

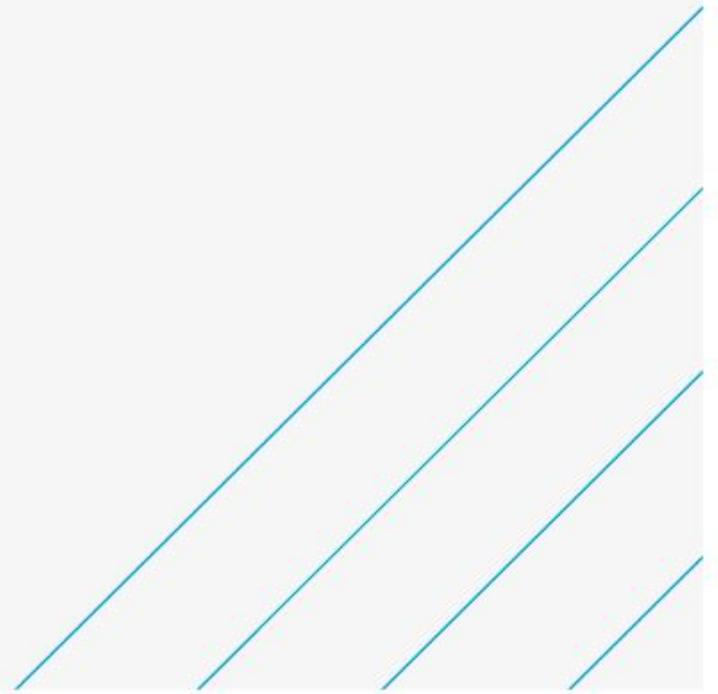


# Water Resources Management Plan 2024

Level 1 Appendix F  
Strategic Environmental Assessment - Main Report

October 2024

5197934





# Notice

This document and its contents have been prepared and are intended solely as information for SES Water and use in relation to the Strategic Environmental Assessment of the SES Water WRMP24.

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## Glossary

Abbreviation	Explanation
ALC	Agricultural Land Classification
ACWG	All Company Working Group
ADO	Average Deployable Output
AONB	Area of Outstanding Natural Beauty
AQMA	Air Quality Management Area
ARU	Aquifer Resource Unit
BAP	Biodiversity Action Plan
BMV	Best and Most Versatile
BNG	Biodiversity Net Gain
CO <sub>2</sub>	Carbon dioxide
DO	Deployable Output
DCLG	Department for Communities and Local Government
DEFRA	Department for Environment Food and Rural Affairs
DLUHC	Department for Levelling Up, Housing and Communities
DP	Drought Plan
DYAA	Dry Year Annual Average
DYCP	Dry Year Critical Period
EAR	Environmental Appraisal Report
EIP	Environmental Improvement Plan
ER	Environmental Report
EU	European Union
GHG	Greenhouse Gas
GIS	Geographic Information System
GVA	Gross Value Added
HRA	Habitats Regulation Assessment
ICA	In Combination Assessment
IMD	Index of Multiple Deprivation
INNS	Invasive Non-Native Species
km	Kilometres
ktCO <sub>2</sub>	Kilo Tonnes of Carbon Dioxide
LSE	Likely Significant Effects
LFRMS	Local Flood Risk Management Strategies
LNR	Local Nature Reserve
MCHLG	Ministry of Housing Communities and Local Government
MCZ	Marine Conservation Zone
MI/d	Megalitres per day / Million litres per day
MRF	Minimum Residual Flow



