCLG	Department for Communities and Local Government
Defra	Department for Environment, Food and Rural Affairs
EAAP	Ecosystems Approach Action Plan
ENCA	Enabling a Natural Capital Approach
EU	European Union
FRA	Flood Risk Area
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GIS	Geographic Information System
GWDE	Ground Water Dependent Terrestrial Ecosystems
HER	Historic Environment Record
HRA	Habitats Regulations Assessment
IMD	Index of Multiple Deprivation
INNS	Invasive Non-Native Species
JNCC	Joint Nature Conservation Committee
km	Kilometres
ktCO₂	Kilo Tonnes of Carbon Dioxide

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
MPZ	Marine Protection Zone
NCA	National Character Area
NERC	Natural Environment and Rural Communities
NFM	Natural Flood Management
NNR	National Nature Reserve
NO₂	Nitrogen Dioxide
NPPF	National Planning Policy Framework
ONS	Office for National Statistics
PM	Particulate Matter
RAG	Red-Amber-Green
NEUBS	Non-Essential Use Bans
RCP	Representative Concentration Pathway
RBMP	River Basin Management Plan
SAC	Special Areas of Conservation
SEA	Strategic Environmental Assessment
SES Water	Sutton & East Surrey Water
SMP	Shoreline Management Plans
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
SRO	Strategic Resource Option
SPA	Special Protection Area
ToLS	Test of Likely Significance
TUBS	Temporary Use Bans
UK	United Kingdom

UKCP18	UK Climate Projections 2018
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organization
WFD	Water Framework Directive
WRMP	Water Resource Management Plan
WRPG	Water Resources Planning Guidance
WRZ	Water Resource Zone
WRSE	Water Resources South East

1 Introduction

1.1 Introduction

Water Resources South East (WRSE) is made up of an alliance of the six water companies that cover the South East region of England, these are:

- Affinity Water
- Portsmouth Water
- SES Water (Sutton & 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 is developing a multi-sector, regional resilience plan in order to secure reliable and resilient water supplies for the southeast of England. The WRSE Regional Plan takes a long-term view to 2100 and provides a consistent framework for the development of the member water companies Water Resources Management Plans (WRMP) 2024.

WRSE has prepared the Draft Regional Plan for publication and consultation in Autumn/Winter 2022/2023. Prior to this, the emerging Regional Plan was published in January 2022 to provide an early insight into the big issues and emerging solutions to gain initial feedback from stakeholders and support the development of the Draft Regional Plan. It is a step in an ongoing process of plan development, and not yet a formal preferred plan. The key steps in the Regional Plan process are as follows:

- Emerging Regional Plan consultation - January to March 2022
- Draft Regional Plan consultation – Autumn/Winter 2022/2023
- Revisions following consultation – Spring 2023
- Final Regional Plan – Autumn 2023

To support the development of the Regional Plan an environmental assessment process has been undertaken that includes:

- Strategic Environmental Assessment (SEA)
- Habitats Regulations Assessment (HRA)
- Water Framework Directive (WFD) Assessment
- Biodiversity Net Gain (BNG) Assessment
- Natural Capital Assessment
- Invasive Non-Native Species (INNS) risk assessment

This report is the SEA Environmental Report and therefore, focusses primarily on the results of the SEA assessment. The additional environmental assessments outlined above are presented in the respective technical appendices of this Environmental Report. The environmental assessments undertaken

supported the development of the emerging Regional Plan and Draft Regional Plan. This Environmental Report should be read alongside the WRSE Draft Regional Plan (November 2022).

The Regional Plan is not a statutory plan and there is currently no legal requirement for the preparation of the SEA. However, the Water Resources National Framework – Annex 2: Regional Planning, states that Regional Plans should comply with SEA legislation. WRSE have therefore, followed the SEA approach to align with this guidance, help develop a sustainable Regional Plan and inform the SEAs of the water company WRMPs. Based on the level and scale of the information available at this stage, the SEA is considered to be a robust assessment of the WRSE Regional Plan in order to support the WRMPs. Limitations of the Environmental Report are set out in Section 1.4. It should be noted that this Environmental Report focusses on the cumulative effects of the Plan and its alternatives. Specifically on potential cumulative effects where options from different water companies could affect the same environmental receptors. This approach avoids duplication of the individual water company WRMP SEA processes and helps capture potential effects between WRMPs (see Chapter 4 for further details on the approach). Details on individual option assessments and WRMP cumulative assessments can be found in the relevant water company WRMP24 Environmental Reports. Table 1.1 signpost where the specific requirements in the SEA Directive relating to the Environmental Report (SEA Directive Annex I) can be found. Further and more detailed assessments, including (where appropriate) Environmental Impact Assessments will be undertaken of individual schemes as part of future applications for planning and other consents.

1.2 The SEA Process

The objective of SEA, according to Article I of the SEA Directive, is:

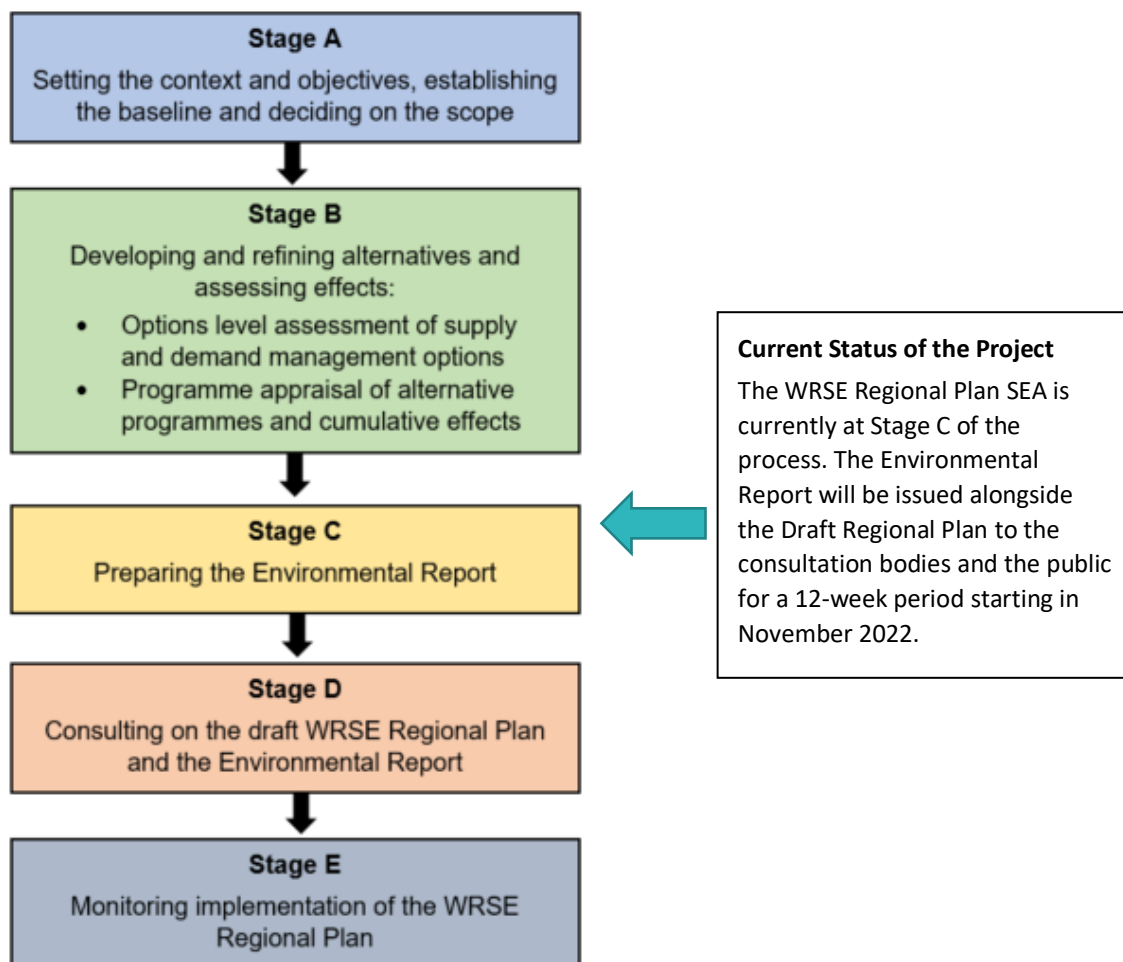
‘to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans with a view to promoting sustainable development’¹.

In order to do this, the SEA Directive requires plans and programmes to undergo an environmental assessment to determine the likely significant effects on issues such as biodiversity, climatic factors, human health, population, cultural heritage (including archaeology), air, material assets, landscape and water.

SEA works to inform the decision-making process through the identification and assessment of significant and cumulative effects a plan or programme may have on the environment. 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 1.1](#) ~~Figure 1.1~~ shows the different stages in the SEA process. Appendix A presents the different tasks involved in each of the SEA stages.

¹ The SEA Directive does not define what is meant by Sustainable Development. However, the Government SEA Guidance “A Practical Guide to the SEA Directive” (September 2005) sets out what “promotion of sustainability development” means in the UK context. The guidance references the UK Sustainable Development Framework “Our Future – difference paths” (2005) which states “The goal of sustainable development is to enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life, without comprising the quality of life for future generations. For the UK Government that goal will be pursued in an integrated way through a sustainable, innovative and productive economy that delivers high levels of employment; and a just society that promotes social inclusion, sustainable communities and personal well-being. This will be done in ways that protect and enhance the physical and natural environment, and use resource and energy as efficiently as possible.” This definition is reflected in the document ‘Mainstreaming sustainable development – The Government’s vision and what this means in practice’ (Defra, February 2011) which sets out the vision of “stimulating economic growth and tacking the deficit, maximising wellbeing and protecting our environment, without negatively impacting on the ability of future generations to do the same”.

Figure 1.1: SEA Process Stages



Source: Adapted from 'A Practical Guide to the Strategic Environmental Assessment Directive' (DCLG, 2005)

The SEA process has followed current guidance on the application of SEA assessment within water resource planning including incorporating best practice within the proposed approach. The current guidance documents include:

- Environmental assessment guidance for water resources management plans and drought plans, 2021, UK Water Industry Research.
- A Practical Guide to the SEA Directive, 2005, Department for Communities and Local Government (DCLG).
- Topic related SEA guidance on climate change, biodiversity and the historic environment from Natural England, Environment Agency and Historic England.
- Water Resource Planning Guidelines, 2022, Environment Agency, Ofwat, Natural Resources Wales and Supplementary Planning Guidance 'Environmental and Society in Decision-Making'.

The SEA process has followed the principles and requirements of the SEA Directive and guidance as stated above. Table 1.1 indicates where the specific requirements in the SEA Directive relating to the Environmental Report (SEA Directive Annex I) can be found.

Table 1.1: SEA Directive Requirements – Signposting Table

SEA Directive Environmental Report Requirements	Location of Information
An outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes	Section 2, Appendix D
The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme	Section B.4 and Appendix E
The environmental characteristics of areas likely to be significantly affected	Section B.4 and Appendix E
Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC	Appendix B.4
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	Appendix B.3 and Appendix D
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 ² , landscape and the interrelationship between the above factors	Section 5 – This Environmental Report focussed on the cumulative effects of the Plan and its alternatives. Specifically on potential cumulative effects where options from different water companies could affect the same environmental receptors. Details on option-specific assessments and effects of WRMP24 on the environment is presented in the individual water company WRMP24 Environmental Reports.
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 6. More detailed option specific and WRMP level mitigation is presented in the individual water company WRMP24 Environmental Reports
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	Section 2.3 and further detail can be found in the WRSE Plan Annex 1.
A description of the measures envisaged concerning monitoring in accordance with Article 10	Section 6. More detailed option specific and WRMP level monitoring is presented in the individual water company WRMP24 Environmental Reports
A non-technical summary of the information provided under the above headings	Non-Technical Summary Document

Source: SEA Directive Annex I

² Historic environment covers the SEA Directive topic cultural heritage including architectural and archaeological heritage

1.3 Purpose of the Environmental Report

The purpose of this Environmental Report is to present the results of the SEA process for the WRSE Draft Regional Plan including the potential effects (positive and negative) of the options included within the Draft Regional Plan, cumulative effects, mitigation and enhancement measures, and monitoring proposals.

The SEA process has involved the assessment of over 1,000 water resource and demand options against the SEA framework. Due to the volume of options, this Environmental Report does not present the assessment matrices and results for each individual option.

The Environmental Report is being published for consultation, alongside the WRSE Draft Regional Plan.

The key tasks undertaken, and the structure of the Environmental Report are presented below:

- Chapter 1 - Introduction to the WRSE Regional Plan, the SEA process and requirements
- Chapter 2 - Description and context of the WRSE Regional Plan
- Chapter 3 – SEA Scoping Summary
- Chapter 4 – Environmental Assessment Methodology
- Chapter 5 – Assessment of the Draft Regional Plan
- Chapter 6 – Mitigation and Monitoring
- Chapter 7 – Consultation and Next Steps
- Appendix A - SEA Process Tasks
- Appendix B – Scoping Summary
- Appendix C – Scoping Report Consultation Log
- Appendix D - Policy, Plans and Programmes Review
- Appendix E - Baseline Review and Baseline Maps
- Appendix F - List of Local Authorities in the WRSE Region
- Appendix G - Assessment Scoring Criteria
- Appendix H - Habitats Regulation Assessment (HRA)
- Appendix I - Water Framework Directive (WFD) Assessment
- Appendix J - Biodiversity Net Gain (BNG) and Natural Capital Assessments

1.4 Limitations of the Environmental Report

The SEA Environmental Report has relied on published data and information provided by WRSE and from third party organisations in the production of this SEA Environmental Report. The baseline information collected as part of the SEA Scoping Stage and presented in this Environmental Report is the most up-to-date information currently available, however it is possible that conditions described in this report may change over time. The consultation process aims to address and minimise any gaps in information to ensure all potential environmental effects have been considered with regard to the WRSE Regional Plan.

The WRSE Regional Plan covers a large geographical area. Therefore, the baseline summarised in this report is currently a high-level review of conditions within the region. A Geographic Information System (GIS) tool was developed to hold location specific baseline information. This tool was used during the

options assessment to provide more detailed information to enable the assessment of effects of each option and the cumulative and in-combination effects of the Draft Regional Plan. A range of baseline datasets under each SEA objective have been used (as set out in Appendix G). However, given the regional nature of the plan, detailed local baseline data such as local (non-designated) wildlife sites, Local Plan housing allocations and minerals and waste allocations were not included. This information has been gathered (where possible) at the WRMP level and included as part of the WRMP24 SEAs.

The option assessments, cumulative and in-combination effects assessments have been based on the options information and GIS data provided by the water companies. It should be noted that options were at varying levels of development and therefore, the options information available to inform the assessments varied.

The cumulative effects assessments of the Draft Regional Plan have been assessed with local level impacts by each of the WRSE water companies individually as part of their WRMP process. WRSE is setting out to ensure there is regional coherence between these and that all impacts to environmental and social receptors (including Natura 2000 designated sites for HRA and waterbodies for WFD) that cross the company boundaries are picked up and the selected options are assessed together. The cumulative assessment presented within this Environmental Report has focussed on options interfaces between the boundaries of the Water Company regions to assess the impacts of different company options on environmental and social receptors. Further information on the methodology is presented in Chapter 4.

The Regional Plan development is currently at the Draft Plan stage and will be further developed into the Final Regional Plan following consultation and further investment model runs. The HRA Test of Likely Significance, WFD Level 1 and INNS risk screening were undertaken to inform the development of the Emerging Plan. Where required, further HRA Appropriate Assessment, WFD Level 2 and INNS assessments have been undertaken to feed into the development of the Draft Regional Plan. However, it should be noted that level 2 assessments were not undertaken for all of the options included within the Draft Regional Plan. The SEA, HRA and WFD have therefore been based on the level 2 assessments where they were made available by the water companies. Where they were not made available, level 1 assessments have been used at this stage. This approach has been discussed and accepted by the Environment Agency and Natural England. The use of level 1 information has the potential to flag the plan as having higher environmental risks. Level 2 assessment information will feed into the assessment of the final plan.

2 Description and Context of the WRSE Regional Plan

2.1 Background and purpose

WRSE is formed of six water companies operating in the south east of England, including Affinity Water, Portsmouth Water, South East Water, SES Water, Southern Water and Thames Water as shown in Figure 2.1. The WRSE region covers approximately 26,400km² and is culturally diverse with a mix of major cities, including London, seaside towns and rural hamlets. The six water companies currently abstract, treat and distribute over five billion litres of water a day to the region equating to over a third of the water provided on average by water companies across the whole of England³.

The south east is the most populated region in the UK with a population of around 19 million and expected long-term growth of approximately four million⁴. The region is also home to businesses which contribute to 37% of the national economy and sees an annual addition of 28 million tourists. Growth in the south east, alongside a changing climate, will place additional pressure on the already scarce water resources with projections indicating that over 1 billion of additional litres will be required per day by 2050 and nearly 1.7 billion litres per day by 2100⁵.

³ WRSE (2020). Method Statements. Available at: <https://www.wrse.org.uk/media/1b5nwx5/wrse-method-statements-summary-document.pdf>

⁴ Available at: <https://www.wrse.org.uk/the-challenge>

⁵ WRSE (2020). Method Statements. Available at: <https://www.wrse.org.uk/media/1b5nwx5/wrse-method-statements-summary-document.pdf>

2.2 Description of the WRSE Regional Plan

WRSE aims to secure resilient and sustainable water supplies for future generations through a collaborative, regional approach. The WRSE Regional Plan takes a long-term view to water resource planning across the region to 2100 in order to secure a sustainable and resilient water supply. The WRSE Regional Plan seeks 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 how much is available

Further details and information on the WRSE Regional Plan are available on the WRSE website: <https://www.wrse.org.uk/> and within the WRSE Draft Regional Plan (November 2022).

Over 1,000 water resource and demand options were assessed as part of the SEA process. Supply options include transfers, desalination, water reuse, conjunctive use, aquifer storage and recovery, reservoirs, trading and nature-based solutions. Demand management options include leakage reduction, water metering, seasonal water rates, targeted restrictions, behavioural measures and water efficiency measures. These supply and demand management options have been provided to WRSE by the individual water companies as a constrained list of options. Catchment management schemes were also assessed which included options such as river restoration, wetland creation and enhancement, pesticide reduction, terrestrial habitat creation and management, natural flood management (NFM) and education.

Strategic Resource Options (SROs) that cover more than one water company have also been proposed, and any SRO that is wholly or partially within the WRSE region has been assessed as part of the SEA and wider environmental assessment process. SROs were assessed as a whole as part of this process. In parallel with the Regional Plan development the SROs are going through the RAPID (Regulators' Alliance for Progressing Infrastructure Development) Gated process. As part of this process detailed project level environmental assessments are being undertaken including project specific HRA Appropriate Assessments and WFD Assessments. This information has fed back into the Draft Regional Plan and WRMP development where available. Further information from the RAPID Gated process will be used to inform the Final Plan as it becomes available from the relevant water companies.

2.3 Development of the WRSE Regional Plan

The WRSE Draft Regional Plan, Annex 1, Part 3 (November 2022) sets out how the Regional Plan has been developed. A brief summary is provided below.

WRSE has characterised the vast range of challenges in the Southeast using an adaptive situational tree. This situational tree is used by the investment model to derive a series of investment plans to meet the needs of the region taking uncertainty into account. The uncertainties are around forecasting future conditions for supply, demand and environmental policy. WRSE has used an adaptive planning approach to allow for the uncertainties in forecasting future conditions over the planning period 2025 to 2075. The investment model uses a set of resilience, environmental, and cost metrics to select an optimum set of solutions over the longer term with alternative situations to meet many different potential futures.

This adaptive planning approach is promoted by the National Framework and the Water Resources Planning Guidance (WRPG)⁶.

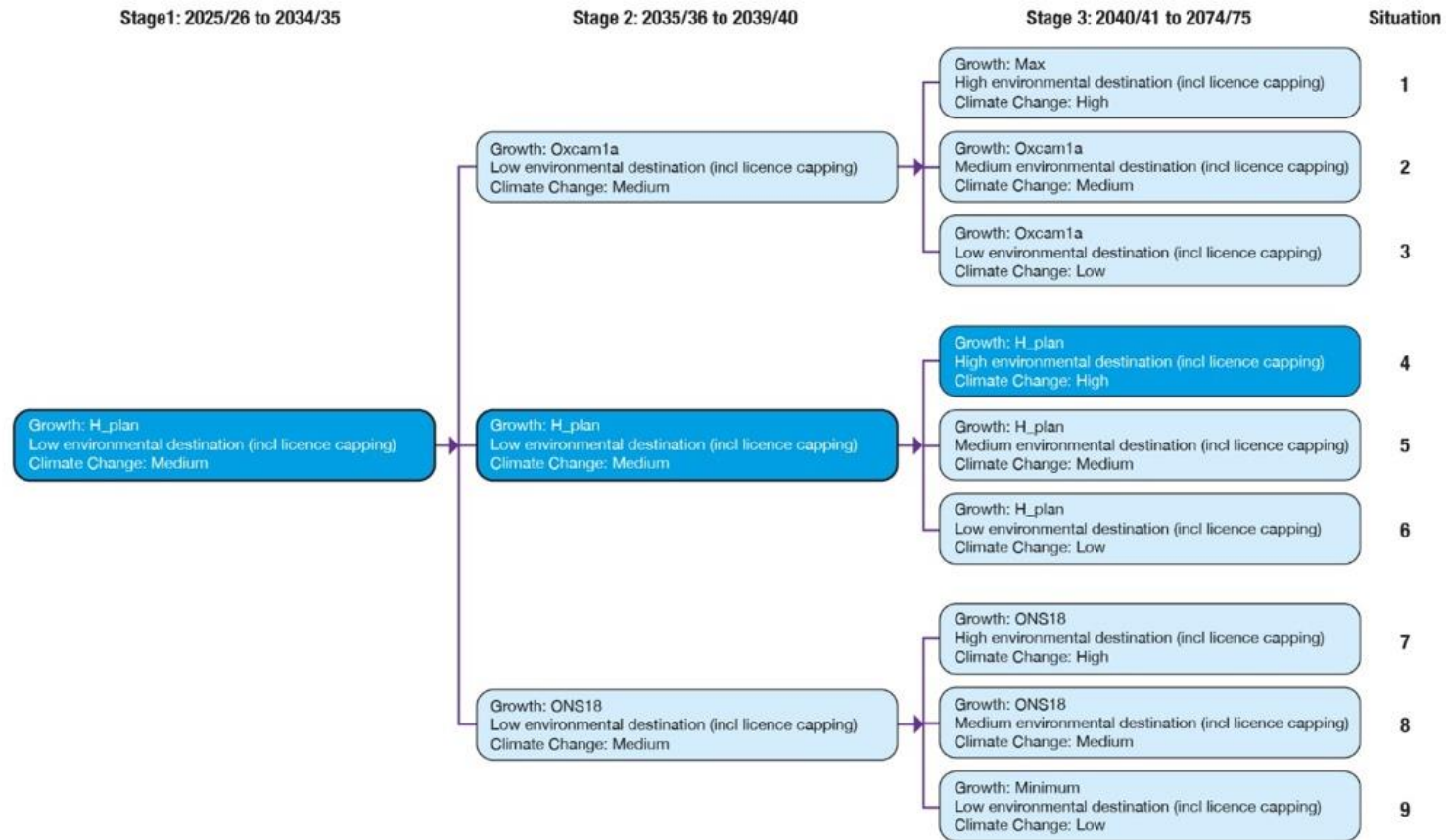
In order to build an adaptive plan, it is necessary to characterise the range of forecast supply demand balances using a set of pathways or situations that are representative of the range of challenges. For the Regional Plan, nine potential pathways were defined to cover the key forecasts including an upper and lower forecasted deficit. For each situation, a specific growth forecast; a supply forecast; an environmental destination and a climate change impact forecast were defined. Further details on defining WRSE's situation tree are included in WRSE Draft Regional Plan Annex 1, Section 12 including how climate change scenarios were generated and used to support future water resource planning in the investment model.

An investment model was used with information on options inputted and different scenarios run to select options based on programmed parameters. WRSE has adopted a best value approach for the Regional Plan. In the context of water resources planning, this means considering a range of factors (not exclusively financial cost), seeking solutions that not only secure supplies for customers, but also increases the overall benefit to customers, the wider environment and society as a whole. In addition, for sensitivity testing and to meet regulatory guidance, the investment model was run to select a least cost plan by only using the cost information to optimise the solution. Similarly, WRSE also developed a Best Environmental and Societal Plan by ensuring the investment model optimised on the environmental and customer preference metrics. The WRSE Draft Regional Plan (Best Value Plan), and the Least Cost Plan and Best Environmental and Societal Plan as alternatives, were assessed as part of the SEA as presented in Chapter 4. The programmes selected contain various types of supply and demand options, including transfers, new reservoirs, conjunctive use, desalination, drought options, catchment management schemes, amongst others. The methodology implemented to assess these programmes is described in Chapter 4.

The programmes selected in the Draft Regional Plan are from the same pathway, Situation 4. Situation 4 has been chosen as the core pathway as it includes the growth scenario and environmental destination scenario (business as usual (BAU)+ plus local commitments) that satisfies guidance. ~~Figure 2.2~~ ~~Figure 2.2~~ shows the adaptative planning approach with the different situations in 2040 and 2060 depending on future scenarios. For the purposes of the SEA the reported branch is situation 4.

⁶ Environment Agency, Natural Resources Wales, Office for Water Services. (2022). WRPG. Available at: <https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline>

Figure 2.2: Adaptive Plan Situation Tree



Source: WRSE

2.4 The WRSE Environmental Destination

Environmental destination is a new term that was introduced through the Environment Agency’s Water Resources National Framework⁷ document, published in March 2020. The term refers to the consideration of actions to enhance the environment and build resilience to future challenges, for example, to drought, flooding, raw water quality decline, impact from invasive non-native species, land use change, and impacts from run off. This information is important to understand to ensure we meet the objective of leaving the environment in a better place for future generations. This objective is also reflected in the Government’s 25 Year Environment Plan⁸, which also pledged to improve resilience to drought and minimise interruption to water supplies. The 25-year plan also included a commitment to work with the water industry to set an ambitious personal consumption target.

Understanding how much water can be abstracted from the environment in a sustainable way now and in the future is important when developing a regional resilience multi-sector plan. In the past the Regional Plan has taken account of the supply and demand forecasts, but not the longer-term needs of the environment. This Regional Plan seeks to address this by incorporating an environmental forecast which sets out potential futures, looking at 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.⁹

The WRSE environmental assessments including the SEA 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 four environmental metrics (SEA positive, SEA negative, BNG and Natural Capital).

⁷ Meeting our future water needs: a national framework for water resources, Environment Agency (2020)

⁸ A Green Future: Our 25 Year Plan to Improve the Environment, HM Government (January 2018)

⁹ Method Statement: Environmental Ambition (Consultation version, July 2020). Available at: https://www.wrse.org.uk/media/zijbfd1/wrse_file_1333_wrse-ms-environmental-ambition-v2.pdf

3 SEA Scoping Summary

3.1.1 Overview

The Scoping Stage of the SEA process sets the context and scope of the SEA and Environmental Report. A summary of the scoping as presented in the SEA Scoping Report (Mott MacDonald, September 2020) is outlined in full in Appendix B with additional information included within Appendix C-E as follows:

- Appendix B – Scoping Summary
- Appendix C – Scoping Report Consultation Log
- Appendix D - Policy, Plans and Programmes Review
- Appendix E - Baseline Review and Baseline Maps

3.1.2 SEA Framework

A key part of the SEA Scoping process is the development of the SEA Framework. The SEA Framework formed the basis for predicting and assessing the effects arising from the implementation of the WRSE Draft Regional Plan. The Framework was used to assess the individual options and the alternative programmes for the Regional Plan. An overarching set of SEA objectives and assessment questions to guide the assessment were developed, as shown in [Table 3.1](#) ~~Table 3-1~~. These are linked to the SEA Directive topics, the key priorities for WRSE and have been informed by a review of the SEA objectives used for WRMP19 by the six water companies' within WRSE. The results of the HRA and WFD assessments fed into the SEA objectives on biodiversity and water.

The SEA assessment also considered the impacts on natural capital stocks that cannot be incorporated within the Natural Capital metric due to uncertainty in the accuracy of monetisation of benefits. These impacts were assessed qualitatively and incorporated into the score for the relevant SEA objective.

The overarching objectives were developed so that they could be used as a framework for WRMP24, where water companies could cross-reference the Regional Plan SEA objectives. This allowed for a consistent approach tailored to individual water companies where objectives could be scoped in or out of the WRMP process but also be aligned to the Regional Plan. It is recognised that certain objectives or sub-themes involve water company wide considerations rather than just option specific, for example how water companies are sourcing power from renewables. This detail was considered at the WRMP24 level and agreed assumptions used for the Regional Plan.

Table 3.1: SEA framework

SEA Topic	Proposed SEA Objective	Assessment Questions/Sub-Themes
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	<ul style="list-style-type: none"> ● Is the option likely to affect the conservation status of any Special Protection Area (SPA), Special Area of Conservation (SACs), Ramsar sites and Marine Conservation Zone (MCZ), undermine or prevent restoration of Site of Special Scientific Interest (SSSI) condition or affect the condition of locally designated sites? ● Will the option protect and enhance aquatic and habitats and species, including freshwater fisheries and chalk rivers? ● Will the option affect the marine environment, habitats and species (including MCZs and MPAs)? ● Is the option likely to affect ancient woodland, priority habitat or species? ● 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 habitats and species “of principal importance for the purpose of conserving biodiversity” covered under Section 41 (England) of the NERC Act (2006)? ● 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? ● Does the option enable or reduce the potential of water dependent wildlife to adapt to climate change?
Soil	Protect and enhance the functionality, quantity and quality of soils	<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?

SEA Topic	Proposed SEA Objective	Assessment Questions/Sub-Themes
		<ul style="list-style-type: none"> ● Will the option promote the sustainable use of land? ● Will the option prevent nutrient loading in water bodies?
Water	Increase resilience and reduce flood risk	<ul style="list-style-type: none"> ● Is the option vulnerable to flood risk? ● Will the option contribute to the risk of flooding? ● Will the option mitigate flood risk? (i.e. attenuation of flows through (Natural Flood Management (NFM), catchment storage etc.)
	Protect and enhance the quality of the water environment and water resources	<ul style="list-style-type: none"> ● Will the option affect surface water quality or quantity? ● Will the option affect ground water quality or quantity? ● Is the option likely to contribute to or conflict with the achievement of WFD objectives? ● Will the option affect bathing waters? ● Will the option affect shellfish water protected areas? ● Will the option affect chalk rivers? ● 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? ● Will the option comply with flow targets (i.e. EFI, CSMG)? ● Will the option provide a water environment more resilient to drought or prolonged dry weather?
	Deliver reliable and resilient water supplies	<ul style="list-style-type: none"> ● 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? ● Does the option reduce the presence of containments in waterbodies, and make more water available to the environment?
Air	Reduce and minimise air emissions	<ul style="list-style-type: none"> ● Is the option in an air quality management area (AQMA)? ● Will the option affect local air quality?

SEA Topic	Proposed SEA Objective	Assessment Questions/Sub-Themes
Climatic Factors	Reduce embodied and operational carbon emissions	<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?
	Reduce vulnerability to climate change risks and hazards	<ul style="list-style-type: none"> ● Is the option vulnerable to climate change effects? ● Does the option include climate resilience measures? ● Will the option create catchment resilience to drought?
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	<ul style="list-style-type: none"> ● Will the option have an effect on the character of the landscape, townscape or seascape, 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	Conserve, protect and enhance the historic environment, including archaeology	<ul style="list-style-type: none"> ● Will the option affect designated or non-designated historic assets, sites and features? ● Will the option affect the setting and/or significance of a historic asset? ● Will the option affect archaeology (including unknown archaeology)? ● Will the option affect heritage assets at risk? ● Will the option affect conservation areas or historic landscape/townscape areas?
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	<ul style="list-style-type: none"> ● Does the option promote water efficiency and encourage a reduction in water consumption? ● 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 Public Rights of Way?

SEA Topic	Proposed SEA Objective	Assessment Questions/Sub-Themes
		<ul style="list-style-type: none"> ● 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?
	Maintain and enhance tourism and recreation	<ul style="list-style-type: none"> ● 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	Minimise resource use and waste production	<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?
	Avoid negative effects on built assets and infrastructure	<ul style="list-style-type: none"> ● Will the option affect built assets and infrastructure, including transport infrastructure?

4 Environmental Assessment Methodology

4.1 Introduction

To determine the environmental effects of the options and Draft Regional Plan and its alternatives, the following staged assessment process was undertaken:

- Options-level assessment (including SEA, HRA, WFD, Natural Capital, BNG, and INNS assessments)
- Programme Appraisal – including cumulative and in-combination effects for SEA, HRA, WFD, Natural Capital and BNG.

This chapter sets out the assessment methodology in relation to the SEA. The full Regional Plan environmental assessment method guidance document is available at:

https://www.wrse.org.uk/media/lb0g0tsr/wrse_file_1347_wrse-regional-plan-environmental-assessment-methodology-guidance.pdf

Figure 4.1 **Figure 4.1** presents a diagram of the overarching environmental assessment approach. It shows the key interactions between the environmental assessment and the options decision-making and plan development as part of an integrated and iterative process.

Figure 4.1: Environmental Method Integration with Options Decision-Making and Plan Development



Source: Mott MacDonald

4.2 Options Level Assessment

4.2.1 SEA Methodology

The options level SEA assessment was carried out using the SEA Framework outlined in [Table 3.1](#) [Table 3.1](#). Each SEA objective has a set of defined datasets and a defined scoring system using a qualitative scale of minor, moderate, major positive and minor, moderate, major negative, and neutral as summarised in [Table 4.1](#) [Table 4.1](#). The effects of each option were assessed using this scale and a

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narrative justification. The datasets and scoring definitions for each SEA objective are presented in full in Appendix G.

Table 4.1: Scoring key

Effect	Description
+++	Major Positive
++	Moderate Positive
+	Minor Positive
0	Neutral
-	Minor Negative
--	Moderate Negative
---	Major Negative

The results of the HRA and WFD assessments fed into the SEA objectives on biodiversity and water. A high-level 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. Further details on the HRA, WFD, INNS, BNG and natural capital assessments are presented in Section 4.5.

An ESRI ArcGIS tool was developed to store most of the environmental data and was used to identify the key constraints and opportunities for each option and then professional judgement was applied to score the option using the scoring method in Appendix G. The SEA assessment was split into construction effects and operational effects as these can be quite different and would not provide an accurate picture if they were combined. An option may have both positive and negative effects under a SEA objective. Rather than trading these effects to cancel each other out, both positive and negative scoring was used to show there are potential mixed effects.

Potential mitigation and enhancement measures were also identified as part of the options assessment process and fed back to the options development team as part of an iterative process.

4.2.2 Environmental Metrics

The outcomes of the environmental assessments were translated into metrics to feed into the multi-criteria optimisation for options selection and the programme appraisal (used in the investment model):

- SEA Metrics:
 - SEA metric positive
 - SEA metric negative
- BNG Metric – BNG net unit change
- Natural Capital Metric - £/yr

Each of the metrics are described in further detail below.

4.2.2.1 SEA Metrics

By its nature SEA does not include numerical values for scoring effects. However, in order to incorporate environmental considerations directly into the investment 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 and WFD assessment processes, and also included non-monetised natural capital. However, the metric itself was generated solely for the investment modelling and was not used in the SEA process for the options assessment or the programme appraisal.

The metrics were based on the option (including embedded mitigation) results and included construction and operation effects combined. To generate the SEA metric(s) the SEA scoring system was given pronounced numerical values e.g. major positive = +8, moderate positive = +4, minor positive = +1, neutral = 0 (and -1 to -8 for corresponding negative effects), to counteract hidden effects (see Table 3.3).

Table 4.2: SEA Scoring Values for Metrics

Effect	Description	Numerical Value
+++	Major Positive	+8
++	Moderate Positive	+4
+	Minor Positive	+1
0	Neutral	0
-	Minor Negative	-1
--	Moderate Negative	-4
---	Major Negative	-8

Two metrics were developed, one for positive effects and one for negative effects. The positive results were summed, and the negative results were 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 (if positive and negative effects are added together in one metric). It also has the additional advantage of alleviating some of the issues of hidden significant effects and cumulative minor effects because of using more pronounced values between minor and major effects. Box 1 presents an example of how the SEA metrics were generated for an option based on the SEA scoring. It is acknowledged that there is a risk of simplification of actual positive and negative effects from combining the SEA results into just two metrics. The programme appraisal reviewed potential biases and considered near alternatives and actual positives and negatives to ensure effects were not being masked by the metrics.

Box 1: Example – Generation of SEA metrics from SEA scoring

An option was assessed using the SEA methodology in Section 4.2.1. As outlined in Section 4.2.1, the option is assessed using each SEA objective and its associated datasets and criteria. Depending on the type, nature and scale of effects a qualitative scoring (plus/minus) was given alongside commentary on the predicted effects. As set out in Section 4.2.2, for the purposes of the investment modelling, these qualitative scores were translated into numerical values as per the table below to generate the SEA positive and negative metrics. These values were uploaded into the investment model for each option and used as part of the best value planning framework to determine the Best Value Plan.

SEA Objective	Construction		Operation	
	Positive	Negative	Positive	Negative
1	0 (0)	-- (-4)	+ (+1)	- (-1)
2	+ (+1)	- (-1)	++ (+4)	- (-1)
3	0 (0)	--- (-8)	0 (0)	-- (-4)
...				
TOTAL	+1	-13	+5	-6

Metrics:

- SEA Positive = +6
- SEA Negative = -19

4.2.2.2 BNG Metric

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 Department for Environment, Food and Rural Affairs (Defra) BNG metric 2.0 which can be used to calculate BNG change through land use of each option¹⁰. The output was a BNG net gain or loss score for each option. The net unit change was used as the primary BNG metric that went into the investment model. A sub-metric was also developed to consider the net unit purchase assuming a 10% net gain would be needed (i.e. the number of units needed to offset the biodiversity loss plus an additional 10% to achieve a 10% net gain).

4.2.2.3 Natural Capital Metric

Using Defra’s Enabling a Natural Capital Approach (ENCA) the assessment included the valuation of natural capital assets and ecosystem services within the footprint of each option and their zone of influence.

The assessment methodology used the most relevant qualitative, quantitative and/or monetary valuation approaches for the NCA. The assessment of the option’s impact on the natural capital metrics (or ecosystem services) was undertaken in a sequential manner with an initial qualitative assessment, followed by a quantitative analysis, and finally a monetised assessment if enough confidence existed in the values. The Natural Capital metric constituted a single discreet monetised value reported in £/year generated by combining the outputs of each of the six monetised natural capital metrics to provide a single cost / benefit figure.

¹⁰ Note: The DEFRA BNG 2.0 metric has been used as part of the assessments. Version 3.0 is now available; however version 4.0 is due to be released and it is intended that the assessments are updated to 4.0 once it is made available.

4.2.2.4 Using the Metrics in the Investment Model

Section 15 in the WRSE Draft Regional Plan Annex I sets out how the environmental metrics were used in the investment model to develop the WRSE draft Regional Plan.

4.3 Programme Appraisal

As explained in Section 2.3, the Draft Regional Plan is an adaptive plan. WRSE has characterised the vast range of challenges in the Southeast using an adaptive situational tree. Figure 2.2 shows the different scenarios that make up the situation tree. Situation 4 is the reference scenario that has been used for the environmental assessments due to it meeting the guidance from the regulators. The situation includes the housing plan growth forecast and moves from low environmental destination (including licence capping) and medium climate change scenarios to high environmental destination and high climate change scenarios.

The WRPG requires WRSE to base its growth forecast on plan-based growth assumptions, and so situation 4 uses the Housing Plan scenario as the growth forecast.

The WRPG identifies that the BAU+ scenario is the minimum to be considered by companies in their WRMPs and the WRSE high environmental ambition scenario best aligns with the BAU+ environmental ambition, whilst also incorporating licence capping. WRSE aligned the environmental destinations with the climate change impacts, which is why the high climate change is used in situation 4 as it will contribute to higher environmental destination reductions to maintain the flows in the river.

The programme appraisal is a cumulative assessment of the chosen programmes of options selected by the WRSE investment model and includes the following three plans:

- WRSE Draft Regional Plan (Best Value Plan) – Investment model pareto runs for Best Value Plan metrics (Customer Preference, SEA+, SEA-, Natural Capital, Carbon, Resilience (reliability, adaptability, evolvability), intergenerational equity), this is optimised on both individual Best Value Plan and cost metrics
- Least Cost Plan – Investment model run result when optimising on cost only
- Best Environmental and Societal Plan - Removes the resilience metrics from the Best Value Plan

The options within these plans include supply, demand, drought, catchment and multi-sector options. The ESRI ArcGIS tool developed for the options assessment was used to help identify potential cumulative or in-combination effects from options on environmental and community features/assets. The aim of the assessment was to ensure that the selected options in a branch will not result in significant negative effects cumulatively or in-combination with each other and that opportunities to maximise positive effects across the plan as a whole are identified.

The cumulative effects assessments of the Draft Regional Plan have been assessed with local level impacts by each of the WRSE water companies individually as part of their WRMP process. The challenge to WRSE is to ensure there is regional coherence between these and that all impacts to environmental and social receptors that cross the company boundaries are picked up and the selected options are assessed together. The SEA, HRA and WFD cumulative and in-combination effects assessments have been undertaken at the interfaces between the boundaries of the water company regions to assess the effects of different company options on environmental and social receptors (including Natura 2000 designated sites for HRA and waterbodies for WFD). The interfaces consider

effects from selected options within 500m of the company boundaries. This ensures the company plans are working together for the environment across the region.

By focussing on the potential for effects at the interfaces between water companies, the cumulative and in-combination assessments therefore provide an additional step beyond the assessments undertaken by the water companies in their WRMP24s to provide a regional overview. The cumulative and in-combination assessments undertaken as part of the individual water companies' WRMP24 Environmental Reports can be reviewed to provide insight into those local level impacts.

The methodology also considers environmental receptors, such as a designated sites, which fall within the 500m buffer region. Any options impacting these designated sites (even if the option is over 500m from the company boundary) will also be brought into the regional assessment. This enables pathways and not just distance to be part of the cumulative effects assessment process. The receptors considered as part of this are presented in Table 4.3. It should be noted that the cumulative assessment undertaken at the water company boundary buffers considers a wider range of receptors. Natura 2000 sites are covered by the HRA in-combination assessment for the Best Value Plan and are also reported in the SEA.

Table 4.3: Environmental receptors within the water company boundary buffer

SEA Topic	Environmental Receptor
Biodiversity, flora and fauna	<ul style="list-style-type: none"> ● SAC, SPA, Ramsar sites – using results from the HRA ● SSSI ● Ground Water Dependent Terrestrial Ecosystem (GWDTE) ● National Nature Reserve (NNR) ● Local Nature Reserve (LNR)
Air	<ul style="list-style-type: none"> ● AQMA
Landscape	<ul style="list-style-type: none"> ● AONB ● National Park
Historic Environment	<ul style="list-style-type: none"> ● Registered Parks and Gardens ● Registered Battlefields ● Scheduled Monuments ● World Heritage Sites

The approach has involved two separate assessments which has comprised of options selected by 2050 and separately those selected post 2050 (and up until 2075). The Regional Plan is not a statutory requirement but as it feeds into the WRMPs, WRSE wants to ensure it is compliant with the requirements. The assessments have been undertaken on the 25-year statutory plan up to 2050. After this the plan becomes the regional strategy with uncertainty related to planning scenarios and technical improvements for options.

Further information on the methodology is presented in the Regional Approach to In-combination and Cumulative Effects Assessment of the WRSE Draft Regional Plan¹¹.

Due to the nature of SEA, an SEA metric for each Plan was not generated. Instead, the standard SEA process was followed whereby the qualitative effects (using the major to minor effect scale) was identified for each of the three plans. The SEA objectives and assessment criteria developed during the

¹¹ WRSE (2022). Regional Approach to In-combination and Cumulative Effects Assessment of the WRSE Draft Regional Plan.

scope stage and used to assess the performance of the individual water resource options were used to undertake the SEA cumulative effects assessment. The results of the cumulative effects assessment are presented in Chapter 5.

The scope of the cumulative effects assessment includes only cumulative effects between the options selected in a plan. In-combination effects with other Regional Plans will be undertaken once this information is available and in-combination effects with other plans, programme and projects such as Local Development Plans has been undertaken at the WRMP24 level.

4.4 Effects outside the WRSE Boundary

There is potential for effects outside the WRSE region, for example, from transfer of water outside the Regional Plan area or from options close to the plan boundary with potential pathways affecting receptors outside the plan area. The baseline GIS database included a buffer around the Regional Plan area so that additional receptors (such as designated sites) were captured and included in the assessment.

SROs that are wholly or partially covered by the WRSE region were included in the assessment. For those SROs only partially within the WRSE area, the whole option was assessed, and the GIS database expanded to cover these areas.

4.5 Other Environmental Assessments

4.5.1 Habitats Regulations Assessment

HRA Test of Likely Significance (ToLS) was undertaken for the options that went into the investment model. Where possible, HRA Appropriate Assessment has been undertaken for the options selected within the Best Value Plan which were identified to have uncertain or likely significant effects. The HRA in-combination effects assessment has been undertaken using the HRA Appropriate Assessment results where available, however where these are not available, the ToLS results have been used to inform the assessment at this stage. The in-combination effects assessment only included the in-combination effects of the selected options within the Best Value Plan, the options selected within the Least Cost Plan and Best Environmental and Societal Plan were not considered. Wider in-combination effects with other plans, programmes and projects were considered at the WRMP24 level. The results of the HRA ToLS and in-combination effects assessment is presented in Appendix H.