NCA	National Character Areas
NEUB	Non-Essential Use Ban
NGO	Non-Governmental Organisation
NHS	National Health Service
NIA	Noise Action Planning Important Area
NNR	National Nature Reserve
NO <sub>2</sub>	Nitrogen dioxide
NPPF	National Planning Policy Framework
NSIP	Nationally Significant Infrastructure Project
NYAA	Normal Year Annual Average
ODPM	Office of the Deputy Prime Minister
Ofwat	Water Services Regulation Authority
PM	Particulate Matter
PPPs	Plans, Policies and Programmes
PRoW	Public Right of Way
pSPA	Potential Special Protection Area
RBD	River Basin District
RBMP	River Basin Management Plan
RdWRMP	Revised Draft Water Resources Management Plan
RIGS	Regional Importance Geological Sites
RRP	Regional Resilience Plan
SAC	Special Area of Conservation
cSAC	Candidate Special Area of Conservation
SEA	Strategic Environmental Assessment
SES Water	Sutton and East Surrey Water
SPA	Special Protection Area
SPZ	Source Protection Zone
SRO	Strategic Resource Option
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
TUBs	Temporary Use Bans
UK	United Kingdom
UKWIR	UK Water Industry Research
ULEV	Ultra Low Emission Vehicle
WFD	Water Framework Directive
WHS	World Heritage Site
WINEP	Water Industry Improvement Plan
WPS	Water Pumping Station
WRMP	Water Resource Management Plan
WRPG	Water Resource Planning Guideline



WRPG SG	Water Resource Planning Guideline Supplementary Guidance
WRSE	Water Resources South East
WRZ	Water Resource Zone
WTW	Water Treatment Works



# 1. Introduction

## 1.1. Purpose of this Document

This is the Strategic Environmental Assessment (SEA) Report of the SES Water (SESW) Water Resource Management Plan 2024 (WRMP24), which has been prepared by AtkinsRéalis Limited.

On 14<sup>th</sup> November 2022 SES Water published their draft Water Resource Management Plan 2024 (dWRMP24) and associated SEA Environmental Report for consultation. The public consultation ran for a 14-week period and closed on 20<sup>th</sup> February 2023. The WRMP24 and SEA Environmental Report takes on board the comments received from this consultation exercise, in addition to updated outputs and data from the Water Resources South East (WRSE) regional modelling in relation to:

- Population and growth forecasts to reflect updated data not available previously;
- Demand forecasts to reflect the above, and updating the base year for forecasts;
- Data and information on individual options, including option timing, costs and best value metrics, and option availability;
- Demand management options, including commitments to leakage and PCC targets considering Government policy expectations, including in the Government's Environmental Improvement Plan; and
- Other data updates to reflect new data availability.

This revised SEA has been informed by seven other environmental assessments, namely Habitats Regulations Assessment (HRA), Water Framework Directive (WFD) Assessment, Biodiversity Net Gain (BNG) Assessment, Natural Capital (NC) Assessment, Invasive Non-Native Species (INNS) Assessment, an assessment on the potential for effects on Sites of Special Scientific Interest and Heritage Impact Assessment (HIA). Notes on these assessments have been included as Appendices to this Report (Level 2 Appendix B7 - B12), excluding the HRA which has been published as a standalone report.

This SEA Report identifies the likely environmental effects of implementing the WRMP24, with an overview of the Water Resource Plan presented in the following section.

## 1.2. SES Water

SES Water is a supply-only water company supplying an area of 834 km<sup>2</sup> within Surrey, Kent, West Sussex and south London, as shown in Figure 1-1. SES Water supplies, on average, 160 million litres of water per day (Ml/d) in the area, however, during the summer 2022 drought period this increased to above 210 Ml/d<sup>1</sup>.