4.5.2 Water Framework Directive Assessment

A WFD Level 1 assessment was undertaken for the options that went into the investment model. Where possible, WFD Level 2 assessments have been undertaken for the options selected within the Best Value Plan which were identified to require further assessment. The WFD in-combination effects assessment has been undertaken using the Level 2 results where available, however where these are not available, the Level 1 assessment have been used to inform the assessment at this stage. The in-combination effects assessment only included the in-combination effects of the selected options within the Best Value Plan, the options selected within the Least Cost Plan and Best Environmental and Societal Plan were not considered. Wider in-combination effects with other plans, programmes and projects were considered at the WRMP level. The results of the WFD Level 1 assessment and in-combination effects assessment are presented in Appendix I.

4.5.3 Natural Capital and Biodiversity Net Gain Assessments

Natural Capital Assessments and the BNG assessments were undertaken for the options that went into the investment model. An in-combination effects assessment was undertaken for options selected within the Best Value Plan. Wider in-combination effects with other plans, programmes and projects were considered at the WRMP level. Only options with land use change could be assessed as part of the Natural Capital and BNG assessments. The natural capital assessment followed the ENCA guidance to assess effects on provision of ecosystem services and provide a monetary value. The BNG assessment used the Defra BNG 2.0 metric to determine the BNG units lost or gained from the option¹². The results of the natural capital and BNG assessments are presented in Appendix J.

4.5.4 Invasive Non-Native Species Risk Assessment

A high-level INNS screening assessment was undertaken based on option type to identify the options which have the potential for INNS risks and the results were included within the SEA objective on biodiversity, flora and fauna. Further INNS assessments, where required, were undertaken by the individual water companies and reported as part of their WRMP24s. A cumulative INNS assessment has not been carried out by WRSE as it is not standard practice.

4.6 Influencing the Development of the WRSE Regional Plan

As presented in the method sections above, the SEA will be an ongoing and iterative process throughout the Regional Plan development. However, there are key decision-points for influencing the plan as follows:

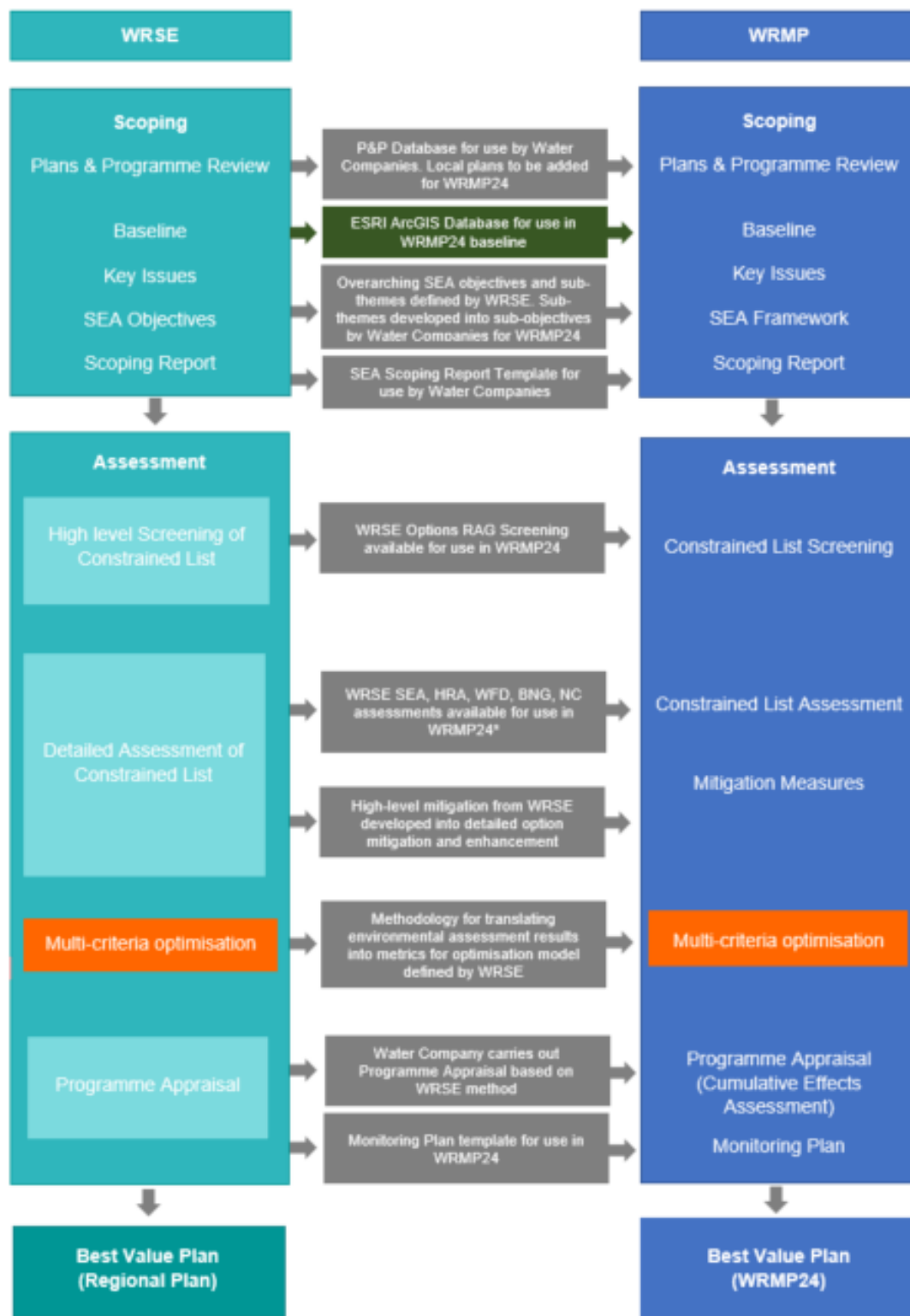
- The options-level SEA assessed the positive and negative effects of each option and identified possible mitigation and enhancement measures that were fed back to the option design teams. Options with major or moderate negative effects will need appropriate mitigation in order for them to be taken forward. Opportunities to maximise benefits were also be considered. Together with the results of the other environmental assessment a list of 'worse performing' options in terms of the environment was developed and these options were removed from the investment model.
- The environmental metrics (translated from the assessment results) were included in the investment modelling to influence the selection of options within the Draft Regional Plan. They were used as part of the development of the Draft Regional Plan as one of the 'best value' criteria.
- The cumulative and in-combination effects of the selected options have been assessed for the Draft Regional Plan and will be assessed for the final plan. The options which have been assessed at this stage as part of the Draft Regional Plan and have been flagged in this Environmental Report as having the potential for cumulative and in-combination effects, have been fed back to WRSE to identify solutions through methods such as scaling up nearby alternative options, confirming and costing larger mitigation packages to allow the scheme to be retained, amongst others. Appropriate plan wide mitigation and enhancement opportunities are being developed to support overall environmental net gain.

¹² Note: The DEFRA BNG 2.0 metric has been used as part of the assessments. Version 3.0 is now available; however version 4.0 is due to be released and it is intended that the assessments are updated to 4.0 once it is made available.

4.7 Relationship between the WRSE Regional Plan and WRMP24

The WRSE Regional Plan environmental assessments including the SEA have been used as a framework for the WRSE member water companies when undertaking their WRMP24 statutory environmental assessments. A large amount of the supporting information required for WRMP24 has been produced as part of the Regional Plan environmental assessments which were made available for use by the individual water companies. [Figure 4.2](#) shows the interactions between the two processes and information shared from the Regional Plan environmental assessment to support the water company WRMP24 development process. The approach aimed to reduce the amount of work individual water companies needed to undertake during WRMP24, streamline the environmental assessment process, and ensure consistency across water company environmental assessments.

Figure 4.2: Interactions and Information Exchange between the WRSE assessment and WRMP process



* Options would only need to be re-assessed by Water Companies if the option elements changed from those assessed as part of the regional plan, an unconstrained option was brought forward that wasn't on the regional plan constrained list, or additional local level baseline was included (this would only require re-assess of the relevant SEA objective)

5 Assessment of Draft Regional Plan

5.1 Introduction

As outlined in Chapter 4, a two staged process was undertaken to determine the environmental effects of the options and Draft Regional Plan. The sections below present a summary of the outcomes of these assessments with further information presented in respective appendices.

5.2 Options Assessment

As outlined in Section 4.2, an SEA option level assessment was undertaken for each option included within the investment model. Over 1,000 options were assessed as part of this process and due to the volume of options, this Environmental Report does not present the assessment matrices for each individual option. The assessment sheets for individual options are available on request to WRSE and options assessments for selected options in WRMP24 are available in the individual water company WRMP24 Environmental Reports.

5.3 Programme Appraisal

A SEA cumulative effects assessment has been undertaken for the nominated programmes of options, selected before 2050 (Section 5.3.1) and post 2050 (Section 5.3.2), which have been identified from the WRSE investment model within Situation 4 (see Section 4 for methodology).

The SEA has been undertaken on the following three programmes, the Best Value Plan (WRSE Draft Regional Plan) and two alternative plans:

- WRSE Draft Regional Plan (Best Value Plan) – Investment model pareto runs for Best Value Plan metrics (Customer Preference, SEA+, SEA-, Natural Capital, Carbon, Resilience (reliability, adaptability, evolvability), intergenerational equity), this is optimised on both individual Best Value Plan and cost metrics
- Least Cost Plan – Investment model run result when optimising on cost only
- Best Environmental and Societal Plan - Removes the resilience metrics from the Best Value Plan

For consistency the same situation 4 programme of options was assessed under the SEA.

The assessment has been undertaken in line with the methodology set out in Section 4.3 with further information presented in the Regional Approach to In-combination and Cumulative Effects Assessment of the WRSE Draft Regional Plan¹³. The assessment is aligned with the same scoring method used on the individual options assessments as described in Section 4.2.

¹³ WRSE (2022). Regional Approach to In-combination and Cumulative Effects Assessment of the WRSE Draft Regional Plan.

The assessment considered the options identified in the three plans above that were selected by 2050 and are within 500m of the water company boundaries. If an environment receptor such as a designated site falls within the 500m buffer region, any options impacting these designated sites (even if the option is over 500m from the company boundary) were considered within the assessment. This enables pathways and not just distance to be part of the cumulative effects assessment process.

5.3.1 Draft Regional Plan (Pre-2050)

The list of options in each of the three Plans within the 500m buffers, selected pre-2050, are presented in Table 5.1. As explained in Section 4.3, the pre and post 2050 options have been assessed separately because up to 2050 is the 25-year statutory WRMP period and after this the plan becomes the regional strategy with uncertainty related to planning scenarios and technical improvements for options. Options without defined geographical locations such as temporary use bans (TUBS), non-essential use bans (NEUBS), catchment management options, media campaigns and demand management options are not included in Table 5.1 but have been considered within the cumulative effects assessment.

HRA and WFD in-combination assessments have also been undertaken on the Best Value Plan and the results have been used to inform the biodiversity and water objective in the SEA cumulative assessment. The results of the HRA and WFD in-combination assessments are presented in full in Appendix H and G respectively. BNG and Natural Capital in-combination assessments were also undertaken with results presented in Appendix J.

Table 5.1: Options within each Plan within the water company buffers (pre-2050)

Option Name	BVP	BESP	LCP
GUC option 3 50 MI/d phase 1 LB	✓	✓	✓
GUC option 3 50 MI/d phase 2 LB	✓	✓	✓
Canals & Rivers Trust Slough	✓	✓	✓
Brent Reservoir Transfer to Iver	✓		
Egham to Iver 50MLD (Supply 2040)	✓	✓	✓
Deal Supply Scheme	✓	✓	✓
Aldington to Saltwood Import Increase by 6 MI/d	✓	✓	✓
Barham Import Increase (of 4MI/d) to 6 MI/d	✓	✓	✓
SRN Source D To Havant Thicket: 50MI/d	✓	✓	✓
Bough Beech reservoir - raising	✓	✓	✓
Transfer from Merton (TW) to SES Boundary at 15MI/d	✓	✓	✓
New Bulk Supply: SESW to SEW RZ1 Transfer - Bough Beech to Riverhill SR (10MI/d)	✓	✓	✓
Peacehaven Recycling at Arlington (30MI/d Option)	✓		
New Bulk Supply: SWS to RZ8 - Brede to Kingsnorth (10MI/d)	✓	✓	✓
Newbury Groundwater	✓	✓	✓
Import from Portsmouth Water (additional 9MI/d)	✓	✓	✓
Import from Portsmouth Water	✓	✓	✓
Transfer: Havant Thicket reservoir - Otterbourne WSW - first Section, raw (90MI/d)	✓	✓	✓
Desalination: Isle of Sheppey (20MI/d)	✓	✓	✓
Recycling: Sittingbourne industrial reuse (7.5MI/d)	✓	✓	✓

Option Name	BVP	BESP	LCP
Desalination: River Thames estuary (20MI/d) Phase 2	✓	✓	✓
Desalination: River Thames estuary (20MI/d)	✓	✓	✓
Canterbury (Broad Oak) to Near Canterbury: 20MI/d	✓	✓	✓
Import: SEW Kingston to KTZ Near Canterbury (2MI/d)	✓	✓	✓
Import: Havant Thicket - Otterbourne direct raw water transfer - second section (90MI/d)	✓	✓	✓
Conjunctive Benefit of Budds farm 60 M/d to Havant Thicket	✓		
Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60MI/d)	✓		
Worthing to Brighton: 40MI/d	✓	✓	✓
Recycling: Littlehampton WwTW (15MI/d)	✓	✓	✓
Storage: River Adur offline Reservoir	✓	✓	✓
Havant Thicket To Pulborough WTW: 50MI/d	✓	✓	✓
Tilmore to Pulborough: 10MI/d	✓	✓	✓
Outwood To Turners Hill: 10MI/d	✓	✓	✓
Culham to HWZ(200) Potable - Construction	✓		
Transfer - SEW to Guildford - Conveyance Element	✓	✓	✓
Groundwater Development - Southfleet & Greenhithe	✓	✓	✓
Resource from Cheam WTW to Merton PS (TW) at 30MI/d		✓	✓
New Bulk Supply: SESW Outwood to SEW Whitely Hill (5MI/d)		✓	
Peacehaven Recycling at Arlington (25MI/d Option)		✓	
Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket		✓	✓
Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d)		✓	✓
Culham to HWZ (120) Potable - Construction		✓	✓
Henley to SWA Transfer – 5 MI/d		✓	✓
Peacehaven Recycling at Barcombe (25MI/d Option)			✓

5.3.1.1 WRSE Draft Regional Plan (Best Value Plan) (Pre-2050)

The cumulative assessment for the WRSE Draft Regional Plan (referred to as the ‘Best Value Plan’) is presented in Table 5.2 and is summarised by SEA topic below. This is considered to be an appropriate level of assessment at this draft regional plan stage and the need for further assessment of alternatives will be considered following draft plan consultation, and taking account of information from our member water companies and consultation on their draft WRMPs.

- Biodiversity, flora and fauna** - There is potential for cumulative effects on a number of statutory and non-statutory designated sites. A HRA in-combination assessment (Mott MacDonald, 2022) has been undertaken for the Best Value Plan to identify where more than one option has the potential to affect a Natura 2000 site (see Appendix H). The assessment has highlighted the potential for in-combination effects for the construction and operational phases of a number of options therefore

major negative effects have been identified¹⁴. However, it should be noted that for some options HRA AA has not yet been undertaken by the individual water companies and therefore the in-combination effects assessment was based on ToLS results for these options. It is recommended that the HRA in-combination effects assessment is re-visited following completion of all selected option AAs so that appropriate mitigation can be included in the assessment process.

There is also potential for cumulative effects on aquatic ecology during the construction phase. Priority habitats, woodland and Ancient Woodland may also be impacted cumulatively. The catchment management schemes within the Best Value Plan are not specifically within the water company boundary buffers, however they may result in positive cumulative effects as they include schemes such as river restoration, terrestrial habitat / management, and wetland creation, amongst others.

- **Soil** - There is potential for cumulative disturbance effects on agricultural land from the options within the Best Value Plan during the construction phase but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another.

There is also potential for cumulative effects from the disturbance of contaminants in historic and/or authorised landfill sites as there are options within the water company boundaries in the Best Value Plan which are within close proximity (500m) to the same site with construction programmed for similar times. Positive cumulative effects may occur as a result of the catchment management schemes within the Best Value Plan that are outside of the water company boundary buffers. They include options which aim to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolio that focus on agricultural land may help to increase the productivity of soil.

- **Water** - It is not anticipated there will be cumulative effects from flood risk during the construction or operational phases. The catchment management schemes within the Best Value Plan are not identified to be specifically within the water company boundary buffers, however, they include natural flood management and wetland restoration options which may lead to positive cumulative effects for reducing flood risk.

There are options within the Best Value Plan that have similar construction programmes and cross the same and/or multiple main rivers, chalk rivers and waterbodies within close proximity to one another. There are multiple options within the same SPZs which are to be constructed at the same time and there are groundwater options located within the same WFD ground waterbody which may have in-combination effects during operation. The cumulative benefit of the options is likely to lead to increased reliability and resilience of water supplies. An in-combination WFD assessment (Mott MacDonald, 2022) has been undertaken for the options selected within the Best Value Plan that fall within the buffers between the water companies. The WFD in-combination assessment is presented in full in Appendix I. In summary the WFD in-combination assessment identified that there are 29 waterbodies which are impacted by two or more Best Value Plan options where at least one intersects 500m water company boundary corridors. Of these waterbodies, 23 are assessed as having no risk of in-combination effects and thus no increased risk of WFD deterioration within these waterbodies. In five of the remaining waterbodies, in combination effects have been identified but there is not anticipated to be changes to the overall WFD risk to the waterbody. In the final water body, the in-combination effects assessment identified a potential risk of WFD deterioration to the

¹⁴ At this stage in the options design, it is not possible to identify and quantify in more detail the potential in-combination effects on the Natura 2000 sites. In the next stages of the option development the identified options will undertake a more in-depth analysis of the potential effects and detail specific mitigation measures.

GB40701G505200: Chichester Chalk groundwater body as a result of the simultaneous operation of Drought option: North Arundel Drought Permit/Order (2025 onwards) and Drought Permit: Source S. The assessment suggested that in the event of a drought event where both emergency drought groundwater options were operational, an in-combination effect would occur which could lead to temporary reduction in groundwater levels, leading to potential changes in the water balance and surface water dependant status elements. Mitigation would be secured through the Drought Plan and drought permit/order processes.

The catchment management schemes include activities to improve water quality and reduce pollutants, increase resilience to low flows and increase the storage of water within the environment, facilitating resilience during drought. Therefore, having the potential to result in positive cumulative effects. The demand management options will provide positive effects through helping to reduce demand and leakage. Drought options, such as TUBS and NEUBS, will help to conserve water during periods of drought. However, there is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.

- **Air** - There is likely to be localised cumulative effects on air quality from the construction phase for the Best Value Plan options which are located within the water company boundaries, are in close proximity (500m) to one another and are being constructed at the same time or have construction periods which overlap. Some of the options that have these localised cumulative effects are located within AQMAs. There is also likely to be localised cumulative effects on air quality during the operational phase of the options from staff and maintenance transport and any emissions from treatment works.
- **Climatic Factors** - The options within the Best Value Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from all the options, located within the water company boundary buffers, within Best Value Plan is anticipated to result in major construction emissions and major operational emissions.

For climate resilience, there is potential for negative cumulative effects given that the Best Value Plan includes a number of options within the water company boundary buffers which involve abstraction from surface and groundwater sources and therefore have the potential to result in negative cumulative effects on the resilience of the natural environment to climate change. Within the Best Value Plan, there are a number of Drought Permit / Order options which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable across the WRSE region. However, although not specifically within the boundary buffers, there are demand management options within the Best Value Plan which aim to keep water in the natural environment and thus increase or maintain resilience to climate change.

- **Landscape** - Cumulative effects on the landscape are likely as a result of the Best Value Plan, particularly during the construction phase where options are located within close proximity to one another and are being constructed at similar times within landscape designations such as AONBs and South Downs National Park. The catchment management schemes within Best Value Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.

- **Historic Environment** - The Best Value Plan has the potential to result in cumulative effects on the setting of historic assets during the construction phase given the proximity to options within the water company buffers which are being constructed at the same time. There are a number of options within the Best Value Plan which directly impact historic environment assets located within the water company boundaries. These options may not impact the same assets, however there is still potential cumulative effects on the historic environment as a whole. Excavation required for the options within the Best Value Plan has the potential to have an overall cumulative effect on archaeology, however this depends on the extent to which it is present at the various option locations within the water company boundaries.
- **Population and Human Health** - There is potential for cumulative effects on the local community from the construction phase of options within the Best Value Plan for the options located within the buffer, in close proximity (500m) to one another and are constructed at similar times. Localised disturbance effects on the local community and community facilities such as noise and vibration, dust and access issues have the potential to occur. There is also potential for long-term disturbance where options are located close to one another, not necessarily constructed at the same time but have construction periods which follow on from one another resulting in a prolonged construction phase.

The catchment management schemes and demand management options within the Best Value Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource.

- **Material Assets** - The new infrastructure required for the options located within the water company boundary buffers included within the Best Value Plan will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in major negative cumulative effects. Options within the catchment management schemes may have cumulative positive effects as they contain NFM options and pesticide reduction which will help to reduce the use of resources. There is also potential for cumulative effects on built assets and infrastructure as a result of the options within the Best Value Plan.

Table 5.2: Best Value Plan Cumulative Effects Assessment (Pre-2050)

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	+++	---	<p>The following options have been identified as potentially having cumulative construction effects on designated sites as they are located within the water company boundary buffers, are being constructed at the same or similar times and are geographically clustered:</p> <ul style="list-style-type: none"> Wraysbury & Hythe End Gravel Pits SPA, Ramsar, SSSI and GWDTE (100% favourable), Staines Moor SPA, Ramsar, SSSI and GWDTE (96.16% favourable, 2.13% unfavourable-recovering, and 1.71% unfavourable-declining), Wraysbury Reservoir SPA, Ramsar, and SSSI (100% favourable), Arthur Jacob Nature Reserve (LNR) as a result of Egham to Iver 50MLD (supply 2040) and Canals and Rivers Trust Slough, located in the buffer between the Affinity Water and Thames Water boundaries. Duncton to Bignor Escarpment SAC and SSSI (6.08% unfavourable – recovering, 93.92% unfavourable – declining) as a result of SRN Source D To Havant Thicket:50MI/d and Havant Thicket To Pulborough WTW: 50MI/d, located in the buffer between Portsmouth Water and Southern Water boundaries. <p>The SSSIs outlined above with a percentage of their area identified as being in an unfavourable or destroyed condition will likely be more vulnerable to cumulative effects during the construction and/or operational phases than those that are identified as being in 100% favourable condition. A HRA in-combination assessment (Mott MacDonald, 2022) has been undertaken for the options selected within the Best Value Plan. In summary, the assessment identified the potential for in-combination construction and/or operational effects on numerous Natura 2000 sites as a result of the implementation of the Best Value Plan. Major negative effects have therefore been identified. The full HRA in-combination assessment is presented in Appendix H and outlines the options and sites which have the potential for in-combination effects. At this stage in the options design, it is not possible to identify and quantify in more detail the potential in-combination effects on the Natura 2000 sites. In the next stages of the option development the identified options will undertake a more in-depth analysis of the potential effects and detail specific mitigation measures.</p> <p>There is potential for effects on aquatic ecology during construction where options are being constructed in the water company boundary buffers, at the same or similar time, within or within close proximity to the same waterbody. This includes:</p> <ul style="list-style-type: none"> Watercourses and surface water during construction as a result of Egham to Iver 50MLD (supply 2040) and Canals and Rivers Trust Slough, located in the buffer between the Affinity Water and Thames Water boundaries. Watercourses and surface water during construction as a result of Newbury Groundwater and Import from Portsmouth Water, located in the buffer between Southern Water and Thames Water boundaries Surface water during construction as a result of Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2, located in the buffer between the Southern Water and Thames Water boundaries. <p>There is anticipated to be cumulative effects where options are being constructed in the water company boundary buffers, at the same or similar time, within or in close proximity to Priority Habitats, Ancient Woodland and woodland, particularly during construction, given a number of the options within the Best Value Plan pass through these areas. This includes:</p> <ul style="list-style-type: none"> SRN Source D To Havant Thicket:50MI/d and Havant Thicket To Pulborough WTW: 50MI/d, located in the buffer between Portsmouth Water and Southern Water boundaries, adjacent to Ancient Woodland, adjacent and through Priority Habitat (mostly deciduous woodland). 	Best practice methods to be implemented to minimise disturbance effects and habitat loss. Where required directional drilling or option re-alignment may be required as the option design progresses. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Ecology surveys will be required at future design stages to determine effects and mitigation required. It is assumed that mitigation recommended by further ecology surveys will be implemented and therefore residual construction effects are lessened although this wouldn't negate the need for a potential appropriate assessment (where only Stage 1 has been undertaken). Implementation of mitigation measures set out in HRA Appropriate Assessments where these have been undertaken. Opportunities for habitat creation and habitat enhancement will be further investigated through WRMP24 and options design. Some options such as reservoirs already have habitat creation designed into proposals. Opportunities for BNG and links with nature recovery networks will be further investigated at the WRMP24 level.	0	---	+++	---

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Egham to Iver 50MLD (supply 2040) and Canals and Rivers Trust Slough, located in the buffer between the Affinity Water and Thames Water boundaries, adjacent and through Priority Habitat (mostly deciduous woodland). Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2, located in the buffer between the Southern Water and Thames Water boundaries, adjacent and through various Priority Habitats. <p>The Best Value Plan include the construction of options which fall within the water company boundaries, that are being constructed around the same period. There are no Ancient Woodland being directly affected in these instances, however, where these options are within 500m of Ancient Woodland there may be cumulative disturbance effects during the construction phase only.</p> <p>There is potential for cumulative effects on LNRs within the water company boundary buffers where more than one option could cause disturbance effects from overlapping construction periods. These include:</p> <ul style="list-style-type: none"> Fairmile Bottom LNR – both options Recycling: Littlehampton WwTW (15MI/d) and Drought option: North Arundel Drought Permit/Order (2025 onwards) are within close proximity to the LNR and selected within a year of each other. However, as one of the options is a Drought Permit option, it would only be implemented in drought conditions and is likely to have limited construction. <p>The top reasons for catchments not achieving good status (RNAG) include urbanisation; barriers – ecological discontinuity; sewage discharge; groundwater abstraction; poor soil management; poor livestock management; drinking water supply; amongst others. There are catchment management schemes within the Best Value Plan which are not specifically within the water company boundary buffers but have the potential to result in positive cumulative effects across the WRSE region. The catchment management schemes contain options such as river restoration options, wetland creation and enhancement, pesticide reduction, and terrestrial habitat creation/management options.</p>					
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	++	-	<p>The Best Value Plan includes the construction of options within the water company boundaries which impact various agricultural land grades, including Grade 1 and Grade 2. There is potential for cumulative effects on agricultural land across from the options within the Best Value Plan during the construction phase from disturbance but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another.</p> <p>There is also potential for cumulative effects from the disturbance of contaminants in historic and/or authorised landfill sites as there are options within the water company boundaries in Best Value Plan which are within close proximity (500m) to the same site with construction programmed for similar times. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough options which are in proximity to the same historic landfill sites and sit within the buffer between Affinity Water and Thames Water. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 options which are in proximity to the same authorised and historic landfill sites and sit within the buffer between Southern Water and Thames Water. Conjunctive Benefit of Budds farm 60 M/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60MI/d), which are in proximity to the same historic landfill sites and sits within the buffer between Portsmouth Water and Southern Water boundaries. 	Following the construction phase, land will be reinstated where possible to minimise disturbance effects. However, there will be some permanent losses to agricultural land due to the above ground infrastructure associated with a number of the options within the Best Value Plan. Mitigation measures will include minimising the footprint of these assets, but residual effects are likely to remain. Best practices methods for reducing risk of working within or within close proximity to landfill sites will be implement, however residual risk remains.	0	-	++	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						Positive cumulative effects may also occur as a result of the catchment management schemes within the Best Value Plan. Although these options are not within the water company boundary buffer, there is potential for positive cumulative effects across the WRSE region given they include options which seek to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolios that focus on agricultural land may help to increase the productivity of soil.					
Water	Increase resilience and reduce flood risk	0	0	++	0	<p>There are numerous options within the Best Value Plan that are located within the boundaries of the water companies and are located within Flood Zone 2 and 3. These options are therefore at risk from flooding during the construction phase and where there is above ground infrastructure there are operational risks. However, it is not anticipated there will be cumulative effects from flooding during the construction or operational phases.</p> <p>The catchment management schemes within the Best Value Plan are not identified to be specifically within the water company boundary buffers, however as they include options such as NFM, river and wetland restoration, they have the potential to lead to positive cumulative effects for reducing flood risk across the WRSE region.</p>	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of flooding during the construction and operational phases of those individual options at risk will likely be implemented.	0	0	++	0
	Protect and enhance the quality of the water environment and water resources	0	--	+++	--	<p>An in-combination WFD assessment (Mott MacDonald, 2022) has been undertaken for the options selected within the Best Value Plan that fall within the buffers between the water companies. The WFD in-combination assessment is presented in full in Appendix I. In summary the WFD in-combination assessment identified that there are 29 waterbodies which are impacted by two or more Best Value Plan options where at least one intersects 500m water company boundary corridors. Of these waterbodies, 23 are assessed as having no risk of in-combination effects and thus no increased risk of WFD deterioration within these waterbodies. In five of the remaining waterbodies, in combination effects have been identified but there is not anticipated to be changes to the overall WFD risk to the waterbody. In the final water body, the in-combination effects assessment identified a potential risk of WFD deterioration to the GB40701G505200: Chichester Chalk groundwater body as a result of the simultaneous operation of Drought option: North Arundel Drought Permit/Order (2025 onwards) and Drought Permit: Source S. The assessment suggested that in the event of a drought event where both emergency drought groundwater options were operational, an in-combination effect would occur which could lead to temporary reduction in groundwater levels, leading to potential changes in the water balance and surface water dependant status elements.</p> <p>There are options within the Best Value Plan that are within the water company boundary buffers, have similar construction programmes and cross the same and/or multiple main rivers, and waterbodies within close proximity to one another. There are multiple options within the same SPZs and ground water bodies which are to be constructed at the same time. The following options have been identified as potentially having cumulative construction effects on the same and/or multiple main rivers, SPZs and waterbodies within close proximity to one another:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & River Trust Slough on, SPZ 3, main rivers, located in the buffer between the Affinity Water and Thames Water boundaries during construction only. SRN Source D to Havant Thicket:50MI/d and Havant Thicket To Pulborough WTW: 50MI/d and ground water body- Chichester chalk, located in the buffer between Portsmouth Water and Southern Water boundaries during construction only. Newbury Groundwater and Import from Portsmouth Water on SPZs 1-3, and main river, located within the buffer between the Southern water and Thames Water boundaries during construction only. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 on SPZ 1-3, surface water, and water ground bodies- West Kent Darent and Cray Chalk 	During construction, best practice methods will likely be implemented to mitigate effects. This is likely to include directional drilling under rivers as well as best practice site construction methods to reduce potential for pollution incidents. Minor residual effects have been identified for the construction phase as risks may remain. The WFD in-combination assessment identified the potential for the WFD deterioration during the operational phase of Madehurst Drought Permit/Order (2025 onwards) and Drought Permit: Slindon and as a result, moderate negative residual in-combination effects are identified.	0	-	+++	--

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						and North Kent Medway Chalk, located within the buffer between the Southern water and Thames Water boundaries during construction. There is potential for cumulative positive effects across the WRSE region as a result of the catchment management schemes within the Best Value Plan as there are options which include activities to improve water quality and reduce pollutants. The river restoration projects may also help to improve resilience to low flows and natural water retention options may help to increase storage of water within the environment, facilitating resilience during drought. Wetland creation options can also help to improve water quality. The demand management options will provide positive effects through helping to reduce demand and leakage across the WRSE region. Drought options, such as TUBS and NEUBS, will help to conserve water during periods of drought. However, there is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.					
	Deliver reliable and resilient water supplies	0	0	+++	0	The combined benefit of the Best Value Plan options located within the water company boundaries is likely to result in resilient supplies which meet demand therefore major positive effects are identified.	No mitigation identified.	0	0	+++	0
Air	Reduce and minimise air emissions	0	--	0	-	<p>There is likely to be localised cumulative effects on air quality from the construction phase for the Best Value Plan options which are located within the water company boundary buffers, are in close proximity (500m) to one another and are being constructed at the same time or have construction periods which overlap. These options include:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are located in the buffer between the Affinity Water and Thames Water boundaries Import from Portsmouth Water and Newbury Groundwater which are located within the buffer between the Southern Water and Thames Water boundaries SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d which are both within the buffer between the Portsmouth Water and Southern Water boundaries Conjunctive Benefit of Budds farm 60 M/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60MI/d) which are both located within the buffer between the Portsmouth Water and Southern Water boundaries. <p>South Bucks District Council AQMA No 2 is anticipated to be affected by the Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough options which have overlapping construction periods, and both sit within the buffer between Affinity Water and Thames Water.</p> <p>Gravesham Borough Council Northfleet Industrial Area AQMA is anticipated to be affected by the Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 which have overlapping construction periods, and both sit within the buffer between Southern Water and Thames Water boundaries.</p> <p>There is also potential for effects on AQMAs within the water company boundary buffers where option construction periods overlap including South Bucks AQMA, Dartford AQMA and Hounslow AQMA.</p> <p>There is also likely to be localised cumulative effects on air quality during the operational phase of the options from staff and maintenance transport and any emissions from treatment works.</p>	The use of best practice mitigation measures is likely to be implemented during construction to minimise impacts on air quality, however residual effects are likely to remain. Compliance with air quality standards and a shift to an electric vehicle fleet for staff and maintenance workers should reduce operational effects but residual effects may remain.	0	-	0	-
Climatic Factors	Reduce embodied and operational carbon emissions	0	---	0	---	The options within Best Value Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from all the options, located within the water company boundary buffers, within Best Value Plan is anticipated to result in major construction emissions and major operational emissions. The following	The opportunity to use renewables during construction and operation for energy supply and use of materials with lower embodied carbon should be investigated. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available. Carbon emissions could be reduced further if options are able to	0	---	0	---

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						are options are located in the water company boundary buffers and as they are desalination options, they have high operational carbon due to the energy intense processes required: <ul style="list-style-type: none"> Desalination: Isle of Sheppey (20MI/d) within the South East Water and Southern Water boundary buffer Desalination: River Thames estuary (20MI/d) which is to be increased in size or capacity through Desalination: River Thames estuary (20MI/d) Phase 2 within the Southern Water and Thames Water boundary buffer 	use 100% renewable energy, but this is unknown at this stage.				
	Reduce vulnerability to climate change risks and hazards	0	0	++	--	The Best Value Plan includes a number of options within the water company boundary buffers which involve abstraction from surface and groundwater sources and therefore have the potential to result in negative cumulative effects on the resilience of the natural environment to climate change. Within the Best Value Plan, there are a number of Drought Permit / Order options which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable. These may not be located within the boundary buffers but have the potential to have effects across boundaries. However, although not specifically within the boundary buffers, there are demand management options within the Best Value Plan which aim to keep water in the natural environment and thus increase or maintain resilience to climate change. The catchment management schemes within Best Value Plan natural water retention which will increase resilience by adding to or retaining water in the natural environment which may lead to cumulative positive effects.	For abstraction options, monitor water levels and flows to identify if further mitigation action is required.	0	0	++	--
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	--	++	0	Cumulative effects on the landscape are likely as a result of the Best Value Plan, particularly during the construction phase where options are located within the water company boundary buffers, within close proximity to one another, and are being constructed at similar times. There are options located within the water company boundary buffers, anticipated to be constructed at the same time and are within landscape designations, including: <ul style="list-style-type: none"> London Area Greenbelt <ul style="list-style-type: none"> Canals & Rivers Trust Slough and Egham to Iver 50MLD (Supply 2040) within the Thames Water and Affinity Water boundary buffer. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 within the Southern Water and Thames Water boundary buffer South Downs National Park <ul style="list-style-type: none"> SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d are both within South Downs National Park where they are 500m of on another in the Portsmouth Water and Southern Water boundary buffers and have overlapping construction periods. Worthing to Brighton: 40MI/d is within the Southern and South East Water boundary buffer and at that point is within the South Downs National Park. Although not within 500m of SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d, there is overlapping construction periods. Recycling: Littlehampton WwTW (15MI/d) is located within the Portsmouth Water and Southern Water boundary buffer; Tilmore to Pulborough: 10MI/d is located within the Southern Water and South East boundary buffer; and Conjunctive Benefit of Budds farm 60 M/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60MI/d) are located within the Portsmouth Water and Southern Water boundary buffer. Although none of these options are located within 500m of one another, they are all within the South Downs National Park when they cross the boundaries and have overlapping construction periods. 	Ground will be reinstated following pipeline construction and measures to reduce the visual impact during construction could be implemented, however potential for residual effects to remain. Visual effects from the result of above ground infrastructure will be mitigated through screening, planting and landscape design, and in the long-term will become part of the landscape.	0	--	++	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						Several options also affect the same AONBs within the water company boundary buffers including the Chilterns AONB, Isle of Wight AONB and North Wessex Downs AONB. Some options have overlapping construction periods resulting in potential cumulative effects on the AONB. Those options with consecutive construction periods could prolong disturbance effects within the AONBs. The catchment management schemes within Best Value Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.					
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	--	0	0	<p>The Best Value Plan has the potential to result in cumulative effects on the setting of historic assets during the construction phase as there are historic assets located within proximity to options within the water company buffers which are being constructed at the same time. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough are located in an unknown conservation area within the buffer between the Affinity Water and Thames Water boundaries. Newbury Groundwater and Import from Portsmouth Water are located in an unknown conservation area within the buffer between the Southern Water and Thames Water boundaries. Bigg's Cottage Grade II Listed Building is also located within the water company boundary buffer and is within 500m of both options. SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d are located 500m from seven Scheduled Monuments within the buffer between the Portsmouth Water and Southern Water boundaries. The Scheduled Monuments are: Bowl barrow reused as moot mound in Barkhale Wood; Barkhale Camp causewayed enclosure; Bowl barrow 780m south-west of Bignor Hill; Bowl barrow 800m south-west of Bignor Hill; Bowl barrow 915m WSW of Bignor Hill; Bowl barrow 960m WSW of Bignor Hill; and Seven sections of Stane Street Roman road between Eartham and Bignor, a prehistoric linear boundary and two bowl barrows. Conjunctive Benefit of Budds farm 60 M/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60MI/d) are located within Titchfield Abbey Conservation Area, and within 500m of Titchfield Conservation Area. Additionally there are numerous listed buildings within the Titchfield Conservation Area within 500m of the options and 15 further listed buildings and two scheduled monuments, Titchfield Abbey and fish ponds, Stony Bridge Titchfield within the Titchfield Abbey Conservation Area. Other historical assets within 500m of the options are, Hollam house Grade II listed building, Ironmasters House Grade II listed building, Funtley House Grade II listed building, The Mill house Grade II listed building, and Funtley ironworks Scheduled Monument. All these are within the buffer between Southern Water and Portsmouth Water boundaries. <p>There are a number of options within the Best Value Plan which directly impact historic environment assets located within the water company boundaries. These options may not impact the same assets, however there is still potential cumulative effects on the historic environment as a whole. Options which directly impact historic assets which are located within the boundary buffers include:</p> <ul style="list-style-type: none"> GUC option 3 50 MI/d phase 1 LB and GUC option 3 50 MI/d phase 2 LB intersects Roman settlement at the Cow Roast Inn Scheduled Monument within the buffer between Affinity Water and Thames Water Worthing to Brighton: 40MI/d intersects Stanmer Park Registered Park and Garden which is located within the buffer between Southern Water and South East Water <p>There is potential for cumulative effects on scheduled monuments within the water company boundary buffers that are in close proximity to options with overlapping or consecutive construction effects. Effects on the setting of scheduled monuments include:</p>	Re-route options, or utilise direction drilling, to avoid direct impacts on historic assets. Best practice mitigation measures will likely be implemented to minimise setting effects during construction. Archaeological Watching Brief may be required during the construction phase.	0	--	0	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Moated site at Marwell Manor – Raw water Transfer between Havant Thicket res and Otterbourne WSW - First Section, 90 MI/d and Import: Havant Thicket - Otterbourne direct raw water transfer - second section (90MI/d). The options are approx. 400m from the schedule monument. Park pale at Marwell, 250m north-west of Marwell Manor - Raw water Transfer between Havant Thicket res and Otterbourne WSW - First Section, 90 MI/d and Import: Havant Thicket - Otterbourne direct raw water transfer - second section (90MI/d). The options are approx. 250m from the schedule monument. Neolithic sites near Ebbsfleet - Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2. The options are approx. 380m from the scheduled monument. Palaeolithic sites near Baker’s Hole - Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2. The options are approx. 240m from the scheduled monument. Springhead Roman site - Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2. The options are approx. 125m from the scheduled monument. <p>Excavation required for the options within the Best Value Plan has the potential to have an overall cumulative effect on archaeology, however this depends on the extent to which it is present at the various option locations within the water company boundaries.</p>					
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	+	0	<p>There is potential for cumulative effects on the local community from the construction phase of options within the Best Value Plan for the options located within the water company buffer boundaries, in close proximity (500m) to one another and are constructed at similar times. Localised disturbance effects on the local community and community facilities such as noise and vibration, dust and access issues have the potential to occur. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are located in the buffer between the Affinity Water and Thames Water boundaries. Newbury Groundwater and Import from Portsmouth Water are which are located within the buffer between the Southern Water and Thames Water boundaries. There is also two noise action planning important areas within the water company boundary buffer and within 500m of both the options. Conjunctive Benefit of Budds farm 60 M/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60MI/d) are located in the buffer between the Portsmouth Water and Southern Water company boundary buffers. There is also one noise action planning important area intersected by the options and within the water company boundary buffers. <p>There is also potential for long-term disturbance where options are located close to one another, not necessarily constructed at the same time but have construction periods which follow on from one another resulting in a prolonged construction phase.</p> <p>The construction of the new reservoirs in the Best Value Plan have the potential to create new recreational opportunities, assuming they are open to the public, therefore contributing to improved health and wellbeing. There are two reservoir options located within the buffers between water companies which includes, Storage: River Adur offline Reservoir between Southern Water and South East Water boundary buffer, and the Brent Reservoir Transfer to Iver between Affinity Water and Thames Water boundary buffer. However, given the distance between the options, no cumulative effects are likely.</p> <p>The catchment management schemes within the Best Value Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and</p>	Best practice mitigation measures will likely be implemented to minimise cumulative effects during the construction phase. However, effects are likely to still occur.	0	-	+	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						education options which may help the local community make more informed decisions and promote rivers as a community and educational resource.					
	Maintain and enhance tourism and recreation	0	-	+	0	<p>The construction phase of options in the Best Value Plan, located within the water company boundary buffers, are located in close proximity and are constructed at similar times have the potential to result in cumulative effects on recreational community assets and public rights of way. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are located in the buffer between the Affinity Water and Thames Water boundaries. These options are both within 500m of the same playing field, play space and sports facility. Conjunctive Benefit of Budds farm 60 M/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60MI/d) are located in the buffer between the Portsmouth Water and Southern Water boundaries. These options are within 500m of the same playing fields, play space, bowling green, college, primary school, allotments, public park or garden, religious buildings. <p>The construction of the new reservoirs in the Best Value Plan have the potential to create new recreational opportunities, assuming they are open to the public. There are two reservoir options located within the buffers between water companies which includes, Storage: River Adur offline Reservoir between Southern Water and South East Water boundary buffer, and the Brent Reservoir Transfer to Iver between Affinity Water and Thames Water boundary buffer. However, given the distance between the options, no cumulative effects are likely.</p> <p>The catchment management schemes within the Best Value Plan also have the potential to reduce in positive effects as they include options such as river restoration, natural water retention, wetland creation and nutrient and sediment reduction. Maintaining and improving river water quality and habitats may increase the opportunities for river-based recreation including angling. There is also opportunities for increased access to rivers with specific schemes seeking to promote this through community engagement.</p>	Best practice mitigation measures will likely be implemented to minimise the cumulative effects during the construction phase.	0	-	+	0
Material Assets	Minimise resource use and waste production	+	---	+	0	<p>The new infrastructure required for the options located within the water company boundary buffers included within the Best Value Plan will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in major negative cumulative effects.</p> <p>Options within the catchment management schemes may have cumulative positive effects as they contain NFM options and pesticide reduction which will help to reduce the use of resources.</p>	Opportunity to implement sustainable design measures to reduce the impact and excavated material could be reused on site. However, it is likely that moderate negative cumulative effects will remain.	+	--	+	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	<p>The construction phase of the following options has the potential to have cumulative effects on major roads, railways, national cycle route and national trails, particularly where the options are within the water company boundary buffers, construction period of different options is at the same time, and is impacting the same asset:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough on major roads, railways, and national cycle routes. Both options are located in the buffer between the Affinity Water and Thames Water boundaries. SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d on national trails. Both options are located in the buffer between Southern Water and Portsmouth Water. Newbury Groundwater and Import from Portsmouth Water on major roads. Both options are located in the buffer between Southern Water and Thames Water Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 on major roads and national cycle network. Both options are within the buffer between the Southern water and Thames Water boundaries. 	Best practice mitigation measures, such as a CTMP, will likely be implemented to minimise effects during construction and roads and cycle routes will be reinstated where possible. Directional drilling under railways is likely. However, there are likely to still be cumulative disruption effects during the construction phase.	0	-	0	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Conjunctive Benefit of Budds farm 60 M/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (60MI/d) on major roads, railways, and national cycle network. Both options are located within the buffer between Portsmouth Water and Southern Water boundaries. 					

5.3.1.2 Least Cost Plan (Pre-2050)

The cumulative assessment for the Least Cost Plan is presented in Table 5.3 and is summarised by SEA topic below:

- **Biodiversity, flora, and fauna** - There is potential for cumulative effects on a number of statutory and non-statutory designated sites. An in-combination HRA assessment has not been undertaken for the options selected within the Least Cost Plan, however there is potential for in-combination effects on Natura 2000 sites. Major negative effects have therefore been identified for construction and operation as a worst-case scenario, however this may change.