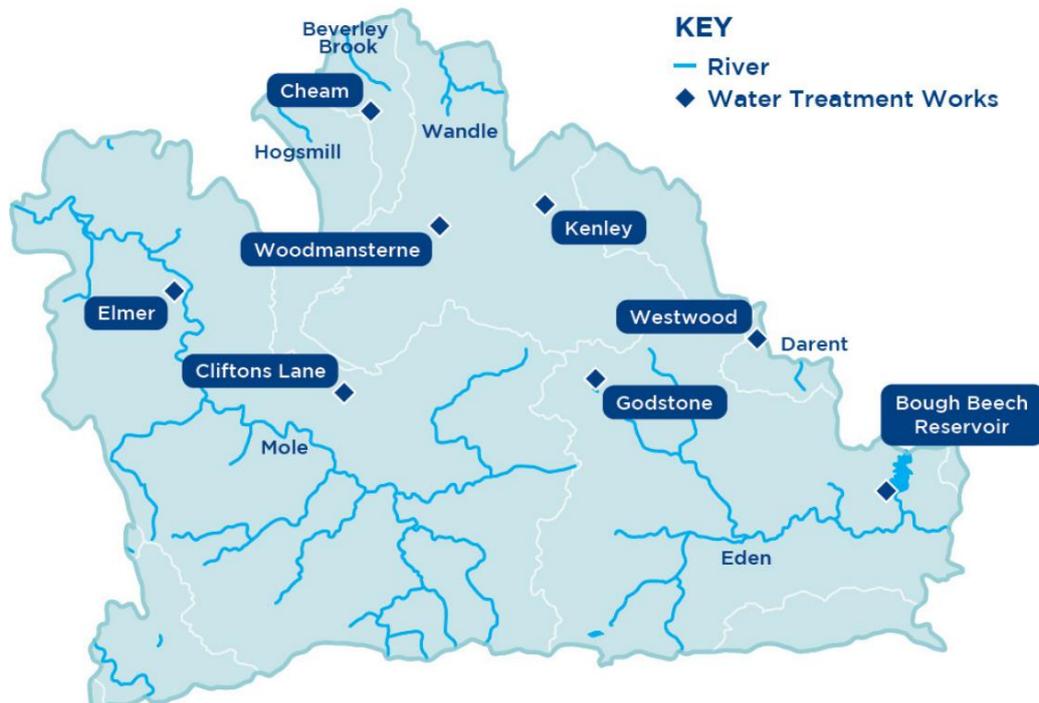
SES Water serves a population of over 750,000 in nearly 300,000 properties from eight Water Treatment Works (WTW). The greater proportion of their water (approximately 85%) is abstracted from groundwater sources in the chalk and greensand strata across the North Downs. Their catchments include rare chalk stream habitats which are of national ecological importance.

SES Waters remaining water supply is abstracted over the winter from the River Eden and stored at their Bough Beech reservoir. All their sources rely on winter rainfall – to recharge their groundwater sources and ensure there is sufficient river flow along the River Eden to enable abstraction.

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<sup>1</sup> [SES Water's Water Resources Management Plan | SES Water](#)

Figure 1-1 - SES Water area of supply and operational catchments<sup>2</sup>



### 1.3. The background and need for the WRMP

It is a regulatory requirement under sections 37A to 37D of the Water Industry Act 1991 for water companies to produce a Water Resources Management Plan (WRMP) every five years to help ensure customers and communities have adequate water supplies available. A WRMP should provide details on how the company will provide and develop an affordable and efficient water supply for its customers, whilst also protecting the environment, effectively improving the resilience of water supplies to droughts and other future challenges. Water Companies in England are currently developing their WRMP for the next 50-year period from 2025 to 2075, known as WRMP24.

A significant influence on water companies plans has been the Environment Agency's National Framework for Water Resources (launched in March 2020). The Framework sets out a national aspiration to 'leave the environment in a better condition than we found it, while improving resilience to drought and minimising interruptions to water supplies'.

#### 1.3.1. Regional Planning

At a national level, water companies across England are developing their own regional plans to give a complete picture of the nation's water resources for the first time. This ensures that the regional plans, when combined, can meet the national need in a dynamic yet flexible way. This more 'joined up' approach marks a step-change in water resource planning. There are five regional groups:

- Water Resources North;
- Water Resources West
- Water Resources East,

<sup>2</sup> [SES Water's Water Resources Management Plan | SES Water](#) Figure 1

- Water Resources West Country; and
- Water Resources South East.

The SES Water WRMP24 is being produced alongside the Water Resources South East (WRSE) regional resilience Plan. The south-east faces the greatest pressures on public water supplies as a designated area of serious water stress by the Environment Agency. This means that current or future household demand for water is a high proportion of the effective rainfall available which is, or is likely to be, available to meet that demand. It has been estimated that over 1 billion additional litres of water will be required per day by 2050 and nearly 1.7 billion litres per day by 2100<sup>3</sup>.

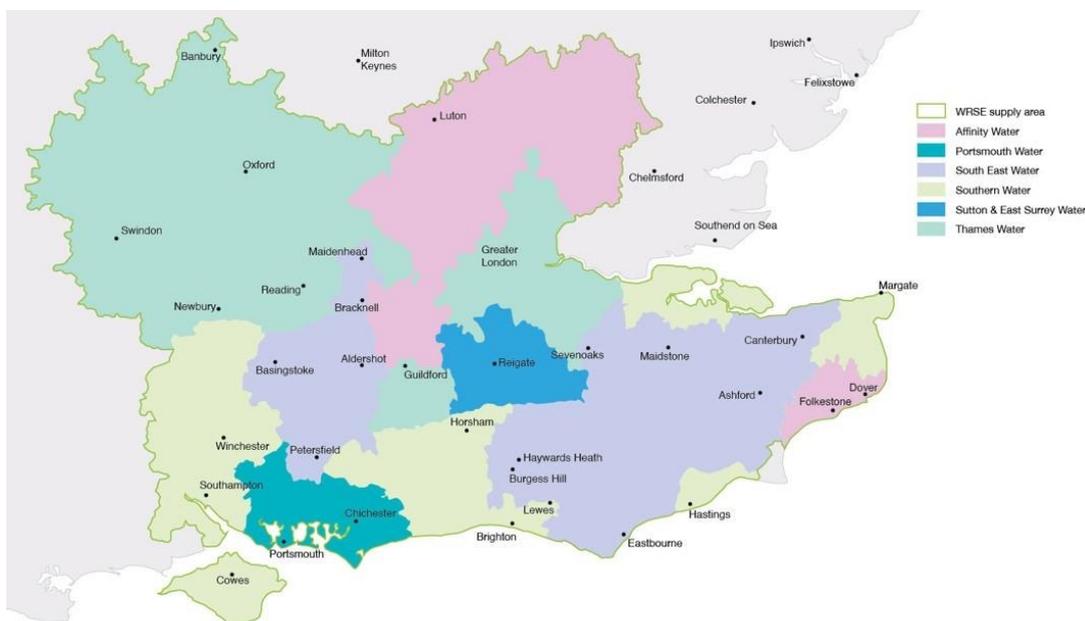
Via a collaborative approach, SES Water are working with five other companies under the banner of WRSE, as shown in Figure 1-2, to deliver the National Framework for water resources and help safeguard continued supplies of water to this part of the country. Alongside SES Water, the other companies within WRSE are:

- Affinity Water;
- Portsmouth Water;
- Southern Water;
- South East Water; and
- Thames Water.

By aligning with the South East regional multi-sector resilience plan for water resources, SES Waters WRMP24 aims to balance national, regional, and local interests – reflecting the best value for their customers as well as the best value regional plan and the investment and environmental ambitions of the regulators, customers and stakeholders.

Through WRSE, the companies of the South East have developed common methodologies, shared data sets and a regional adaptive planning approach to meet future water resource challenges. This ambitious multi-sector regional plan uses new, sophisticated modelling and forecasting methods which are then reflected in the SES Water plan, to align with the wider region.

**Figure 1-2 - Regional companies forming part of WRSE**



The WRSE regional resilience plan aims to take a long-term view to water resource planning across the region to 2100 in order to secure a sustainable and resilient water supply. It covers investment in new infrastructure, leakage reduction measures and water efficiency programmes. In addition, it also includes catchment

<sup>3</sup> WRSE Draft Regional Plan SEA Environmental Report, September 2022

management solutions which seek to provide more sustainable land management practices that will protect and enhance the quality of the water at source. This will reduce water treatment costs in future, enhance the biodiversity of rivers and streams and increase the overall resilience of the water environment. The 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; and
- Address the impacts of **climate change** on demand for water and how much is available.

Best Value objectives set out by the draft regional WRMP include:

- Deliver a **secure and wholesome** supply of water to customers and other sectors to 2100;
- Deliver **environmental improvement** and **social benefit**;
- Increase the **resilience** of the region's water systems (public water supply system, environmental system and the non-public water supply systems used by other sectors); and
- Be **deliverable at a cost** that is acceptable to customers.

In order to fully identify and assess effects at both the regional and local levels, the regional resilience plan and the local SES Water WRMP24 will iteratively inform each other.