There is also potential for cumulative effects on aquatic ecology during the construction phase. Priority habitats, woodland and Ancient Woodland may also be impacted cumulatively. The catchment management schemes within the Least Cost Plan are not specifically within the water company boundary buffers, however they may result in positive cumulative effects as they include schemes such as river restoration, terrestrial habitat / management, and wetland creation, amongst others.

- **Soil** - There is potential for cumulative disturbance effects on agricultural land across the Least Cost Plan during the construction phase but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another.

There is also potential for cumulative effects from the disturbance of contaminants in historic and/or authorised landfill sites as there are options within the water company boundaries in the Least Cost Plan which are within close proximity (500m) to the same site with construction programmed for similar times. Positive cumulative effects may occur as a result of the catchment management schemes within the Least Cost Plan that are outside of the water company boundary buffers. They include options which aim to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolio that focus on agricultural land may help to increase the productivity of soil.

- **Water** - It is not anticipated there will be cumulative effects from flood risk during the construction or operational phases. The catchment management schemes within the Least Cost Plan are not identified to be specifically within the water company boundary buffers, however, they include natural flood management and wetland restoration options which may lead to positive cumulative effects for reducing flood risk.

An in-combination WFD assessment has not been undertaken for the options selected in the Least Cost Plan that fall within the water company boundary buffers, however there is potential for in-combination effects. Moderate negative effects have been identified for construction and operation as worst-case scenario, however this may change. There are options within the Least Cost Plan that have similar construction programmes and cross the same and/or multiple main rivers, chalk rivers, and waterbodies within close proximity to one another. There are multiple options within the same SPZs which are to be constructed at the same time and there are groundwater options located within the same WFD ground waterbody which may have in-combination effects during operation.

The combined benefit of the options within each of the options are likely to lead increased reliability and resilience of water supplies. The catchment management schemes include activities to improve water quality and reduce pollutants, increase resilience to low flows and increase the storage of water within the environment, facilitating resilience during drought. Therefore, having the potential to result in positive cumulative effects. The demand management options will provide positive

effects through helping to reduce demand and leakage. Drought options, such as TUBS and NEUBS, will help to conserve water during periods of drought. However, there is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.

- **Air** - There is likely to be localised cumulative effects on air quality from the construction phase for the Least Cost Plan options which are located within the water company boundaries, are in close proximity (500m) to one another and are being constructed at the same time or have construction periods which overlap. Some of the options that have these localised cumulative effects are located within AQMAs. There is also likely to be localised cumulative effects on air quality during the operational phase of the options from staff and maintenance transport and any emissions from treatment works.
- **Climatic Factors** - The options within Least Cost Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from all the options, located within the water company boundary buffers, within the Least Cost Plan is anticipated to result in major construction emissions and major operational emissions.

For climate resilience, there is potential for negative cumulative effects given that the Least Cost Plan includes a number of options within the water company boundary buffers which involve abstraction from surface and groundwater sources and therefore have the potential to result in negative cumulative effects on the resilience of the natural environment to climate change. Within the Least Cost Plan, there are a number of Drought Permit / Order options which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable across the WRSE region. However, although not specifically within the boundary buffers, there are demand management options within the Least Cost Plan which aim to keep water in the natural environment and thus increase or maintain resilience to climate change.

- **Landscape** - Cumulative effects on the landscape are likely as a result of the Least Cost Plan, particularly during the construction phase where options are located within close proximity to one another and are being constructed at similar times within landscape designations such as AONBs and South Downs National Park. The catchment management schemes within Least Cost Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.
- **Historic Environment** - The Least Cost Plan has the potential to result in cumulative effects on the setting of historic assets during the construction phase given the proximity to options within the water company buffers which are being constructed at the same time. There are a number of options within the Least Cost Plan which directly impact historic environment assets located within the water company boundaries. These options may not impact the same assets, however there is still potential cumulative effects on the historic environment as a whole. Excavation required for the options within the Least Cost Plan has the potential to have an overall cumulative effect on archaeology, however this depends on the extent to which it is present at the various option locations within the water company boundaries.
- **Population and Human Health** - There is potential for cumulative effects on the local community from the construction phase of options within the Least Cost Plan for the options located within the buffer, in close proximity (500m) to one another and are constructed at similar times. Localised

disturbance effects on the local community and community facilities such as noise and vibration, dust and access issues have the potential to occur. There is also potential for long-term disturbance where options are located close to one another, not necessarily constructed at the same time but have construction periods which follow on from one another resulting in a prolonged construction phase.

The catchment management schemes within the Least Cost Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource.

- **Material Assets** - The new infrastructure required for the options located within the water company boundary buffers included within the Least Cost Plan will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in major negative cumulative effects. Options within the catchment management schemes may have cumulative positive effects as they contain NFM options and pesticide reduction which will help to reduce the use of resources. There is also potential for cumulative effects on built assets and infrastructure as a result of the options within the Least Cost Plan.

Table 5.3: Least Cost Plan Cumulative Effects Assessment (Pre-2050)

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	+++	---	<p>An in-combination HRA assessment has not been undertaken for the Least Cost Plan, however there is potential for in-combination effects on Natura 2000 sites. Major negative effects have therefore been identified for construction and operation as a worst-case scenario, however this may change.</p> <p>The following options have been identified as potentially having cumulative construction effects on designated sites as they are located within the water company boundary buffers, are being constructed at the same or similar times and are geographically clustered:</p> <ul style="list-style-type: none"> Wraysbury & Hythe End Gravel Pits SPA, Ramsar, SSSI and GWDTE (100% favourable), Staines Moor SPA, Ramsar, SSSI and GWDTE (96.16% favourable, 2.13% unfavourable-recovering, and 1.71% unfavourable-declining), Wraysbury Reservoir SPA, Ramsar, and SSSI (100% favourable), Arthur Jacob Nature Reserve (LNR) as a result of Egham to Iver 50MLD (supply 2040) and Canals and Rivers Trust Slough, located in the buffer between the Affinity Water and Thames Water boundaries. Duncton to Bignor Escarpment SAC and SSSI (6.08% unfavourable – recovering, 93.92% unfavourable – declining) as a result of SRN Source D To Havant Thicket:50MI/d and Havant Thicket To Pulborough WTW: 50MI/d, located in the buffer between Portsmouth Water and Southern Water boundaries. Ravensbury Park Local Nature Reserve (LNR) as a result of Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d, located in the buffer between Sutton & East Surrey Water and Thames Water boundaries. <p>There is potential for effects on aquatic ecology during construction where options are being constructed in the water company boundary buffers, at the same or similar time, within or within close proximity to the same waterbody. This includes:</p> <ul style="list-style-type: none"> Watercourses and surface water during construction as a result of Egham to Iver 50MLD (supply 2040) and Canals and Rivers Trust Slough, located in the buffer between the Affinity Water and Thames Water boundaries. Watercourses and surface water during construction as a result of Newbury Groundwater and Import from Portsmouth Water, located in the buffer between Southern Water and Thames Water boundaries. Surface water during construction as a result of Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2, located in the buffer between the Southern Water and Thames Water boundaries. Watercourses and surface water during construction as a result of Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d, located in the buffer between Sutton & East Surrey Water and Thames Water boundaries. Chalk rivers and watercourses during construction as a result of Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d), located in the buffer between the Portsmouth Water and Southern Water boundaries. <p>There is anticipated to be cumulative effects on Priority Habitats, Ancient Woodland and woodland, where options are being constructed in the water company boundary buffers, at the same or similar time, within or within close proximity, particularly during</p>	<p>Best practice methods to be implemented to minimise disturbance effects and habitat loss. Where required directional drilling or option re-alignment may be required as the option design progresses.</p> <p>Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat.</p> <p>Ecology surveys will be required at future design stages to determine effects and mitigation required. It is assumed that mitigation recommended by further ecology surveys will be implemented and therefore residual construction effects are lessened although this wouldn't negate the need for a potential appropriate assessment (where only Stage 1 has been undertaken). Implementation of mitigation measures set out in HRA Appropriate Assessments where these have been undertaken.</p> <p>Opportunities for habitat creation and habitat enhancement will be further investigated through WRMP24 and options design. Some options such as reservoirs already have habitat creation designed into proposals. Opportunities for BNG and links with nature recovery networks will be further investigated at the WRMP24 level.</p>	0	---	+++	---

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<p>construction, given a number of the options within the Least Cost Plan pass through these areas. This includes:</p> <ul style="list-style-type: none"> SRN Source D To Havant Thicket:50MI/d and Havant Thicket To Pulborough WTW: 50MI/d, located in the buffer between Portsmouth Water and Southern Water boundaries, adjacent to Ancient Woodland, adjacent and through Priority Habitat (mostly deciduous woodland). Egham to Iver 50MLD (supply 2040) and Canals and Rivers Trust Slough, located in the buffer between the Affinity Water and Thames Water boundaries, adjacent and through Priority Habitat (mostly deciduous woodland). Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2, located in the buffer between the Southern Water and Thames Water boundaries, adjacent and through various Priority Habitats. Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d, located in the buffer between Sutton & East Surrey Water and Thames Water boundaries, adjacent and through Priority Habitat (mostly deciduous woodland). Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d), located in the buffer between the Portsmouth Water and Southern Water boundaries, adjacent to Ancient Woodland, through and adjacent to Priority Habitats (mostly costal and floodplain grazing marsh and deciduous woodland). <p>There is potential for cumulative effects on LNRs within the water company boundary buffers where more than one option could cause disturbance effects from overlapping construction periods. These include:</p> <ul style="list-style-type: none"> Fairmile Bottom LNR – both options Recycling: Littlehampton WwTW (15MI/d) and Drought option: North Arundel Drought Permit/Order (2025 onwards) are within close proximity to the LNR and selected within a year of each other. However, as one of the options is a Drought Permit option, it would only be implemented in drought conditions and is likely to have limited construction. <p>The top reasons for catchments not achieving good status (RNAG) include urbanisation; barriers – ecological discontinuity; sewage discharge; groundwater abstraction; poor soil management; poor livestock management; drinking water supply; amongst others. There are catchment management schemes within the Least Cost Plan which are not specifically within the water company boundary buffers but have the potential to result in positive cumulative effects across the WRSE region. The catchment management schemes contain options such as river restoration options, wetland creation and enhancement, pesticide reduction, sediment reduction and terrestrial habitat creation/management options.</p>					
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	++	-	<p>The Least Cost Plan includes the construction of options within the water company boundaries which impact various agricultural land grades, including Grade 1 and Grade 2. There is potential for cumulative effects on agricultural land across from the options within the Least Cost Plan during the construction phase from disturbance but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another.</p> <p>There is also potential for cumulative effects from the disturbance of contaminants in historic and/or authorised landfill sites as there are options within the water company</p>	Following the construction phase, land will be reinstated where possible to minimise disturbance effects. However, there will be some permanent losses to agricultural land due to the above ground infrastructure associated with a number of the options within the Least Cost Plan. Mitigation measures will include minimising the footprint of these assets, but residual effects are likely to remain. Best practices methods for reducing risk of working within or within close proximity to landfill sites will be implement, however residual risk remains.	0	-	++	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<p>boundaries in Least Cost Plan which are within close proximity (500m) to the same site with construction programmed for similar times. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough options which are in proximity to the same historic landfill sites and sit within the buffer between Affinity Water and Thames Water. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 options which are in proximity to the same authorised and historic landfill sites and sit within the buffer between Southern Water and Thames Water. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d), which are in proximity to the same historic landfill sites and sits within the buffer between Portsmouth Water and Southern Water boundaries. <p>Positive cumulative effects may also occur as a result of the catchment management schemes within the Least Cost Plan. Although these options are not within the water company boundary buffer, there is potential for positive cumulative effects across the WRSE region given they include options which seek to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolios that focus on agricultural land may help to increase the productivity of soil.</p>					
	Increase resilience and reduce flood risk	0	0	++	0	<p>There are numerous options within the Least Cost Plan that are located within the boundaries of the water companies and are located within Flood Zone 2 and 3. These options are therefore at risk from flooding during the construction phase and where there is above ground infrastructure there are operational risks. However, it is not anticipated there will be cumulative effects from flooding during the construction or operational phases.</p> <p>The catchment management schemes within the Least Cost Plan are not identified to be specifically within the water company boundary buffers, however as they include options such as NFM, river and wetland restoration, they have the potential to lead to positive cumulative effects for reducing flood risk across the WRSE region.</p>	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of flooding during the construction and operational phases of those individual options at risk will likely be implemented.	0	0	++	0
Water	Protect and enhance the quality of the water environment and water resources	0	--	+++	--	<p>An in-combination WFD assessment has not been undertaken for the options selected in the Least Cost Plan that fall within the water company boundary buffers, however there is potential for in-combination effects. Moderate negative effects have been identified for construction and operation as worst-case scenario, however this may change.</p> <p>There are options within the Least Cost Plan that are within the water company boundary buffers, have similar construction programmes and cross the same and/or multiple main rivers, and waterbodies within close proximity to one another. There are multiple options within the same SPZs and ground water bodies which are to be constructed at the same time. The following options have been identified as potentially having cumulative construction effects on the same and/or multiple main rivers, SPZs and waterbodies within close proximity to one another:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & River Trust Slough on, SPZ 3, main rivers, located in the buffer between the Affinity Water and Thames Water boundaries during construction only. SRN Source D to Havant Thicket:50MI/d and Havant Thicket To Pulborough WTW: 50MI/d on SPZ 3 and ground water body- Chichester chalk, located in the buffer between Portsmouth Water and Southern Water boundaries during construction only. 	During construction, best practice methods will likely be implemented to mitigate effects. This is likely to include directional drilling under rivers as well as best practice site construction methods to reduce potential for pollution incidents. Minor residual effects have been identified for the construction phase as risks may remain.	0	-	+++	--

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Newbury Groundwater and Import from Portsmouth Water on SPZs 1-3, and main rivers located within the buffer between the Southern water and Thames Water boundaries during construction only. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 on SPZ 1-3, surface water, and water ground bodies- West Kent Darent and Cray Chalk and North Kent Medway Chalk, located within the buffer between the Southern water and Thames Water boundaries during construction. Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d on SPZs 3, rivers and surface water, located within the buffer between the Sutton & East Surrey Water and Thames Water boundaries during construction only. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) on rivers, waterbodies- South Hants Lambeth Group located within the buffer between the Portsmouth Water and Southern Water boundaries during construction only. <p>There is potential for cumulative positive effects across the WRSE region as a result of the catchment management schemes within the Least Cost Plan as there are options which include activities to improve water quality and reduce pollutants. The river restoration projects may also help to improve resilience to low flows and natural water retention options may help to increase storage of water within the environment, facilitating resilience during drought. Wetland creation options can also help to improve water quality. The demand management options will provide positive effects through helping to reduce demand and leakage across the WRSE region. Drought options, such as TUBS and NEUBS, will help to conserve water during periods of drought. However, there is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.</p>					
	Deliver reliable and resilient water supplies	0	0	+++	0	The combined benefit of the Least Cost Plan options located within the water company boundaries is likely to result in resilient supplies which meet demand therefore major positive effects are identified.	No mitigation identified.	0	0	+++	0
Air	Reduce and minimise air emissions	0	--	0	-	<p>There is likely to be localised cumulative effects on air quality from the construction phase for the Least Cost Plan options which are located within the water company boundary buffers, are in close proximity (500m) to one another and are being constructed at the same time or have construction periods which overlap. These options include:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are located in the buffer between the Affinity Water and Thames Water boundaries Import from Portsmouth Water and Newbury Groundwater which are located within the buffer between the Southern Water and Thames Water boundaries SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d which are both within the buffer between the Portsmouth Water and Southern Water boundaries Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 located in the buffer between the Southern water and Thames Water boundaries. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) which are both 	<p>The use of best practice mitigation measures is likely to be implemented during construction to minimise impacts on air quality, however residual effects are likely to remain.</p> <p>Compliance with air quality standards and a shift to an electric vehicle fleet for staff and maintenance workers should reduce operational effects but residual effects may remain.</p>	0	-	0	-

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<p>located within the buffer between the Portsmouth Water and Southern Water boundaries.</p> <ul style="list-style-type: none"> Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d which are both located within the buffer between Sutton & East Surrey Water and Thames Water boundaries. <p>South Bucks District Council AQMA No 2 is anticipated to be affected by the Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough options which have overlapping construction periods, and both sit within the buffer between Affinity Water and Thames Water.</p> <p>Gravesham Borough Council Northfleet Industrial Area AQMA is anticipated to be affected by the Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 which have overlapping construction periods, and both sit within the buffer between Southern Water and Thames Water boundaries.</p> <p>Merton AQMA is anticipated to be affected by the Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d which have overlapping construction periods and both sit within the buffer between Sutton & East Surrey Water and Thames Water boundaries.</p> <p>There is also potential for effects on AQMAs within the water company buffers where option construction periods overlap including South Bucks AQMA, Hounslow AQMA and Dartford AQMA.</p> <p>There is also likely to be localised cumulative effects on air quality during the operational phase of the options from staff and maintenance transport and any emissions from treatment works.</p>					
Climatic Factors	Reduce embodied and operational carbon emissions	0	---	0	---	<p>The options within Least Cost Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from all the options, located within the water company boundary buffers, within Least Cost Plan is anticipated to result in major construction emissions and major operational emissions. The following are options are located in the water company boundary buffers and as they are desalination options, they have high operational carbon due to the energy intense processes required:</p> <ul style="list-style-type: none"> Desalination: Isle of Sheppey (20MI/d) within the South East Water and Southern Water boundary buffer Desalination: River Thames estuary (20MI/d) which is to be increased in size or capacity through Desalination: River Thames estuary (20MI/d) Phase 2 within the Southern Water and Thames Water boundary buffer 	The opportunity to use renewables during construction and operation for energy supply and use of materials with lower embodied carbon should be investigated. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available. Carbon emissions could be reduced further if options are able to use 100% renewable energy, but this is unknown at this stage.	0	---	0	---
	Reduce vulnerability to climate change risks and hazards	0	0	++	--	<p>The Least Cost Plan includes a number of options within the water company boundary buffers which involve abstraction from surface and groundwater sources and therefore have the potential to result in negative cumulative effects on the resilience of the natural environment to climate change. Within the Least Cost Plan, there are a number of Drought Permit / Order options which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable. These may not be located within the boundary buffers but have the potential to have effects across boundaries.</p> <p>However, although not specifically within the boundary buffers, there are demand management options within the Least Cost Plan which aim to keep water in the natural environment and thus increase or maintain resilience to climate change. The catchment</p>	For abstraction options, monitor water levels and flows to identify if further mitigation action is required.	0	0	++	--

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						management schemes within Least Cost Plan include natural water retention which will increase resilience by adding to or retaining water in the natural environment which may lead to cumulative positive effects.					
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	--	++	0	<p>Cumulative effects on the landscape are likely as a result of the Least Cost Plan, particularly during the construction phase where options are located within close proximity to one another and are being constructed at similar times. There are options located within the water company boundary buffers, anticipated to be constructed at the same time and are within landscape designations, including:</p> <ul style="list-style-type: none"> • London Area Greenbelt <ul style="list-style-type: none"> – Canals & Rivers Trust Slough and Egham to Iver 50MLD (Supply 2040) within the Thames Water and Affinity Water boundary buffer. – Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 within the Southern Water and Thames Water boundary buffer • South Downs National Park <ul style="list-style-type: none"> – SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d are both within South Downs National Park where they are 500m of one another in the Portsmouth Water and Southern Water boundary buffers and have overlapping construction periods. – Worthing to Brighton: 40MI/d is within the Southern and South East Water boundary buffer and at that point is within the South Downs National Park as is Peacehaven Recycling at Barcombe (25ml/d Option). Although not within 500m of SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d, there is overlapping construction periods. – Recycling: Littlehampton WwTW (15MI/d) is located within the Portsmouth Water and Southern Water boundary buffer; Tilmore to Pulborough: 10MI/d is located within the Southern Water and South East boundary buffer; and Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) are located in Southern Water and Portsmouth Water boundary buffers. Although none of these options are located within 500m of one another, they are all within the South Downs National Park when they cross the boundaries and have overlapping construction periods. <p>Several options also affect the same AONBs within the water company boundary buffers including the Chilterns AONB, Isle of Wight AONB and North Wessex Downs AONB. Some options have overlapping construction periods resulting in potential cumulative effects on the AONB. Those options with consecutive construction periods could prolong disturbance effects within the AONBs.</p> <p>The catchment management schemes within Least Cost Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.</p>	Ground will be reinstated following pipeline construction and measures to reduce the visual impact during construction could be implemented, however potential for residual effects to remain. Visual effects from the result of above ground infrastructure will be mitigated through screening, planting, and landscape design, and in the long-term will become part of the landscape.	0	--	++	0
Historic Environment	Conserve, protect and enhance the historic	0	--	0	0	The Least Cost Plan has the potential to result in cumulative effects on the setting of historic assets during the construction phase as there are historic assets located within	Re-route options, or utilise direction drilling, to avoid direct impacts on historic assets. Best practice mitigation measures will likely be implemented to minimise setting	0	--	0	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
	environment, including archaeology					<p>proximity to options within the water company buffers which are being constructed at the same time. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough are located in an unknown conservation area within the buffer between the Affinity Water and Thames Water boundaries. Newbury Groundwater and Import from Portsmouth Water are located in an unknown conservation area within the buffer between the Southern Water and Thames Water boundaries. Bigg's Cottage Grade II Listed Building is also located within the water company boundary buffer and is within 500m of both options. Culham to HWZ (120) Potable - Construction though not constructed at the same time will also impact the same historic assets. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 are located adjacent and close to multiple listed buildings within the buffer between Southern Water, South East Water and Thames Water boundaries. Church of All Saints Grade II* listed building within 500m, Garden walls of Scadbury Manor Grade II listed building, Scadbury Manor Grade II listed building, The Pest House in the garden of Scadbury Manor Grade II listed building, Scadbury Cottage Grade II listed building, Hazells Grade II listed building, Calf house or stable with granary above Grade II listed building, Hazells Farm Barn and attached oast Grade II listed building an Springhead Roman site are all within 500m of the options and within the boundary buffers. Resource from Cheam WTW to Merton PS (TW) at 30 MI/d and Transfer from Merton (TW) to SES boundary at 15 MI/d intersects Morden Hall Park Registered Park and Garden. Morden Hall Grade II listed building, and a further 10 associated Grade II listed buildings all part of Morden Hall, Ravensbury Mill Grade II listed building, The Grange Morden grade II listed building, Milestone opposite number 92 Grade II listed building, Milestone Grade II listed building, are located adjacent and within 500m of both options and located within the buffer between Thames Water and Sutton & East Surrey Water. Additionally the are also located in Wandle Valley Conservation Area and Upper Morden Conservation area within the buffer between Thames Water and Sutton & East Surrey Water. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) are located within Titchfield Abbey Conservation Area, and within 500m of Titchfield Conservation Area. Additionally there are numerous listed buildings within the Titchfield Conservation Area within 500m of the options and 15 further listed buildings and two scheduled monuments, Titchfield Abbey and fish ponds, Stony Bridge Titchfield within the Titchfield Abbey Conservation Area. Other historical assets within 500m of the options are, Hollam house Grade II listed building, Ironmasters House Grade II listed building, Funtley House Grade II listed building, The Mill house Grade II listed building, and Funtley ironworks Scheduled Monument. All these are within the buffer between Southern Water and Portsmouth Water boundaries. <p>There are a number of options within the Least Cost Plan which directly impact historic environment assets located within the water company boundaries. These options may not impact the same assets, however there is still potential cumulative effects on the historic environment as a whole. Options which directly impact historic assets which are located within the boundary buffers include:</p>	effects during construction. Archaeological Watching Brief may be required during the construction phase.				

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> GUC option 3 50 MI/d phase 1 LB and GUC option 3 50 MI/d phase 2 LB intersects Roman settlement at the Cow Roast Inn Scheduled Monument and Dudswell Conservation Area within the buffer between Affinity Water and Thames Water Worthing to Brighton: 40MI/d intersects Stanmer Park Registered Park and Garden and Stanmer Conservation Area which are located within the buffer between Southern Water and South East Water Aldlington to Saltwood Import Increase by 6 MI/d intersects Romano-British building S of Burch's Rough Scheduled Monument, unknown Conservation Area, which are located within the buffer between South East Water and Affinity Water. Resource from Cheam WTW to Merton PS (TW) at 30 MI/d intersects Morden Hall Park Registered Park and Garden which is located within the buffer between Thames Water and Sutton & East Surrey Water. Bough Beech Reservoir- raising is located within an unknown conservation area within the buffer between the Thames Water and Sutton & East Surrey Water boundaries. Deal Supply Scheme unknown Conservation Area within the buffer between the Affinity Water and Southern Water boundaries. New Bulk Supply: SESW to SEW RZ1 Transfer - Bough Beech to Riverhill SR (10MI/d) within unknown Conservation Area within the buffer between South East Water and Sutton & East Surrey Water boundaries. New Bulk Supply: SWS to RZ8 - Brede to Kingsnorth (10MI/d) within unknown Conservation Area located within the buffer between Southern Water and South East Water boundaries. Import: SEW Kingston to KTZ Wingham (2MI/d) within multiple Conservation Areas, Blooden Adisham, Cooting Adisham, and Kingston located within the buffer between Affinity Water and Southern Water boundaries. Henley to SWA Transfer – 5 MI/d is within an unknown Conservation Area within the buffer between South East Water and Thames Water boundaries. <p>There is potential for cumulative effects on scheduled monuments within the water company boundary buffers that are in close proximity to options with overlapping or consecutive construction effects. Effects on the setting of scheduled monuments include:</p> <ul style="list-style-type: none"> Moated site at Marwell Manor – Raw water Transfer between Havant Thicket res and Otterbourne WSW - First Section, 90 MI/d and Import: Havant Thicket - Otterbourne direct raw water transfer - second section (90MI/d). The options are approx. 400m from the schedule monument. Park pale at Marwell, 250m north-west of Marwell Manor - Raw water Transfer between Havant Thicket res and Otterbourne WSW - First Section, 90 MI/d and Import: Havant Thicket - Otterbourne direct raw water transfer - second section (90MI/d). The options are approx. 250m from the schedule monument. Neolithic sites near Ebbsfleet - Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2. The options are approx. 380m from the scheduled monument. Palaeolithic sites near Baker's Hole - Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2. The options are approx. 240m from the scheduled monument. 					

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Springhead Roman site - Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2. The options are approx. 125m from the scheduled monument. <p>Excavation required for the options within the Least Cost Plan has the potential to have an overall cumulative effect on archaeology, however this depends on the extent to which it is present at the various option locations within the water company boundaries.</p>					
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	+	0	<p>There is potential for cumulative effects on the local community from the construction phase of options within the Least Cost Plan for the options located within the buffer, in close proximity (500m) to one another and are constructed at similar times. Localised disturbance effects on the local community and community facilities such as noise and vibration, dust and access issues have the potential to occur. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are located in the buffer between the Affinity Water and Thames Water boundaries. Newbury Groundwater and Import from Portsmouth Water are which are located within the buffer between the Southern Water and Thames Water boundaries. There is also two noise action planning important areas within the water company boundary buffer and within 500m of both the options. Transfer from Merton (TW) to SES Boundary at 15MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d which are located in the buffer between the Thames Water and Sutton & East Surrey Water. There is also one noise action planning important area intersected by the options and within the water company boundary buffers. SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d which are located in the buffer between the Portsmouth Water and Southern Water company boundary buffers. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) which are located in the buffer between the Portsmouth Water and Southern Water company boundary buffers. There is also one noise action planning important area intersected by the options and within the water company boundary buffers. <p>There is also potential for long-term disturbance where options are located close to one another, not necessarily constructed at the same time but have construction periods which follow on from one another resulting in a prolonged construction phase.</p> <p>The catchment management schemes within the Least Cost Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource.</p> <p>The catchment management schemes within the Least Cost Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource.</p>	Best practice mitigation measures will likely be implemented to minimise the cumulative effects during the construction phase.	0	-	+	0
	Maintain and enhance tourism and recreation	0	-	+	0	<p>The construction phase of options in the Least Cost Plan, located within the water company boundary buffers, are located in close proximity and are constructed at similar times have the potential to result in cumulative effects on recreational community assets and public rights of way. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are located in the buffer between the Affinity Water and Thames Water boundaries. 	Best practice mitigation measures will likely be implemented to minimise the cumulative effects during the construction phase.	0	-	+	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<p>These options are both within 500m of the same playing field, play space and sports facility.</p> <ul style="list-style-type: none"> Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d which are located in the buffer between the Sutton & East Surrey Water and Thames Water boundaries. These options are both within 500m of the same Public Park or Gardens, playing fields, play spaces, secondary school, primary schools, infant school, religious buildings and sport facilities. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) which are located in the buffer between the Portsmouth Water and Southern Water boundaries. These options are within 500m of the same playing fields, play space, bowling green, college, primary school, allotments, public park or garden, religious buildings. <p>The catchment management schemes within the Least Cost Plan also have the potential to reduce in positive effects as they include options such as river restoration, natural water retention, wetland creation and nutrient and sediment reduction. Maintaining and improving river water quality and habitats may increase the opportunities for river-based recreation including angling. There are also opportunities for increased access to rivers with specific schemes seeking to promote this through community engagement.</p>					
Material Assets	Minimise resource use and waste production	+	---	+	0	<p>The new infrastructure required for the options located within the water company boundary buffers included within the Least Cost Plan will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in major negative cumulative effects.</p> <p>Options within the catchment management schemes may have cumulative positive effects as they contain NFM options and pesticide reduction which will help to reduce the use of resources.</p>	Opportunity to implement sustainable design measures to reduce the impact and excavated material could be reused on site. However, it is likely that moderate negative cumulative effects will remain.	+	--	+	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	<p>There is potential for cumulative effects on built assets and infrastructure from the construction phase of options within the Least Cost Plan for the options located within the water company boundaries. The construction phase of the following options has the potential to have cumulative effects on major roads, railways, national cycle route and national trails, particularly where the construction period of different options is at the same time and is impacting the same asset:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough on major roads, railways, and national cycle routes. Both options are located in the buffer between the Affinity Water and Thames Water boundaries. Newbury Groundwater and Import from Portsmouth Water on major roads. Both options are located within the buffer between the Southern Water and Thames Water boundaries. Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d on major roads, railways, and national cycle network. Both options are located within the buffer between the Sutton & East Surrey Water and Thames Water boundaries. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) on major roads, railways, and national cycle network. Both options are located within the buffer between Portsmouth Water and Southern Water boundaries. 	Best practice mitigation measures, such as a CTMP, will likely be implemented to minimise effects during construction and roads and cycle routes will be reinstated where possible. Directional drilling under railways is likely. However, there are likely to still be cumulative disruption effects during the construction phase.	0	-	0	0

5.3.1.3 Best Environmental and Societal Plan (Pre-2050)

The cumulative assessment for the Best Environmental and Societal Plan is presented in Table 5.4 and is summarised by SEA topic below:

- **Biodiversity, flora and fauna** - There is potential for cumulative effects on a number of statutory and non-statutory designated sites. An in-combination HRA assessment has not been undertaken for the options selected within the Best Environmental and Societal Plan, however there is potential for in-combination effects on Natura 2000 sites. Major negative effects have therefore been identified for construction and operation as a worst-case scenario, however this may change.

There is also potential for cumulative effects on aquatic ecology during the construction. Priority habitats, woodland and Ancient Woodland may also be impacted cumulatively. The catchment management schemes within the Best Environmental and Societal Plan which are not specifically within the water company boundary buffers, however they may result in positive cumulative effects as they include schemes such as river restoration, terrestrial habitat / management and wetland creation, amongst others.

- **Soil** - There is potential for cumulative disturbance effects on agricultural land across the Best Environmental and Societal Plan during the construction phase but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another.

There is also potential for cumulative effects from the disturbance of contaminants in historic and/or authorised landfill sites as there are options within the water company boundaries in the Best Environmental and Societal Plan which are within close proximity (500m) to the same site with construction programmed for similar times. Positive cumulative effects may occur as a result of the catchment management schemes within the Best Environmental and Societal Plan that are outside of the water company boundary buffers. They include options which aim to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolio that focus on agricultural land may help to increase the productivity of soil.

- **Water** - It is not anticipated there will be cumulative effects from flood risk during the construction or operational phases. The catchment management schemes within the Best Environmental and Societal Plan are not identified to be specifically within the water company boundary buffers, however, they include natural flood management and wetland restoration options which may lead to positive cumulative effects for reducing flood risk.

An in-combination WFD assessment has not been undertaken for the options selected in the Best Environmental and Societal Plan that fall within the water company boundary buffers, however there is potential for in-combination effects. Moderate negative effects have been identified for construction and operation as worst-case scenario, however this may change. There are options within the Best Environmental and Societal Plan that have similar construction programmes and cross the same and/or multiple main rivers, chalk rivers, and waterbodies within close proximity to one another. There are multiple options within the same SPZs which are to be constructed at the same time and there are groundwater options located within the same WFD ground waterbody which may have in-combination effects during operation.

The combined benefit of the options within each of the options are likely to lead increased reliability and resilience of water supplies. The catchment management schemes include activities to improve water quality and reduce pollutants, increase resilience to low flows and increase the storage of water within the environment, facilitating resilience during drought. Therefore, having the potential

to result in positive cumulative effects. The demand management options will provide positive effects through helping to reduce demand and leakage. Drought options, such as TUBS and NEUBS, will help to conserve water during periods of drought. However, there is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.

- **Air** - There is likely to be localised cumulative effects on air quality from the construction phase for the Best Environmental and Societal Plan options which are located within the water company boundaries, are in close proximity (500m) to one another and are being constructed at the same time or have construction periods which overlap. Some of the options that have these localised cumulative effects are located within AQMAs. There is also likely to be localised cumulative effects on air quality during the operational phase of the options from staff and maintenance transport and any emissions from treatment works.
- **Climatic Factors** - The options within Best Environmental and Societal Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from all the options, located within the water company boundary buffers, within the Best Environmental and Societal Plan is anticipated to result in major construction emissions and major operational emissions.

For climate resilience, there is potential for negative cumulative effects given that the Best Environmental and Societal Plan includes a number of options within the water company boundary buffers which involve abstraction from surface and groundwater sources and therefore have the potential to result in negative cumulative effects on the resilience of the natural environment to climate change. Within the Best Environmental and Societal Plan, there are a number of Drought Permit / Order options which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable across the WRSE region. However, although not specifically within the boundary buffers, there are demand management options within the Best Environmental and Societal Plan which aim to keep water in the natural environment and thus increase or maintain resilience to climate change.

- **Landscape** - Cumulative effects on the landscape are likely as a result of the Best Environmental and Societal Plan, particularly during the construction phase where options are located within close proximity to one another and are being constructed at similar times within landscape designations such as AONBs and South Downs National Park. The catchment management schemes within Best Environmental and Societal Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.
- **Historic Environment** - The Best Environmental and Societal Plan has the potential to result in cumulative effects on the setting of historic assets during the construction phase given the proximity to options within the water company buffers which are being constructed at the same time. There are a number of options within the Best Environmental and Societal Plan which directly impact historic environment assets located within the water company boundaries. These options may not impact the same assets, however there is still potential cumulative effects on the historic environment as a whole. Excavation required for the options within the Best Environmental and Societal Plan has the potential to have an overall cumulative effect on archaeology, however this depends on the extent to which it is present at the various option locations within the water company boundaries.

- **Population and Human Health** - There is potential for cumulative effects on the local community from the construction phase of options within the Best Environmental and Societal Plan for the options located within the buffer, in close proximity (500m) to one another and are constructed at similar times. Localised disturbance effects on the local community and community facilities such as noise and vibration, dust and access issues have the potential to occur. There is also potential for long-term disturbance where options are located close to one another, not necessarily constructed at the same time but have construction periods which follow on from one another resulting in a prolonged construction phase.

The catchment management schemes within the Best Environmental and Societal Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource.

- **Material Assets** - The new infrastructure required for the options located within the water company boundary buffers included within the Best Environmental and Societal Plan will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in major negative cumulative effects. Options within the catchment management schemes may have cumulative positive effects as they contain NFM options and pesticide reduction which will help to reduce the use of resources. There is also potential for cumulative effects on built assets and infrastructure as a result of the options within the Best Environmental and Societal Plan.

Table 5.4: Best Environmental and Societal Plan Cumulative Effects Assessment (Pre-2050)

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	+++	---	<p>An in-combination HRA assessment has not been undertaken Best Environmental and Societal Plan, however there is potential for in-combination effects on Natura 2000 sites. Major negative effects have therefore been identified for construction and operation as a worst-case scenario, however this may change.</p> <p>The following options have been identified as potentially having cumulative construction effects on designated sites as they are located within the water company boundary buffers, are being constructed at the same or similar times and are geographically clustered:</p> <ul style="list-style-type: none"> Wraysbury & Hythe End Gravel Pits SPA, Ramsar, SSSI and GWDTE (100% favourable), Staines Moor SPA, Ramsar, SSSI and GWDTE (96.16% favourable, 2.13% unfavourable-recovering, and 1.71% unfavourable-declining), Wraysbury Reservoir SPA, Ramsar, and SSSI (100% favourable), Arthur Jacob Nature Reserve (LNR) as a result of Egham to Iver 50MLD (supply 2040) and Canals and Rivers Trust Slough, located in the buffer between the Affinity Water and Thames Water boundaries. Potential impacts due to construction as hydrologically linked via surface and groundwater sources. Duncton to Bignor Escarpment SAC and SSSI (6.08% unfavourable – recovering, 93.92% unfavourable – declining) as a result of SRN Source D To Havant Thicket:50MI/d and Havant Thicket To Pulborough WTW: 50MI/d, located in the buffer between Portsmouth Water and Southern Water boundaries. Ravensbury Park Local Nature Reserve (LNR) as a result of Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d, located in the buffer between Sutton & East Surrey Water and Thames Water boundaries. Titchfield Haven National Nature Reserve (NNR) as a result of Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d), located in the buffer between the Portsmouth Water and Southern Water boundaries. <p>There is potential for effects on aquatic ecology during construction where options are being constructed in the water company boundary buffers, at the same or similar time, within or within close proximity to the same waterbody and operational effects are also likely where options are abstracting and/or discharging in the same waterbody. This includes:</p> <ul style="list-style-type: none"> Watercourses and surface water during construction as a result of Egham to Iver 50MLD (supply 2040) and Canals and Rivers Trust Slough, located in the buffer between the Affinity Water and Thames Water boundaries. Watercourses and surface water during construction as a result of Newbury Groundwater and Import from Portsmouth Water, located in the buffer between Southern Water and Thames Water boundaries. Surface water during construction as a result of Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2, located in the buffer between the Southern Water and Thames Water boundaries. Watercourses and surface water during construction as a result of Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 	Best practice methods to be implemented to minimise disturbance effects and habitat loss. Where required directional drilling or option re-alignment may be required as the option design progresses.	0	---	+++	---

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<p>15MI/d, located in the buffer between Sutton & East Surrey Water and Thames Water boundaries.</p> <ul style="list-style-type: none"> Chalk rivers and watercourses during construction as a result of Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d), located in the buffer between the Portsmouth Water and Southern Water boundaries. <p>There is anticipated to be cumulative effects on Priority Habitats, Ancient Woodland and woodland, where options are being constructed in the water company boundary buffers, at the same or similar time, within or within close proximity, particularly during construction, given a number of the options within the Best Environmental and Societal Plan pass through these areas. This includes:</p> <ul style="list-style-type: none"> SRN Source D To Havant Thicket:50MI/d and Havant Thicket To Pulborough WTW: 50MI/d, located in the boundary buffer between Portsmouth Water and Southern Water boundaries, adjacent to Ancient Woodland, adjacent and through Priority Habitat (mostly deciduous woodland). Egham to Iver 50MLD (supply 2040) and Canals and Rivers Trust Slough, located in the boundary buffer between the Affinity Water and Thames Water boundaries, adjacent and through Priority Habitat (mostly deciduous woodland). Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2, located in the boundary buffer between the Southern Water and Thames Water boundaries, adjacent and through various Priority Habitats. Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d, located in the boundary buffer between Sutton & East Surrey Water and Thames Water boundaries, adjacent and through Priority Habitat (mostly deciduous woodland). Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d), located in the buffer between the Portsmouth Water and Southern Water boundaries, adjacent to Ancient Woodland, through and adjacent to Priority Habitats (mostly costal and floodplain grazing marsh and deciduous woodland). <p>There is potential for cumulative effects on LNRs within the water company boundary buffers where more than one option could cause disturbance effects from overlapping construction periods. These include:</p> <ul style="list-style-type: none"> Fairmile Bottom LNR – both options Recycling: Littlehampton WwTW (15MI/d) and Drought option: North Arundel Drought Permit/Order (2025 onwards) are within close proximity to the LNR and selected within a year of each other. However, as one of the options is a Drought Permit option, it would only be implemented in drought conditions and is likely to have limited construction. <p>The top reasons for catchments not achieving good status (RNAG) include urbanisation; barriers – ecological discontinuity; sewage discharge; groundwater abstraction; poor soil management; poor livestock management; drinking water supply; amongst others. There are catchment management schemes within the Best Environmental and Societal Plan which are not specifically within the water company boundary buffers but have the potential to result in positive cumulative effects across the WRSE region. The catchment management schemes contain options such as river restoration options, wetland creation and enhancement, pesticide reduction, sediment reduction and terrestrial habitat creation/management options.</p>					

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
Soil	Protect and enhance the functionality, quantity, and quality of soils	0	--	++	-	<p>The Best Environmental and Societal Plan includes the construction of options within the water company boundaries which impact various agricultural land grades, including Grade 1 and Grade 2. There is potential for cumulative effects on agricultural land across from the options within the Best Environmental and Societal Plan during the construction phase from disturbance but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another.</p> <p>There is also potential for cumulative effects from the disturbance of contaminants in historic and/or authorised landfill sites as there are options within the water company boundaries in Best Environmental and Societal Plan which are within close proximity (500m) to the same site with construction programmed for similar times. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are in proximity to the same historic landfill sites and sits within the buffer between Affinity Water and Thames Water boundaries. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) which are in proximity to the same authorised and historic landfill sites and sits within the buffer between Southern Water and Thames Water boundaries. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d), which are in proximity to the same historic landfill sites and sits within the buffer between Portsmouth Water and Southern Water boundaries. <p>Positive cumulative effects may also occur as a result of the catchment management schemes within the Best Environmental and Societal Plan. Although these options are not within the water company boundary buffer, there is potential for positive cumulative effects across the WRSE region given they include options which seek to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolios that focus on agricultural land may help to increase the productivity of soil.</p>	Following the construction phase, land will be reinstated where possible to minimise disturbance effects. However, there will be some permanent losses to agricultural land due to the above ground infrastructure associated with a number of the options within the Best Environmental and Societal Plan. Mitigation measures will include minimising the footprint of these assets, but residual effects are likely to remain. Best practices methods for reducing risk of working within or within close proximity to landfill sites will be implement, however residual risk remains.	0	-	++	0
Water	Increase resilience and reduce flood risk	0	0	++	0	<p>There are numerous options within the Best Environmental and Societal Plan that are located within the boundaries of the water companies and are located within Flood Zone 2 and 3. These options are therefore at risk from flooding during the construction phase and where there is above ground infrastructure there are operational risks. However, it is not anticipated there will be cumulative effects from flooding during the construction or operational phases.</p> <p>The catchment management schemes within the Best Environmental and Societal Plan are not identified to be specifically within the water company boundary buffers, however as they include options such NFM, river and wetland restoration, they have the potential to lead to positive cumulative effects for reducing flood risk across the WRSE region.</p>	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of flooding during the construction and operational phases of those individual options at risk will likely be implemented.	0	0	++	0
	Protect and enhance the quality of the water environment and water resources	0	--	+++	--	<p>There are options within the Best Environmental and Societal Plan that are within the water company boundary buffers, have similar construction programmes and cross the same and/or multiple main rivers, and waterbodies within close proximity to one another. There are multiple options within the same SPZs and ground water bodies which are to be constructed at the same time. The following options have been identified as potentially having cumulative construction and/or operational effects on the same and/or multiple main rivers, SPZs and waterbodies within close proximity to one another:</p>	During construction, best practice methods will likely be implemented to mitigate effects. This is likely to include directional drilling under rivers as well as best practice site construction methods to reduce potential for pollution incidents. Minor residual effects have been identified for the construction phase as risks may remain.	0	-	+++	--

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & River Trust Slough on, SPZ 3, main rivers, located in the buffer between the Affinity Water and Thames Water boundaries during construction only. SRN Source D to Havant Thicket:50MI/d and Havant Thicket To Pulborough WTW: 50MI/d on SPZ 3 and ground water body- Chichester chalk, located in the buffer between Portsmouth Water and Southern Water boundaries during construction only. Newbury Groundwater and Import from Portsmouth Water on SPZs 1-3, and main rivers located within the buffer between the Southern water and Thames Water boundaries. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 on SPZ 1-3, surface water, and water ground bodies- West Kent Darent and Cray Chalk and North Kent Medway Chalk, located within the buffer between the Southern water and Thames Water boundaries during construction. Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d on SPZs 3, rivers and surface water, located within the buffer between the Sutton & East Surrey Water and Thames Water boundaries. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) on rivers, waterbodies- South Hants Lambeth Group located within the buffer between the Portsmouth Water and Southern Water boundaries. <p>An in-combination WFD assessment has not been undertaken for the options selected in the Best Environmental and Societal Plan that fall within the water company boundary buffers, however there is potential for in-combination effects. Moderate negative effects have been identified for construction and operation as worst-case scenario, however this may change.</p> <p>There is potential for cumulative positive effects across the WRSE region as a result of the catchment management schemes within the Best Environmental and Societal Plan as there are options which include activities to improve water quality and reduce pollutants. The river restoration projects may also help to improve resilience to low flows and natural water retention options may help to increase storage of water within the environment, facilitating resilience during drought. Wetland creation options can also help to improve water quality. The demand management options will provide positive effects through helping to reduce demand and leakage across the WRSE region. Drought options, such as TUBS and NEUBS, will help to conserve water during periods of drought. However, there is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.</p>					
	Deliver reliable and resilient water supplies	0	0	+++	0	The combined benefit of the Best Environmental and Societal Plan options located within the water company boundaries is likely to result in resilient supplies which meet demand therefore major positive effects are identified.	No mitigation identified.	0	0	+++	0
Air	Reduce and minimise air emissions	0	--	0	-	There is likely to be localised cumulative effects on air quality from the construction phase for the Best Environmental and Societal Plan options which are located within the water company boundary buffers, are in close proximity (500m) to one another and are being constructed at the same time or have construction periods which overlap. These options include:	The use of best practice mitigation measures is likely to be implemented during construction to minimise impacts on air quality, however residual effects are likely to remain. Compliance with air quality standards and a shift to an electric vehicle fleet for staff and	0	-	0	-