## 1.4. SES Water's WRMP24

### 1.4.1. WRMP24 Objectives

The SES Water WRMP24 outlines how the water company has considered the implications of climate change, sustainable abstractions, future population, and housing growth, in addition to other factors that affect long term future uncertainty in the south east. The Plan sets out the overall approach and recommends options to reduce any predicted deficits and how to maintain secure supplies to its customers, for the period 2025 to 2075.

As noted in section 1.3, the SES Water WRMP24 aligns with the EA's National Framework for Water Resources. The framework sets out core planning objectives for all company plans. The National Framework objectives are to:

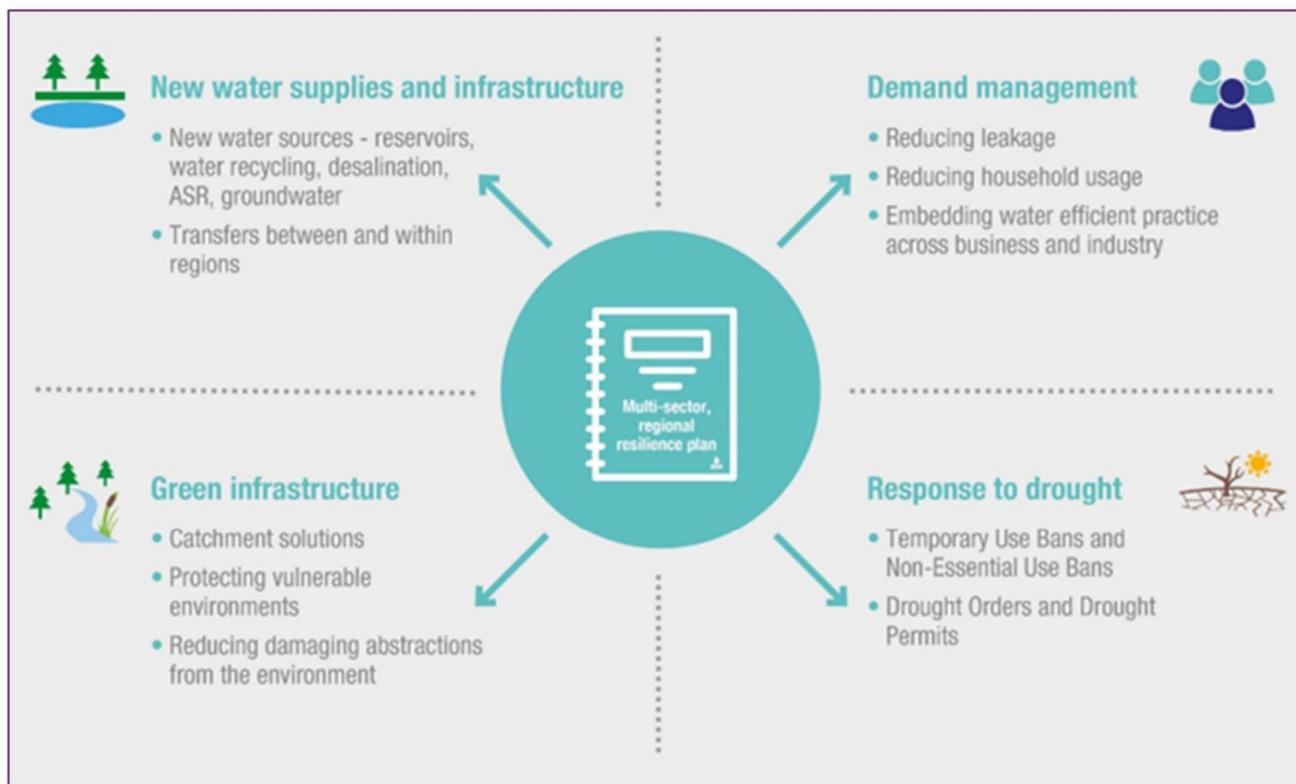
- Reduce the average amount of water individuals use to 110 litres of water per person per day by 2050,
- Facilitate a reduction in water use across all customer sectors,
- Halve leakage rates by 2050 (based on a baseline of 2017–18) and
- Reduce the use of drought measures that have an impact on the environment.