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are located in the buffer between the Affinity Water and Thames Water boundaries Import from Portsmouth Water and Newbury Groundwater which are located within the buffer between the Southern Water and Thames Water boundaries SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d which are both within the buffer between the Portsmouth Water and Southern Water boundaries Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 located in the buffer between the Southern water and Thames Water boundaries. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) which are both located within the buffer between the Portsmouth Water and Southern Water boundaries. Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d which are both located within the buffer between Sutton & East Surrey Water and Thames Water boundaries. <p>South Bucks District Council AQMA No 2 is anticipated to be affected by the Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough options which have overlapping construction periods, and both sit within the buffer between Affinity Water and Thames Water boundaries.</p> <p>Gravesham Borough Council Northfleet Industrial Area AQMA is anticipated to be affected by the Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 which have overlapping construction periods, and both sit within the buffer between Southern Water and Thames Water boundaries.</p> <p>Merton AQMA is anticipated to be affected by the Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d which have overlapping construction periods and both sit within the buffer between Sutton & East Surrey Water and Thames Water boundaries.</p> <p>There is also potential for effects on AQMAs within the water company buffers where option construction periods overlap including South Bucks AQMA, Sutton AQMA and Dartford AQMA.</p> <p>There is also likely to be localised cumulative effects on air quality during the operational phase of the options from staff and maintenance transport and any emissions from treatment works.</p>	<p>maintenance workers should reduce operational effects but residual effects may remain.</p>				
Climatic Factors	Reduce embodied and operational carbon emissions	0	---	0	---	<p>The options within Best Environmental and Societal Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from all the options, located within the water company boundary buffers, within the Best Environmental and Societal Plan is anticipated to result in major construction emissions and major operational emissions. The following are options are located in the water company boundary buffers and as they are desalination options, they have high operational carbon due to the energy intense processes required:</p> <ul style="list-style-type: none"> Desalination: Isle of Sheppey (20MI/d) within the South East Water and Southern Water boundary buffer 	<p>The opportunity to use renewables during construction and operation for energy supply and use of materials with lower embodied carbon should be investigated. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available. Carbon emissions could be reduced further if options are able to use 100% renewable energy, but this is unknown at this stage.</p>	0	---	0	---

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Desalination: River Thames estuary (20MI/d) which is to be increased in size or capacity through Desalination: River Thames estuary (20MI/d) Phase 2 within the Southern Water and Thames Water boundary buffer 					
	Reduce vulnerability to climate change risks and hazards	0	0	++	--	<p>The Best Environmental and Societal Plan includes a number of options within the water company boundary buffers which involve abstraction from surface and groundwater sources and therefore have the potential to result in negative cumulative effects on the resilience of the natural environment to climate change. Within the Best Environmental and Societal Plan, there are a number of Drought Permit / Order options which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable. These may not be located within the boundary buffers but have the potential to have effects across boundaries</p> <p>However, although not specifically within the boundary buffers, there are demand management options within the Best Environmental and Societal Plan which aim to keep water in the natural environment and thus increase or maintain resilience to climate change. The catchment management schemes within the Best Environmental and Societal Plan include natural water retention which will increase resilience by adding to or retaining water in the natural environment which may lead to cumulative positive effects.</p>	For abstraction options, monitor water levels and flows to identify if further mitigation action is required.	0	0	++	--
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	--	++	0	<p>Cumulative effects on the landscape are likely as a result of the Best Environmental and Societal Plan, particularly during the construction phase where options are located within close proximity to one another and are being constructed at similar times. There are options located within the water company boundary buffers, anticipated to be constructed at the same time and are within landscape designations, including:</p> <ul style="list-style-type: none"> London Area Greenbelt <ul style="list-style-type: none"> Canals & Rivers Trust Slough and Egham to Iver 50MLD (Supply 2040) within the Thames Water and Affinity Water boundary buffer. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 within the Southern Water and Thames Water boundary buffer South Downs National Park <ul style="list-style-type: none"> SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d are both within South Downs National Park where they are 500m of one another in the Portsmouth Water and Southern Water boundary buffers and have overlapping construction periods. Worthing to Brighton: 40MI/d is within the Southern and South East Water boundary buffer and at that point is within the South Downs National Park as is Peacehaven Recycling at Barcombe (25ml/d Option). Although not within 500m of SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d, there is overlapping construction periods. Recycling: Littlehampton WwTW (15MI/d) is located within the Portsmouth Water and Southern Water boundary buffer Tilmore to Pulborough: 10MI/d is located within the Southern Water and South East boundary buffer; and Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) are located in Southern Water and Portsmouth Water boundary buffers. Although none of these options are located within 500m of one another, they are all within the South 	Ground will be reinstated following pipeline construction and measures to reduce the visual impact during construction could be implemented, however potential for residual effects to remain. Visual effects from the result of above ground infrastructure will be mitigated through screening, planting, and landscape design, and in the long-term will become part of the landscape.	0	--	++	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<p>Downs National Park when they cross the boundaries and have overlapping construction periods.</p> <ul style="list-style-type: none"> There are also several options outside the water company boundary buffer that also affect South Downs National Park. <p>Several options also affect the same AONBs within the water company boundary buffers including the Chilterns AONB, Isle of Wight AONB and North Wessex Downs AONB. Some options have overlapping construction periods resulting in potential cumulative effects on the AONB. Those options with consecutive construction periods could prolong disturbance effects within the AONBs.</p> <p>The catchment management schemes within Best Environmental and Societal Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.</p>					
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	--	0	0	<p>The Best Environmental and Societal Plan has the potential to result in cumulative effects on the setting of historic assets during the construction phase as there are historic assets located within proximity to options within the water company buffers which are being constructed at the same time. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough are located in an unknown conservation area within the buffer between the Affinity Water and Thames Water boundaries. Resource from Cheam WTW to Merton PS (TW) at 30 MI/d and Transfer from Merton (TW) to SES boundary at 15 MI/d intersects Morden Hall Park Registered Park and Garden. Morden Hall Grade II listed building, and a further 10 associated Grade II listed buildings all part of Morden Hall, Ravensbury Mill Grade II listed building, The Grange Morden grade II listed building, Milestone opposite number 92 Grade II listed building, Milestone Grade II listed building, are located adjacent and within 500m of both options and located within the buffer between Thames Water and Sutton & East Surrey Water. Additionally the are also located in Wandle Valley Conservation Area and Upper Morden Conservation area within the buffer between Thames Water and Sutton & East Surrey Water. Newbury Groundwater and Import from Portsmouth Water are located in an unknown conservation area within the buffer between the Southern Water and Thames Water boundaries. Bigg's Cottage Grade II Listed Building is also located within the water company boundary buffer and is within 500m of both options. Culham to HWZ (120) Potable – Construction and Import from Portsmouth Water (additional 9MI/d) though not constructed at the same time will also impact the same historic assets. Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2 located adjacent and close to multiple listed buildings within the buffer between Southern Water, South East Water and Thames Water boundaries. Church of All Saints Grade II* listed building within 500m, Garden walls of Scadbury Manor Grade II listed building, Scadbury Manor Grade II listed building, The Pest House in the garden of Scadbury Manor Grade II listed building, Scadbury Cottage Grade II listed building, Hazells Grade II listed building, Calf house or stable with granary above Grade II listed building, Hazells Farm Barn and attached oast Grade II 	Re-route options, or utilise direction drilling, to avoid direct impacts on historic assets. Best practice mitigation measures will likely be implemented to minimise setting effects during construction. Archaeological Watching Brief may be required during the construction phase.	0	--	0	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<p>listed building an Springhead Roman site are all within 500m of the options and within the boundary buffers.</p> <p>There are a number of options within the Best Environmental and Societal Plan which directly impact historic environment assets located within the water company boundaries. These options may not impact the same assets, however there is still potential cumulative effects on the historic environment as a whole. Options which directly impact historic assets which are located within the boundary buffers include:</p> <ul style="list-style-type: none"> • GUC option 3 50 MI/d phase 1 LB and GUC option 3 50 MI/d phase 2 LB intersects Roman settlement at the Cow Roast Inn Scheduled Monument and Dudswell Conservation Area within the boundary buffer between Affinity Water and Thames Water. • Deal Supply Scheme unknown Conservation Area within the buffer between the Affinity Water and Southern Water boundaries. • Aldlington to Saltwood Import Increase by 6 MI/d intersects Romano-British building S of Burch's Rough Scheduled Monument, unknown Conservation Area, which are located within the buffer between South East Water and Affinity Water. • Bough Beech Reservoir- raising is located within an unknown conservation area within the buffer between the Thames Water and Sutton & East Surrey Water boundaries. • New Bulk Supply: SESW to SEW RZ1 Transfer - Bough Beech to Riverhill SR (10MI/d) within unknown Conservation Area within the buffer between South East Water and Sutton & East Surrey Water boundaries. • New Bulk Supply: SWS to RZ8 - Brede to Kingsnorth (10MI/d) within unknown Conservation Area within the buffer between South East Water and Southern Water boundaries. • Recycling: Sittingbourne industrial reuse (7.5MI/d) within Tunstall Conservation Area with the buffer for South East Water and Southern Water boundaries. • Import: SEW Kingston to KTZ Near Canterbury (2MI/d) within multiple Conservation Areas, Blooden Adisham, Cooting Adisham, and Kingston located within the buffer between Affinity Water and Southern Water boundaries. • Worthing to Brighton: 40MI/d intersects Stanmer Park Registered Park and Garden and Stanmer Conservation Area which are located within the buffer between Southern Water and South East Water • Henley to SWA Transfer – 5 MI/d within an unknown Conservation Area within the buffer between South East Water and Thames Water boundaries. <p>There is potential for cumulative effects on scheduled monuments within the water company boundary buffers that are in close proximity to options with overlapping or consecutive construction effects. Effects on the setting of scheduled monuments include:</p> <ul style="list-style-type: none"> • Moated site at Marwell Manor – Raw water Transfer between Havant Thicket res and Otterbourne WSW - First Section, 90 MI/d and Import: Havant Thicket - Otterbourne direct raw water transfer - second section (90MI/d). The options are approx. 400m from the schedule monument. • Park pale at Marwell, 250m north-west of Marwell Manor - Raw water Transfer between Havant Thicket res and Otterbourne WSW - First Section, 90 MI/d and Import: Havant Thicket - Otterbourne direct raw water transfer - second section (90MI/d). The options are approx. 250m from the schedule monument. 					

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Neolithic sites near Ebbsfleet - Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2. The options are approx. 380m from the scheduled monument. Palaeolithic sites near Baker's Hole - Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2. The options are approx. 240m from the scheduled monument. Springhead Roman site - Desalination: River Thames estuary (20MI/d) and Desalination: River Thames estuary (20MI/d) Phase 2. The options are approx. 125m from the scheduled monument. <p>Excavation required for the options within the Best Environmental and Societal Plan has the potential to have an overall cumulative effect on archaeology, however this depends on the extent to which it is present at the various option locations within the water company boundaries.</p>					
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	--	+	0	<p>There is potential for cumulative effects on the local community from the construction phase of options within the Best Environmental and Societal Plan for the options located within the water company boundaries, in close proximity (500m) to one another and are constructed at similar times. Localised disturbance effects on the local community and community facilities such as noise and vibration, dust and access issues have the potential to occur. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are located in the buffer between the Affinity Water and Thames Water boundaries. SRN Source D To Havant Thicket: 50MI/d and Havant Thicket To Pulborough WTW: 50MI/d which are located in the buffer between the Portsmouth Water and Southern Water company boundary buffers. Transfer from Merton (TW) to SES Boundary at 15MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d which are located in the buffer between the Thames Water and Sutton & East Surrey Water. There is also one noise action planning important area intersected by the options and within the water company boundary buffers. Newbury Groundwater and Import from Portsmouth Water are which are located within the buffer between the Southern Water and Thames Water boundaries. There is also two noise action planning important areas within the water company boundary buffer and within 500m of both the options. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) which are located in the buffer between the Portsmouth Water and Southern Water company boundary buffers. There is also one noise action planning important area intersected by the options and within the water company boundary buffers. <p>There is also potential for long-term disturbance where options are located close to one another, not necessarily constructed at the same time but have construction periods which follow on from one another resulting in a prolonged construction phase.</p> <p>The catchment management schemes within the Best Environmental and Societal Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource.</p>	Best practice mitigation measures will likely be implemented to minimise the cumulative effects during the construction phase.	0	-	+	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
	Maintain and enhance tourism and recreation	0	-	+	0	<p>The construction phase of options in the Best Environmental and Societal Plan, located within the water company boundary buffers, are located in close proximity and are constructed at similar times have the potential to result in cumulative effects on recreational community assets and public rights of way. This includes:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough which are located in the buffer between the Affinity Water and Thames Water boundaries. These options are both within 500m of the same playing field, play space and sports facility. Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d which are located in the buffer between the Sutton & East Surrey Water and Thames Water boundaries. These options are both within 500m of the same Public Park or Gardens, playing fields, play spaces, secondary school, primary schools, infant school, religious buildings and sport facilities. Conjunctive Benefit of Budds farm 45 MI/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15MI/d) which are located in the buffer between the Portsmouth Water and Southern Water boundaries. These options are within 500m of the same playing fields, play space, bowling green, college, primary school, allotments, public park or garden, religious buildings. <p>The catchment management schemes within the Best Environmental and Societal Plan also have the potential to reduce in positive effects as they include options such as river restoration, natural water retention, wetland creation and nutrient and sediment reduction. Maintaining and improving river water quality and habitats may increase the opportunities for river-based recreation including angling. There are also opportunities for increased access to rivers with specific schemes seeking to promote this through community engagement.</p>	Best practice mitigation measures will likely be implemented to minimise the cumulative effects during the construction phase.	0	-	+	0
Material Assets	Minimise resource use and waste production	+	---	+	0	<p>The new infrastructure required for the options located within the water company boundary buffers included within the Best Environmental and Societal Plan will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in major negative cumulative effects.</p> <p>Options within the catchment management schemes may have cumulative positive effects as they contain NFM options and pesticide reduction which will help to reduce the use of resources.</p>	Opportunity to implement sustainable design measures to reduce the impact and excavated material could be reused on site. However, it is likely that moderate negative cumulative effects will remain.	+	--	+	0
	Avoid negative effects on built assets and infrastructure	0	--	0	0	<p>There is potential for cumulative effects on built assets and infrastructure from the construction phase of options within the Best Environmental and Societal Plan for the options located within the water company boundaries. The construction phase of the following options has the potential to have cumulative effects on major roads, railways, national cycle route and national trails, particularly where the construction period of different options is at the same time and is impacting the same asset:</p> <ul style="list-style-type: none"> Egham to Iver 50MLD (Supply 2040) and Canals & Rivers Trust Slough on major roads, railways, and national cycle routes. Both options are located in the buffer between the Affinity Water and Thames Water boundaries. Newbury Groundwater and Import from Portsmouth Water on major roads. Both options are located within the buffer between the Southern Water and Thames Water boundaries. Resource from Cheam WTW to Merton PS (TW) at 30MI/d and Transfer from Merton (TW) to SES Boundary at 15MI/d on major roads, railways, and national cycle network. 	Best practice mitigation measures, such as a CTMP, will likely be implemented to minimise effects during construction and roads and cycle routes will be reinstated where possible. Directional drilling under railways is likely. However, there are likely to still be cumulative disruption effects during the construction phase.	0	-	0	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
		+	-	+	-	<p>Both options are located within the buffer between the Sutton & East Surrey Water and Thames Water boundaries.</p> <ul style="list-style-type: none"> Conjunctive Benefit of Budds farm 45 Ml/d to Havant Thicket and Recycling: Recharge of Havant Thicket reservoir from Budds Farm and new WRP (15Ml/d) on major roads, railways, and national cycle network. Both options are located within the buffer between Portsmouth Water and Southern Water boundaries. 		+	-	+	-

5.3.1.4 Summary of Programme Appraisal (Pre 2050)

The cumulative assessment results identified across the Best Value Plan, Least Cost Plan and Best Environmental and Societal Plan are similar. This is likely due to the nature of the assessment in only considering options within water company boundary buffers which are similar across all three plans. Major and moderate positive residual effects are identified across numerous multiple SEA topics and objectives due to the inclusion of the catchment management and demand management schemes within the three plans. SEA objectives with positive residual effects include biodiversity, flora and fauna, soils; flood risk; water environment; climate resilience; landscape; and population and human health. The catchment management schemes include options such as river restoration, wetland creation and enhancement, and terrestrial habitat creation/management, natural flood management, education and engagement, which are likely to contribute to cumulative positive effects.

Major negative residual effects were identified for the construction and operational phase for the objective on biodiversity, flora and fauna for all three plans. The HRA in-combination assessment undertaken for the Best Value Plan identified that there are potential for in-combination construction and/or operational effects as a result of numerous options within the Best Value Plan. It should be noted that HRA ToLS (Level 1) information was predominately used to inform the HRA in-combination assessment as HRA Appropriate Assessment (Level 2) information was not made available by all the water companies at the time of assessment. It is recommended that the HRA in-combination effects assessment is re-visited once AA information is available to allow appropriate mitigation to be included in the assessment process. Although HRA in-combination assessments were not undertaken for the two alternative plans, major negative effects were identified as a worst-case scenario. Further assessments of these potential affects will be undertaken ahead of the finalisation of the plan, taking account of information from member water companies, including appropriate mitigation to be included in the assessment process.

Moderate negative residual effects were identified for all three plans in relation to the SEA objective on the water environment. The WFD in-combination assessment undertaken on the Best Value Plan identified a potential risk of WFD deterioration as a result of the simultaneous operation of two drought permit options within the Best Value Plan. Mitigation would be secured through the Drought Plan and drought permit/order processes. Moderate negative residual effects have therefore been carried through on the other two plans as a worst-case scenario as the two drought options are selected in all three plans.

For all three plans, major negative residual effects have also been identified for the objective on carbon emissions for both construction and operation due to the cumulative impact of materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. During operation, moderate negative residual effects have also been identified for climate resilience given the cumulative effect of options which involve groundwater or surface water abstraction, particularly during periods of drought, which will reduce the resilience of the natural environment to climate change. All three plans are also identified to have moderate negative residual effects on landscape and the historic environment during the construction phase. The construction phase is also identified to have moderate negative residual effects on material assets due to the resource use and waste which will be cumulatively generated through the construction phase. Further assessments of these potential affects will be undertaken ahead of the finalisation of the plan, taking account of information from member water companies, including appropriate mitigation to be included in the assessment process.

5.3.2 Draft Regional Plan (Post 2050)

The list of options in each of the three Plans within the 500m buffers, selected post-2050, are presented in Table 5.5. As explained in Section 4.3, the post 2050 options have been assessed separately because up to 2050 is the 25-year statutory WRMP period and after this the plan becomes the regional strategy with uncertainty related to planning scenarios and technical improvements for options. Options without defined geographical locations such as TUBS, NEUBS, catchment management options, media campaigns and demand management options are not included in Table 5.5 but have been considered within the cumulative effects assessment.

HRA and WFD in-combination assessments have also been undertaken on the Best Value Plan and the results have been used to inform the biodiversity and water objective in the SEA cumulative assessment. The results of the HRA and WFD in-combination assessment are presented in full in Appendix H and G respectively. BNG and Natural Capital in-combination assessments were also undertaken with results presented in Appendix J.

Table 5.5: Options within each Plan within the water company buffers (Post-2050)

Option Name	BVP	BESP	LCP
Desalination: Isle of Sheppey (10MI/d) Phase 2		✓	
Desalination: Tidal River Arun (20MI/d)		✓	
Groundwater Development - Confined Chalk North London		✓	✓
New Bulk Supply: SESW Outwood to SEW Whitely Hill (5MI/d)			✓
Import from South East Water			✓

5.3.2.1 WRSE Draft Regional Plan (Best Value Plan) (Post-2050)

The WRSE Draft Regional Plan (referred to as the ‘Best Value Plan’) has no options located in the water company buffers selected after 2050. The assessment is therefore focussed on where options affect designated sites or sensitive receptors which are located within buffers between water companies. The assessment is presented in Table 5.6 and is summarised below. This is considered to be an appropriate level of assessment at this draft regional plan stage and the need for further assessment of alternatives will be considered following draft plan consultation, and taking account of information from member water companies and consultation on their draft WRMPs.

- Biodiversity, flora and fauna** - The Best Value Plan does not have any options selected post-2050 which are located in the buffers between the water company boundaries. The options selected post-2050 which are outside of the water company boundary buffers have been analysed to determine if there are any pathways for effects on designated sites located within the buffer, however no potential in-combination effects were identified. The HRA in-combination assessment (Mott MacDonald, 2022) was undertaken and identified that a number of the options selected post-2050 have the potential to have in-combination effects of a number of sites during the construction phase (see Appendix H). Major negative effects were therefore identified¹⁵. However, it should be noted that for some options HRA AA has not yet been undertaken by the individual water companies and therefore the in-combination effects assessment was based on ToLS results for these options. It is

¹⁵ At this stage in the options design, it is not possible to identify and quantify in more detail the potential in-combination effects on the Natura 2000 sites. In the next stages of the option development the identified options will undertake a more in-depth analysis of the potential effects and detail specific mitigation measures.

recommended that the HRA in-combination effects assessment is re-visited following completion of all selected option AAs so that appropriate mitigation can be included in the assessment process.

There are catchment management schemes within the Best Value Plan (selected post-2050) which are not specifically within the water company boundary buffers but have the potential to result in positive cumulative effects across the WRSE region. The catchment management schemes contain options such as river restoration options, INNS options, wetland creation and enhancement, pesticide reduction, sediment reduction and terrestrial habitat creation/management options.

- **Soil** - The options selected post-2050 in the Best Value Plan do not fall within the water company boundary buffers therefore neutral effects are identified. There is potential for positive cumulative effects may also occur as a result of the catchment management schemes within the Best Value Plan. Although these options are not within the water company boundary buffer, there is potential for positive cumulative effects across the WRSE region given they include options which seek to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolios that focus on agricultural land may help to increase the productivity of soil.
- **Water** - It is not anticipated there will be cumulative effects from flood risk during the construction or operational phases. The catchment management schemes within the Best Value Plan, selected post-2050, are not identified to be specifically within the water company boundary buffers, however, they include natural flood management, wetland restoration and Sustainable Urban Drainage (SuDS) options which may lead to positive cumulative effects for reducing flood risk.

A WFD in-combination effects assessment has been carried out to assess options selected in the Best Value Plan post-2050. In summary, the assessment identified two water bodies impacted by two or more options from different water companies. However, it was identified that there was no risk of in-combination effects and thus no increased risk of WFD deterioration within these waterbodies.

The WFD in-combination assessment is presented in full in Appendix I.

There is potential for cumulative positive effects across the WRSE region as a result of the catchment management schemes within the Best Value Plan as there are options which include activities to improve water quality and reduce pollutants. The river restoration projects may also help to improve resilience to low flows and natural water retention options may help to increase storage of water within the environment, facilitating resilience during drought. Wetland creation options can also help to improve water quality. There is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.

- **Air** - There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers. The options selected post-2050 which are outside of the water company boundary buffers have been analysed to determine if there are any pathways for effects on AQMAs within the boundary buffers. It identified that there are unlikely to be cumulative effects.
- **Climatic Factors** - There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers therefore neutral effects are identified. There are a number of Drought Permit / Order options, selected post-2050, which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable. These may not be located within the boundary buffers but have the potential to have effects across boundaries. Although not specifically within the boundary buffers, there are demand management options within the Best Value Plan which aim to keep water in the natural environment and thus increase or maintain resilience to climate change. The catchment management schemes within Best Value Plan include augmentation and natural

water retention which will increase resilience by adding to or retaining water in the natural environment which may lead to cumulative positive effects.

- **Landscape** - There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers. The options selected post-2050 which are outside of the water company boundary buffers have been analysed to determine if there are any effects on landscape designations (AONB and National Parks) within the boundary buffers. It identified that there is unlikely to be any cumulative effects. The catchment management schemes within Best Value Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.
- **Historic Environment** - There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers. The options selected post-2050 which are outside of the water company boundary buffers have been analysed to determine if there are any effects on historic environment assets (Registered Parks and Gardens; Registered Battlefields; Scheduled Monuments; or World Heritage Sites) within the boundary buffers. It identified that there are unlikely to be cumulative effects.
- **Population and Human Health** - There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers therefore neutral effects are identified. The catchment management schemes within the Best Value Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource. The catchment management schemes within the Best Value Plan also have the potential to reduce in positive effects as they include options such as river restoration, natural water retention, wetland creation and nutrient and sediment reduction. Maintaining and improving river water quality and habitats may increase the opportunities for river-based recreation including angling. There are also opportunities for increased access to rivers with specific schemes seeking to promote this through community engagement.
- **Material Assets** - Options within the catchment management schemes may have cumulative positive effects for the construction phase as they contain NFM options and pesticide reduction which will help to reduce the use of resources. There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers therefore neutral effects are identified in relation to built assets and infrastructure.

Table 5.6: Best Value Plan Cumulative Effects Assessment (Post-2050)

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	+++	0	<p>The Best Value Plan does not have any options selected post-2050 which are located in the buffers between the water company boundaries. The options selected post-2050 which are outside of the water company boundary buffers have been analysed to determine if there are any pathways for effects on designated sites located within the buffer, however no potential in-combination effects were identified.</p> <p>The HRA in-combination assessment (Mott MacDonald, 2022) was undertaken and identified the following options have the potential to impact the follow sites:</p> <ul style="list-style-type: none"> STT Support for 500 MI/d Pipeline interconnector - Vyrnwy Phase 4 Additional 30MI/d (105 MI/d total); STT Support for 500 MI/d Pipeline interconnector - Vyrnwy Phase 2 Additional 35MI/d (60 MI/d total); STT Support for 500 MI/d Pipeline interconnector - Vyrnwy Phase 3 Additional 15MI/d (75 MI/d total); and STT Support for 500 MI/d Pipeline interconnector - Vyrnwy Phase 1 25MI/d may be affected the following sites during construction: <ul style="list-style-type: none"> Midland Meres and Mosses Phase 2 Ramsar River Clun SAC River Usk SAC River Wye SAC Severn Estuary Ramsar Severn Estuary / Mor Hafren SAC Severn Estuary SPA <p>At this stage in the options design, it is not possible to identify and quantify in more detail the potential in-combination effects on the Natura 2000 sites. In the next stages of the option development the identified options will undertake a more in-depth analysis of the potential effects and detail specific mitigation measures.</p> <p>The top reasons for catchments not achieving good status (RNAG) include urbanisation; barriers – ecological discontinuity; sewage discharge; groundwater abstraction; poor soil management; poor livestock management; drinking water supply; amongst others. There are catchment management schemes within the Best Value Plan (selected post-2050) which are not specifically within the water company boundary buffers but have the potential to result in positive cumulative effects across the WRSE region. The catchment management schemes contain options such as river restoration options, INNS options, wetland creation and enhancement, pesticide reduction, sediment reduction and terrestrial habitat creation/management options.</p>	Best practice methods to be implemented to minimise disturbance effects and habitat loss. Where required directional drilling or option re-alignment may be required as the option design progresses.	0	---	+++	0
Soil	Protect and enhance the functionality, quantity and quality of soils	0	0	++	0	<p>The options selected post-2050 in the Best Value Plan do not fall within the water company boundary buffers therefore neutral effects are identified. However, it is acknowledged that the implementation of the options selected in the Best Value Plan, post-2050 and outside of the water company boundary buffers, have the potential to result in cumulative effects on agricultural land across the WRSE region. The cumulative effects of these options are assessed as part of the individual water company WRMP24s.</p> <p>There is potential for Positive cumulative effects may also occur as a result of the catchment management schemes within the Best Value Plan. Although these options are not within the water company boundary buffer, there is potential for positive cumulative effects across the WRSE region given they include options</p>	No cumulative effects are identified therefore mitigation is not required.	0	0	++	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						which seek to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolios that focus on agricultural land may help to increase the productivity of soil.					
Water	Increase resilience and reduce flood risk	0	0	++	0	<p>The options selected post-2050 in the Best Value Plan do not fall within the water company boundary buffers. Regardless of whether the options are located within the buffers or not, there is not anticipated that there will be cumulative effects from flooding during the construction or operational phases.</p> <p>The catchment management schemes within the Best Value Plan are not identified to be specifically within the water company boundary buffers, however as they include options such as NFM, river and wetland restoration and Sustainable Urban Drainage (SuDS), they have the potential to lead to positive cumulative effects for reducing flood risk across the WRSE region.</p>	No cumulative effects are identified therefore mitigation is not required.	0	0	++	0
	Protect and enhance the quality of the water environment and water resources	0	0	+++	0	<p>There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers.</p> <p>A WFD in-combination effects assessment has been carried out to assess options selected in the Best Value Plan post-2050. In summary, the assessment identified two water bodies impacted by two or more options from different water companies. However, it was identified that there was no risk of in-combination effects and thus no increased risk of WFD deterioration within these waterbodies. The WFD in-combination assessment is presented in full in Appendix I.</p> <p>There is potential for cumulative positive effects across the WRSE region as a result of the catchment management schemes within the Best Value Plan as there are options which include activities to improve water quality and reduce pollutants. The river restoration projects may also help to improve resilience to low flows and natural water retention options may help to increase storage of water within the environment, facilitating resilience during drought. Wetland creation options can also help to improve water quality. The demand management options will provide positive effects through helping to reduce demand and leakage across the WRSE region. Drought options, such as TUBS and NEUBS, will help to conserve water during periods of drought. However, there is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.</p>	During construction, best practice methods will likely be implemented to mitigate effects. This is likely to include directional drilling under rivers as well as best practice site construction methods to reduce potential for pollution incidents. Neutral residual effects have therefore been identified for the construction phase.	0	0	+++	0
	Deliver reliable and resilient water supplies	0	0	0	0	There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers therefore neutral effects are identified. However, it is acknowledged that the implementation of the options selected in the Best Value Plan, post-2050 and outside the water company boundary buffers, will likely have positive cumulative effects on securing reliable and resilient water supplies for the WRSE region. The cumulative effects of these options are assessed as part of the individual water company WRMP24s.	No cumulative effects are identified therefore mitigation is not required	0	0	0	0
Air	Reduce and minimise air emissions	0	0	0	0	There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers. The options selected post-2050 which are outside of the water company boundary buffers have been analysed to determine if there are any pathways for effects on AQMAs within the boundary buffers. It identified that there are unlikely to be cumulative effects.	No cumulative effects are identified therefore mitigation is not required	0	0	0	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
Climatic Factors	Reduce embodied and operational carbon emissions	0	0	0	0	There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers therefore neutral effects are identified. However, it is acknowledged that the implementation of the options selected in the Best Value Plan, post-2050 and outside the water company boundary buffers, will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects of these options are assessed as part of the individual water company WRMP24s.	No cumulative effects are identified therefore mitigation is not required	0	0	0	0
	Reduce vulnerability to climate change risks and hazards	0	0	++	--	There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers. Within the Best Value Plan, there are a number of Drought Permit / Order options, selected post-2050, which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable. These may not be located within the boundary buffers but have the potential to have effects across boundaries. Although not specifically within the boundary buffers, there are demand management options within the Best Value Plan which aim to keep water in the natural environment and thus increase or maintain resilience to climate change. The catchment management schemes within Best Value Plan include augmentation and natural water retention which will increase resilience by adding to or retaining water in the natural environment which may lead to cumulative positive effects.	For abstraction options, monitor water levels and flows to identify if further mitigation action is required.	0	0	++	--
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	++	0	There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers. The options selected post-2050 which are outside of the water company boundary buffers have been analysed to determine if there are any effects on landscape designations (AONB and National Parks) within the boundary buffers. It identified that there is unlikely to be any cumulative effects. The catchment management schemes within Best Value Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.	No cumulative effects are identified therefore mitigation is not required	0	0	++	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	0	0	There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers. The options selected post-2050 which are outside of the water company boundary buffers have been analysed to determine if there are any effects on historic environment assets (Registered Parks and Gardens; Registered Battlefields; Scheduled Monuments; or World Heritage Sites) within the boundary buffers. It identified that there are unlikely to be cumulative effects.	No cumulative effects are identified therefore mitigation is not required	0	0	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	+	0	There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers therefore neutral effects are identified. However, it is acknowledged that the implementation of the options selected in the Best Value Plan, post-2050 and located outside of the water company boundary buffers, have the potential to result in cumulative effects on the local community, particularly during the construction phase. The cumulative effects of these options are assessed as part of the individual water company WRMP24s. The catchment management schemes within the Best Value Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local	No cumulative effects are identified therefore mitigation is not required	0	0	+	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects		
		+	-	+	-			+	-	+	-	
						community make more informed decisions and promote rivers as a community and educational resource.						
	Maintain and enhance tourism and recreation	0	0	+	0	<p>There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers therefore neutral effects are identified. However, it is acknowledged that the implementation of the options selected in the Best Value Plan, post-2050 and located outside of the water company boundary buffers, have the potential to result in cumulative effects on recreation and tourism. The cumulative effects of these options are assessed as part of the individual water company WRMP24s.</p> <p>The catchment management schemes within the Best Value Plan also have the potential to reduce in positive effects as they include options such as river restoration, natural water retention, wetland creation and nutrient and sediment reduction. Maintaining and improving river water quality and habitats may increase the opportunities for river-based recreation including angling. There are also opportunities for increased access to rivers with specific schemes seeking to promote this through community engagement.</p>	No cumulative effects are identified therefore mitigation is not required	0	0	+	0	
Material Assets	Minimise resource use and waste production	+	0	0	0	<p>There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers therefore neutral effects are identified. However, it is acknowledged that the implementation of the options selected in the Best Value Plan, post-2050 and outside of the water company boundary buffers, will use resources and generate. The cumulative effects of these options are assessed as part of the individual water company WRMP24s.</p> <p>Options within the catchment management schemes may have cumulative positive effects as they contain NFM options and pesticide reduction which will help to reduce the use of resources.</p>	No cumulative effects are identified therefore mitigation is not required	+	0	0	0	
	Avoid negative effects on built assets and infrastructure	0	0	0	0	<p>There are no options within the Best Value Plan, selected post-2050, that are within the water company boundary buffers therefore neutral effects are identified. However, it is acknowledged that the implementation of the options selected in the Best Value Plan, post-2050 and outside of the water company boundary buffers, have the potential to have cumulative effects on built assets and infrastructure across the WRSE region. The cumulative effects of these options are assessed as part of the individual water company WRMP24s.</p>	No cumulative effects are identified therefore mitigation is not required	0	0	0	0	

5.3.2.2 Least Cost Plan (Post-2050)

The Least Cost Plan has three options located in the water company boundary buffers selected after 2050 as presented in Table 5.5 and as follows:

- Groundwater Development - Confined Chalk North London
- New Bulk Supply: SESW Outwood to SEW Whitely Hill (5Ml/d)
- Import from South East Water

The assessment of the options selected in the Least Cost Plan post-2050 is presented in Table 5.7 and is summarised by SEA topic below.

- **Biodiversity, flora and fauna** - A HRA in-combination has not been undertaken for options selected in the Least Cost Plan post-2050. However, there is potential for in-combination effects on Natura 2000 sites. Major negative effects have therefore been identified for construction and operation as a worst-case scenario, however this may change. There are three options within the Least Cost Plan, selected post-2050 and located in the water company boundary buffers. None of the three options have overlapping construction periods with other options located which are located within close proximity within the water company boundary buffers. They also so not have operational effects which would result in cumulative effects. However, potential cumulative effects have been identified for one of the options (Import from South East Water) given it directly intersects Lewes Down SSSI (4.97% favourable, 88.58% unfavourable – recovering, 6.45% unfavourable – declining) and GWDTE. Peacehaven Recycling at Barcombe (25Ml/d Option) is also located in the Southern Water and South East boundary buffer, and also intersects the same site. Although construction periods of these options are over 10 years apart, potential cumulative construction related effects may occur due to prolonged direct disturbance in the designated site.

There are catchment management schemes within the Least Cost Plan (selected post-2050) which are not specifically within the water company boundary buffers but have the potential to result in positive cumulative effects across the WRSE region. The catchment management schemes contain options such as river restoration options, INNS options, wetland creation and enhancement, pesticide reduction, sediment reduction and terrestrial habitat creation/management options.

- **Soil** - The Least Cost Plan includes the construction of options, selected post-2050, within the water company boundaries which impact various agricultural land grades, however not including Grade 1 and Grade 2. There is potential for cumulative effects on agricultural land across from the options within the Least Cost Plan during the construction phase from disturbance but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another.

There is potential for positive cumulative effects may also occur as a result of the catchment management schemes within the Least Cost Plan. Although these options are not within the water company boundary buffer, there is potential for positive cumulative effects across the WRSE region given they include options which seek to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolios that focus on agricultural land may help to increase the productivity of soil.

- **Water** - It is not anticipated there will be cumulative effects from flood risk during the construction or operational phases. The catchment management schemes within the Least Cost Plan, selected post-2050, are not identified to be specifically within the water company boundary buffers,

however, they include natural flood management, wetland restoration and Sustainable Urban Drainage (SuDS) options which may lead to positive cumulative effects for reducing flood risk.

An in-combination WFD assessment has not been undertaken, however moderate negative effects have been identified for construction and operation as worst-case scenario; however, this may change. There are three options within the Least Cost Plan, selected post-2050 and located in the water company boundary buffers. However, they are not within proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction related effects have therefore been identified as a result of these options. Operational cumulative effects are also not anticipated as the options do not interact operationally with other options located within the water company boundary buffers.

There is potential for cumulative positive effects across the WRSE region as a result of the catchment management schemes within the Least Cost Plan as there are options which include activities to improve water quality and reduce pollutants. The river restoration projects may also help to improve resilience to low flows and natural water retention options may help to increase storage of water within the environment, facilitating resilience during drought. Wetland creation options can also help to improve water quality. There is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.

- **Air** – Neutral effects are identified as the options within the water company buffers are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. One of these options (Groundwater Development - Confined Chalk North London) is located within the Ealing AQMA, however there are no other options located in the same AQMA.
- **Climatic Factors** – The options within Least Cost Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from the three options are anticipated to result in major construction emissions and major operational emissions.

There is potential for cumulative effects on the resilience of the local environment to climate change given the Least Cost Plan includes groundwater abstraction as well as drought permit / order options, although these are not necessarily located in buffers, they have the potential for cross boundary effects. The catchment management schemes within the Least Cost Plan include natural water retention which will increase resilience by adding to or retaining water in the natural environment which may lead to cumulative positive effects.

- **Landscape** – The catchment management schemes within Least Cost Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences. No cumulative construction and/or operational effects are identified in relation to the options selected in the Least Cost Plan, post-2050 and located within the buffers between the water companies.
- **Historic Environment** - Neutral effects are identified. There is potential the options within the water company boundary buffers to have localised impacts on the historic environment, particularly during the construction phase, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative

construction or operational related effects have therefore been identified as a result of these options.

- **Population and Human Health** - The catchment management schemes within the Least Cost Plan have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource. There is potential for the options within the water company boundary buffers to have localised impacts on population and human health, particularly during the construction phase, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.
- **Material Assets** – The new infrastructure required for the options selected in the Least Cost Plan, post-2050 and located within the water company boundary buffers, will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in cumulative effects. Positive cumulative effects are anticipated from the catchment management schemes as they contain NFM options and pesticide reduction which will help to reduce the use of resources. Neutral effects are identified in relation to the objective on built assets and infrastructure. There is potential for the options within the water company boundary buffers to have localised impacts on built assets and infrastructure during the construction phase, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.

Table 5.7: Least Cost Plan Cumulative Effects Assessment (Post-2050)

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	+++	---	<p>A HRA in-combination has not been undertaken for options selected in the Least Cost Plan selected post-2050. However, there is potential for in-combination effects on Natura 2000 sites. Major negative effects have therefore been identified for construction and operation as a worst-case scenario, however this may change.</p> <p>There are three options within the Least Cost Plan, selected post-2050 and located in the water company boundary buffers. None of the three options have overlapping construction periods with other options located which are located within close proximity within the water company boundary buffers. They also so not have operational effects which would result in cumulative effects. However, potential cumulative effects have been identified for one of the options (Import from South East Water) given it directly intersects Lewes Down SSSI (4.97% favourable, 88.58% unfavourable – recovering, 6.45% unfavourable – declining) and GWDTE. Peacehaven Recycling at Barcombe (25MI/d Option) is also located in the Southern Water and South East boundary buffer, and also intersects the same site. Although construction periods of these options are over 10 years apart, potential cumulative construction related effects may occur due to prolonged direct disturbance in the designated site.</p> <p>The top reasons for catchments not achieving good status (RNAG) include urbanisation; barriers – ecological discontinuity; sewage discharge; groundwater abstraction; poor soil management; poor livestock management; drinking water supply; amongst others. There are catchment management schemes within the Least Cost Plan (selected post-2050) which are not specifically within the water company boundary buffers but have the potential to result in positive cumulative effects across the WRSE region. The catchment management schemes contain options such as river restoration options, INNS options, wetland creation and enhancement, pesticide reduction, sediment reduction and terrestrial habitat creation/management options.</p>	<p>Best practice methods to be implemented to minimise disturbance effects and habitat loss. Where required directional drilling or option re-alignment may be required as the option design progresses.</p> <p>Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat.</p> <p>Ecology surveys will be required at future design stages to determine effects and mitigation required. It is assumed that mitigation recommended by further ecology surveys will be implemented and therefore residual construction effects are lessened although this wouldn't negate the need for a potential appropriate assessment (where only Stage 1 has been undertaken). Implementation of mitigation measures set out in HRA Appropriate Assessments where these have been undertaken.</p> <p>Opportunities for habitat creation and habitat enhancement will be further investigated through WRMP24 and options design. Some options such as reservoirs already have habitat creation designed into proposals.</p> <p>Opportunities for BNG and links with nature recovery networks will be further investigated at the WRMP24 level.</p>	0	---	+++	---
Soil	Protect and enhance the functionality, quantity and quality of soils	0	-	++	0	<p>The Least Cost Plan includes the construction of options, selected post-2050, within the water company boundaries which impact various agricultural land grades, however not including Grade 1 and Grade 2. There is potential for cumulative effects on agricultural land across from the options within the Least Cost Plan during the construction phase from disturbance but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another. There is not anticipated to be cumulative effects where options in the Least Cost Plan, selected post-2050 and located in water company boundary buffers, are in proximity to the same historic or authorised landfill sites.</p> <p>There is potential for positive cumulative effects may also occur as a result of the catchment management schemes within the Least Cost Plan. Although these options are not within the water company boundary buffer, there is potential for positive cumulative effects across the WRSE region given they include options which seek to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolios that focus on agricultural land may help to increase the productivity of soil.</p>	<p>Following the construction phase, land will be reinstated where possible to minimise disturbance effects. However, there will be some permanent losses to agricultural land due to the above ground infrastructure associated with a number of the options within the Least Cost Plan.</p> <p>Mitigation measures will include minimising the footprint of these assets, but residual effects are likely to remain.</p>	0	-	++	0
Water	Increase resilience and reduce flood risk	0	0	++	0	<p>The options in the Least Cost Plan, selected post-2050 and within the boundaries of the water companies, and are located within Flood Zone 2 and 3. These options are therefore at risk from flooding during the construction phase and where there is above ground infrastructure there are operational risks. However, it is not</p>	<p>No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of flooding</p>	0	0	++	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<p>anticipated there will be cumulative effects from flooding during the construction or operational phases.</p> <p>The catchment management schemes within the Least Cost Plan are not identified to be specifically within the water company boundary buffers, however as they include options such as NFM, river and wetland restoration and Sustainable Urban Drainage (SuDS), they have the potential to lead to positive cumulative effects for reducing flood risk across the WRSE region.</p>	during the construction and operational phases of those individual options at risk will likely be implemented.				
	Protect and enhance the quality of the water environment and water resources	0	--	+++	--	<p>An in-combination WFD assessment has not been undertaken for the options selected in the Least Cost Plan that fall within the water company boundary buffers, however there is potential for in-combination effects. Moderate negative effects have been identified for construction and operation as worst-case scenario; however this may change.</p> <p>There are three options within the Least Cost Plan, selected post-2050 and located in the water company boundary buffers. However, they are not within proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction related effects have therefore been identified as a result of these options. Operational cumulative effects are also not anticipated as the options do not interact operationally with other options located within the water company boundary buffers.</p> <p>There is potential for cumulative positive effects across the WRSE region as a result of the catchment management schemes within the Least Cost Plan as there are options which include activities to improve water quality and reduce pollutants. The river restoration projects may also help to improve resilience to low flows and natural water retention options may help to increase storage of water within the environment, facilitating resilience during drought. Wetland creation options can also help to improve water quality. There is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.</p>	During construction, best practice methods will likely be implemented to mitigate effects. This is likely to include directional drilling under rivers as well as best practice site construction methods to reduce potential for pollution incidents. Neutral residual effects have therefore been identified for the construction phase.	0	--	+++	--
	Deliver reliable and resilient water supplies	0	0	+++	0	The combined benefit of the three options selected in the Least Cost Plan post-2050, and located within the water company boundaries, is likely to result in resilient supplies which meet demand therefore major positive effects are identified.	No mitigation identified.	0	0	+++	0
Air	Reduce and minimise air emissions	0	0	0	0	The Least Cost Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have localised impacts on air quality during construction and/or operation, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction related effects have therefore been identified as a result of these options. One of these options (Groundwater Development - Confined Chalk North London) is located within the Ealing AQMA, however there are no other options located in the same AQMA.	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on air quality will likely be implemented.	0	0	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	---	0	---	The options within Least Cost Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from the three options, selected post-2050 and located within the water company boundary buffers, within the Least Cost Plan is anticipated to result in major construction emissions and major operational emissions.	The opportunity to use renewables during construction and operation for energy supply and use of materials with lower embodied carbon should be investigated. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available. Carbon emissions could be reduced further if options are able to	0	---	0	---

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
							use 100% renewable energy, but this is unknown at this stage.				
	Reduce vulnerability to climate change risks and hazards	0	0	++	--	The Least Cost Plan has three options which are selected post-2050 and are located within the buffers between water companies. Groundwater Development - Confined Chalk North London is located within the buffer between Thames Water and Affinity Water and involves abstraction of groundwater sources therefore has the potential to result in negative effects on the resilience of the natural environment to climate change. Within the Least Cost Plan, there are a number of Drought Permit / Order options which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable. These may not be located within the boundary buffers but have the potential to have effects across boundaries. Cumulative negative effects are therefore identified. The catchment management schemes within the Least Cost Plan include flow augmentation options and natural water retention which will increase resilience by adding to or retaining water in the natural environment which may lead to cumulative positive effects.	For abstraction options, monitor water levels and flows to identify if further mitigation action is required.	0	0	++	--
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	++	0	The Least Cost Plan has three options which are selected post-2050 and are located within the buffers between water companies. Import from South East Water is located Southern Water and Portsmouth Water boundary buffer and is partially located within the South Downs National Park. New Bulk Supply: SESW Outwood to SEW Whitely Hill (5Ml/d) is located South East Water, Southern Water and Sutton and East Surrey Water boundary buffers and is partially within the High Weald AONB. There are other options which are also located within the same landscape designations; however these are selected pre-2050 and do not have overlapping construction periods with those selected post-2050 therefore no cumulative effects are identified. The other option is not located within any landscape designations. There is potential for the three options to have effects on the landscape during construction and/or operational individually, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options. The catchment management schemes within Least Cost Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on the landscape will likely be implemented.	0	0	++	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	0	0	The Least Cost Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have indirect effects on the setting of historic environment assets, particularly during, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on the historic environment will likely be implemented.	0	0	0	0
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	+	0	The Least Cost Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have impacts on the local community during construction and/or operation, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on the local community will likely be implemented.	0	0	+	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<p>proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.</p> <p>The catchment management schemes within the Least Cost Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource.</p>					
	Maintain and enhance tourism and recreation	0	0	+	0	<p>The Least Cost Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have localised impacts on tourism or recreations during construction and/or operation, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.</p> <p>The catchment management schemes within the Least Cost Plan also have the potential to reduce in positive effects as they include options such as river restoration, natural water retention, wetland creation and nutrient and sediment reduction. Maintaining and improving river water quality and habitats may increase the opportunities for river-based recreation including angling. There are also opportunities for increased access to rivers with specific schemes seeking to promote this through community engagement.</p>	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on tourism or recreation will likely be implemented.	0	0	+	0
Material Assets	Minimise resource use and waste production	+	---	0	0	<p>The new infrastructure required for the options selected in the Least Cost Plan, post-2050 and located within the water company boundary buffers, will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in major negative cumulative effects.</p> <p>Options within the catchment management schemes may have cumulative positive effects as they contain NFM options and pesticide reduction which will help to reduce the use of resources.</p>	Opportunity to implement sustainable design measures to reduce the impact and excavated material could be reused on site. However, it is likely that moderate negative cumulative effects will remain.	+	--	0	0
	Avoid negative effects on built assets and infrastructure	0	0	0	0	<p>The Least Cost Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have localised impacts on built assets and infrastructure during the construction phase, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.</p>	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on built assets and infrastructure, such as best practice construction methods, will likely be implemented.	0	0	0	0

5.3.2.3 Best Environmental and Societal Plan (Post-2050)

The Best Environmental and Societal Plan has three options located in the water company boundary buffers selected after 2050 as presented in Table 5.5 and as follows:

- Desalination: Isle of Sheppey (10MI/d) Phase 2
- Desalination: Tidal River Arun (20MI/d)
- Groundwater Development - Confined Chalk North London

The assessment of the options selected in the Best Environmental and Societal Plan post-2050 is presented in Table 5.8 and is summarised by SEA topic below.

- **Biodiversity, flora and fauna** - A HRA in-combination has not been undertaken for options selected in the Best Environmental and Societal Plan post-2050. As the potential for in-combination effects on Natura 2000 sites is unknown, major negative effects have therefore been identified for construction and operation as a worst-case scenario, however this may change. There are three options within the Best Environmental and Societal Plan, selected post-2050 and located in the water company boundary buffers. However, they are not within proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction related effects have therefore been identified as a result of these options. Operational cumulative effects are also not anticipated as the options do not interact with other options located within the water company boundary buffers.

There are catchment management schemes within the Best Environmental and Societal Plan (selected post-2050) which are not specifically within the water company boundary buffers but have the potential to result in positive cumulative effects across the WRSE region. The catchment management schemes contain options such as river restoration options, INNS options, wetland creation and enhancement, pesticide reduction, sediment reduction and terrestrial habitat creation/management options.

- **Soil** - The Best Environmental and Societal Plan includes the construction of options, selected post-2050, within the water company boundaries which impact various agricultural land grades, including Grade 1 and Grade 2. There is potential for cumulative effects on agricultural land across from the options within the Best Environmental and Societal Plan during the construction phase from disturbance but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another.

There is potential for positive cumulative effects may also occur as a result of the catchment management schemes within the Best Environmental and Societal Plan. Although these options are not within the water company boundary buffer, there is potential for positive cumulative effects across the WRSE region given they include options which seek to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolios that focus on agricultural land may help to increase the productivity of soil.

- **Water** - It is not anticipated there will be cumulative effects from flood risk during the construction or operational phases. The catchment management schemes within the Best Environmental and Societal Plan, selected post-2050, are not identified to be specifically within the water company boundary buffers, however, they include natural flood management, wetland restoration and Sustainable Urban Drainage (SuDS) options which may lead to positive cumulative effects for reducing flood risk.

An in-combination WFD assessment has not been undertaken, however moderate negative effects have been identified for construction and operation as worst-case scenario; however, this may change. There are three options within the Best Environmental and Societal Plan, selected post-2050 and located in the water company boundary buffers. However, they are not within proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction related effects have therefore been identified as a result of these options. Operational cumulative effects are also not anticipated as the options do not interact operationally with other options located within the water company boundary buffers.

There is potential for cumulative positive effects across the WRSE region as a result of the catchment management schemes within the Best Environmental and Societal Plan as there are options which include activities to improve water quality and reduce pollutants. The river restoration projects may also help to improve resilience to low flows and natural water retention options may help to increase storage of water within the environment, facilitating resilience during drought. Wetland creation options can also help to improve water quality. There is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.

- **Air** – Neutral effects are identified as the options within the water company buffers are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. One of these options (Groundwater Development - Confined Chalk North London) is located within the Ealing AQMA, however there are no other options located in the same AQMA.
- **Climatic Factors** – The options within Best Environmental and Societal Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from the three options are anticipated to result in major construction emissions and major operational emissions. Two of the three options are desalination options and therefore have high operational carbon due to the energy intense processes required. There is potential for cumulative effects on the resilience of the local environment to climate change given the Best Environmental and Societal Plan includes groundwater abstraction as well as drought permit / order options, although these are not necessarily located in buffers, they have the potential for cross boundary effects. The catchment management schemes within the Best Environmental and Societal Plan include flow augmentation options and natural water retention which will increase resilience by adding to or retaining water in the natural environment which may lead to cumulative positive effects.
- **Landscape** – The catchment management schemes within Best Environmental and Societal Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences. There is potential for the options within the water company boundary buffers to have effects on the landscape during construction and/or operational individually, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.
- **Historic Environment** - Neutral effects are identified. There is potential the options within the water company boundary buffers to have localised impacts on the historic environment, particularly during the construction phase, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative

construction or operational related effects have therefore been identified as a result of these options.

- **Population and Human Health** - The catchment management schemes within the Best Environmental and Societal Plan have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource. There is potential for the options within the water company boundary buffers to have localised impacts on population and human health, particularly during the construction phase, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.
- **Material Assets** – The new infrastructure required for the options selected in the Best Environmental and Societal Plan, post-2050 and located within the water company boundary buffers, will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in cumulative effects. Positive cumulative effects are anticipated from the catchment management schemes as they contain NFM options and pesticide reduction which will help to reduce the use of resources. Neutral effects are identified in relation to the objective on built assets and infrastructure. There is potential for the options within the water company boundary buffers to have localised impacts on built assets and infrastructure during the construction phase, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.

Table 5.8: Best Environmental and Societal Plan Cumulative Effects Assessment (Post-2050)

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
Biodiversity, flora and fauna	Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	0	---	+++	---	<p>A HRA in-combination has not been undertaken for options selected in the Best Environmental and Societal Plan post-2050. However, there is potential for in-combination effects on Natura 2000 sites. Major negative effects have therefore been identified for construction and operation as a worst-case scenario, however this may change.</p> <p>There are three options within the Best Environmental and Societal Plan, selected post-2050 and located in the water company boundary buffers. However, they are not within proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction related effects have therefore been identified as a result of these options. Operational cumulative effects are also not anticipated as the options do not interact with other options located within the water company boundary buffers.</p> <p>The top reasons for catchments not achieving good status (RNAG) include urbanisation; barriers – ecological discontinuity; sewage discharge; groundwater abstraction; poor soil management; poor livestock management; drinking water supply; amongst others. There are catchment management schemes within the Best Environmental and Societal Plan (selected post-2050) which are not specifically within the water company boundary buffers but have the potential to result in positive cumulative effects across the WRSE region. The catchment management schemes contain options such as river restoration options, INNS options, wetland creation and enhancement, pesticide reduction, sediment reduction and terrestrial habitat creation/management options.</p>	<p>Best practice methods to be implemented to minimise disturbance effects and habitat loss. Where required directional drilling or option re-alignment may be required as the option design progresses.</p> <p>Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat.</p> <p>Ecology surveys will be required at future design stages to determine effects and mitigation required. It is assumed that mitigation recommended by further ecology surveys will be implemented and therefore residual construction effects are lessened although this wouldn't negate the need for a potential appropriate assessment (where only Stage 1 has been undertaken). Implementation of mitigation measures set out in HRA Appropriate Assessments where these have been undertaken.</p> <p>Opportunities for habitat creation and habitat enhancement will be further investigated through WRMP24 and options design. Some options such as reservoirs already have habitat creation designed into proposals. Opportunities for BNG and links with nature recovery networks will be further investigated at the WRMP24 level.</p>	0	---	+++	---
Soil	Protect and enhance the functionality, quantity and quality of soils	0	--	++	0	<p>The Best Environmental and Societal Plan includes the construction of options, selected post-2050, within the water company boundaries which impact various agricultural land grades, including Grade 1 and Grade 2. There is potential for cumulative effects on agricultural land across from the options within the Best Environmental and Societal Plan during the construction phase from disturbance but also permanent losses where options have above ground infrastructure. This cumulative effect is a result of all the options which fall within the water company boundaries, not just those that are being constructed around the same period and within close proximity (500m) to one another. There is not anticipated to be cumulative effects where options in the Best Environmental and Societal Plan, selected post-2050 and located in water company boundary buffers, are in proximity to the same historic or authorised landfill sites.</p> <p>There is potential for positive cumulative effects may also occur as a result of the catchment management schemes within the Best Environmental and Societal Plan. Although these options are not within the water company boundary buffer, there is potential for positive cumulative effects across the WRSE region given they include options which seek to improve water quality at landscape scale with a focus on soil health/management. Schemes included within the catchment portfolios that focus on agricultural land may help to increase the productivity of soil.</p>	<p>Following the construction phase, land will be reinstated where possible to minimise disturbance effects. However, there will be some permanent losses to agricultural land due to the above ground infrastructure associated with a number of the options within the Best Environmental and Societal Plan. Mitigation measures will include minimising the footprint of these assets, but residual effects are likely to remain.</p>	0	-	++	0
Water	Increase resilience and reduce flood risk	0	0	++	0	<p>The options in the Best Environmental and Societal Plan, selected post-2050 and within the boundaries of the water companies, and are located within Flood Zone 2 and 3. These options are therefore at risk from flooding during the construction phase and where there is above ground infrastructure there are operational risks. However, it is not anticipated there will be cumulative effects from flooding during the construction or operational phases.</p>	<p>No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of flooding during the construction and operational phases of those individual options at risk will likely be implemented.</p>	0	0	++	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						The catchment management schemes within the Best Environmental and Societal Plan are not identified to be specifically within the water company boundary buffers, however as they include options such as NFM, river and wetland restoration and Sustainable Urban Drainage (SuDS), they have the potential to lead to positive cumulative effects for reducing flood risk across the WRSE region.					
	Protect and enhance the quality of the water environment and water resources	0	--	+++	--	<p>An in-combination WFD assessment has not been undertaken for the options selected in the Best Environmental and Societal Plan that fall within the water company boundary buffers, however there is potential for in-combination effects. Moderate negative effects have been identified for construction and operation as worst-case scenario; however this may change.</p> <p>There are three options within the Best Environmental and Societal Plan, selected post-2050 and located in the water company boundary buffers. However, they are not within proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction related effects have therefore been identified as a result of these options. Operational cumulative effects are also not anticipated as the options do not interact operationally with other options located within the water company boundary buffers.</p> <p>There is potential for cumulative positive effects across the WRSE region as a result of the catchment management schemes within the Best Environmental and Societal Plan as there are options which include activities to improve water quality and reduce pollutants. The river restoration projects may also help to improve resilience to low flows and natural water retention options may help to increase storage of water within the environment, facilitating resilience during drought. Wetland creation options can also help to improve water quality. There is also potential for drought options, such as drought orders or permits, to have cumulative negative effects on water quality, levels and flows if simultaneous implementation is required across the WRSE region.</p>	During construction, best practice methods will likely be implemented to mitigate effects. This is likely to include directional drilling under rivers as well as best practice site construction methods to reduce potential for pollution incidents. Neutral residual effects have therefore been identified for the construction phase.	0	--	+++	--
	Deliver reliable and resilient water supplies	0	0	+++	0	The combined benefit of the three options selected in the Best Environmental and Societal Plan post-2050, and located within the water company boundaries, is likely to result in resilient supplies which meet demand therefore major positive effects are identified.	No mitigation identified.	0	0	+++	0
Air	Reduce and minimise air emissions	0	0	0	0	The Best Environmental and Societal Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have localised impacts on air quality during construction and/or operation, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction related effects have therefore been identified as a result of these options. One of these options (Groundwater Development - Confined Chalk North London) is located within the Ealing AQMA, however there are no other options located in the same AQMA.	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on air quality will likely be implemented.	0	0	0	0
Climatic Factors	Reduce embodied and operational carbon emissions	0	---	0	---	The options within Best Environmental and Societal Plan which are located within the water company boundary buffers will generate carbon emissions as a result of the materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. The cumulative effects from the three options, selected post-2050 and located within the water company boundary buffers, within the Best Environmental and Societal Plan is anticipated to result in major construction emissions and major operational emissions. The following are options are located in the water company boundary buffers and as they are desalination options, they have high operational carbon due to the energy intense processes required:	The opportunity to use renewables during construction and operation for energy supply and use of materials with lower embodied carbon should be investigated. A carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available. Carbon emissions could be reduced further if options are able to use 100% renewable energy, but this is unknown at this stage.	0	---	0	---

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
						<ul style="list-style-type: none"> Desalination: Isle of Sheppey (10MI/d) Phase 2 within the South East Water and Southern Water boundary buffer Desalination: Tidal River Arun (20MI/d) within the Southern Water and Portsmouth Water boundary buffer 					
	Reduce vulnerability to climate change risks and hazards	0	0	++	--	<p>The Best Environmental and Societal Plan has three options which are selected post-2050 and are located within the buffers between water companies. Groundwater Development - Confined Chalk North London is located within the buffer between Thames Water and Affinity Water and involves abstraction of groundwater sources therefore has the potential to result in negative effects on the resilience of the natural environment to climate change. The desalination options located within the buffers, and selected post-2050, also have the potential to result in positive effects as they will utilise sea water rather than abstracting fresh water from the environment.</p> <p>Within the Best Environmental and Societal Plan, there are a number of Drought Permit / Order options which allow for increased abstraction during drought periods thereby reducing resilience during drought periods when the natural environment is at its most vulnerable. These may not be located within the boundary buffers but have the potential to have effects across boundaries</p> <p>The catchment management schemes within the Best Environmental and Societal Plan include flow augmentation options and natural water retention which will increase resilience by adding to or retaining water in the natural environment which may lead to cumulative positive effects.</p>	For abstraction options, monitor water levels and flows to identify if further mitigation action is required.	0	0	++	--
Landscape	Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	0	++	0	<p>The Best Environmental and Societal Plan has three options which are selected post-2050 and are located within the buffers between water companies. Desalination: Tidal River Arun (20MI/d) is located within the Southern Water and Portsmouth Water boundary buffer and is partially located within the South Downs National Park. There are other options which are also located within the South Downs National Park; however these are selected pre-2050 and do not have overlapping construction periods with Desalination: Tidal River Arun (20MI/d) therefore no cumulative effects are identified. The other two options are not within any landscape designations. There is potential for these options to have effects on the landscape during construction and/or operational individually, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.</p> <p>The catchment management schemes within Best Environmental and Societal Plan may lead to positive cumulative effects for the landscape across the WRSE region as they contain options which improve the overall health of the catchment such as through wetland creation, river restoration and agricultural measures. NFM may also help to improve the landscape rather than traditional hard engineering defences.</p>	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on the landscape will likely be implemented.	0	0	++	0
Historic Environment	Conserve, protect and enhance the historic environment, including archaeology	0	0	0	0	<p>The Best Environmental and Societal Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have indirect effects on the setting of historic environment assets, particularly during, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.</p>	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on the historic environment will likely be implemented.	0	0	0	0

SEA Topic	SEA Objective	Construction Effects		Operation Effects		Comments	Mitigation	Construction Effects		Operation Effects	
		+	-	+	-			+	-	+	-
Population and Human Health	Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	0	0	+	0	The Best Environmental and Societal Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have impacts on the local community during construction and/or operation, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options. The catchment management schemes within the Best Environmental and Societal Plan also have the potential to have positive cumulative effects across the WRSE region as they include knowledge exchange and education options which may help the local community make more informed decisions and promote rivers as a community and educational resource.	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on the local community will likely be implemented.	0	0	+	0
	Maintain and enhance tourism and recreation	0	0	+	0	The Best Environmental and Societal Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have localised impacts on tourism or recreations during construction and/or operation, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options. The catchment management schemes within the Best Environmental and Societal Plan also have the potential to reduce in positive effects as they include options such as river restoration, natural water retention, wetland creation and nutrient and sediment reduction. Maintaining and improving river water quality and habitats may increase the opportunities for river-based recreation including angling. There are also opportunities for increased access to rivers with specific schemes seeking to promote this through community engagement.	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on tourism or recreation will likely be implemented.	0	0	+	0
Material Assets	Minimise resource use and waste production	+	---	0	0	The new infrastructure required for the options selected in the Best Environmental and Societal Plan, post-2050 and located within the water company boundary buffers, will use materials and generate waste, including excavated materials. The combination of all the options, not necessarily in proximity to one another but as a whole, will likely result in major negative cumulative effects. Options within the catchment management schemes may have cumulative positive effects as they contain NFM options and pesticide reduction which will help to reduce the use of resources.	Opportunity to implement sustainable design measures to reduce the impact and excavated material could be reused on site. However, it is likely that moderate negative cumulative effects will remain.	+	--	0	0
	Avoid negative effects on built assets and infrastructure	0	0	0	0	The Best Environmental and Societal Plan has three options which are selected post-2050 and are located within the buffers between water companies. There is potential for these options to have localised impacts on built assets and infrastructure during the construction phase, however they are not in proximity to any other options located within the buffer and/or do not have overlapping construction periods with options in proximity. No cumulative construction or operational related effects have therefore been identified as a result of these options.	No cumulative effects are identified therefore mitigation is not required. Measures to reduce the impact of individual options on built assets and infrastructure, such as best practice construction methods, will likely be implemented.	0	0	0	0

5.3.2.4 Summary of Programme Appraisal (Post 2050)

The cumulative assessment results identified across the Least Cost Plan and Best Environmental and Societal Plan are similar. The Best Value Plan is similar in some respects, however as it does not contain any options located within the water company boundary buffers, neutral effects are identified for several of the SEA objectives. Neutral effects are also identified for the Least Cost Plan and Best Environmental and Societal Plan as although they contain options located within the boundary buffers, no in-combination effects are likely given the distance between options and absence of overlapping construction periods.

Major and moderate positive residual effects are identified across numerous multiple SEA topics and objectives due to the inclusion of the catchment management and demand management schemes within the three plans. SEA objectives with positive residual effects include biodiversity, flora and fauna, soils; flood risk; water environment; climate resilience; landscape; and population and human health. The catchment management schemes include options such as river restoration, wetland creation and enhancement, and terrestrial habitat creation/management, natural flood management, education and engagement, which are likely to contribute to cumulative positive effects.

Major negative residual effects are identified for the construction phase of the Best Value Plan, and for both the construction and operational phases of the Least Cost Plan and the Best Environmental and Societal Plan, due to potential for in-combination effects on Natura 2000 sites. The HRA in-combination assessment undertaken for the Best Value Plan identified that there are potential for in-combination construction as a result of numerous options. Although HRA in-combination assessments were not undertaken for the two alternative plans, major negative effects were identified as a worst-case scenario. Further assessments of these potential affects will be undertaken ahead of the finalisation of the plan, taking account of information from member water companies, including appropriate mitigation to be included in the assessment process.

The Best Value Plan was not identified to have any residual (or pre-mitigation) negative effects on the water SEA objectives (including flood risk, water environment and resilient supplies). The WFD in-combination assessment undertaken on the Best Value Plan identified two water bodies have the potential to be impacted by two or more options from different water companies. However, it was identified that there was no risk of in-combination effects and thus no increased risk of WFD deterioration within these waterbodies. Moderate negative residual effects were identified for construction and operational phases of the Least Cost Plan and the Best Environmental and Societal Plan in relation to the SEA objective on the water environment. However, these are identified on a precautionary approach as WFD in-combination assessments have not been carried out.

For the Least Cost Plan and Best Environmental and Societal Plan, major negative residual effects have also been identified for the objective on carbon emissions for both construction and operation due to the cumulative impact materials used to construct the new infrastructure and construction activities (embodied carbon), and from operation. Moderate negative residual effects have been identified for all three plans in relation to climate resilience given the cumulative effect of options which involve groundwater or surface water abstraction, particularly during periods of drought, which will reduce the resilience of the natural environment to climate change. The Least Cost Plan and Best Environmental and Societal Plan is identified to identified to have moderate negative residual effects on material assets due to the resource use and waste which will be cumulatively generated through the construction phase. Further assessments of these potential affects will be undertaken ahead of the finalisation of the plan, taking account of information from member water companies, including appropriate mitigation to be included in the assessment process.

5.4 Climate Change

Natural England have developed the National Biodiversity Climate Change Vulnerability Assessment Tool (NBCCV Assessment Tool) which allows for the assessment of the relative vulnerability of priority habitats to climate change¹⁶. Individual metrics are available for the following:

- Habitat Sensitivity
- Habitat Fragmentation
- Topographic Heterogeneity
- Management and Condition
- Conservation Value

A metric is also available for Overall Vulnerability (adding the sensitivity, fragmentation, topography and management metric results together) as well as for Overall Vulnerability plus Conservation Value (adding all five of the above individual metric results together with equal weighting). The Overall Vulnerability plus Conservation Value metric allows for the identification of areas that may benefit from adaptation action across a range of broad actions but also prioritise this action based on conservation designation requirements. Grid cells are scored based on their vulnerability to climate change ranging from the most vulnerable habitat overall in that cell, taking the sensitivity and adaptive capacity and Conservation Value metrics in the model into account.

The Tool does not use specific climate change projection data, instead it adopts a 'direction of travel' approach which takes into account the key message of hotter drier summers and warmer wetter winters. However, the Met Office UKCP09¹⁷ the 2050 medium emissions scenario at the central estimate (50% probability) has been used to frame the approach.

All the metrics available from Natural England were added to the GIS database to identify where the Best Value Plan may impact areas of sensitivity. Using the Overall Vulnerability plus Conservation Value metric, it was identified that a number of options within the Best Value Plan, such as transfer options, pass through areas of priority habitat which are considered to be the most vulnerable. Given the Tool looks forward to 2050, priority habitats are likely to get more sensitive to climate change as time progresses and the hazards associated with climate change are likely to worsen. Options constructed in the next five years may therefore have less of an impact on the priority habitats considered to be most vulnerable compared to if they were constructed post 2030 for example. Many of the rivers and their surrounding habitat are classed as highly sensitive in the tool including the River Yar, Grand Union Canal, River Test, River Itchen, River Thames, Oxford Canal, River Tame, River Ouse, River Arun, River Colne, River Lee, River Medway. Options that interact with these habitat areas and rivers may have a greater effect in the future as climate change results in these areas becoming more sensitive.

Climate change scenarios and abstraction reduction scenarios (to protect the environment) were also included in the water resource planning and investment modelling. Details can be found in the WRSE Draft Regional Plan Annex 1, Section 12.

¹⁶ Natural England. (2014). National biodiversity climate change vulnerability model (NERR054). Available at: <http://publications.naturalengland.org.uk/publication/5069081749225472>

¹⁷ Note: UKCP09 has been updated by UKCP18 by the Met Office since the publication of Natural England's NBCCV Assessment Tool.

5.5 Environmental Net Gain

5.5.1 Nature Recovery Networks and Local Nature Recovery Strategies

Making Space for Nature, A review of England's Wildlife Sites and Ecological Network (2010), set out the essence of what needs to be done to enhance the resilience and coherence of England's ecological networks. The report proposed that this could be summarised in four key words: more, bigger, better and joined. The Environment Act 2021 requires the preparation and publication of Local Nature Recovery Strategies setting out biodiversity priorities including opportunities for recovering or enhancing biodiversity, and production of local habitat maps to support the strategy. The Government's 25-year plan supports this by including provision for a Nature Recovery Network (NRN). The WRPG aligns with these requirements and identifies that WRMPs should support recovery and enhancement of biodiversity according to opportunities and priorities identified in relevant Local Nature Recovery Strategies and contribution to Nature Recovery Networks. Therefore, it is important that the Regional Plan identifies potential opportunities to support both Government priorities and WRMP requirements. To assist with these requirements Natural England has developed a series of habitat network maps including the following:

- Network Enhancement Zones:
 - Network Enhancement Zone 1 -Land connecting existing patches of primary and associated habitats which is likely to be suitable for creation of the primary habitat. Factors affecting suitability include: proximity to primary habitat, land use (urban/rural), soil type, slope and proximity to coast. Action in this zone to expand and join up existing habitat patches and improve the connections between them can be targeted here.
 - Network Enhancement Zone 2 -Land connecting existing patches of primary and associated habitats which is less likely to be suitable for creation of the primary habitat. Action in this zone that improves the biodiversity value through land management changes and/or green infrastructure provision can be targeted here.
- Fragmentation Action Zone - Land within Enhancement Zone 1 that connects existing patches of primary and associated habitats which are currently highly fragmented and where fragmentation could be reduced by habitat creation. Action in this zone to address the most fragmented areas of habitat can be targeted here.
- Network Expansion Zone - Land beyond the Network Enhancement Zones with potential for expanding, linking/joining networks across the landscape i.e. conditions such as soils are potentially suitable for habitat creation for the specific habitat in addition to Enhancement Zone 1. Action in this zone to improve connections between existing habitat networks can be targeted here.
- Restorable Habitat - Areas of land, predominantly composed of existing semi-natural habitat where the primary habitat is present in a degraded or fragmented form and which are likely to be suitable for restoration.

It should be noted that the mapping also includes mapping of priority habitats. Priority habitats were included under the biodiversity SEA objectives and the effects of options on priority habitat is included in the option assessments.

The habitat network maps were included in the GIS database to identify where the Best Value Plan may have opportunities to support habitat creation, restoration and networks linkages. The majority of options were at least partially within either a network enhancement zone or network expansion zone.

Where pipelines are to be constructed as part of these scheme within one of the identified habitat zones, reinstatement of land following construction could be linked to the priorities of that area such as habitat creation, restoration or improvement.

It is proposed that these opportunities are further explored as the Final Regional Plan develops. It should be noted that the national approach and process is evolving, and guidance is due to be published. This will be reviewed if it is available in time for the Final Plan. Catchment management schemes could be targeted at certain identified areas and wider partnership working with landowners, conservation groups and other organisations should be explored to help deliver opportunities for biodiversity enhancement. The individual water companies can explore these opportunities further as part of the WRMP24 development and as options are taken forward for planning.

5.5.2 Biodiversity Net Gain

The WRPG require that WRMPs contributes to conservation and enhancement of biodiversity, delivers net biodiversity gain (where appropriate) and delivers environmental gain. The Environment Act 2021 makes a minimum 10% biodiversity net gain a condition of planning permission in England and in relation to consent for nationally significant infrastructure projects.

As discussed in Section 4.5.3 and Appendix J, a BNG assessment was undertaken for each option and a cumulative assessment of the Draft Regional Plan to identify current BNG status and opportunities to increase the net gain.

5.5.3 Catchment Management Solutions

A number of catchment management portfolios are included within the Draft Regional Plan that contain a range of options to delivery catchment improvements such as wetland creation, woodland planting, river restoration, soil improvement, working with landowners to reduce fertiliser and pesticides use and more sustainable farming practices. These options will include and support habitat creation and environmental improvement, adding to environmental net gain.

6 Mitigation and Monitoring

6.1 Mitigation and Enhancement Measures

Mitigation measures and enhancement opportunities are identified in the individual option assessments and in the cumulative and in-combination effects assessments. A summary of the high-level plan wide measures is provided below:

- General construction best practice measures to be implemented to reduce effects on air, water, flora and fauna, landscape, heritage, soils and communities.
- HRA Appropriate Assessment, WFD Level 2 assessment and INNS assessment will be required for a number of the selected options and specific mitigation will be developed as part of this process.
- Opportunities for habitat creation and habitat enhancement will be further investigated through WRMP24 and options design. Some options such as reservoirs already have habitat creation designed into proposals. Opportunities for BNG and links with nature recovery networks will be further investigated at the WRMP24 level.
- Land disturbed temporarily for construction (e.g. laying pipelines) will be reinstated to the same or better quality. As discussed in Section 5.5.1 there are potential opportunities to connect with nature recovery networks to provide habitat restoration.
- Use of directional drilling under sensitive assets such as river, motorways, railway lines and certain designated sites.
- Opportunity to use renewables during construction and operation for energy supply and use of materials with lower embodied carbon should be investigated. A carbon footprint study could help identify areas for carbon savings or alternative materials.
- For options that may change water levels, monitoring of river or reservoir water levels and flows may be required. This is more significant if the reservoir or river is also a designated site.
- Appropriate layout and landscape design to screen new treatment plants and buildings and provide habitat.
- Certain options may need the pipelines slightly re-routing to avoid designated sites and historic assets.
- Best practice mitigation to avoid impacts on historic assets. Archaeological Watching Brief may be required during the construction phase.
- Reservoir options have a large potential to provide both environmental and social benefits and should be designed to maximise multiple benefits.

WRSE are currently looking at options that have flagged as having potential cumulative effect so identify whether solutions can be put place that either scale up nearby alternatives, change the environmental destination delivery profile or costs for a larger mitigation package to allow the options to be retained.

The options within the Draft Regional Plan are assessed strategically at a regional level as part of WRSE which informs the SEAs of the water companies WRMPs, alongside HRA, WFD and Biodiversity Net Gain and Natural Capital where relevant. As the options progress into projects, Environmental Impact Assessment should be applied where required to avoid likely significant effects.

6.2 Monitoring Proposals

Monitoring will be carried out by the water companies as part of their WRMP 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 WRMP is being successfully implemented. The DCLG guidance states that it is inappropriate to monitor everything, and monitoring proposals should be focused on the following areas:

- Identify potential breaches of international, national, or local legislation, recognised guidelines, or standards.
- Actions which may give rise to irreversible damage, with a view to identifying trends before such damage occurs.
- Where there was any uncertainty in the SEA and where monitoring would enable prevention or mitigation measures to be taken.

Monitoring proposals will be developed in the WRMP SEA but may include the following examples:

- Ecological and chemical status of water bodies
- Achievements against WFD objectives
- Number of supply disruptions per annum
- % of habitat creation or existing habitat enhancement
- Area (hectares) and number of statutory and non-statutory ecological sites that will be harmed or lost to WRMP options
- Area of both blue and green infrastructure created
- River flow levels
- Area of agricultural land (by grade) lost due to the need for water resource options/infrastructure
- Number of geological sites affected
- Number of historic assets damaged by a WRMP option
- Number of historic assets enhanced by options
- 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
- % 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 %
- Number of, and attendance levels at public engagement events
- Number of tourism assets created
- Number of apprenticeships
- Number, type, and area of community assets created
- Km of new footpath/cycleways

7 Consultation and Next Steps

7.1 Environmental Report Consultation

This draft Environmental Report is being issued for public consultation alongside the Draft Regional Plan for a 12-week period in November 2022. This will allow the public and the consultation bodies to feed into the next stage of the SEA and updated Environmental Report for the final Regional Plan.

7.2 Next steps

Following consultation, a consultation log of responses will be produced and will record the comments received from the Statutory Consultees and the public, and the action taken to address them. The Environmental Report will be updated to reflect consultation comments and the consultation log will be appended to the final Environmental Report.

As the final Regional Plan is developed, the SEA will be updated to reflect the selected options and potential cumulative and in-combination effects. The Environmental Report will be updated to take into account any changes between the draft WRSE Regional Plan as it develops into the final Regional Plan. Alongside this the HRA Appropriate Assessment, WFD Level 2 assessments and INNS assessment will be undertaken, and the results used to inform the plan development and SEA.

8 References

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commission.org.uk/data/files/publications/050307One%20Future%20-%20Different%20Paths.pdf

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A. SEA Process 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)
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	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

SEA Stage	SEA Task	Task Purpose
programme and the Environmental Report		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 Plan. To gather more information through the opinions and concerns of the public
	D2: Assessing significant changes	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

Source: Adapted from 'A Practical Guide to the Strategic Environmental Assessment Directive' (ODPM, September 2005)

B. Scoping Summary

B.1 Introduction

The Scoping Stage of the SEA process sets the context and scope of the SEA and Environmental Report. This appendix provides a summary of the scoping results as presented in the SEA Scoping Report (Mott MacDonald, September 2020) and includes updates following the scoping consultation where relevant. This appendix covers a summary of the tasks under SEA Stage A including the following with full details presented in Appendix C-E:

- Scoping Consultation
- Policies, plans and programmes review
- Baseline information including future trends
- Key sustainability issues and opportunities
- SEA Framework (See Section 3.2.2)
- Compatibility of the SEA objectives
- Compatibility of the WRSE Regional Plan objectives and the SEA objectives

B.2 Scoping Consultation

The Scoping Report 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 internal 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. The comments received from the formal consultation process and the resulting updates made to the Environmental Report are detailed in Appendix C.

B.3 Relationship with other Plans, Policies and Programmes

B.3.1 Plans, Policies and Programmes Review

A review of the policies, plans and programmes relevant to the WRSE Regional Plan has been undertaken. The aim was to determine how the WRSE Regional Plan may be affected by these external factors. The WRSE Regional Plan must aim to support current relevant policies, plans, programmes and environmental protection legislation at an international, national and local level. A review of these documents is required to identify potential inconsistencies or constraints, and consistencies between these documents and the WRSE Regional Plan to inform the development of the SEA Framework.

The relevant policies, plans, and programmes which were considered during the SEA scoping stage are listed in Table B.1 Appendix D presents the policies, plans, and programmes review in full. The WRSE

Regional Plan must aim to support, and where possible, strengthen the objectives of other local plans and strategies within across the south east. However, as the WRSE Regional Plan covers such a large area, the local plans and policies have not been reviewed in detail at this stage. These will be reviewed as part of the water companies' WRMP24 SEA process.

Table B.1: Plans, Policies and Programmes reviewed

Policies, Plans and Programmes

International	
<ul style="list-style-type: none"> ● Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979) ● Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983) ● Convention on Biological Diversity (1992) ● Ramsar Convention - The Convention on Wetlands of International Importance (1971) ● United Nations (UN) Framework Convention on Climate Change (1992) ● Kyoto Protocol to the UN Framework Convention on Climate Change (1997) 	<ul style="list-style-type: none"> ● Commitments arising from the World Summit on Sustainable Development, Johannesburg (2002) ● Paris Agreement (2015) ● Charter for the Protection and Management of Archaeological Heritage (1990) ● The World Heritage Convention (1972) ● Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) (1998)
European	
<ul style="list-style-type: none"> ● Ambient Air Quality Directive (2008/50/EC) ● Thematic Strategy on Air Pollution (2005) ● Establishing measures for the recovery of the stock of European eel 2007 (1100/2007) ● Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011) ● Fresh Water Fish Directive (2006/44/EC) ● Directive on the Conservation of Wild Birds (79/409/EEC) (as amended) ● Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC) ● 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) ● Habitats Directive (92/43/EEC) ● Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond (2007) ● A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (2018) ● Promotion of the use of energy and renewable sources Directive (2009/28/EC) ● Energy Act 2013 ● Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development ● European Commission Environmental Liability Directive (2004/35/EC) 	<ul style="list-style-type: none"> ● The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention) (1985) ● The European Convention on the Protection of Archaeological Heritage (Valletta Convention) (1992) ● The European Landscape Convention (2006) ● The Environmental Noise Directive (2002/49/EC) ● European Soils Charter (2003) ● Thematic Strategy for Soil Protection (2006) ● The Nitrates Directive (91/676/EEC) ● The Water Framework Directive (WFD) (2000/60/EC) ● Urban Wastewater Treatment Directive (91/271/EEC) ● Drinking Water Directive (1998/83/EC) ● Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014) ● Groundwater Directive (2006/118/EC) ● Marine Strategy Framework Directive (2008/56/EEC) ● Directive on the Assessment and Management of Flood Risks (2007/60/EC) ● Blueprint to Safeguard Europe's Water Resources (2012) ● The Water Resources Planning Guideline

Policies, Plans and Programmes

- The SEA Directive (Directive 2001/42/EC)

National

- | | |
|---|--|
| <ul style="list-style-type: none"> ● The Eels (England & Wales) Regulations 2009 (as amended) ● Salmon and Freshwater Fisheries Act 1975 ● UK Post-2010 Biodiversity Framework, Joint Nature Conservation Committee (JNCC) and Defra (2012) ● Making Space for Nature - A review of England's Wildlife Sites and Ecological Network (2010) ● Biodiversity 2020: A strategy for England's wildlife and ecosystem services, Defra (2011) ● The Conservation of Habitats and Species Regulations (2010) (as amended) ● The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019) ● Delivering a healthy natural environment. Ecosystem approach action plan, Defra (2010) ● The Invasive Alien Species (Enforcement and Permitting) Order 2019 ● The Great Britain Invasive Non-Native Species Strategy, Defra (2015) ● A narrative for conserving freshwater and wetland habitats in England, Natural England (2016) ● Conservation 21 - Natural England's Conservation Strategy for the 21st Century, Natural England (2016) ● State of Natural Capital Annual Report 2020, Natural Capital Committee (2020) ● Standing Advice on Protected Species, Natural England (2016) ● Climate Change Act 2008 ● UK Climate Change Risk Assessment, Defra (2017) ● The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting, Defra (2018) ● National Planning Policy Framework (NPPF) (2019) ● A Green Future: Our 25 Year Plan to Improve the Environment, UK Government (2018) ● Environment Act 2021 ● Securing the Future – Delivering the UK Sustainable Development Strategy (2005) ● The Natural Choice: Securing the Value of Nature, Defra (2011) ● Marine and Coastal Access Act (2009) ● The Wildlife and Countryside Act 1981 (as amended) | <ul style="list-style-type: none"> ● The Ancient Monuments and Archaeological Areas Act 1979 ● Climate Change and the Historic Environment, English Heritage (2008) ● Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment, Historic Environment (2016) ● The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning 3, Historic Environment (2017) ● Ancient Woodland and Veteran Trees: Protecting them from development, Forestry Commission and Natural England (2014) ● Our Waste, Our Resources: A Strategy for England, HM Government (2018) ● Safeguarding our Soils - A strategy for England, Defra (2009) ● Water Resources Act 1991 ● Water Industry Act 1991 ● Water Act 2003 (as amended) ● Preparing for a drier future: England's water infrastructure needs, National Infrastructure Commission (2018) ● Draft National Policy Statement for Water Resources Infrastructure, Defra (2018) ● Water for Life White Paper, Defra (2011) ● The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (as amended) ● Protect groundwater and prevent groundwater pollution, Environment Agency (2017) ● Groundwater protection technical guidance, Environment Agency (2017) ● The Environment Agency's approach to groundwater protection, Environment Agency (2018) ● Flood and Water Management Act 2010 ● The Environment Agency's National Framework and supporting Guiding Principles for Environmental Destination ● Understanding the risks, empowering communities, building resilience: The National Flood and Coastal Erosion Risk Management Strategy for England, Defra and Environment Agency (2014) |
|---|--|

Policies, Plans and Programmes

- Environment Protection Act 1990
- Countryside and Rights of Way (CROW) Act
- The Natural Environment and Communities Act 2006 (NERC Act)
- Creating a better place: Our ambition to 2020, Environment Agency (2018)
- UK National Ecosystem Assessment Follow-on (2014)
- National Infrastructure Delivery Plan 2016–2021, Infrastructure and Projects Authority (HM Government) (2016)
- Fixing the foundations: Creating a more prosperous nation, HM Government (2015)
- Environment Act 1995
- The Environmental Damage (Prevention and Remediation) (England) Regulations 2015
- Environmental Assessment of Plans and Programmes Regulations 2004
- Planning Act 2008
- National Parks and Access to the Countryside Act 1949
- Planning (Listed Buildings and Conservation Areas) Act 1990
- National Flood and Coastal Erosion Risk Management Strategy for England (2020)
- The Water Resources Management Plan Regulations 2007
- Water Resources Planning Framework (2015-2065), Water UK (2016)
- Water Supply (Water Quality) Regulations 2016 (as amended)
- National Policy Statement for Wastewater (2012)
- Climate change approaches in water resources planning – Overview of new methods, Environment Agency (2013)
- Future Water: the Government’s water strategy for England, Defra (2008)
- Water Resources Planning Guideline, Environment Agency (2016)
- Managing Water Abstraction, Environment Agency (2016)
- Marine Plans – South East Inshore, South Inshore, South Offshore (to be published 2021)
- UK Marine Policy Statement (2011)

Local

- Site Improvement Plans for Natura 2000 sites: London & South East, Natural England
- Local Development Plans (Various)
- Creating a Vision for the Oxford-Cambridge Arc
- National Character Areas (Various), Natural England
- River Basin Management Plans (RBMPs), Defra and Environment Agency (2015)
- Various Local Catchment Management Strategies
- Catchment Flood Management Plans (CFMPs), Defra and Environment Agency (2016)
- Shoreline Management Plans (Various)
- Catchment Management Strategies (Various)
- National Park Management Plans – New Forest and South Downs
- AONB Management Plans (Various)

WRSE Water Companies

- Affinity Water
 - Environment Policy (2019)
 - WRMP 2020-2080 (2020)
 - Drought Plan Annual Update (2019)
 - Revised Business Plan (2019)
- Southern Water
 - Environment Policy (2019)
 - WRMP 2020-2070 (2019)
 - Drought Plan (2019)
 - Business Plan 2020-25 (2019)

Policies, Plans and Programmes

- Portsmouth Water
 - Biodiversity, Public Amenities and Recreation Strategy (undated)
 - WRMP 2020-2045 (2019)
 - Drought Plan (2019)
 - Business Plan 2020-2025 (2018)
 - SES Water
 - Environment Policy (2019)
 - WRMP 2020-2045 (2019)
 - Drought Plan (2019)
 - Business Plan 2020-2025 (2018)
 - South East Water
 - WRMP 2020 to 2080 (2019)
 - Drought Plan 2018 to 2030 (2019)
 - Pure know h2ow – Business Plan 2020 to 2025 (2019)
 - Thames Water
 - Sustainability Policy
 - WRMP 2020 to 2100 (2019)
 - Drought Plan (2017)
 - Building a better future – Business Plan 2020 to 2025
-

B.3.2 Identification of Key Themes

The main themes, messages and objectives from the policies, plans and programmes review that are considered relevant to the WRSE Regional Plan 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 infrastructure¹⁸
- Protection of landscape character and quality
- No deterioration of waterbodies 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 communities¹⁹
- Promote social inclusion and community participation
- 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 a Catchment Based Approach (CaBA))
- Reduce water waste and leakage (Ofwat targets and penalties)
- Improve resilience to extreme droughts ensuring consistency with WRMP24 (1/500 year resilience)
- Protect cultural heritage assets including archaeology and built heritage
- Protect best quality soils and agricultural land

¹⁸ The European Commission defines green infrastructure as a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation. This network of green (land) and blue (water) spaces can improve environmental conditions and therefore citizens' health and quality of life. It also supports a green economy, creates job opportunities and enhances biodiversity. The Natura 2000 network constitutes the backbone of the EU green infrastructure. Available at: http://ec.europa.eu/environment/nature/ecosystems/index_en.htm

¹⁹ The UK Government definition of sustainable communities as outlined in the document 'Sustainable Communities: Homes for All' (ODPM, January 2005, page 74) is: "Sustainable communities are places where people want to live and work, now and in the future. They meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services for all". Available at: <https://webarchive.nationalarchives.gov.uk/20120920061353/http://www.communities.gov.uk/documents/corporate/pdf/homes-for-all.pdf>

- Support the Lawton recommendation²⁰ 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 Environment²¹:
 - Using and managing land sustainably – including embedding an “environmental net gain” principle into development (as supported by the Environment Act 2021²²).
 - 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 have been used to identify key issues and opportunities and develop the SEA Framework.