In addition to meeting the objectives of the framework, SES Water's plan strives to:

- Deliver a secure and wholesome supply of water to customers and other sectors;
- Deliver environmental improvement and social benefit;
- Increase the resilience of the region's water systems; and
- Be deliverable at a cost that is acceptable to customers.

The process of producing a WRMP starts with a calculation of the supply and demand forecasts (stage 1 'understanding the scale of the water resource challenge'). Where the supply forecast is not sufficient to meet demand at any point in the planning period, then this deficit must be solved through a comparison of options (stage 2 'feasible option development'). When developing potential options, SES Water considered a number of factors including Government policy, customer preferences, resilience, third party options, demand management recommendations; and environmental enhancement. The suite of options fall into four groups as displayed in Figure 1-3. The final step involves 'developing the preferred plan' (stage 3). These elements relied to a large extent on work undertaken by WRSE at the regional level, which helped inform development of the SES Water's WRMP24.

Figure 1-3 - Option Types



## 1.4.2. Adaptive planning

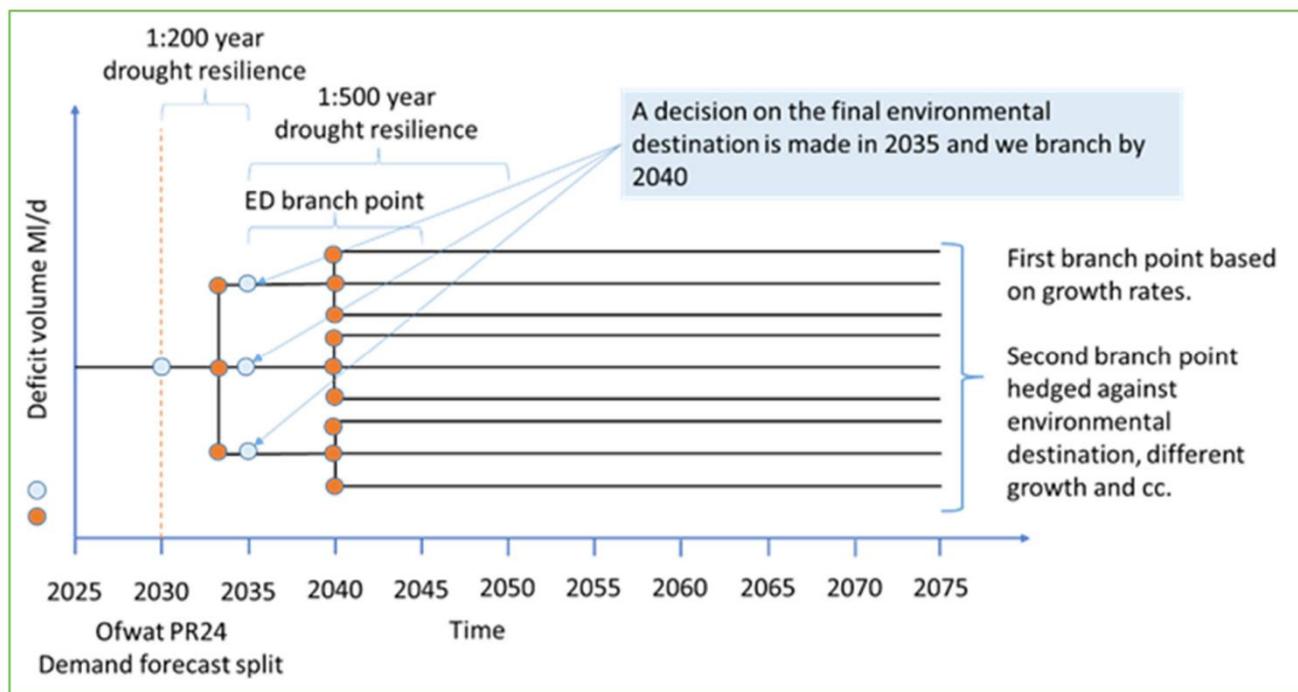
### 1.4.2.1. Regional multi-sector planning approach

There is considerable uncertainty to planning many years in advance as it requires planning for different scenarios using various supply and demand projections. However, the regional planning process has been specifically designed to help water companies adopt a forward-looking approach to uncertain requirements through adaptive planning. This allows companies to plan for schemes that may be required from 2025 and beyond.