B.4 Scoping Baseline Review

B.4.1 Baseline Review

The current environment and socio-economic baseline was reviewed for the WRSE region. The baseline information is presented under the SEA Directive topics and provides an evidence base which environmental issues and/or opportunities resulting from the WRSE Regional Plan can be predicted and assessed.

The baseline information was collected from published sources as referenced in the text in Appendix E, 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

²⁰ Lawton (2010). Making Space for Nature (Recommendation 4, Page 73). Available at: <https://www.gov.uk/government/news/making-space-for-nature-a-review-of-englands-wildlife-sites-published-today>

²¹ UK Government (2018). A Green Future: Our 25 Year Plan to Improve the Environment. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

²² UK Government (2021). Environment Act. Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted>

A summary of the baseline information collected for the WRSE region is presented below. The baseline review is presented in full in Appendix E and maps showing key spatial baseline information are also presented in Appendix E.

- **Biodiversity, flora and fauna** – The WRSE region is rich in habitat species and diversity. It is made up of the following terrestrial land cover types: agriculture (56.5%); urban (23.2%); woodland (13.2%); semi-natural grassland (5.3%); and surface water (1.5%). There is a large stretch of coastline in the WRSE region which supports a wide range of wetland, coastal and estuarine habitats and species. Priority habitats make up 16.6% of the WRSE region equating to a total of 39,5109ha. There are over 600 Natura 2000 European Designated Sites within the WRSE region, including 298 Special Areas of Conservation (SAC), 196 Special Protected Areas (SPA) and 126 Ramsar sites. There are 1,661 Sites of Special Scientific Interest (SSSI), 86 National Nature Reserves (NNR) and 280 Local Nature Reserves (LNR). Marine designations include one Marine Protected Area (MPA) and 14 Marine Conservation Areas (MCZ).
- **Water** – The WRSE region is one of the driest areas in the UK and Affinity Water, South East Water, SES, Southern Water and Thames Water are all classed as areas with serious water stress. Additional water stress is anticipated as a result of climate change alongside population and economic growth. Underground sources accounts for around half of the region’s water supply with some water resource zones completely reliant on underground sources. The Thames and South East river basin districts make up the WRSE region. The achievement of ‘Good’ status in both river basin district is affected commonly by phosphate, pollution from wastewater and physical modifications. Furthermore, abstraction can limit flows to reach good ecological status, and cause poor status of groundwater bodies. The South East and the Thames River basins district are made of individual management catchments. The WRSE Regional Plan proposes catchment management options in 25 management catchments across the region. All the waterbodies within these management catchments failed the WFD chemical status. 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. The Thames river basin district has over 227,000 people at high risk of surface water flooding and the South East has over 31,000. Those at high risk of flooding from rivers and the sea is over 107,000 people in the Thames basin and over 36,000 in the South East basin.
- **Soil** – The WRSE region is a hub for agriculture with cereal and livestock grazing being the most predominant type of farming. 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 country. Currently, there are approximately 400 authorised landfill sites across the WRSE region.
- **Air** - Air quality in the WRSE region is varied and there are certain areas with higher concentrations of air pollutants likely to be associated with transport or business activities. Air Quality Management Areas (AQMAs) are declared where the national air quality objectives are not being met. A high proportion of the local authorities which fall within the WRSE region contain at least one AQMA and are predominately designated for Nitrogen dioxide (NO₂) and Particulate Matter (PM₁₀).
- **Climatic factors** – Using the RCP8.5 scenario at the 50th percentile against a 1981-2010 baseline, the Met Office UK Climate Projections (UKCP18) indicate that for the south east of England, annual mean temperatures are projected to increase by 2.0°C. Average mean summer temperatures projected to see increases of 2.6°C with extreme mean maximum summer temperatures increasing by 2.9°C. Seasonal variability in precipitation rates is projected with a 22.9% decrease during summer months and an increase of 11.5% during winter months. The total carbon dioxide (CO₂) emissions for the WRSE region in 2018 is estimated to be 95,371 kilo tonnes (ktCO₂) (not including Land use, land-use

change, and forestry (LULUCF)). The transport sector contributed the highest proportion of emissions to the total in 2018 followed by the domestic and industrial sector. The LULUCF sector is estimated to be responsible for the removal of 2,406ktCO₂ equating to a 3% reduction in the total CO₂ emissions.

- **Landscape** – The landscape across the WRSE region is diverse and is made up of a mixture of lowlands and small hills and there is also a striking stretch of coastline, including the cliffs of Dover, and picturesque seaside villages. Agriculture plays an important role in the landscape, however the WRSE region also has densely populated areas. The Green Belt around London is an important aspect of the WRSE region landscape which exists to prevent urban sprawl. There are 34 National Character Areas (NCAs) within the WRSE boundary which divide the landscape into distinct areas. There are two National Parks located within the WRSE region, New Forest and South Downs, which became designated in 2005 and 2010 respectively. There are also eight Areas of Outstanding Natural Beauty (AONB) within the WRSE region which are protected to conserve and enhance their natural beauty and distinctives.
- **Historic environment** – The WRSE region is rich in heritage with over 112,000 listed buildings, over 3,000 scheduled monuments, over 2,500 conservation areas, over 600 registered parks and gardens, eight registered battlefields and 10 world heritage sites. There is also one protected wreck site within the region. The Local Authorities in the WRSE region will hold a Historic Environment Record (HER) which is a database of archaeological sites, listed buildings and other historic buildings, and finds of historic objects. There is also potential for unidentified heritage assets and archaeological remains to be present within the region.
- **Population and human health** – Approximately 19 million people, equating to around 30% of the UK's total population, live within the WRSE region. Long-term population growth in the region is anticipated to be around four million. Life expectancy at birth for both males and females in the WRSE region is better than the England average and against the various indicators included within the Public Health Profiles, the region is generally better than the national average. The WRSE region contributes around 37% of the total UK economy with London and the South East being the first and second largest contributors respectively. 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 UK. Tourism is an important sector within the WRSE region's economy attracting visitors from across the UK and internationally. 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 below.
- **Material assets** – 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. The UK's two busiest airports, Heathrow and Gatwick, and the two busiest UK ports, Southampton and Dover, are located within the region. The rail link to Europe via the Channel Tunnel Rail Link is also located within the region. In 2018/19 the total amount of local authority managed waste was 25.6 million tonnes. Incineration accounts for the most common waste disposal method by local authorities in the region followed by recycling and composting.
- **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. These include soils and geology, freshwater, farmland, grasslands, urban, woodland and coastal and marine. The region also contains several key abiotic stocks including fertile soils and coastal shelves.

B.4.2 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:

- **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 consequences²³. 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.
- **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. Rising temperatures and variation in rainfall patterns will change the recharge to groundwater in UK aquifers. The groundwater recharge season could become shorter, but more recharge may occur within the shorter period, leading to flashy responses in groundwater level. Surface waters are likely to be prone to more flooding, as climate change is increasing the likelihood of intense rainfall in the UK.
- **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.
- **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.
- **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 2030²⁴.
- **Landscape** – changing and continued development will affect the quality and character of landscapes.
- **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

²³ Lawton (2010). Making Space for Nature.

²⁴ Available at: <https://www.water.org.uk/news-item/water-industry-plans-to-reach-net-zero-carbon-by-2030/>

structures and archaeology²⁵. Historic assets will likely continue to be protected through European and UK legislation. Development could put pressure on heritage assets and their setting.

- **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.

B.4.3 Key Issues and Opportunities

Determining which SEA topics are relevant to the WRSE Regional Plan and which should be scoped out (if any) is a key stage in the Scoping process. The SEA topics and the scoping determination for each is presented in Table B.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 WRSE Regional Plan on them. This was assessed by reviewing baseline conditions, current environmental issues for the WRSE Regional Plan area and an assessment of the likelihood of potential impacts occurring.

²⁵ Historic England (2019). Heritage at Risk. Available at: <https://historicengland.org.uk/advice/heritage-at-risk/findings/>

Table B.2: Key issues and opportunities

SEA topic	Scoped in	Implications	Opportunities
Biodiversity, Flora and Fauna	Yes	<p>The WRSE region is rich in habitats and species diversity, and includes national and internationally designated sites including SSSIs, SPAs, SACs, Ramsar sites and MPAs/MCZs.</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 WRSE Regional Plan to result in surface and/or groundwater pollution which could have an impact on wildlife.</p> <p>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 possible. Best value outcomes can be identified through combining nature-based solutions work with abstraction reduction scenarios.</p> <p>WRSE policies should be more clearly aligned to the 25 Year Environment Plan, including commitments on how the WRSE Regional Plan can contribute to the 25 Year Environment Plan policies.</p>	<p>The WRSE Regional Plan should ensure that there are no impacts on biodiversity and should look to enhance biodiversity and achieve biodiversity net gain where possible. There are opportunities to include options which result in improvements to the natural environment and biodiversity net gain through habitat creation or enhancement, support Nature Recovery Networks and Strategies, connectivity of ecological networks to increase species resilience and introduction of vegetation to slow run-off and reduce flood risk, amongst others.</p> <ul style="list-style-type: none"> • Protect, conserve and enhance biodiversity • Slow/halt biodiversity losses/declines • Integrate biodiversity into new infrastructure <p>Habitat recreation and enhancement within the WRSE Regional Plan has the opportunity to contribute to 25 Year Plan goals of “75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term” and “achieving 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.”</p>
Water	Yes	<p>Phosphate and physical modifications are the most common pressures affecting the achievement of ‘Good’ status. The significant water management issues which are most common in affecting the achievement of ‘Good’ are pollution from wastewater, physical</p>	<p>The WRSE Regional Plan should avoid options which have a negative impact on water quality or ecology. Protection of flow regimes and compliance with EFI and CSMG, including targets for water quality are important to adhere to. Abstraction is a significant pressure,</p>

SEA topic	Scoped in	Implications	Opportunities
		<p>modifications and pollution from town, cities or rural areas. There is potential for the options within the WRSE Regional Plan to have a negative impact on water quality.</p> <p>Areas of the WRSE region are at high risk of flooding from both surface water and rivers and the sea. There is potential that the options within the WRSE Regional Plan could be affected by or contribute to an increased risk of flooding.</p>	<p>causing many waterbodies to fail in GES/P, having detrimental impact on flows. In times of drought and prolonged dry weather, this could result in a detrimental impact. Groundwater bodies (such as chalk aquifers) are also at risk or already at poor WFD quantitative status.</p> <p>Options which reduce pressures on the water environment should be explored. WFD will be considered during the optioneering process to contribute to the selection of options which could lead to WFD improvements or avoid WFD deterioration.</p> <p>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</p> <p>The options within the WRSE Regional Plan 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>Agriculture has a dominant role in the landscape of the WRSE region. Agriculture land of Grade 2 and 3 are the most common across the region.</p> <p>The options within the WRSE Regional Plan have the potential to result in a loss of agricultural land or through a reduction in water availability for agricultural processes. There is also potential for soil contamination through the construction phase.</p>	<p>Soil is an important natural resource and as such the WRSE Regional Plan should consider the impact of options on the soil stocks and avoid options which have significant negative effects. The options within the WRSE Regional Plan 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</p>

SEA topic	Scoped in	Implications	Opportunities
			<p>options to positively affect agriculture, for example options to increase raw water storage and supply.</p> <ul style="list-style-type: none"> ● Promote regenerative agricultural practices ● Prioritise the implementation of catchment management solutions to help manage soils and reduce impacts of waterbodies ● Ensure the sustainable use of land ● Ensure measures are taken to prevent soil erosion; ● Reduce nutrient loads within surface water and groundwater bodies.
Air	Yes	<p>Air quality in the region is varied. Generally, it is good, however there are some areas designated as AQMAs. Air pollution sources include transport and industry.</p> <p>The options within the WRSE Regional Plan have the potential to impact air quality. This could include the generation of air pollutants from treatment plants and there is also likely to be effects from the construction phase.</p>	<p>There is potential for the WRSE Regional Plan to mitigate any increases in air pollutants as a result of the options and improve air quality in the region. There may opportunities within the design to reduce emissions from Water Treatment Works. In construction, local materials should be used to construct infrastructure, using low sulphur diesel, or improving existing equipment where feasible. Where possible, removal of trees could look to be avoided by design and be replanted locally. Planting initiatives will also be beneficial to improve air quality in the region.</p>
Climatic Factors	Yes	<p>The WRSE region is projected to have hotter and drier summers, and wetter and warmer winters, as well as short duration “extreme weather events” such as thunderstorms and heatwaves. There is potential that this could affect water availability through increases in periods of drought.</p> <p>There is also potential for options within the WRSE Regional Plan to result in carbon emissions during the construction and operation phase which will further contribute to climate change.</p> <p>Increased demand due to extreme events (i.e. heatwaves). Greater</p>	<p>The WRSE region has the opportunity to consider the impact of climate change within the option selection process. Measures to increase the resilience of the option to a changing climate could also be considered. The options should also consider the impact on climate change through the optioneering and design processes.</p> <p>The options should consider promoting nature-based solutions within their design, Reference should be made to opportunities to use nature-based solution, through natural capital assessments and the outcomes from the catchment workshops, to deliver multiple</p>

SEA topic	Scoped in	Implications	Opportunities
		<p>risks to rapid responding catchments (i.e. North Sussex clay catchments).</p>	<p>benefits such as carbon sequestration, biodiversity, nutrient capture, urban cooling, flood risk mitigation in addition to improved infiltration and storage of water for resources.</p> <p>The Regional Plan 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 resource, infrastructure and the environment ● Reduce contribution to climate change ● 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. <p>The Regional Plan has the opportunity to create more areas of water available for wildlife, contributing to DEFRA’s objective of making wildlife more resilient to climate change. The opportunities linked to climate change for wildlife include:</p> <ul style="list-style-type: none"> ● To reduce impacts of abstraction and water supply infrastructure from current levels and leave more water to enable wildlife to be more resilient to climate change in its current location ● To reduce impacts of abstraction and water supply infrastructure from current levels and leave more 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.

SEA topic	Scoped in	Implications	Opportunities
Population, Communities and Human Health	Yes	<p>There are approximately 19 million people living within the WRSE Region, which accounts for 30% of the UK’s population. Population is expected to grow which will likely place additional pressure on the water environment within the WRSE region. Economic growth and climate change will also add to this pressure. Health within the region is generally good.</p> <p>The options within the WRSE Regional Plan 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 have impacts on recreation and wellbeing.</p>	<p>There is an opportunity for the WRSE Regional Plan to engage with the local community. The WRSE Regional Plan could also look to maximise opportunities for recreation through enhancing access 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 WRSE Regional Plan 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> <p>The WRSE Regional Plan should 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.</p> <ul style="list-style-type: none"> ● Prevent disturbance effects for the local community ● Enhance the natural environment for recreation purposes ● 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>The WRSE region 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 WRSE Regional Plan have the potential to directly or indirect impact the historic environment through effecting the asset’s fabric or setting.</p>	<p>The options within the WRSE Regional Plan should consider the historic environment and minimise adverse effects.</p> <ul style="list-style-type: none"> ● Protect archaeology ● Careful consideration to the siting of options to reduce effects on historic assets and their setting ● Encourage public awareness through promoting heritage sites
Landscape	Yes	<p>The WRSE region’s landscape is diverse and there are important landscapes within the region, including two National Parks and eight AONB.</p>	<p>Consideration of the impacts of the landscape should be considered as part of the option development. There is potential for the WRSE Regional Plan to enhance the landscape. This may involve selecting</p>

SEA topic	Scoped in	Implications	Opportunities
		<p>There is potential for the options within the WRSE Regional Plan 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.</p>	<p>certain materials or colours for the option or through planting or habitat creation.</p> <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.
Material Assets	Yes	<p>The WRSE region contains important transport links which could be affected during construction works. There is also significant water and wastewater treatment infrastructure across the region, operated by the six water companies within WRSE. The region also produces and manages a significant amount of waste and there are over 400 authorised landfill sites.</p> <p>The WRSE Regional Plan has the potential to increase the use of resources within the region and result in the generation of waste.</p>	<p>The WRSE Regional Plan has the opportunity to consider the use of resources within the option development and reduce the use of energy, materials and prevent waste generation.</p> <ul style="list-style-type: none"> ● Reduce resource use ● Minimise waste generation ● Avoid impacts on the transport network ● Achieve required leakage reduction targets ● Reduce unplanned outages

B.4.4 Compatibility of the Objectives

B.4.4.1 Compatibility of the SEA Objectives

The development of SEA objectives based on environmental, social and economic issues means that it is likely not all of the objectives will relate or be compatible. Objectives which cover economic issues may sometimes conflict with environmental objectives, and vice versa, for example. A compatibility assessment of the SEA objectives is presented in Table B.3 and demonstrates any potential conflicts and uncertainties between the SEA objectives.

The following key has been used to illustrate the SEA objectives compatibility:

+	Objectives are compatible
-	Objectives are potentially incompatible
0	Objectives are not related
/	Uncertainty over relationship

Table B.3: SEA objectives compatibility matrix

1. Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)															
2. Protect and enhance the functionality, quantity and quality of soils	+														
3. Increase resilience and reduce flood risk	+	+													
4. Protect and enhance the quality of the water environment and water resources	+	+	+												
5. Deliver reliable and resilient water supplies	+	+	+	+											
6. Reduce and minimise air emissions	+	0	+	+	+										
7. Reduce embodied and operational carbon emissions	+	+	+	+	+	+									
8. Reduce vulnerability to climate change risks and hazards	+	+	+	+	+	+	+								
9. Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	+	+	+	+	0	+	+	+							
10. Conserve, protect and enhance the historic environment, including archaeology	0	+	+	+	0	+	+	+	+						
11. Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	+	+	+	+	+	+	+	+	+	+					
12. Maintain and enhance tourism and recreation	+	+	+	+	+	+	0	+	+	+	+				
13. Minimise resource use and waste production	+	+	+	+	+	+	+	+	0	0	+	+			
14. Avoid negative effects on built assets and infrastructure	0	+	+	0	0	0	0	+	+	+	+	+	+	+	
	1. Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	2. Protect and enhance the functionality, quantity and quality of soils	3. Increase resilience and reduce flood risk	4. Protect and enhance the quality of the water environment and water resources	5. Deliver reliable and resilient water supplies	6. Reduce and minimise air emissions	7. Reduce embodied and operational carbon emissions	8. Reduce vulnerability to climate change risks and hazards	9. Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	10. Conserve, protect and enhance the historic environment, including archaeology	11. Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	12. Maintain and enhance tourism and recreation	13. Minimise resource use and waste production	14. Avoid negative effects on built assets and infrastructure	

B.4.4.2 Compatibility of the SEA Objectives with the WRSE Regional Plan Objectives

It is important that the objectives developed for the WRSE Regional Plan are compatible with the SEA objectives. A compatibility assessment of the SEA and WRSE Regional Plan objectives is presented in Table B.4.

The following key has been used to illustrate the objectives compatibility:

+	Objectives are compatible
-	Objectives are potentially incompatible
0	Objectives are not related
/	Uncertainty over relationship

The compatibility matrix demonstrates that the SEA and WRSE Regional Plan objectives are compatible with one another. However, there is potential for tension between the objective to “ensure there is enough water to support a growing population and economic growth”, and the objective “to protect and enhance biodiversity and vulnerable habitats”. However, the aim of the plan and environmental assessment is to protect and enhance the environment, therefore, the plan shouldn’t conflict with ecological objectives.

Table B.4: SEA and WRSE Regional Plan objectives compatibility matrix

	WRSE Regional Plan			
	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 how much is available
1. Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)	/	+	+	+
2. Protect and enhance the functionality, quantity and quality of soils	+	+	+	+
3. Increase resilience and reduce flood risk	+	+	+	+
4. Protect and enhance the quality of the water environment and water resources	+	+	+	+
5. Deliver reliable and resilient water supplies	+	+	+	+
6. Reduce and minimise air emissions	+	+	+	+
7. Reduce embodied and operational carbon emissions	+	+	+	+
8. Reduce vulnerability to climate change risks and hazards	+	+	+	+
9. Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	0	+	+	+
10. Conserve, protect and enhance the historic environment, including archaeology	0	+	0	0
11. Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	+	+	+	+
12. Maintain and enhance tourism and recreation	+	+	+	+
13. Minimise resource use and waste production	+	+	+	0
14. Avoid negative effects on built assets and infrastructure	0	+	0	0

SEA objectives

C. Scoping Report 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 1A 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 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.

Ref	Organisation	Topic / Report section	Feedback	Response
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.
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 water resources planning guidance 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.

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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 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.	Agree - assessing for adverse effects on integrity will not be undertaken at Stage 1.
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 significant effect cannot be excluded on objective evidence as appears to be the case later in the methodology	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 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

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				<p>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.</p>
11	Natural England	Appendix F HRA - Zone of Influence	<p>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, 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>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 the ambiguity it has created, has been removed from the assessment proposals.</p>

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12	Natural England	Appendix F HRA - Zone of Influence	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	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.
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

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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 it might be more logical to put 1.5 into section 2	We will review and amend if appropriate
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.

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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, 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”	Agree - Alternatives will be considered prior to IROPI, which itself will only be considered 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 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.	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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22	Natural England	Baseline	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.	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.
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.

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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 this list and what the MPA is that is not also one of the other designations	Table 4.1 will be reviewed and clarified.
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 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.	The agreed the percentage covers will be updated and Marine capital considered within the assessment

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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 capture, urban cooling, flood risk mitigation in addition to improved infiltration and storage of water for resources.	The key issues and opportunities table will be updated to include more reference to the need for and benefits of 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.

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32	Natural England	Key issues and opportunities - making water available for wildlife to adapt to climate change	<p>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:</p> <p>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</p> <p>ii)To reduce impacts of abstraction and water supply infrastructure from current levels and leave more 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>	The suggested opportunities will be added into the key issues and opportunities section.
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 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.

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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 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.	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.
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.

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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.
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 don't provide an effective assessment which is why the SEA looks at wider effects on setting and character.

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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 WRSE region and lead to significant delays in implementing schemes.	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.
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.

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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> <p>The Environment Agency’s National Framework and supporting Guiding Principles for Environmental Destination</p> <p>The draft Water Resources Planning Guidelines and supporting technical notes that are out for consultation</p> <p>Any documents relating to OxCam development</p> <p>Consider EA Strategic and Local Outcome Plans. These are currently being developed but may be worth noting.</p> <p>Consideration of other regional groups’ publications – Water resources East, water west,</p> <p>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 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>	<p>The suggested plans, programmes and guidance documents will be included where appropriate and available.</p>

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45	Environment Agency	Baseline information	<p>With regards to the climatic factors, how will sunshine, snowfall and wind climatic data be used in the SEA assessment?</p> <p>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.</p> <p>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?</p> <p>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.</p> <p>Each individual main river should have been set an Ecological Flow objective. This data will be critical when comparing if a new water company proposal is indeed compatible with the SEA objections.</p> <p>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>	<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 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: 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 now but in the future with the lowest environmental implications. The report does set some high aspirations with regard no adverse environmental implications by stating no effect on surface water and/or ground water 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.</p>	<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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Ref	Organisation	Topic / Report section	Feedback	Response
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 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	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	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 SEA should reflect this.

Ref	Organisation	Topic / Report section	Feedback	Response
50	Environment Agency	High-level screening RAG Criteria and Definitions and/or the SEA objectives scoring criteria	<p>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.</p> <p>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.</p> <p>The outcome from this exercise should be explained through further consultation highlighting where professional judgement has been used.</p>	<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>
51	Environment Agency	Other comments on the scoping report	<p>Further details on how the numerical valuation of effects will be incorporated into the decision making modelling?</p>	<p>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 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.</p>

Ref	Organisation	Topic / Report section	Feedback	Response
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 don't 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
53	Environment Agency	Uncertainties	The scope doesn't 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	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. Additionally impacts of natural capital stocks that are not captured here will be assessed in the SEA assessment.

Ref	Organisation	Topic / Report section	Feedback	Response
				Agreed that chalk streams should be mapped and considered as a unique habitat. This was raised during consultation
56	Environment Agency	Baseline Maps	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 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: 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

Ref	Organisation	Topic / Report section	Feedback	Response
59	Environment Agency	Section 1.3	<p>Pg. 11. Amendment to bullet five: Provide sufficient opportunity to engage and collaborate with the Consultation Bodies and wider stakeholders.</p> <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	<p>Pg. 12. Amendment to bullet four (replace): Mitigate the impacts of climate change through demand and supply interventions to ensure water is available for society and the environment</p>	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.
61	Environment Agency	Section 2.2	<p>Pg. 12/13 Paragraph under bullets: 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.</p>	The wording will be amended
62	Environment Agency	Section 2.3	<p>Pg. 13. Paragraph 1: The terms refers to the consideration of actions to enhance the environment and build resilience to future challenges</p>	The wording will be amended
63	Environment Agency	Section 2.3	<p>Pg. 13. Paragraph 2: 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.</p>	The wording will be amended
64	Environment Agency	Section 2.3	<p>Last paragraph on page 13 talks about plan aiming to provide environmental net gain against the four environmental metrics. What are those?</p>	The environmental metrics are those proposed to translate the environmental assessment results into metrics for the investment model: SEA positive, SEA

Ref	Organisation	Topic / Report section	Feedback	Response
				negative, BNG and Natural capital as set out in the WRSE methodology guidance document
65	Environment Agency	Section 3.2	<p>Pg. 16. Bullet Point List: Points to be added...</p> <p>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)</p> <p>Habitat creation and safeguarding ecosystem services (Woodland Carbon Guarantee scheme in line with the Woodland Carbon Fund)</p> <p>Catchment management / nature based solutions working to enhance natural processes (existing work through CaBA)</p> <p>Reduce water waste and leakage (Ofwat targets and penalties)</p> <p>Improve resilience to extreme droughts ensuring consistency with WRMP24 (1/500 year resilience)</p>	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	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	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's 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.
68	Environment Agency	Table 4.10	This doesn't 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

Ref	Organisation	Topic / Report section	Feedback	Response
69	Environment Agency	Table 4.14	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	2015 classifications used – 2019 classifications now available	The baseline will be updated with the 2019 classifications
71	Environment Agency	Section 4.2.10	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?	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. 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.
72	Environment Agency	Section 4.3	Again future considerations for groundwater are missing. It would be useful to include maybe separate consideration for groundwater and surface water as the response to climatic conditions/ human activity/ pollution and remediation has different timeframe and potentially consequences. Risks also will vary.	The future baseline section will be updated to include groundwater and surface water.
73	Environment Agency	Section 5.1	Table 5.1: 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: How do we understand cost-effective in this context? (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.

Ref	Organisation	Topic / Report section	Feedback	Response
75	Environment Agency	Section 5.1	<p>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.</p> <p>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.</p> <p>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.’</p> <p>Important to recognise here another significant pressure: 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.</p>	Noted
76	Environment Agency	Section 5.1	<p>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:</p> <ul style="list-style-type: none"> Promote regenerative agricultural practices Prioritise the implementation of catchment management solutions to help manage soils and reduce impacts of waterbodies Ensure measures are taken to prevent soil erosion Ensure the sustainable use of land 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	<p>Air – Opportunity isn’t entirely clear? Needs more detail – planting of trees, reduced emissions from Water Treatment Works?</p>	The key issues and opportunities will be updated to include the suggestions

Ref	Organisation	Topic / Report section	Feedback	Response
78	Environment Agency	Section 5.1	<p>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.</p> <p>To be added to implications – increased demand due to extreme events (i.e. heatwaves). Greater risks to rapid responding catchments (i.e. North Sussex clay catchments).</p> <p>To add the following bullets:</p> <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 	The key issues and opportunities will be updated to include the suggestions
79	Environment Agency	Section 5.1	<p>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.</p>	The key issues and opportunities will be updated to include the suggestions
80	Environment Agency	Section 5.1	<p>Landscape - Amend bullets</p> <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	<p>Material Assets – Nothing on leakage?</p> <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	<p>Soil</p> <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

Ref	Organisation	Topic / Report section	Feedback	Response
83	Environment Agency	Section 6.1, Table 6.1	<p>Water:</p> <p>Flood:</p> <p>Will the option mitigate flood risk? (I.e. attenuation of flows through NFM, catchment storage etc.)</p> <p>Protect and enhance:</p> <p>Will the option comply with flow targets (i.e. EFI, CSMG)?</p> <p>Deliver reliable and resilient water supplies:</p> <p>Does the option reduce the presence of containments in waterbodies, and make more water available to the environment?</p>	The suggested assessment questions will be added
84	Environment Agency	Section 7.1, Table 7.1	<p>Water: Rag criteria should also include:</p> <p>Drinking water protected areas – integration of surface water safeguard zones</p> <p>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.

Ref	Organisation	Topic / Report section	Feedback	Response
85	Environment Agency	Proposed RAG criteria and definitions	<p>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.</p> <p>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 unlikely. 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.</p> <p>It would be useful to understand the definition of the criteria and the level of detail that will be provided to inform these judgements.</p> <p>Also need some further explanation on how detailed considerations for biodiversity will fit into a plan covering the whole of the south east.</p> <p>'Green corridors' and migration routes have been included, so to some extent river corridors might be covered, but need further confirmation.</p> <p>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>	<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 will look at more than just distances when considering effects of an option.</p> <p>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

D. Policies, Plans and Programmes Review

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
International		
Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)	Biodiversity	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 (1983)	Biodiversity	The Convention aims to conserve terrestrial, aquatic and avian migratory species throughout their range.
Convention on Biological Diversity (1992)	Biodiversity	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.
Ramsar Convention - The Convention on Wetlands of International Importance (1971)	Biodiversity	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.
UN Framework Convention on Climate Change (1992)	Climatic Factors	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.
Kyoto Protocol to the UN Framework Convention on Climate Change (1997)	Climatic Factors	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.
Commitments arising from the World Summit on Sustainable Development, Johannesburg (2002)	Climatic Factors	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.
Paris Agreement (2015)	Climatic Factors	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.
Charter for the Protection and Management of Archaeological Heritage (1990)	Historic Environment	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 inventurisation, 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.

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
The World Heritage Convention (1972)	Historic Environment	The Convention defines the kind of natural or cultural sites which can be considered for inscription on the World Heritage List. It also sets out the duties of states in identifying potential sites and their role in preserving them.
Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) (1998)	Population and Human Health	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.
European		
Ambient Air Quality Directive (2008/50/EC)	Air	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'.
Thematic Strategy on Air Pollution (2005)	Air	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.
Establishing measures for the recovery of the stock of European eel 2007 (1100/2007)	Biodiversity	<p>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.</p> <p>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.</p>
Our life insurance, our natural capital: an EU biodiversity strategy to 2020 (2011)	Biodiversity	<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; and • A bigger EU contribution to averting global biodiversity loss. <p>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</p>

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
		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’.
Fresh Water Fish Directive (2006/44/EC)	Biodiversity	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.
Directive on the Conservation of Wild Birds (79/409/EEC) (as amended)	Biodiversity	<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); and ● 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).
Directive on the Conservation of Natural Habitats and of Wild Flora and Fauna (92/43/EEC)	Biodiversity	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.
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)	Biodiversity	The Directive sets out rules on animal health concerning aquaculture animals and related products which apply to the marketing, importation and transit of such products. It also establishes measures aimed at the prevention and control of diseases in aquaculture animals as well as making further provisions regarding the authorisation to aquaculture production businesses and processing establishments.
Habitats Directive (92/43/EEC)	Biodiversity	The aim pursued by this Directive is to ensure biodiversity through the conservation of natural habitats and of wild fauna and flora in the territories of the Member States. Pursuant to this Directive, measures shall be designed and undertaken in order to maintain or restore, as the case may be, natural habitats and species of wild fauna and flora. To this end, a coherent European ecological network of special areas of conservation shall be set up under the title Nature 2000.
Limiting Global Climate Change to 2 degrees Celsius - The way ahead for 2020 and beyond (2007)	Climatic Factors	<p>This a set of binding legislation to ensure the EU meets its climate and energy targets for the year 2020. The targets are:</p> <ul style="list-style-type: none"> ● 20% reduction in GHGs ● 20% of EU energy from renewables ● 20% improvement in energy efficiency

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
A Clean Planet for all: A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy (2018)	Climatic Factors	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.
Promotion of the use of energy and renewable sources Directive (2009/28/EC)	Climatic Factors	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.
Energy Act 2013	Climatic Factors	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.
Mainstreaming sustainable development into EU policies: 2009 Review of the European Union Strategy for Sustainable Development	Cross-cutting	The Renewed EU Sustainable Development Strategy (2006) deals in an integrated way with economic, environmental and social issues and lists the following seven key challenges: <ol style="list-style-type: none"> 1. Climate change and clean energy; 2. Sustainable transport; 3. Sustainable consumption and production; 4. Conservation and management of natural resources; 5. Public health; 6. Social inclusion, demography and migration; and 7. Global poverty
European Commission Environmental Liability Directive (2004/35/EC)	Cross-cutting	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.
The SEA Directive (Directive 2001/42/EC)	Cross-cutting	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.
The Convention for the Protection of the Architectural Heritage of Europe (Granada Convention) (1985)	Historic Environment	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 European Convention on the Protection of Archaeological Heritage (Valletta Convention) (1992)	Historic Environment	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.

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
The European Landscape Convention (2006)	Landscape	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 Environmental Noise Directive (2002/49/EC)	Population and Human Health	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.
European Soils Charter (2003)	Soil	The Charter sets out to protect soil as a complex natural resource which is fundamental to life. It recognises that: <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; and • Further research and collaboration is required to ensure the wise use and conservation of soil.
Thematic Strategy for Soil Protection (2006)	Soil	The Strategy aims to protect soil and promote its sustainable use. It is based on the following guiding principles: <ul style="list-style-type: none"> • Preventing further soil degradation and preserving its functions • 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
The Nitrates Directive (91/676/EEC)	Water	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)	Water	The WFD has the following key aims: <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; and • Streamlining legislation.

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
		<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>
Urban Wastewater Treatment Directive (91/271/EEC)	Water	<p>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.</p>
Drinking Water Directive (1998/83/EC)	Water	<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; and ● 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.
Directive on Bathing Water (76/160/EEC); and Directive 2006/7/EC repealing Directive 76/160/EEC (from 2014)	Water	<p>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.</p>
Groundwater Directive (2006/118/EC)	Water	<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 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> <ul style="list-style-type: none"> ● Groundwater quality standards to be established by the end of 2008; ● 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); ● Pollution trends to be reversed so that environmental objectives are achieved by 2015 by using the measures set out in the WFD; ● 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; and ● Compliance with good chemical status criteria (based on EU standards of nitrates and pesticides and on threshold values established by Member States).
Marine Strategy Framework Directive (2008/56/EEC)	Water	<p>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.</p>

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
Directive on the Assessment and Management of Flood Risks (2007/60/EC)	Water	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.
Blueprint to Safeguard Europe's Water Resources (2012)	Water	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.
The Water Resources Planning Guidelines	Water	Guideline to assist is designed to help water companies in England and Wales to ensure WMRPs complies with all the relevant statutory requirements and government policy.
National		
The Eels (England & Wales) Regulations 2009 (as amended)	Biodiversity	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.
Salmon and Freshwater Fisheries Act 1975	Biodiversity	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.
UK Post-2010 Biodiversity Framework, JNCC and Defra (2012)	Biodiversity	<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; and • To streamline governance arrangements for UK-scale activity.
Making Space for Nature - A review of England's Wildlife Sites and Ecological Network (2010)	Biodiversity	<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> <ul style="list-style-type: none"> • 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; • 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 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;

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
		<ul style="list-style-type: none"> • 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; • 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.
Biodiversity 2020: A strategy for England's wildlife and ecosystem services, Defra (2011)	Biodiversity	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’.
The Conservation of Habitats and Species Regulations (2010) (as amended)	Biodiversity	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 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations (2019)	Biodiversity	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.
Delivering a healthy natural environment. Ecosystem approach action plan, Defra (2010)	Biodiversity	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.
The Invasive Alien Species (Enforcement and Permitting) Order 2019	Biodiversity	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 Great Britain Invasive Non-Native Species Strategy, Defra (2015)	Biodiversity	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.
A narrative for conserving freshwater and wetland habitats in England, Natural England (2016)	Biodiversity	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.
Conservation 21 - Natural England's Conservation Strategy for the 21st Century, Natural England (2016)	Biodiversity	<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

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
		<ul style="list-style-type: none"> • Putting people at the heart of the environment • Growing natural capital
State of Natural Capital Annual Report 2020, Natural Capital Committee (2020)	Biodiversity	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.
Standing Advice on Protected Species, Natural England (2016)	Biodiversity	Provides guidance on reviewing planning applications which might have an affected on protected species.
Climate Change Act 2008	Climatic Factors	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.
UK Climate Change Risk Assessment, Defra (2017)	Climatic Factors	Identifies the key climate change risks and opportunities for the UK which are as follows: <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; and • New and emerging pests and diseases and invasive non-native species affecting people, plants and animals.
The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting, Defra (2018)	Climatic Factors	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.
National Planning Policy Framework (NPPF) (2019)	Cross-cutting	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.
A Green Future: Our 25 Year Plan to Improve the Environment, UK Government (2018)	Cross-cutting	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: <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

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
Environment Act 2021	Cross-cutting	<p>The Bill was first introduced to parliament in October 2019 and received Royal Assent on 9 November 2021. The Environment Act supports 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 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)
Securing the Future – Delivering the UK Sustainable Development Strategy (2005)	Cross-cutting	<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: ● Sustainable consumption and production ● Climate change and energy ● Natural resource protection and environmental enhancement ● Sustainable communities
The Natural Choice: Securing the Value of Nature, Defra (2011)	Cross-cutting	<p>The White Paper outlines the Government’s vision for the natural environment for the next 50 years.</p>
Marine and Coastal Access Act (2009)	Cross-cutting	<p>The Act sets out to protect marine functions, activities and wildlife. It commits the UK to ambitious actions and sets out the provisions for Marine Conservation Zones (MCZs), a Marine Planning system, reform of inshore fishers, amongst others.</p>
The Wildlife and Countryside Act 1981 (as amended)	Cross-cutting	<p>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.</p>
Environment Protection Act 1990	Cross-cutting	<p>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.</p>

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Countryside and Rights of Way (CROW) Act	Cross-cutting	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 Natural Environment and Communities Act 2006 (NERC Act)	Cross-cutting	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.
Creating a better place: Our ambition to 2020, Environment Agency (2018)	Cross-cutting	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.
UK National Ecosystem Assessment Follow-on (2014)	Cross-cutting	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.
National Infrastructure Delivery Plan 2016–2021, Infrastructure and Projects Authority (HM Government) (2016)	Cross-cutting	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: <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
Fixing the foundations: Creating a more prosperous nation, HM Government (2015)	Cross-cutting	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: <ul style="list-style-type: none"> • Encouraging long term investment in economic capital, including infrastructure, skills and knowledge • Promoting a dynamic economy that encourages innovation and helps resources flow to their most productive use
Environment Act 1995	Cross-cutting	The Act set out provisions for the creation of a number of government agencies including the Environment Agency and the Scottish Environment Protection Agency (SEPA). It also set out new standards for environmental protection.
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015	Cross-cutting	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.
Environmental Assessment of Plans and Programmes Regulations 2004	Cross-cutting	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.
Planning Act 2008	Cross-cutting	The Planning Act 2008 is an Act of the Parliament of the United Kingdom intended to speed up the process for approving major new infrastructure projects.

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
National Parks and Access to the Countryside Act 1949	Cross-cutting	The Act makes provision for National Parks and the National Parks Commission to enable 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, to amend the law relating to rights of way; and to confer further powers for preserving and enhancing natural beauty;
Planning (Listed Buildings and Conservation Areas) Act 1990	Historic Environment	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
The Ancient Monuments and Archaeological Areas Act 1979	Historic Environment	This Act is concerned with the provisioning, investigation, recording and the preservation and protection of archaeological sites and ancient monuments.
Climate Change and the Historic Environment, English Heritage (2008)	Historic Environment	The statement recognises the climate change impacts the UK is facing and how this poses a risk to the historic environment.
Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment, Historic Environment (2016)	Historic Environment	Provides guidance on SEA in relation to the historic environment.
The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning 3, Historic Environment (2017)	Historic Environment	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.
Ancient Woodland and Veteran Trees: Protecting them from development, Forestry Commission and Natural England (2014)	Landscape	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: <ul style="list-style-type: none"> • conserving and enhancing biodiversity • reducing the level of impact of the proposed development on ancient woodland and ancient and veteran trees
Our Waste, Our Resources: A Strategy for England, HM Government (2018)	Material Assets	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.
Safeguarding our Soils - A strategy for England, Defra (2009)	Soil	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.
Water Resources Act 1991	Water	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.

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
Water Industry Act 1991	Water	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 Act 2003 (as amended)	Water	The Act amends the Water Resources Act and Regulations 1991 and the Water Industry Act 1991. The Act has the following four broad aims: <ul style="list-style-type: none"> • the sustainable use of water resources; • strengthening the voice of consumers; • a measured increase in competition; and • the promotion of water conservation.
Preparing for a drier future: England's water infrastructure needs, National Infrastructure Commission (2018)	Water	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 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.
Draft National Policy Statement for Water Resources Infrastructure, Defra (2018)	Water	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.
Water for Life White Paper, Defra (2011)	Water	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.
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (as amended)	Water	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: <ul style="list-style-type: none"> • Surface freshwater (including lakes, streams and rivers); • Groundwaters; • Groundwater dependant ecosystems; • Estuaries; and • Coastal waters out to one mile from low-water.
Protect groundwater and prevent groundwater pollution, Environment Agency (2017)	Water	It aims to avoid negative impacts on groundwater sources including impacts of pollution by providing guidance on discharging or abstracting from groundwater sources.
Groundwater protection technical guidance, Environment Agency (2017)	Water	It aims to avoid negative effects on the quality and quantity of groundwater resources by providing guidance on the inputs of substances and pollutants to groundwater, discernibility of hazardous substances and when geological formations can be determined permanently unsuitable for other purposes.

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
The Environment Agency’s approach to groundwater protection, Environment Agency (2018)	Water	These position statements describe the Environment Agency’s approach to managing and protecting groundwater. They update Groundwater protection: principles and practice (GP3).
Flood and Water Management Act 2010	Water	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.
The Environment Agency’s National Framework and supporting Guiding Principles for Environmental Destination	Water	The National Framework explores the long-term needs of all sectors that depend on a secure supply of water. This includes public water supplies provided by water companies to customers’ homes and businesses; direct abstraction for agriculture, electricity, generation and industry; and the water needs of the environment.
Understanding the risks, empowering communities, building resilience: The National Flood and Coastal Erosion Risk Management Strategy for England, Defra and Environment Agency (2014)	Water, Climatic Factors, Population, Human Health	This strategy provides the overarching framework for future action by all risk management authorities to tackle flooding and coastal erosion in England. The Environment Agency are revising the National Flood and Coastal Risk Management Strategy and is planned to be published in spring 2020.
National Flood and Coastal Erosion Risk Management Strategy for England (2020)	Water, Climatic Factors, Population, Human Health	The Strategy sets out the long-term delivery objectives the nation should take over the next 10 to 30 years as well as shorter term, practical measures risk management authorities should take working with partners and communities. It includes the following long term vision: ‘a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100’, and includes the following three long-term ambitions: <ul style="list-style-type: none"> • Climate resilient places • Today’s growth and infrastructure resilient in tomorrow’s climate • A nation ready to respond and adapt to flooding and coastal change
The Water Resources Management Plan Regulations 2007	Water	The regulations set out the statutory duty for water companies to prepare and publish a WRMP.
Water Resources Planning Framework (2015-2065), Water UK (2016)	Water	The project aims to develop a high-level strategy and framework for the long-term management and planning of water resources in England and Wales. It identifies the challenges facing water resources including climate change, resilience to droughts and demand growth and presents options to mitigate the issues.
Water Supply (Water Quality) Regulations 2016 (as amended)	Water	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.
National Policy Statement for Wastewater (2012)	Water	National Policy Statement (NPS) sets out Government policy for the provision of major wastewater infrastructure. It aims to make existing policy and practice clear and transparent in relation to nationally significant wastewater infrastructure.

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
Climate change approaches in water resources planning – Overview of new methods, Environment Agency (2013)	Water, Climatic Factors	<p>The report explores different ways in which the possible impacts of climate change could be incorporated into Water Resource Management Plans (WRMPs) in England and Wales. A number of improvements are suggested, but not limited to:</p> <ul style="list-style-type: none"> • Undertaking vulnerability assessments to evaluate Water Resource Zones (WRZs) vulnerability to current and future climate and using the outcomes to determine the level of modelling required to assess future impacts of climate change • Alternative methods to scaling the impacts of climate change from the base year to the 2030s and beyond • Headroom assessment should clearly distinguish between climate and non-climate risks and report outputs for specific reference levels of headroom
Future Water: the Government’s water strategy for England, Defra (2008)	Water	<p>The Strategy sets Defra’s vision for the water sector up to 2030 and outlines the steps they will implement to achieve that vision. Their vision is where rivers, canals, lakes and seas have improved for people and wildlife, with benefits for angling, boating and other recreational activities, and with continued provisions for excellent quality drinking water. It is structured around water supply and demand, water quality in the natural environment, surface water drainage, river and coastal flooding, greenhouse gas, water charging, the regulatory framework and innovation.</p>
Water Resources Planning Guideline, Environment Agency (2016)	Water	<p>This document provides guidance on the requirements and process for water resource planning through WRMPs to ensure resilient and sustainable water supplies. It is currently being updated and is out for public consultation until October 2020.</p>
Managing Water Abstraction, Environment Agency (2016)	Water	<p>Sets out how the Environment Agency manage water resources in England and outlines the technical, legal and policy requirements behind the abstraction licensing strategies.</p>
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.</p> <p>All marine plan areas are scheduled to have a plan by 2021.</p>
UK Marine Policy Statement (2011)		<p>The UK Marine Policy Statement (MPS) provides the policy framework for the marine planning system. It provides the context for marine plans. Marine plans put into practice the objectives for the marine environment that are identified in the MPS alongside the National Planning Policy Framework (NPPF) and the Localism Act 2011. Where there is no marine plan in place, the MPS sets the direction for decisions that affect the marine areas, such as granting licences for all public bodies.</p>
Local		
Site Improvement Plans for Natura 2000 sites: London & South East, Natural England	Biodiversity	<p>Site Improvement Plans outline the priority measures needed to achieve and maintain the European species and habitats within a site in favourable condition. They include the following:</p> <ul style="list-style-type: none"> • Provide a high level overview of the issues affecting the condition of the site • Identify the priority actions to address the issues • Identify the potential funding sources available

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
Local Development Plans (Various)	Cross-cutting	<p>Local Development Plans or Core Strategies are the main framework for planning in a local authorities and set out the long-term spatial vision to guide sustainable development. They include policies on key area such as housing, transport, the natural environment, employment and economic development, carbon reduction and resources, amongst others.</p> <p>The following local authorities fall within the WRSE boundary and therefore their Local Plans/Core Strategies are relevant:</p> <ul style="list-style-type: none"> • Bracknell Forest; Central Bedfordshire; West Berkshire; Wiltshire; Swindon; The City of Brighton and Hove; City of Southampton; Luton; Medway; Reading; Slough; Windsor and Maidenhead; Wokingham; City of Portsmouth; Isle of Wight; Wycombe ; South Bucks ; Chiltern ; Aylesbury Vale ; South Cambridgeshire; Lewes; Rother; Wealden; Eastbourne; Hastings; Brentwood ; Epping Forest; Uttlesford; Chelmsford; Braintree; Harlow; Cotswold; Stroud; Basingstoke and Deane; New Forest; Eastleigh; East Hampshire; Winchester; Test Valley; Hart; Gosport; Fareham; Havant; Rushmoor; Three Rivers; Hertsmere; Broxbourne; Dacorum; East Hertfordshire; St. Albans; Welwyn Hatfield; North Hertfordshire; Watford; Vale of White Horse; South Oxfordshire; Cherwell; West Oxfordshire; Stevenage; Sevenoaks; Tonbridge and Malling; Thanet; Ashford; Canterbury; Dover; Maidstone; Swale; Dartford; Gravesham; South Northamptonshire; Oxford; Waverley; Tandridge; Woking; Surrey Heath; Runnymede; Guildford; Reigate and Banstead; Mole Valley; Elmbridge; Spelthorne; Epsom and Ewell; Stratford-on-Avon; Arun; Adur; Chichester; Mid Sussex; Horsham; Bromley London Borough; Hounslow London Borough; Worthing; Crawley; Ealing London Borough; Havering London Borough; Hillingdon London Borough; Kingston upon Thames London Borough; Croydon London Borough; Harrow London Borough; Barnet London Borough; Brent London Borough; Lambeth London Borough; Southwark London Borough; Lewisham London Borough; Greenwich London Borough; Bexley London Borough; Enfield London Borough; Waltham Forest London Borough; Redbridge London Borough; Sutton London Borough; Richmond upon Thames London Borough; Merton London Borough; Wandsworth London Borough; Hammersmith and Fulham London Borough; City and County of the City of London; Tunbridge Wells; Kensington and Chelsea London Borough; City of Westminster London Borough; Folkestone and Hythe; Camden London Borough; Tower Hamlets London Borough; Islington London Borough; Hackney London Borough; Haringey London Borough; Newham London Borough; Barking and Dagenham London Borough; Tewkesbury; Cheltenham; and Wychavon.
Creating a Vision for the Oxford-Cambridge Arc	Cross-cutting	A consultation documents setting out the government’s first public consultation on the Oxford-Cambridge Arc Spatial Framework.
National Character Areas (NCAs) (Various), Natural England	Landscape	NCAs are subdivisions in England based on a combination of landscape, biodiversity, geodiversity and economic activity characteristics. They intend to inform local decision making.
River Basin Management Plans (RBMPs), Defra and Environment Agency (2015)	Water	RBMPs set out to provide a framework for protecting and enhancing the benefits provided by the water environment. To achieve this, and because water and land resources are closely linked, it also informs decisions on land-use planning.
Various Local Catchment Management Strategies	Water	A strategy which must set principles for allocating water to existing and prospective users, taking into account all matters relevant to the protection, use, development, conservation, management and control of water resources.
Catchment Flood Management Plans (CFMPs), Defra and Environment Agency (2016)	Water	CFMPs set out the risk for each of the river basins in relation to flooding from rivers, the sea, surface water, groundwater and reservoirs across England and Wales. They do not cover coastal flooding which are covered by Shoreline Management Plans. The role of the CFMPs is to establish flood risk management policies which will deliver sustainable flood risk management for the long term. CFMPs should be used to inform planning and decision making by key stakeholders such as the Environment Agency, local authorities, Internal Drainage Boards, water companies and other utilities; transportation planners; landowners, farmers and land managers; the public and businesses to enhance their understanding of flood risk and how it will be managed.

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
		<p>The CFMPs identify six generic flood risk management policies:</p> <ul style="list-style-type: none"> • Policy 1- Areas of little or no flood risk where the Environment Agency will continue to monitor and advise: this policy will tend to be applied in those areas where there are very few properties at risk of flooding. It reflects a commitment to work with the natural flood processes as far as possible. • Policy 2 - Areas of low to moderate flood risk where the Environment Agency can generally reduce existing flood risk management actions: this policy will tend to be applied where the overall level of risk to people and property is low to moderate. • Policy 3 - Areas of low to moderate flood risk where the Environment Agency are generally managing existing flood risk effectively: this policy will tend to be applied where the risks are currently appropriately managed and where the risk of flooding is not expected to increase significantly in the future. • Policy 4 - Areas of low, moderate or high flood risk where the Environment Agency are already managing the flood risk effectively but where they may need to take further actions to keep pace with climate change: this policy will tend to be applied where the risks are currently deemed to be appropriately-managed, but where the risk of flooding is expected to significantly rise in the future. • Policy 5 - Areas of moderate to high flood risk where the Environment Agency can generally take further action to reduce flood risk: this policy will tend to be applied to those areas where the case for further action to reduce flood risk is most compelling, for example where there are many people at high risk, or where changes in the environment have already increased risk. • Policy 6 - Areas of low to moderate flood risk where the Environment Agency will take action with others to store water or manage run-off in: locations that provide overall flood risk reduction or environmental benefits. This policy will tend to be applied where there may be opportunities in some locations to reduce flood risk locally or more widely in a catchment by storing water or managing run-off. <p>To select the most appropriate policy, the CFMPs consider how the social, economic and environmental objectives are affected by flood risk management activities under each policy option. The policies identified in the CFMPs will be delivered through a range of delivery plans, projects and actions.</p>
Shoreline Management Plans (Various)	Water	Shoreline Management Plans (SMPs) are developed by Coastal Groups with members mainly from local councils and the Environment Agency. They cover the whole of the coastline and identify the most sustainable approach to managing the flood and coastal erosion risks to the coastline in the short-term (0 to 20 years), medium term (20 to 50 years) and long term (50 to 100 years).
Catchment Management Strategies (Various)	Water	The Catchment Abstraction Management Strategy (CAMS) set out how the Environment Agency will manage water abstraction. They outline where water is available, and also, if relevant, where the Environment Agency needs to reduce current rates of abstraction. Each CAMS provides an overview of the catchment area and characteristics, including abstractions, geology, hydrology, hydrometry, water quality and discharges, ecology and conservation, recreation and navigation. The CAMS make information on water resources and licensing practice publicly available and allow the balance between the needs of abstractors, other water users and the aquatic environment to be considered in consultation with the local community and interested parties. CAMS are also the mechanism for managing time limited licences by determining whether they should be renewed and, if so, on what terms.
National Park Management Plans – New Forest and South Downs		<p>All National Parks are expected to have a Management Plan for their area, to help guide the work of those with responsibilities or an interest in the Park. Government guidance emphasises that the plan should be for the National Park as a place, and not specifically for the National Park Authority or any other particular organisation. However, relevant authorities are required to take the two national park purposes into account in any work that may affect the area (Environment Act, 1995). The purposes are:</p> <ul style="list-style-type: none"> • To conserve and enhance the natural beauty, wildlife and cultural heritage of the National Park • To promote opportunities for the understanding and enjoyment of the special qualities of the area by the public

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
		<ul style="list-style-type: none"> National Park Authorities also have a duty, in taking forward the two purposes, to seek to foster the economic and social well-being of local communities within the National Park. <p>The original New Forest National Park Management Plan was updated in 2015 and has been published as the Partnership Plan for the New Forest National Park. It sets out a vision for the National Park describing the overall ambition for how the National Park should look and function in 20 years’ time and beyond.</p> <p>The South Downs National Park Management Plan (PMP) - The fundamental approach that underpins the PMP is delivering sustainable development and in support of that, taking an ecosystem approach. The PMP contains a vision and outcomes that are long-term, policies that are for five years and beyond and a delivery framework showing projects and initiatives.</p>
AONB Management Plans (Various)		Areas of Outstanding Natural Beauty (AONB) are protected to conserve and enhance their natural beauty and distinctiveness. There are eight AONB within the WRSE regional.
Water Companies		
Affinity Water		
Environment Policy (2019)	Cross-cutting	<p>The Policy sets out Affinity Water’s commitment and vision on being the leading community-focussed water company, protecting the environment, preventing pollution and complying with environmental regulations. Management of the impact on the natural environment will be achieved by:</p> <ul style="list-style-type: none"> Minimising waste generation Optimising energy use Controlling pollution risks Minimising environmental impacts from the supply chain Working collaboratively with communities, regulators and government agencies to manage impacts on the environment
WRMP 2020-2080 (2020)	Water	<p>The WRMP sets out how Affinity Water will provide a reliable, resilient, efficient and affordable water supply to customers from 2020 to 2080, whilst protecting the environment. It aims to balance the availability of water with the demand and recognises the important role population growth and climate change will play in achieving this balance. The bulk of Affinity Water’s water supply is from aquifers (65%) and the remaining is from rivers. The following are key themes of the Plan:</p> <ul style="list-style-type: none"> Demand growth through population growth Climate change – extreme weather Reduce demand through metering and water efficiency Collaboration and trading of water resources Water quality Sustainable abstraction Leakage Drought Resilience in the round short, medium and long term Achieving their ambition

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
Drought Plan Annual Update (2019)	Water	<p>The Plan sets out to ensure a consistent approach is implemented across Affinity Water’s three regions and throughout the business. The Plan is built on their experience of previous drought management over the last 30 years, including the multiple year groundwater droughts of 1990 to 1992, 1996 to 1998 and 2005 to 2007, as well as 2011 to 2012 and 2017 to 2019. A proactive approach is taken to ensure resilience and secure supplies through:</p> <ul style="list-style-type: none"> ● Being prepared for drought at any time and having the Plan ready to deal with it. ● Continuous monitoring of environmental conditions in partnership with the Environment Agency ● Identifying the onset of drought and mobilising additional resources to proactively manage risks ● Assessing drought duration and severity together with the impact on water available to customers ● Minimising environmental impact of operations during drought conditions by optimising the use of our resources ● Reducing water demand or increasing capacity of our assets to maintain security of supplies ● Acting and communicating with customers and other stakeholders in partnership
Revised Business Plan (2019)	Water	<p>The Business Plan sets out Affinity Water’s focus, taking into account Ofwat’s responses to the original place. The Plan recognises that Affinity have performed well in some areas during AMP6, but fell short in others such as performance on supply interruptions. Some of the key features of the Plan include:</p> <ul style="list-style-type: none"> ● Reducing household bills ● Making themselves more visibility accountable to different communities by increasing performance commitments ● Increasing the leakage reduction target from 15% to 18.5%
Portsmouth Water		
Biodiversity, Public Amenities and Recreation Strategy (undated)	Cross-cutting	<p>Sets out Portsmouth Water’s vision to promote a high quality environment that supports biodiversity, public amenities and recreation. In 2015, they made a commitment to triple the money made available to biodiversity projects on their sites following support from customers to spend more on the environment. Annual reports are provided with the most recent published for 2016/17.</p>
WRMP 2020-2045 (2019)	Water	<p>The Plan sets out how Portsmouth Water will secure resilient water supplies over the next 25 years. It demonstrates the need for investment to maintain the balance between supply and demand over the planning period. It shows the programme of actions Portsmouth Water plan to undertake to ensure the Company can be resilient to a 1 in 200 year drought and support other water companies in the region. The following six schemes were selected as part of the WRMP:</p> <ul style="list-style-type: none"> ● Reduce leakage ● Water efficiency (metering) ● Havant Thicket Reservoir ● Groundwater improvements ● Enhanced groundwater source ● Drought permits

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
Drought Plan (2019)	Water	The Plan outlines how Portsmouth Water will manage droughts. The sources of supply for Portsmouth Water are all groundwater based and there are currently no surface water storage reservoirs (Havant Thicket Reservoir by 2029) therefore drought management relies upon balancing demands with the yield from its sources. The Plan recognises that the greatest challenge is likely to be during dry summers when peak demands are usually experienced.
Business Plan 2020-2025 (2018)	Water	The Plan is underpinned by the four pillars of Ofwat’s PR19 process (customer service, affordable bills, resilience and innovation). Portsmouth Water’s long term vision is “delivering excellence for our customers, our people and our environment”. There are several key themes within the Plan which includes: <ul style="list-style-type: none"> • Ambitious 15% leakage reduction • Havant Thicket – a new major reservoir in the South East • Innovative catchment management and biodiversity • Affordable bills for all • Customer engagement, leading customer service and culture of ‘customer first’
SES Water		
Environment Policy (2019)	Cross-cutting	The Policy outlines SES Water’s commitment to protecting natural resources and recognises the important role they can play in minimising effects. Activities will be managed proactively under the following four core strategies and commitments: <ul style="list-style-type: none"> • Efficient use of natural resources and controlling activities which affect the natural and built environment • Managing energy use and carbon • Limited waste generation and promoting use and recycling • Managing environmental risk in the supply chain
WRMP 2020-2045 (2019)	Water	The Plan sets out the preferred programme (comprising a range of options) to reduce any deficit through supply and demand options within the SES region over the next 25 years. The majority (approximately 85%) of the SES Water’s deployable output is from four main groundwater aquifer resources units (ARUs): North Downs Chalk; Confined Chalk; Mole Valley Chalk; and Lower Greensand.
Drought Plan (2019)	Water	The Plan outlines the operational actions SES Water will consider in response to drought events of different severities. The aim of the plan is to minimise environmental impacts, but where potential impacts are identified, balance of measures that may include restrictions on customers’ use of water is presented.
Business Plan 2020-2025 (2018)	Water	The Plan sets out five key pledges, supported by 25 targets, to improve service to customers. These pledges are as follows: <ul style="list-style-type: none"> • High quality water all day, every day • Excellent service, whenever and however you need it • Fair prices and help when you need it • Support a thriving environment we can all rely upon • A service that is fit now and for the future
Southern Water		
Environment Policy (2019)	Cross-cutting	Sets out Southern Water’s environmental commitments which include the following, amongst others:

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
		<ul style="list-style-type: none"> ● Prevent pollution ● Provide sustainable and reliable water and wastewater services with minimise nuisance and carbon emissions ● Minimise waste ● Collaborate with customers, contractors, regulators, suppliers and other stakeholders ● Protect the environment by promoting the sustainable and efficient use and conservation of water, energy and natural resources
WRMP 2020-2070 (2019)	Water	<p>The Plan sets out how Southern Water will secure reliable water supplies across each of the water resource zones (WRZs) making up its supply area over the next 50 years. It includes detailed proposals that take account of challenges they know already exist, and a range of future uncertainties. The WRMP19 adopts a ‘twin track’ approach to addressing the forecast supply-demand deficit, with demand management (including leakage reduction) options to reduce water demand within Southern Water’s supply area being considered alongside the development of options to enhance reliable water supply availability.</p>
Drought Plan (2019)	Water	<p>The Plan details the actions Southern Water will take to save and produce more water during a drought as well as outlining the actions customers and businesses will have to take. The supply of water in the Southern Water region comes from groundwater abstractions, river abstractions and reservoir abstractions. The Plan outlines the actions required across five key stages in a drought: Normal: No drought; Stage 1: Impending drought; Stage 2: Drought; Stage 3: Severe drought – phase 1; and Stage 4: Severe drought – phase 2.</p>
Business Plan 2020-25 (2019)	Water	<p>The Plan sets out a framework for Southern Water over the next five years to achieve their vision: “to create a resilient water future for customers in the South East”. The vision is supported by five long term outcomes and five transformational programmes which includes the following:</p> <ul style="list-style-type: none"> ● Outcomes <ul style="list-style-type: none"> – Resources – Environment – Economy – Communities – Value ● Transformational Programmes <ul style="list-style-type: none"> – Target 100 – Catchment First – Networks 2030 – Resource Hubs – Sustainable Drainage 2030
South East Water		
WRMP 2020 to 2080 (2019)	Water	<p>The Plan sets out how South East Water plan to secure water supplies for today’s and tomorrow’s customers, from 2020 to 2080. It estimates the amount of water they will need, and what they will need to do – where and by when – to meet those future water needs. It represents a twin track and demand management led plan where over 50 per cent of the new water generated through the plan will come from demand management, with the remainder to be met through the development of a small number of key new water resource schemes.</p>

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
Drought Plan 2018 to 2030 (2019)	Water	<p>The Plan outlines a framework and actions that will be implemented before, during and after every drought event to maintain a secure supply of water in the South East Water region. A three-stage system for the evaluation of the appropriate level of response to a progressing drought event has been adopted:</p> <ul style="list-style-type: none"> ● Stage 1: Monitoring of key representative groundwater, rainfall, and reservoir individual trigger sites, and of demands per drought region. The rainfall data feed into a recharge calculation so recharge is monitored for each groundwater unit ● Stage 2: Matrix assessment of four types of triggers (groundwater, reservoir, recharge and demand) to determine drought severity status ● Stage 3: Decision making and selection of drought actions for responding to and managing change in drought status
Pure know h ₂ ow – Business Plan 2020 to 2025 (2019)	Water	<p>The Plan sets out the plan for South East Water over the next five years. Customer satisfaction is at the core of the Plan and it is built around the following five key themes:</p> <ul style="list-style-type: none"> ● Customer satisfaction ● Resilient customers ● Innovation ● Responsible business commitments ● Goes beyond historical performance
Thames Water		
Sustainability Policy	Cross-cutting	<p>Sustainability is aligned to the Corporate Strategy and reporting on sustainability is published annual. There are nine key themes within Thames Water’s Sustainability Policy:</p> <ul style="list-style-type: none"> ● Protecting water, a precious resource. ● Managing wastewater and sustainable drainage. ● Mitigating climate change. ● Adapting to climate change. ● Delivering efficient operations. ● Investing sustainably for the long-term. ● Ensuring responsible operations. ● Enhancing customer inclusion. ● Maintaining a safe and sustainable workforce.
WRMP 2020 to 2100 (2019)	Water	<p>The Plan sets out the actions Thames Water will take to provide a secure and sustainable supply of water for our customers in London and the Thames Valley over the next 80 years. It recognises that the already water stressed area is likely to come under further pressures from population growth and a changing climate whilst also upholding a requirement to protect the environment. The following are key themes in the Plan:</p> <ul style="list-style-type: none"> ● Reducing amount of water abstracted from rivers and underground sources ● Reduce leakage by investing in new pipes ● Reduce consumption ● Innovation to boost supply

Policy, Plan or Programme	Topic	Key Objectives, Guidance and References
Drought Plan (2017)	Water	<p>The Plan covers the next 5 years, up to 2022 and demonstrates how Thames Water will react to a period of unusually low rainfall. Approximately 80% of Thames Water's is from river abstraction and the remainder is derived from groundwater abstraction. The four worst summer droughts affecting water supply capability occurred over 1920/21, 1933/34, 1943/44 and 1975/76 and were characterised by a prolonged period of around 12 to 18 months of below average rainfall.</p>
Building a better future – Business Plan 2020 to 2025	Water	<p>The Plan sets out how Thames Water are going to invest to build a better future for our customers and our region, create customer advocacy and enhance the environment. The following are outlined as key priorities:</p> <ul style="list-style-type: none"> ● Deliver brilliant customer engagement to create lifelong advocacy ● Invest in resilient systems and assets ● Protect and enhance the environment ● Build a collaborative and capable team, dedicated to serving our customers ● Use data from customers, operations and the environment to make better decisions

E. Baseline Review and Baseline Maps

The SEA Directive requires:

‘the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme’

‘the environmental characteristics of areas likely to be significantly affected’

SEA Directive Annex I (b) and (c)

E.1 Introduction

The current environment and socio-economic baseline was reviewed for the WRSE region. The baseline information is presented under the SEA Directive topics and provides an evidence base which environmental issues or opportunities resulting from the WRSE Regional Plan can be predicted and assessed. Maps showing key spatial baseline information are presented in Appendix E.3 and referenced within this appendix. The baseline summarised in this appendix 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 will be used as part of the options assessment process to identify the effects of each option.

The baseline information in this appendix 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

E.2 Baseline information

E.2.1 Biodiversity, flora and fauna

E.2.1.1 Designated sites

The WRSE region contains numerous Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR), Marine Protected Areas (MPA) and Marine Conservation Zones (MCZ). The number and type of ecological sites across the WRSE region is presented in Table E.1 and shown in Map E.1 to E.4 in Appendix E.3.

Table E.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

E.2.1.2 Flora and fauna

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 designated Local Wildlife Sites (LWS).

The WRSE region is made up of the following terrestrial land cover types: agriculture (56.5%); urban (23.2%); woodland (13.2%); semi-natural grassland (5.3%); and surface water (1.5%). There is a large stretch of coastline in the WRSE region which supports a wide range of wetland, coastal and estuarine habitats and species.

Priority habitats make up 16.6% of the WRSE region equating to a total of 39,5109ha²⁶. 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 E.2. The region also contains 1611.2 km of Chalk rivers and streams.

²⁶ Natural England (2020). Priority Habitat Inventory. Available at: <https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england>

Table E.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%
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%

E.2.2 Water

The WRSE region is one of the driest areas in the UK and Affinity Water, South East Water, SES, Southern Water and Thames Water are all classed as areas with serious water stress²⁷. Around half of the region’s water supply comes from underground sources with some water resource zones relying completely on underground sources²⁸. Precipitation during winter months is crucial for these sources meeting higher demand during spring and summer months. The anticipated population and economic growth alongside the projected changes in climate will likely continue to place additional stress on water availability and the natural environment within the WRSE region.

The main rivers in the WRSE region are shown on Map E.5 in Appendix E.3. The river basin districts which make up the WRSE region are Thames and the South East. The Thames river basin district covers an area of 16,200km² and includes 17 management catchments which range from chalk streams and

²⁷ Environment Agency (2013). Water Stressed Areas – Final Classification. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/244333/water-stressed-classification-2013.pdf

²⁸ WRSE (2020). Future water resource requirements for South East England. Available at: <https://www.wrse.org.uk/media/anbhm2cb/wrse-future-water-resource-requirements-march-2020-3.pdf>

aquifers to tidal and coastal marshes²⁹. These support a rich diversity of species and habitats some of which are of national or European importance. The number of water bodies within the Thames river basin district is presented in Table E.3. The current status of the ground and surface water bodies in the Thames district is presented in Table E.4 and Table E.5. Phosphate followed by physical modifications are the two most common pressures preventing the water bodies in the Thames river basin district from achieving ‘Good’ status. Pollution from wastewater followed by physical modifications and pollution from towns and cities are reported as the most common significant water management issues affecting the achievement of ‘Good’ status.

Table E.3: Number of water bodies in the Thames river basin district

Water body categories	Natural	Artificial	Heavily modified	Total
Rivers, canals and surface water transfers	287	21	106	414
Lake	7	47	19	73
Coastal	0	0	1	1
Estuarine	1	4	5	10
Groundwater	47	0	0	47
Total	342	72	131	545

Source: Thames River Basin Management Plan (RBMP)

Table E.4: Ecological and chemical 2015 classification for surface waters in the Thames river basin district

No. of water bodies	Ecological status or potential					Chemical status	
	Bad	Poor	Moderate	Good	High	Fail	Good
498	19	116	333	30	0	498	0

Source: <https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/6/Summary>

Table E.5: Chemical and quantitative 2015 classification for groundwaters in the Thames river basin district

No. of water bodies	Quantitative status		Chemical status	
	Poor	Good	Poor	Good
47	17	30	29	18

Source: <https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/6/Summary>

The South East river basin district covers an area of 10,200km² and is made up of nine management catchments which range from chalk streams of the Test and Itchen catchments to the modified rivers of the Rother catchment³⁰. These also support diverse species and habitats some of which are of national

²⁹ Defra and Environment Agency (2015). Part 1: Thames River Basin District – River Basin Management Plan. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718342/Thames_RBD_Part_1_river_basin_management_plan.pdf

³⁰ Defra and Environment Agency (2015). Part 1: South East River Basin District – River Basin Management Plan. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718337/South_East_RB_D_Part_1_river_basin_management_plan.pdf

or European importance, including migratory salmon rivers, native white clawed crayfish, and estuaries and coastal waters important for shellfish, wintering wildfowl, breeding gulls and terns. The chalk groundwater provides most of the drinking water within the river basin district at 72%. The number of water bodies in the South East river basin district is presented in Table E.6. The current status of the ground and surface water bodies in the South East district is presented in Table E.7 and Table E.8. Phosphate followed by physical modifications are also the most common water pressures affecting the water bodies in the South East river basin district from achieving 'Good' status. Pollution from wastewater followed by physical modifications and pollution from rural areas are reported as the most common significant water management issues affecting the achievement of 'Good' status.

Table E.6: Number of water bodies in the South East river basin district

Water body categories	Natural	Artificial	Heavily modified	Total
Rivers, canals and surface water transfers	138	13	69	220
Lake	2	16	10	28
Coastal	2	0	9	11
Estuarine	1	5	17	23
Groundwater	33	0	0	33
Total	176	37	105	315

Source: South East RBMP

Table E.7: Ecological and chemical 2015 classification for surface waters in the South East river basin district

No. of water bodies	Ecological status or potential					Chemical status	
	Bad	Poor	Moderate	Good	High	Fail	Good
282	10	54	172	46	0	282	0

Source: South East RBMP

Table E.8: Chemical and quantitative 2015 classification for groundwaters in the South East river basin district

No. of water bodies	Quantitative status		Chemical status	
	Poor	Good	Poor	Good
33	12	21	16	17

Source: South East RBMP

The RBMPs for the Thames and South East river basin district highlight significant water management issues which prevent the sustainable management of water within each river basin as presented in Table E.9. For both the river basin districts, physical modifications and pollution from wastewater affect the highest proportions of water bodies followed by pollution from rural areas.

Table E.9: Water management issues

Water Management Issue	Percentage of water bodies affected	
	Thames	South East
Physical modifications	44%	43%
Pollution from wastewater	45%	40%
Pollution from towns, cities and transport	17%	9%
Changes to the natural flow and level of water	12%	7%
Negative effects of invasive non-native species	3%	2%
Pollution from rural areas	27%	30%

Source: Thames and South East RBMP

E.2.2.1 Management Catchments

The WRSE is comprised of the South East river basin and the Thames River basin district each of which are made of management catchments. The WRSE Regional Plan proposes catchment management options in 25 management catchments across the region. Environmental information for each of these management catchments is presented in Table E.10.

Table E.10: Management catchments

Management Catchment	Operational Catchments	Predicted sea level rise ³¹	Designated Sites	Chalk Rivers and Streams	WFD Status		Predominant reasons for not achieving Good (RNAG)
					Chemical	Ecological	
Adur and Ouse	<ul style="list-style-type: none"> Adur Upper Ouse Upper Teville 	242mm increase	<ul style="list-style-type: none"> 22 SSSIs 2 NNRs 22 LNRs 1 MCZ 	There is one chalk stream.	All water bodies failed chemical status	4 water bodies received Bad Status, 18 Poor and 24 Moderate.	Waste water from the water industry, physical modifications by the water industry, agriculture industry, the local governmental and urban transport. Pollution from agriculture and INNS.
Arun and Western Streams	<ul style="list-style-type: none"> Arun Lower Arun Upper Rother Western Western Streams 	242mm increase	<ul style="list-style-type: none"> 36 SSSIs 12 SACs 2 SPAs 3 Ramsar 5 NNRs 18 LNRs 1 MCZ 	There are three chalk streams.	All water bodies failed chemical status	2 waterbodies received Bad status, 15 Poor, 22 Moderate and 1 Good.	Agriculture, water industry and pollution from domestic sources
Cherwell and Ray	<ul style="list-style-type: none"> Cherwell Oxon Ray 	242mm increase	<ul style="list-style-type: none"> 26 SSSIs 6 LNRs 	None	All water bodies failed chemical status	2 waterbodies received Bad status, 12 Poor, 20 Moderate and 1 Good.	Agriculture and water industry / pollution from wastewater.

³¹ Between 2000 - 2035 using the upper end scenario

Management Catchment	Operational Catchments	Predicted sea level rise ³¹	Designated Sites	Chalk Rivers and Streams	WFD Status		Predominant reasons for not achieving Good (RNAG)
					Chemical	Ecological	
Colne	<ul style="list-style-type: none"> Colne 		<ul style="list-style-type: none"> 36 SSSIs 2 SACs 1 SPA 1 Ramsar 1 NNR 32 LNRs 	There are seven chalk streams.	All water bodies failed chemical status	1 waterbody received Bad status, 5 Poor and 20 Moderate.	Urbanisation - urban development, drinking water supply, sewage discharge (continuous), groundwater abstraction, sewage discharge (intermittent) and agriculture industry.
Cotswolds	<ul style="list-style-type: none"> Evenlode Windrush 		<ul style="list-style-type: none"> 48 SSSIs 1 SAC 2 NNRs 9 LNRs 	None	All water bodies failed chemical status	2 waterbodies received Bad status, 12 Poor, 21 Moderate and 2 Good.	Sewage discharge (continuous), agriculture industry, land management and barriers - ecological discontinuity.
Cuckmere and Pevensy Levels	<ul style="list-style-type: none"> Combe Haven Cuckmere Upper Pevensy 	242mm increase	<ul style="list-style-type: none"> 18 SSSIs 2 SACs 1 SPA 1 Ramsar 2 NNRs 10 LNRs 2 MCZ 	None	All water bodies failed chemical status	6 waterbody received Poor status, 11 Moderate and 1 Good.	Agriculture and water industry / pollution from wastewater.
Darent and Cray	<ul style="list-style-type: none"> Cray and Shuttle Darent 		<ul style="list-style-type: none"> 14 SSSIs 1 NNR 7 LNRs 	There are two chalk streams.	All water bodies failed chemical status	1 waterbody received Bad status and 4 Moderate.	Barriers - ecological discontinuity, groundwater abstraction, urbanisation and agriculture industry.

Management Catchment	Operational Catchments	Predicted sea level rise ³¹	Designated Sites	Chalk Rivers and Streams	WFD Status		Predominant reasons for not achieving Good (RNAG)
					Chemical	Ecological	
East Hampshire	<ul style="list-style-type: none"> East Hampshire Rivers 	N/A	<ul style="list-style-type: none"> 27 SSSIs 2 SACs 3 SPAs 3 Ramsar 4 NNR 26 LNRs 	None	All water bodies failed chemical status	1 waterbody received Bad status, 1 Poor, 6 Moderate and 4 Good.	Changes to the natural flow and levels of water, pollution from rural areas, pollution from waste water, physical modifications, pollution from towns, cities and transport.
Gloucestershire and the Vale	<ul style="list-style-type: none"> Ock Thames Upper 	N/A	<ul style="list-style-type: none"> 59 SSSIs 5 SACs 1 Ramsar 2 NNRs 13 LNRs 	There is one chalk stream.	All water bodies failed chemical status	1 waterbody received Bad, 13 Poor, 30 Moderate and 3 Good.	Pollution from rural areas, pollution from waste water, physical modifications to the waterbody, pollution from towns and cities.
Isle of Wight	<ul style="list-style-type: none"> Isle of Wight Rivers 	N/A	<ul style="list-style-type: none"> 33 SSSIs 6 SACs 1 Ramsar 1 NNR 8 LNRs 3 MCZs 	None	All water bodies failed chemical status	1 waterbody received Poor status and 9 Moderate.	Pollution from rural areas, physical modifications, pollution from wastewater, changes to the natural flow and levels of water and INNS.
Kennet and Tributaries	<ul style="list-style-type: none"> Kennet 	242mm increase	<ul style="list-style-type: none"> 31 SSSIs 2 SACs 2 NNRs 	There are eight chalk streams.	All water bodies failed chemical status	3 waterbodies received Poor status, 25	Barriers - ecological discontinuity for fish, pollution from agriculture and rural land management, land drainage - operational management and issues with phosphate

Management Catchment	Operational Catchments	Predicted sea level rise ³¹	Designated Sites	Chalk Rivers and Streams	WFD Status		Predominant reasons for not achieving Good (RNAG)
					Chemical	Ecological	
			<ul style="list-style-type: none"> 6 LNRs 			Moderate and 7 Good.	concentration suspected to be predominantly from sewage discharge
Lee Upper	<ul style="list-style-type: none"> Lee Upper 		<ul style="list-style-type: none"> 23 SSSIs 1 SAC 1 SPA 1 Ramsar 1 NNR 19 LNRs 	There are seven chalk streams.	All water bodies failed chemical status	1 waterbody received Bad status, 9 Poor and 13 Moderate.	Pollution from urban and transport, groundwater abstraction, sewage discharge (continuous), riparian/in-river activities (inc bankside erosion) and reservoir / impoundment - non flow related.
Loddon and Tributaries	<ul style="list-style-type: none"> Loddon 		<ul style="list-style-type: none"> 19 SSSIs 2 SACs 1 SPA 1 NNR 22 LNRs 	There are three chalk streams.	All water bodies failed chemical status	1 waterbody received Bad status, 9 Poor and 12 Moderate.	Pollution from urban and transport, water industry – sewage discharge (continuous), agriculture industry, land management and barriers - ecological discontinuity.
London	<ul style="list-style-type: none"> Beverley Brook Brent Rivers and Lakes Crane Rivers and Lakes Hogsmill Lee Lower Rivers and Lakes Marsh Dykes Ravensbourne 		<ul style="list-style-type: none"> 26 SSSIs 6 SACs 2 SPAs 2 Ramsar 3 NNRs 93 LNRs 	There are four chalk streams.	All water bodies failed chemical status	2 waterbodies received Bad status, 9 Poor, 34 Moderate and 2 Good.	Pollution from urban areas, misconnections, water industry - sewage discharge (intermittent and continuous) and flood protection – structure.

Management Catchment	Operational Catchments	Predicted sea level rise ³¹	Designated Sites	Chalk Rivers and Streams	WFD Status		Predominant reasons for not achieving Good (RNAG)
					Chemical	Ecological	
	<ul style="list-style-type: none"> Wandle 						
Maidenhead and Sunbury	<ul style="list-style-type: none"> Thames Lower 		<ul style="list-style-type: none"> 20 SSSIs 3 SACs 2 SPAs 1 Ramsar 1 NNR 16 LNRs 	None	All water bodies failed chemical status	4 waterbodies received Poor status, 12 Moderate and 1 Good.	Nutrients, water industry - sewage discharge (continuous and intermittent), pollution from urban and transport, and barriers - ecological discontinuity
Medway	<ul style="list-style-type: none"> Beult Eden Medway Lower Medway Middle Medway Upper Teise 		<ul style="list-style-type: none"> 49 SSSIs 5 SACs 3 SPAs 2 Ramsar 2 NNRs 25 LNRs 2 MCZs 	There is one chalk stream.	All water bodies failed chemical status	4 waterbodies received Bad status, 4 Poor, 44 Moderate and 2 Good.	Water industry - sewage discharge (continuous), private sewage treatment, nutrients, poor soil management and barriers - ecological discontinuity.
Mole	<ul style="list-style-type: none"> Mole Lower and Rythe Mole Upper Tributaries 	242mm increase	<ul style="list-style-type: none"> 14 SSSIs 1 SAC 1 NNR 18 LNRs 	There is one chalk stream.	All water bodies failed chemical status	1 waterbody received Bad status, 6 Poor, 13 Moderate and 1 Good.	Agriculture, urban and transport and water industry / pollution from wastewater.

Management Catchment	Operational Catchments	Predicted sea level rise ³¹	Designated Sites	Chalk Rivers and Streams	WFD Status		Predominant reasons for not achieving Good (RNAG)
					Chemical	Ecological	
New Forest	<ul style="list-style-type: none"> New Forest - Bartley Water New Forest - Hatchet Sowley New Forest - Lymington and Beaulieu Becton Bunny Langdown Stream 	N/A	<ul style="list-style-type: none"> 9 SSSIs 3 SACs 2 SPAs 2 Ramsar 1 NNR 6 LNRs 1 MPA 	None	All water bodies failed chemical status	1 waterbody received Poor status, 14 Moderate and 3 Good.	Pollution from rural areas, pollution from waste water, physical modifications to the waterbody, pollution from towns and cities.
North Kent	<ul style="list-style-type: none"> White Drain and Lakes 	242mm increase	<ul style="list-style-type: none"> 5 SSSIs 1 SAC 1 SPA 3 NNRs 8 LNRs 1 MCZ 	None	All water bodies failed chemical status	1 waterbody received Poor status and 1 Moderate.	Alterations in phosphorus levels from agriculture and rural land management and sewage. Flow alterations and increased dissolved oxygen from water abstraction and sewage waste. Physical modifications causing land drainage problems and barriers for fish.
Roding, Beam and Ingerbounre	<ul style="list-style-type: none"> Roding, Beam and Ingerbounre 	N/A	<ul style="list-style-type: none"> 11 SSSIs 1 SAC 1 SPA 2 Ramsar 1 NNR 20 LNRs 	None	All water bodies failed chemical status	13 waterbodies received Moderate status.	Pollution from rural areas, pollution from wastewater, physical modifications, pollution from towns, cities and transport.

Management Catchment	Operational Catchments	Predicted sea level rise ³¹	Designated Sites	Chalk Rivers and Streams	WFD Status		Predominant reasons for not achieving Good (RNAG)
					Chemical	Ecological	
Rother	<ul style="list-style-type: none"> Brede and Tillingham Reading Cradlebridge and RMC Romney Marsh South Rother Levels Rother Upper 	N/A	<ul style="list-style-type: none"> 11 SSSIs 1 SAC 1 SPA 2 Ramsar 20 LNRs 	None.	All water bodies failed chemical status	7 waterbodies received Poor status, 23 Moderate and 8 Good.	Pollution from rural areas, pollution from waste water, physical modifications to the waterbody, pollution from towns and cities.
Stour	<ul style="list-style-type: none"> Dour Little Stour and Wingham North and South Streams Oyster Coast Brooks Stour Lower Stour Marshes Stour Upper 		<ul style="list-style-type: none"> 26 SSSIs 9 SACs 4 SPAs 4 Ramsar 6 NNRs 13 LNRs 3 MCZs 	There are eight chalk streams.	All water bodies failed chemical status	2 waterbodies received Bad status, 4 Poor, 17 Moderate and 2 Good.	Sewage discharge (continuous and intermittent), poor nutrient management, barriers - ecological discontinuity, and private Sewage Treatment.
Test and Itchen	<ul style="list-style-type: none"> Itchen Test Lower and Southampton Streams Test Upper and Middle 	6.9mm increase	<ul style="list-style-type: none"> 21 SSSIs 3 SACs 2 NNRs 6 LNRs 	There are 11 chalk streams.	All water bodies failed chemical status	1 waterbody received Bad status, 16 Moderate and 15 Good.	Physical modifications to the river, pollution from agriculture and rural land management and INNS. Bow lake in river Itchen received bad status due to ecological problems for fish and invertebrates.
Thames and South Chilterns	<ul style="list-style-type: none"> Thames Chiltern South 	N/A	<ul style="list-style-type: none"> 71 SSSIs 4 SACs 	There are 7 chalk streams.	All water bodies failed chemical status	10 waterbodies received Poor	Changes to the natural flow and levels of water, pollution from rural areas, pollution from waste water, physical

Management Catchment	Operational Catchments	Predicted sea level rise ³¹	Designated Sites	Chalk Rivers and Streams	WFD Status		Predominant reasons for not achieving Good (RNAG)
					Chemical	Ecological	
			<ul style="list-style-type: none"> • 1 NNR • 20 LNRs • 			status and 23 Moderate.	modifications, pollution from towns, cities and transport.
Wey and Tributaries	<ul style="list-style-type: none"> • Wey 	242mm increase	<ul style="list-style-type: none"> • 37 SSSIs • 5 SACs • 4 SPAs • 2 Ramsar • 2 NNRs • 24 LNRs 	There are two chalk streams.	All water bodies failed chemical status	4 waterbodies received Bad status, 13 Poor, 23 Moderate and 2 Good.	Agriculture and water industry/ pollution from wastewater, and urban and transport.

E.2.2.2 Flood risk

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, as covered in Section E.2.5, 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.

The Thames river basin district has over 227,000 people at high risk of surface water flooding and over 107,000 people are at high risk of flooding from rivers and the sea³². It contains two primary flood risk areas (FRAs)³³, the London and Medway, which are areas with higher risk of surface water flooding. There is also one partial flood risk area, South Essex, which is partly within the Thames river basin district.

The South East river basin district consists of one primary flood risk area, Brighton and Hove, and there are over 31,000 people at high risk of surface water flooding and over 36,000 people at high risk of flooding from rivers and the sea³⁴. There has been notable and severe flooding occurring across the basin in recent years which resulted in significant impacts on communities, businesses and the natural environment.

E.2.3 Soil

The WRSE region is a hub for agriculture with cereal and livestock grazing being the most predominant type of farming³⁵. 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 as shown on Map E.5 in Appendix E.3. 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 country³⁶. Currently, there are approximately 400 authorised landfill sites across the WRSE region³⁷.

E.2.4 Air

Air quality in the WRSE region is varied and there are certain areas with higher concentrations of air pollutants likely to be associated with transport or business activities. Air Quality Management Areas (AQMAs) are declared where the national air quality objectives are not being met³⁸. A high proportion of

³² Environment Agency (2016). Thames River Basin District Flood Risk Management Plan 2015 – 2021. Available at: <https://www.gov.uk/government/publications/thames-river-basin-district-flood-risk-management-plan>

³³ Primary FRAs are defined in the River Basin Flood Risk Management Plans as areas where the risk of flooding from local flood risks is significant as designated under the Flood Risk Regulations.

³⁴ Environment Agency (2016). South East River Basin District Flood Risk Management Plan 2015 – 2021. Available at: <https://www.gov.uk/government/publications/south-east-river-basin-district-flood-risk-management-plan>

³⁵ 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

³⁶ 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

³⁷ 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>

³⁸ Defra National Air Quality Objectives. Available at: https://uk-air.defra.gov.uk/assets/documents/National_air_quality_objectives.pdf

the local authorities which fall within the WRSE region contain at least one AQMA and are predominately designated for Nitrogen dioxide (NO₂) and Particulate Matter (PM₁₀)³⁹.

E.2.5 Climatic factors

E.2.5.1 Current climate trends

Current observations indicate that the UK is continuing to warm. In 2019, four new temperature records were set, including a high of 38.7°C and a new winter record of 21.2°C⁴⁰. The decade between 2010 and 2019 has been on average 0.3°C warmer than the 1981-2010 average and 0.9°C warmer than 1961-1990. Annual precipitation has increased across the UK in the last few decades with 2019 seeing 107% more rainfall than the 1981-2010 average⁴¹. Summers have been 11% wetter on average than 1981-2010 and 13% wetter than 1961-1990. Winters have been 4% and 12% 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 1981-2010⁴². Those published for Southern England are presented in Table E.11.

Table E.11: 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	<p>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.</p> <p>The region can be subject to dry periods, placing demands upon water supplies. If a period with below average rainfall includes winter months as well as the high-demand summer months, then conditions can become severe as</p>

³⁹ Defra List of Local Authorities with AQMA. Available at: <https://uk-air.defra.gov.uk/aqma/list>

⁴⁰ RMetS (2020). State of the UK Climate. Available at: <https://rmets.onlinelibrary.wiley.com/doi/epdf/10.1002/joc.6726>

⁴¹ RMetS (2020). State of the UK Climate.

⁴² 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
	the winter is the normal recharge time for both reservoirs and chalk aquifers, upon which much of the region relies for water supplies. Examples include the period November 2004 to February 2006, when about 75% of the normal rainfall occurred over the area, making it the driest such period since 1932/34.
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 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

E.2.5.2 Climate projections

The Met Office UK Climate Projections (UKCP) were updated for the first time since 2009 in December 2018 (UKCP18)⁴³. The UKCP18 are largely the same as the previous projections 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 Table E.12. 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 E.12: 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.

⁴³ Met Office UKCP18. Available at: <https://ukclimateprojections-ui.metoffice.gov.uk/>

Climatic Factor	Climate Projections
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

E.2.5.3 Greenhouse gas emissions

Based on the local authorities which fall within the WRSE region, as shown in Appendix F, the total carbon dioxide (CO₂) emissions for 2018 across all sectors is estimated at 95,371 kilo tonnes (ktCO₂) (not including Land use, land-use change, and forestry (LULUCF))⁴⁴.

The transport sector contributed the highest proportion of emissions to the total in 2018 at 40% followed by the domestic and industrial sector at 31% and 29% respectively. The LULUCF sector is estimated to be responsible for the removal of 2,406ktCO₂ equating to a 3% reduction in the total CO₂ emissions⁴⁵.

E.2.6 Population and human health

E.2.6.1 Population

Approximately 19 million people, equating to around 30% of the UK's total population, live within the WRSE region⁴⁶. 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 million⁴⁷.

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 65⁴⁸. 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%⁴⁹ across the WRSE region.

E.2.6.2 Human health

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 respectively⁵⁰. 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

⁴⁴ BEIS (2020). UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2018. Available at: <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-to-2018>

⁴⁵ BEIS (2020). UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2018.

⁴⁶ Available at: <https://www.wrse.org.uk/the-challenge>

⁴⁷ WRSE (2020). Method Statements. Available at: <https://www.wrse.org.uk/media/ib5nwx5/wrse-method-statements-summary-document.pdf>

⁴⁸ NOMIS (2011). Age structure (KS102EW) for South East and London. Available at: <https://www.nomisweb.co.uk/census/2011/ks102ew>

⁴⁹ NOMIS (2011). Ethnic group (QS201EW) for South East and London. Available at: <https://www.nomisweb.co.uk/census/2011/qs201ew>

⁵⁰ 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>

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 roads⁵¹.

The percentage of the population describing their general health as very good, good, fairly good, not good, and very bad is shown in Table E.13⁵². 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 E.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

E.2.6.3 Economy

The WRSE region contributes around 37% of the total UK economy with London and the South East being the first and second largest contributors respectively⁵³. Gross Domestic Product (GDP) per head is £54,686 in London and £34,083 in the South East both of which are higher than the national UK average of £31,976. 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 UK⁵⁴. The South East is made up of a higher proportion of production jobs compared to London.

For the three months ending June 2020, the employment rate (those between ages 16 and 64 in the WRSE region was higher than the UK average. The South East region had the highest employment rate across the whole of the UK at 79.7%, similar to what was recorded the previous year⁵⁵, and for London it was 76.5% and saw an increase of 1.9% compared to the previous year. Unemployment rates in London for the three months ending June 2020 were higher than the national average (3.9%) at 4.6% and South East was lower at 3.3%, both of which are similar to the previous year.

Tourism is an important sector within 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 London⁵⁶. International visits to the WRSE region in 2019 were around 27 million in 2019, up 3% from

⁵¹ Public Health England (2019). Public Health Profiles for South East and London.

⁵² 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>

⁵³ 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>

⁵⁴ (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>

⁵⁵ ONS (2020). Regional labour market: Headline Labour Force Survey indicators for all regions (HI00). Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/datasets/headlinelabourforcesurveyindicatorsforallregionshi00>

⁵⁶ 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

the previous year, with an average night stay of around 6 nights and total expenditure of £18.3 billion⁵⁷. These visits are predominately for holidays (48%) followed by visiting friends and relatives (27%) and business (19%), the remainder is for study and miscellaneous.

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 below⁵⁸.

E.2.7 Historic environment

The WRSE region is rich in heritage with listed buildings, scheduled monuments, conservation areas, registered parks and gardens, registered battlefields, protected wrecks and world heritage sites. The total number of each of these assets within the WRSE region is presented in Table E.14. Scheduled monuments, registered parks and gardens, and registered battlefield are shown in Map E.6 in Appendix E.3.

Table E.14: Historic environment assets

Asset	Description	Number	
Listed Buildings	The statutory responsibility for listed buildings control lies with the individual Local Authorities. The Department for Digital, Culture, Media and Sport is responsible for compiling the statutory list of buildings of special architectural or historic interest and each building or structure of interest is classified under one of three Grades; I, II* and II depending on their significance (Grade I assessed as highest significance).	Grade I	2,562
		Grade II*	6,235
		Grade II	103,433
Registered Parks and Gardens	Historic England maintains a register of historic parks and gardens of special interest in England, these parks and gardens are as equally important as buildings and settlements and form part of an area’s cultural heritage. However, unlike listed buildings and conservation areas, historical parks and gardens are not afforded legal protection within the UK. The registration of these historic parks and gardens is a ‘material consideration’ in the planning process, meaning that planning authorities must consider the impact of any proposed development on the landscapes’ special character.	Grade I	65
		Grade II*	169
		Grade II	379
Scheduled Monuments	Scheduled Monuments are protected under the Ancient Monuments and Archaeological Areas Act 1979. The monuments are scheduled and recorded through Historic England, based on national importance and covering a diverse range of archaeological sites. Scheduled	3,384	

⁵⁷ 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

⁵⁸ 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>

Asset	Description	Number
	monuments are often in a ruinous or semi-ruinous condition or take on the form of earthworks. More complete structures of national significance are usually protected as listed buildings.	
Conservation Areas	Conservation Areas are designated by local planning authorities under their powers. The areas are protected to preserve special areas of historical and architectural importance and can range from small villages, town centres and residential areas. Each conservation area will have its own conservation area appraisal, which sets out how it should be protected.	2,649
Protected Wrecks	The Protection of Wrecks Act (1973) allows the Government to designate a wreck to prevent uncontrolled interference. Designated sites are identified as being likely to contain the remains of a vessel, or its contents, which are of historical, artistic, or archaeological importance.	1
Registered Battlefields	Historic England holds a Register of Historic Battlefields. Its purpose is to offer battlefields protection through the planning system, and to promote a better understanding of their significance and public enjoyment.	8
World Heritage Sites	The United Nations Educational, Scientific and Cultural Organization (UNESCO) seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity.	10

Source: Historic England

It is likely that most of the Local Authorities in the WRSE region will hold a Historic Environment Record (HER) which is a database of archaeological sites, listed buildings and other historic buildings, and finds of historic objects. There are hundreds of entries on the HERs from churches and houses to roman coin finds and medieval finds. There is also potential for unidentified heritage assets and archaeological remains to be present within the region.

E.2.8 Landscape

The landscape across the WRSE region is diverse and is made up of a mixture of lowlands and small hills. The WRSE region also has a striking stretch of coastline, including the cliffs of Dover, and picturesque seaside villages. Agriculture plays an important role in the landscape, however the WRSE region also has densely populated areas. The Green Belt around London is an important aspect of the WRSE region landscape which exists to prevent urban sprawl.

National Character Areas (NCAs) divide England’s landscape into 159 distinct areas and are defined by a unique combination of aspects such as landscape, biodiversity, geodiversity and economic activity⁵⁹. There are 34 NCAs within the WRSE boundary.

National Parks are designated to protect their outstanding landscape and countryside, wildlife and cultural heritage. There are two National Parks located within the WRSE region, New Forest and South Downs, which became designated in 2005 and 2010 respectively. New Forest National Park covers an area of 566km² and is made up of ancient woodland, open heathlands and coastline⁶⁰. South Downs National Park is designated for its rolling hills, picturesque towns and villages, and dramatic cliffs⁶¹.

Areas of Outstanding Natural Beauty (AONB) are protected to conserve and enhance their natural beauty and distinctiveness⁶². There are eight AONB within the WRSE regional which are detailed in Table E.15 and shown on Map E.7 in Appendix E.3.

Table E.15: AONB

AONB	Description
Kent Downs	Kent Downs AONB consists of rolling rural land which meets the sea at the cliffs of Dover. The Kent Downs rise to over 240m and the river valleys of the Darent, Medway and Stour run through it. Rivers, streams, springs and ditches include a great variety of habitat and landscape types and are important features of the Kent Downs. The River Darent is a chalk stream that flows between Westerham and Dartford Marshes in West Kent. The Kent Downs supports a variety of wildlife in the unimproved chalk grassland and broadleaved woodlands.
High Weald	High Weald AONB is made up of rolling hills, dissected by steep-sided gill streams and sandstone outcrops. There are small and irregular shaped fields and open heath and there is an abundance of interconnected ancient woodlands. Scattered farmsteads and hamlets also make up the area and there are narrow sunken lanes from the movement of animals. The area is known for its steep sided ravines, known as gills, house streams that fast flow in winter and gently trickle in summer, but remain sheltered, shaded and damp for most of the year, providing the perfect conditions for a variety of rare and unusual plant species.
Surrey Hills	Surrey Hills AONB spans Surrey from east to west which together with the Green Belt prevents the advancing London sprawl. The deciduous woodlands of the AONB have ecological importance alongside the chalk grassland and unimproved heath. The built environment, including villages such as Shere and Abinger, is also part of the quality of the AONB.
Chichester Harbour	Chichester Harbour AONB is one of the few remaining undeveloped coastal areas in Southern England. It is a series of tidal inlets, with a narrow mouth to the sea, and wind-sculptured oaks and hawthorns line the shore. There are saltmarsh and mudflats which are important for wildlife and birds, supporting large flocks of Brent

⁵⁹ Natural England (2014). NCAs. Available at: <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making>

⁶⁰ Visit Hampshire – New Forest National Park. Available at: <https://www.visit-hampshire.co.uk/explore/areas-to-visit/new-forest>

⁶¹ South Downs National Park. Available at: <https://www.southdowns.gov.uk/our-history/why-are-we-a-national-park/>

⁶² Natural England (AONBs): designation and management. Available at: <https://www.gov.uk/guidance/areas-of-outstanding-natural-beauty-aonbs-designation-and-management>

AONB	Description
	Geese, Dunlin and Little Egrets. The wide expanses and indicate creeks are also important for recreational boating.
Isle Of Wight	Half of the Isle of Wight is designated as an AONB in separate areas and include the principal landscape features of the interior’s central and southern downlands and also much of the coastline. The AONB landscape is of considerable scientific and ecological importance and includes exceptional flora-rich chalk grasslands, the north coast’s major estuarial habitats and the geologically notable southern cliffs and landslips. The Chalk geology of much of the Island is an aquifer collecting and storing rainwater.
Chilterns	Chilterns AONB is made up of rounded hills which are part of the chalk ridge that crosses England from Dorset to Yorkshire. The characteristic scarp slope looks out north over the panorama of the Vale of Aylesbury and the dip slope curves gently down into the London Basin. The Chilterns AONB is heavily wooded and supports a diversity of habitats ranging from the country’s most extensive areas of beech woodland to chalk grassland. Chalk streams are a characteristic and attractive feature of the Chilterns landscape, important habitats for wildlife and support a massive range of plants and animals.
North Wessex Downs	North Wessex Downs AONB was designated to protect one of the largest tracts of chalk downland in southern England and perhaps one of the least affected by development. The River Kennet running through the landscape is one of England's premier chalk streams. The AONB meets the Thames and the Chilterns AONB and loops south round the Kennet Valley. The AONB includes ancient woodlands and is of archaeological significance and includes a World Heritage Site.
Cotswolds	Cotswold AONB rises gently west from the broad, green meadows of the upper Thames to crest in a dramatic escarpment above the Severn valley and Evesham Vale. The distinctive character of the AONB is made up of Jurassic limestone. It is nationally important for the rare limestone grassland habitat and for ancient beechwoods with rich flora.

Source: Landscapes for Life⁶³

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 quality⁶⁴. The Campaign for Rural England (CPRE) developed a tranquillity map for England to show the range of undisturbed or disturbed tranquillity areas across the country⁶⁵. There are areas of high tranquillity distributed throughout the WRSE region with the least tranquil areas surrounding areas with higher population, particularly London and the surrounding area.

⁶³ Landscape for Life - The UK’s AONBs Overview. Available at: <https://landscapesforlife.org.uk/about-aonbs/aonbs/cotswolds>

⁶⁴ 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>

⁶⁵ CPRE (2007). Map of Tranquillity. Available at: https://www.cpre.org.uk/wp-content/uploads/2019/11/tranquillity_map_england_regional_boundaries_1.pdf

E.2.9 Material assets

E.2.9.1 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 port⁶⁶. The rail link to Europe via the Channel Tunnel Rail Link is also located within the region.

E.2.9.2 Resource use and waste

In 2018/19 the total amount of local authority managed waste was 25.6 million tonnes. The South East managed the largest tonnage of local authority collected waste in 2018/19 at 4.2 million tonnes and London managed 3.6 million tonnes in the same period⁶⁷. Incineration accounts for the most common waste disposal method by local authorities in the region with the South East sending 42% of all waste for incineration, and London sending 59% 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 48% of total waste in the South East and 30% in London. Landfill waste is 9% and 7% in the South East and London respectively.

E.2.10 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.

E.2.10.1 Soils and geology

Detailed Information on soils stocks with the WRSE region is provided in Section 4.2.3 and within Map E.5 in Appendix E.3. The WRSE region contains important stocks of soils nationally

E.2.10.2 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

⁶⁶ 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>

⁶⁷ Defra (2019). Statistics on waste managed by local authorities in England in 2018/19. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/906559/201819_LA_collected_waste_mgt_annual_stats_notice_FINAL_Accessible_rev_v11.pdf

E.2.10.3 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 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.

E.2.10.4 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.

E.2.10.5 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.

E.2.10.6 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.

E.2.10.7 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.

E.3 Baseline Maps

Baseline maps showing the following key spatial baseline information are presented below:

- Figure E.1: Special Protection Areas and Special Areas of Conservation
- Figure E.2: Sites of Special Scientific Interest and Ramsar Sites
- Figure E.3: National Nature Reserves and Local Nature Reserves
- Figure E.4: Marine Conservation Zones and Offshore Marine Protection Areas
- Figure E.5: Main Rivers and Agricultural Land Classification
- Figure E.6: Heritage Assets
- Figure E.7: Areas of Outstanding Natural Beauty

Figure E.1: Special Protection Areas and Special Areas of Conservation

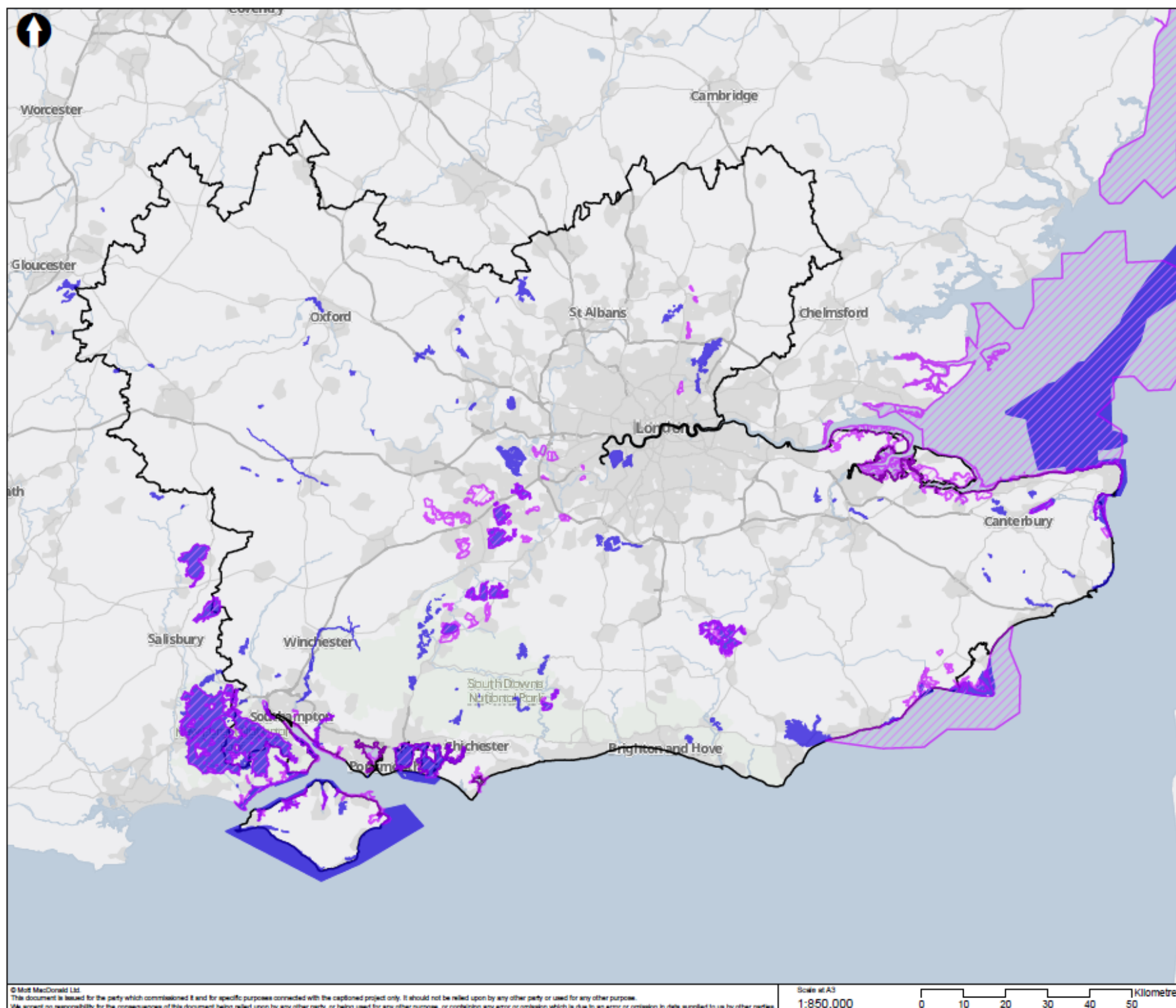


Figure E.2: Sites of Special Scientific Interest and Ramsar Sites

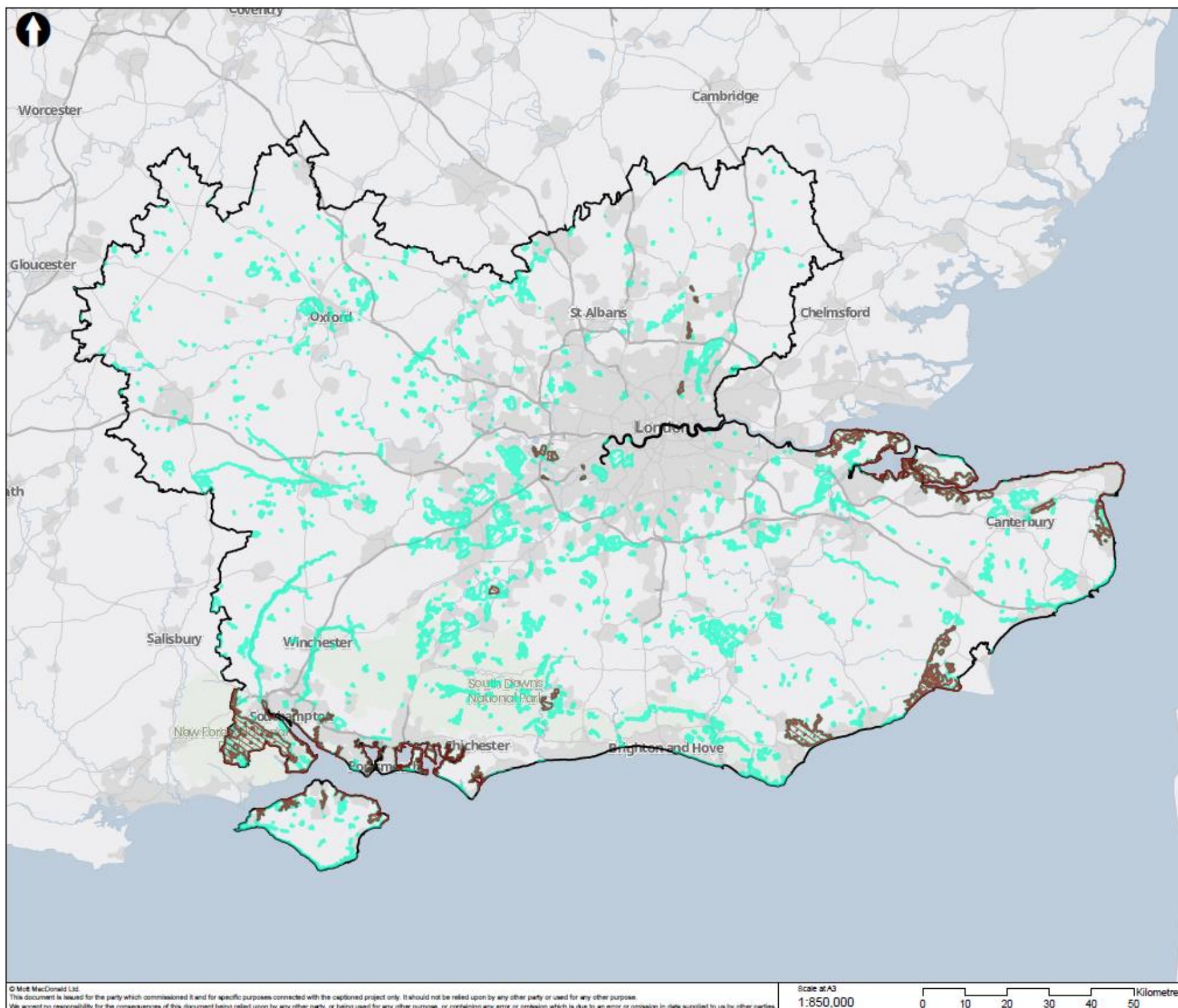


Figure E.3: National Nature Reserves and Local Nature Reserves

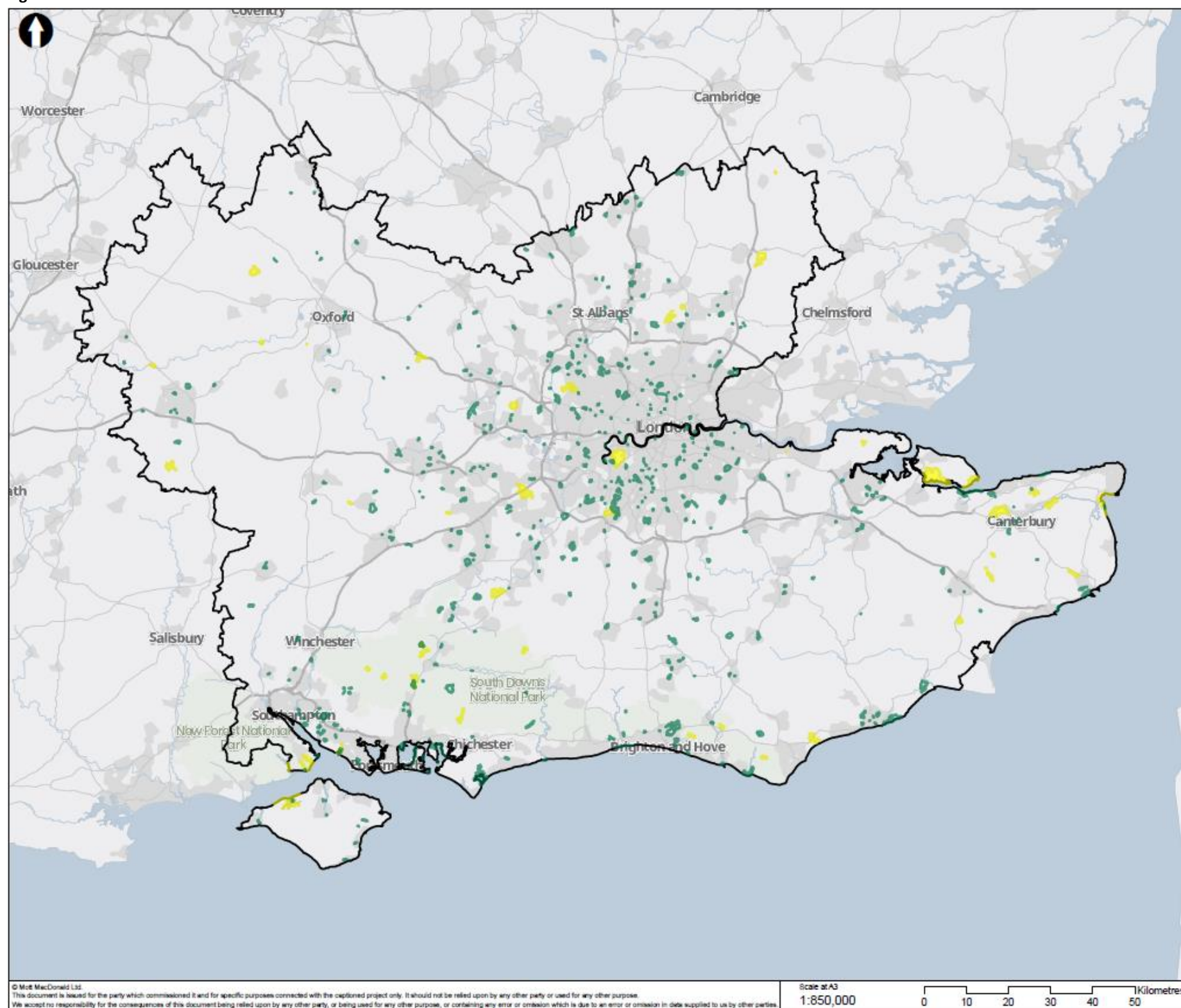


Figure E.4: Marine Conservation Zones and Offshore Marine Protection Areas

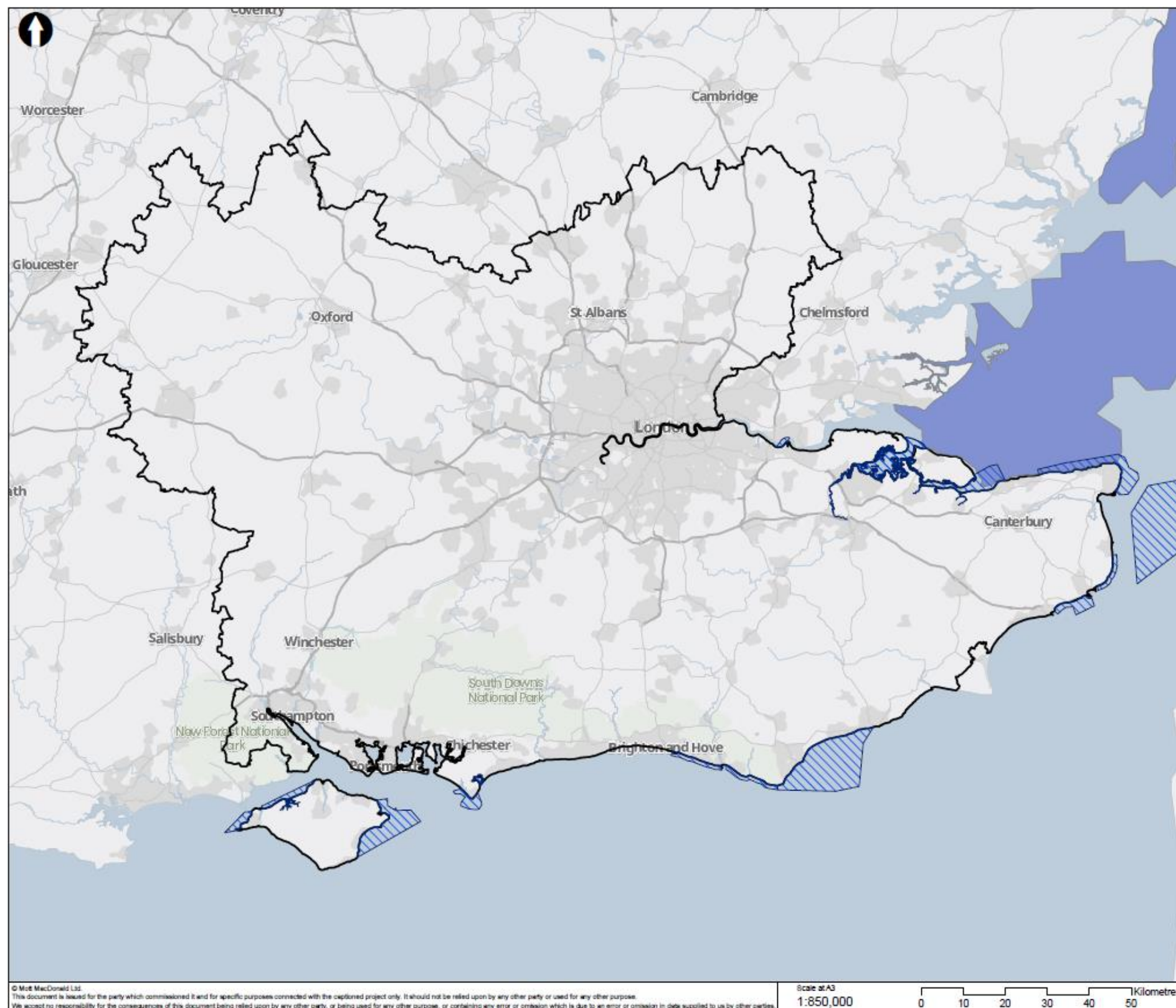


Figure E.5: Main Rivers and Agricultural Land Classification

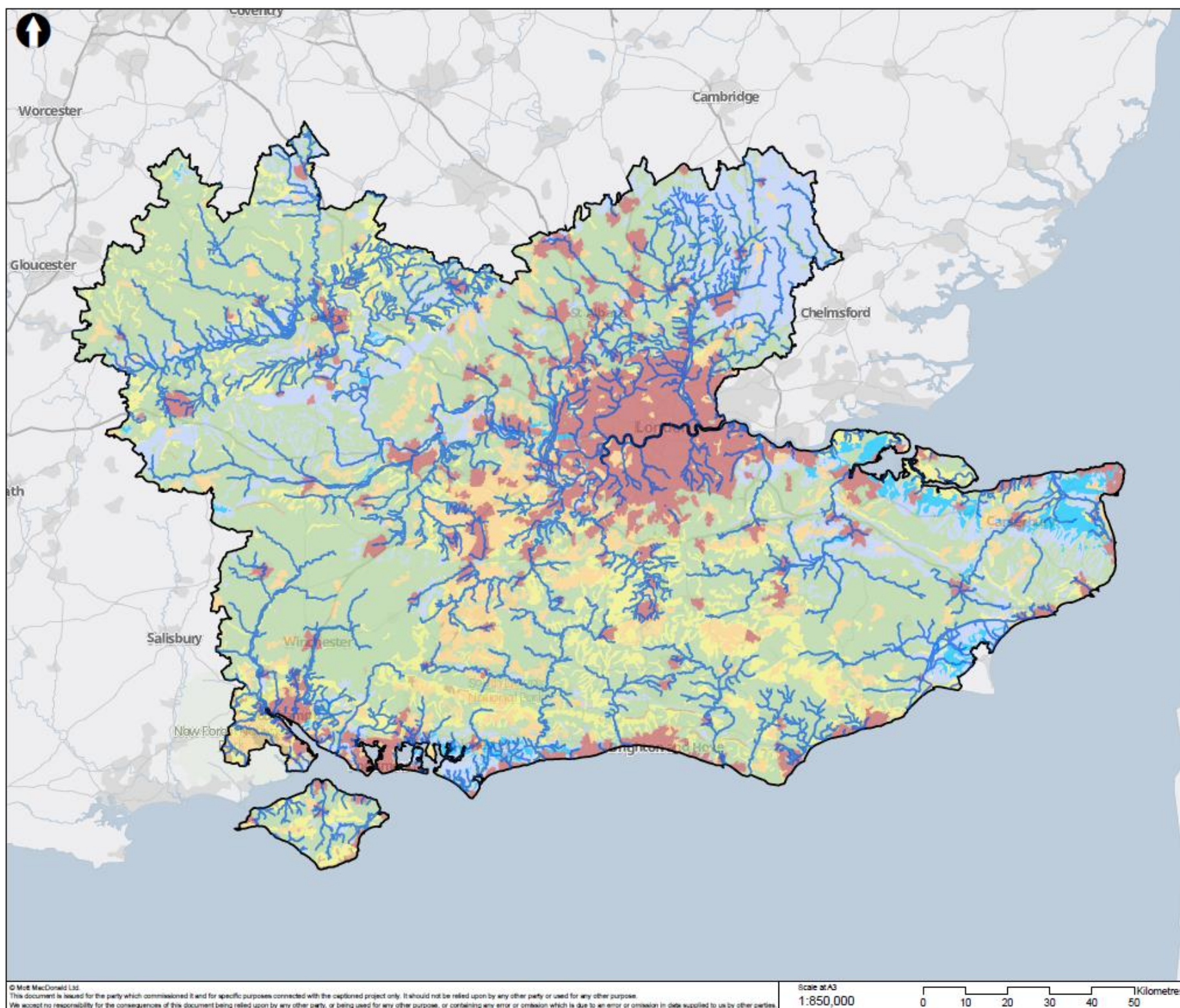


Figure E.6: Heritage Assets

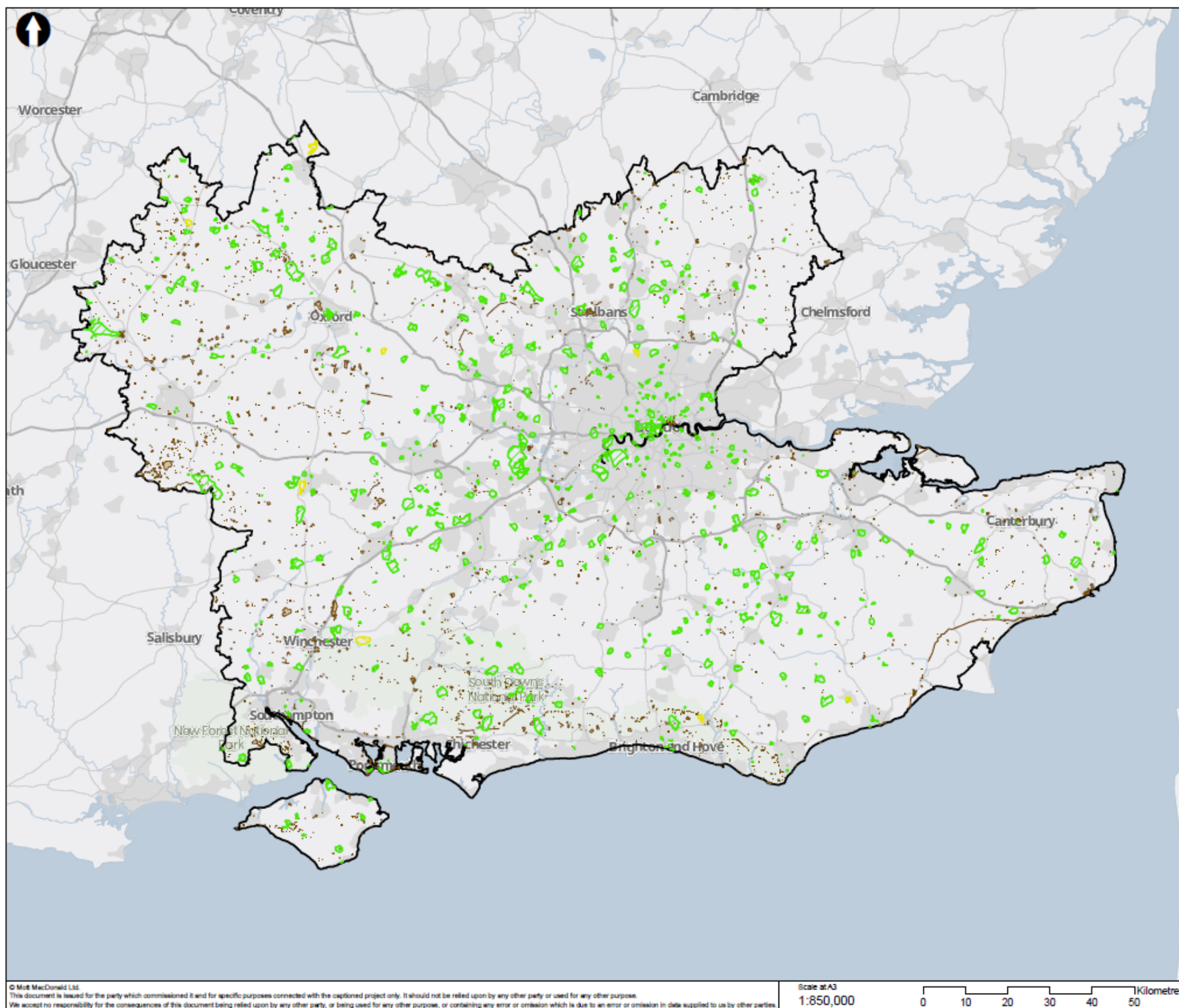
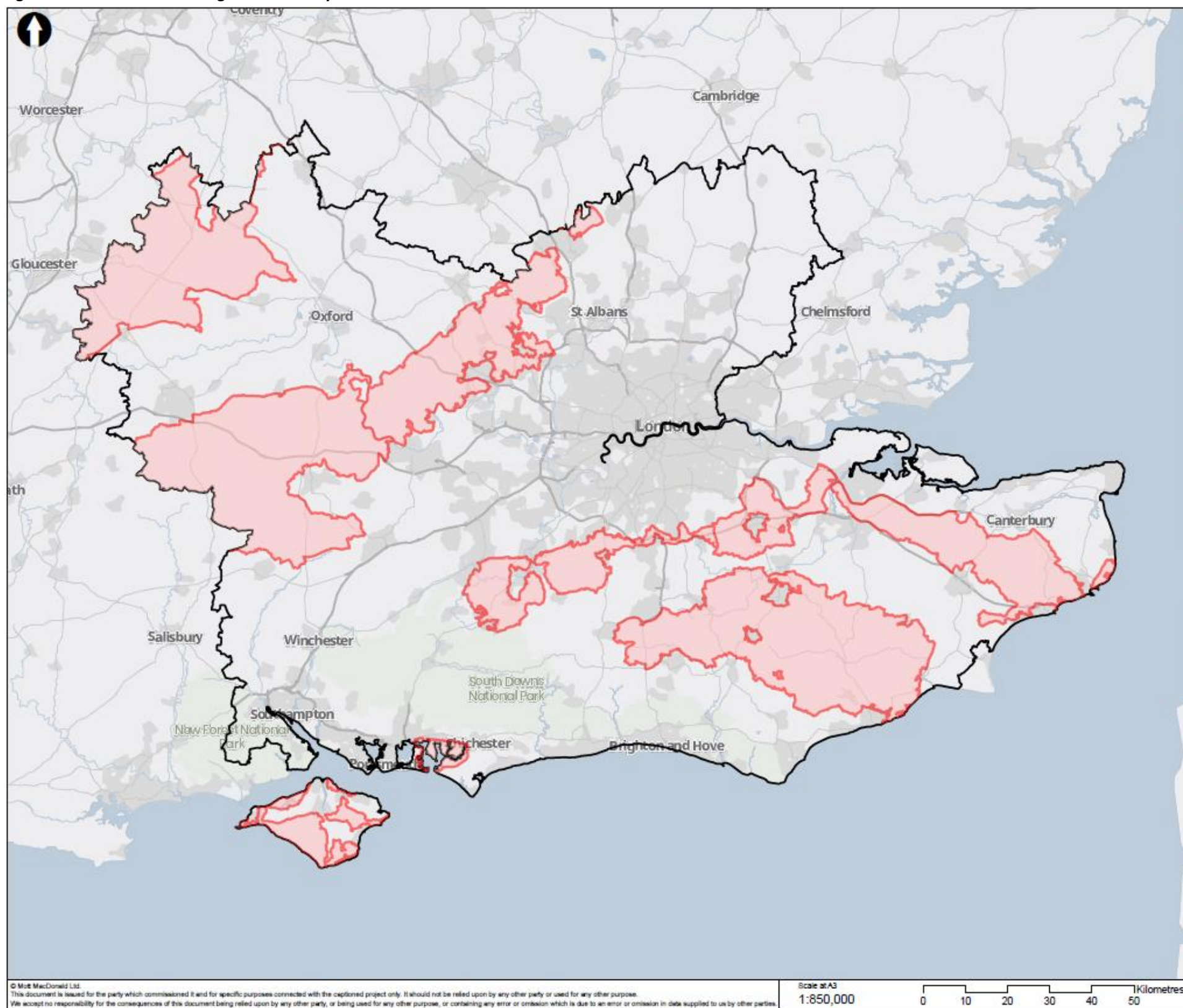


Figure E.7: Areas of Outstanding Natural Beauty



F. List of Local Authorities in the WRSE Region

Local Authorities in the WRSE Region				
Adur	Croydon	Havant	Reigate and Banstead	Three Rivers
Arun	Dacorum	Havering	Richmond upon Thames	Tonbridge and Malling
Ashford	Dartford	Hertsmere	Rother	Tower Hamlets
Aylesbury Vale	Dover	Hillingdon	Runnymede	Tunbridge Wells
Barking and Dagenham	Ealing	Horsham	Rushmoor	Uttlesford
Barnet	East Hampshire	Hounslow	Sevenoaks	Vale of White Horse
Basingstoke and Deane	East Hertfordshire	Isle of Wight	Slough	Waltham Forest
Bexley	Eastbourne	Islington	South Bucks	Wandsworth
Bracknell Forest	Eastleigh	Kensington and Chelsea	South Cambridgeshire	Watford
Braintree	Elmbridge	Kingston upon Thames	South Northamptonshire	Waverley
Brent	Enfield	Lambeth	South Oxfordshire	Wealden
Brentwood	Epping Forest	Lewes	Southampton	Welwyn Hatfield
Brighton and Hove	Epsom and Ewell	Lewisham	Southwark	West Berkshire
Bromley	Fareham	Luton	Spelthorne	West Oxfordshire
Broxbourne	Folkestone and Hythe	Maidstone	St Albans	Westminster
Camden	Gosport	Medway	Stevenage	Wiltshire
Canterbury	Gravesham	Merton	Stratford-on-Avon	Winchester
Central Bedfordshire	Greenwich	Mid Sussex	Stroud	Windsor and Maidenhead
Chelmsford	Guildford	Mole Valley	Surrey Heath	Woking
Cheltenham	Hackney	New Forest	Sutton	Wokingham
Cherwell	Hammersmith and Fulham	Newham	Swale	Worthing
Chichester	Haringey	North Hertfordshire	Swindon	Wychavon
Chiltern	Harlow	Oxford	Tandridge	Wycombe
City of London	Harrow	Portsmouth	Test Valley	
Cotswold	Hart	Reading	Tewkesbury	
Crawley	Hastings	Redbridge	Thanet	

G. Assessment 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 • MPA • MCZ • NNR • 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, 	+++	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.

SEA Objective	Datasets/Key Themes	Effect	Description
	hibernation areas etc. at all scales)		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. 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.

SEA Objective	Datasets/Key Themes	Effect	Description
			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: ● 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.
		---	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.

SEA Objective	Datasets/Key Themes	Effect	Description
			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 50 MI/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 25 MI/d

SEA Objective	Datasets/Key Themes	Effect	Description
		0	<p>Neutral</p> <p>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.</p>
		-	<p>Minor Negative</p> <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>
		--	<p>Moderate Negative</p> <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>
		---	<p>Major Negative</p> <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>

SEA Objective	Datasets/Key Themes	Effect	Description
			The option is located in Flood Zone 3 and further contributes to flood risk. The option would result in major decreases in water efficiency, increases demand and reduces resilience.
		?	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 ● 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.
Climate Factors: ● Reduce embodied and operational carbon emissions	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.

SEA Objective	Datasets/Key Themes	Effect	Description
<ul style="list-style-type: none"> Reduce vulnerability to climate change risks and hazards 		++	<p>Moderate Positive</p> <p>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)</p>
		+	<p>Minor Positive</p> <p>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)</p>
		0	<p>Neutral</p> <p>The option would have no discernible effect on greenhouse gas emissions, nor would the option increase resilience/decrease vulnerability to climate change effects.</p>
		-	<p>Minor Negative</p> <p>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).</p>
		--	<p>Moderate Negative</p> <p>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.</p>
		---	<p>Major Negative</p> <p>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.</p>
		?	<p>Uncertain</p> <p>From the level of information available the effect that the option would have on this objective is uncertain.</p>

SEA Objective	Datasets/Key Themes	Effect	Description
Landscape: ● 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 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.

SEA Objective	Datasets/Key Themes	Effect	Description
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 	+++	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.
	<ul style="list-style-type: none"> - Grade II listed structures 	++	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.
	<ul style="list-style-type: none"> ● Registered Parks and Gardens: <ul style="list-style-type: none"> - Grade I Registered Parks and Gardens 	+	Minor Positive The option will result in enhancements to non-designated heritage assets and/or their setting.
	<ul style="list-style-type: none"> - Grade II* Registered Parks and Gardens 	0	Neutral The option will have no effect on cultural heritage assets or archaeology.
	<ul style="list-style-type: none"> - Grade II Registered Parks and Gardens 	-	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.
	<ul style="list-style-type: none"> ● Protected Wreck 	--	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. The option will diminish of significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.
	<ul style="list-style-type: none"> ● Registered Battlefields ● Scheduled Monuments 		
<ul style="list-style-type: none"> ● Conservation Areas ● World Heritage Sites 	---	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. 	

SEA Objective	Datasets/Key Themes	Effect	Description
		?	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"> 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 	+++	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.
	<ul style="list-style-type: none"> Indices of Multiple Deprivation 2015 	++	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
	<ul style="list-style-type: none"> Functional site: <ul style="list-style-type: none"> Schools Medical facilities 	+	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
	<ul style="list-style-type: none"> 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 	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
	<ul style="list-style-type: none"> Natural England - Country Parks 	---	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.

SEA Objective	Datasets/Key Themes	Effect	Description
	<ul style="list-style-type: none"> National Parks Section 15 open access areas CRoW S4 Conclusive Registered Common Land 	?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.
Material Assets <ul style="list-style-type: none"> Minimise resource use and waste production Avoid negative effects on built assets and infrastructure 	Transport: <ul style="list-style-type: none"> Major roads – A roads Major roads motorway Railway line National cycle route National trails 	+++	Major Positive The option will re-use 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 re-use 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 re-use 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 re-use 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
		--	<p>Moderate Negative</p> <p>The option will require new infrastructure with only limited opportunities for the re-use 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>
		---	<p>Major Negative</p> <p>The option will require significant new infrastructure that cannot be provided through the re-use 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>
		?	<p>Uncertain</p> <p>From the level of information available the effect that the option would have on this objective is uncertain.</p>

H. Habitats Regulation Assessment (HRA) Report

I. Water Framework Directive (WFD) Report

J. Biodiversity Net Gain (BNG) and Natural Capital Report