In order to do this, WRSE developed a 'root and branch' adaptive tree as the base for forecast for its regional plan investment modelling. This includes the most likely set of future challenges and uncertainties facing the south east region over the next 50 years. There are nine different pathways ('situations'), as shown in Figure 1-4, with different combinations of:

- **Population growth:** According to the Office for National Statistics (ONS) the south east region could grow between two (minimum growth) and 33 per cent (maximum growth) over the next 50 years;
- **Climate change impacts:** Using the Met Offices most recent climate change predictions the model reflects a low climate change forecast up to a high climate change scenario; and
- **Levels of environmental ambition:** There needs to be a reduction on the amount of water taken from rivers, streams and underground sources, all which have impacts on the environment. The model reflects a range of abstraction reduction scenarios from low to high.

Figure 1-4: Decision tree and adaptive pathways<sup>4</sup>



Analysis of these pathways have identified three key time periods:

**2025–2035 Priority ‘least regrets’ plan:** This period includes the schemes that water companies must progress. These schemes are required in all the future pathways and are considered ‘least regret’ options. This period will also include preparatory work necessary to assess the feasibility and effectiveness of options that could be needed in later years.

**2035–2050 The adaptive plan:** This period is more uncertain and so includes a strategy to deal with different futures through nine representative alternative pathways. Each pathway represents a different combination of population growth, environmental destination and climate change scenarios and includes the schemes needed under each. Collectively the nine pathways encompass a full range of impacts from 580 identified possible futures identified initially. The plan will adapt depending on which future scenario occurs.

**2050-2075 Potential Future Strategies:** This period includes the same range of scenarios as in the adaptive planning period, but is extended beyond the first 25 years.

Adaptive planning pathway 4 (‘situation 4’) is the reported pathway for the revised draft regional plan, informed by an update from regulators setting out their preference for pathway 4. Pathway 4 meets the regulatory guidance. It uses growth scenarios that are compliant with regulatory guidance, incorporates climate change impacts and an environmental destination preferred by Natural England and the Environment Agency. Critically, it includes all activities that need to be undertaken to be ready for all plausible future scenarios. The eight alternative pathways cover the full range of scenarios between 2025 and 2075, including the Ofwat core pathway (‘Situation 8’). Each pathway is equally as likely.

#### 1.4.2.2. SES Water Planning Scenarios

SES Water have adopted the adaptive planning pathways and scenarios developed by WRSE. These have been produced in accordance with Ofwat’s guidance to plan for future uncertainties and comply with the Water Resource Planning Guidance (WRPG). Where required, the adaptive scenarios have however been localised to account for nuances in the SES Water plan area. Consultation to SES Water’s draft plan outlined that some local authorities are preparing a new Local Plan which will include significant growth compared to the adopted

<sup>4</sup> [SES Water's Water Resources Management Plan | SES Water](#) Figure 24



Local Plans. SES Water have noted that some local authorities may have discrepancies between their adopted and proposed updates to their Local Plans, and have therefore revised the adaptative pathway to account for higher and lower population growth than the preferred pathway.

In line with WRSE, SES Waters long-term adaptive planning strategy consists of a reported pathway ('Situation 4') which is consistent with best practice techniques and encompasses the 'low regrets' investments that are identified as necessary in all plausible future scenarios. Situation 4 for SES Water follows:

- the housing plan growth forecast, in line with Guidelines ('medium scenario');
- a median level of climate change ('medium scenario'); and
- a high level of environmental destination following the second decision point to ensure SES Water reach the environmental flow indicator by 2050 ('high scenario').

SES Water are currently developing a monitoring plan which sets out how they will monitor and track which situation or alternative future is emerging to ensure the plan remains optimal for customers and the environment (see 'Monitoring' section of the WRMP24). A number of external and company specific factors have been identified including population growth (units), no of new properties (units), profile of abstraction reductions and experienced weather (continuous data). Monitoring this data will allow SES Water to alter their pathway in the event of a higher or lower trajectory.

### 1.4.3. The preferred Best Value Plan

To determine, for any given adaptive pathway, the optimum set of options, SES Water have, through the WRSE regional planning group, assessed the **best value plan**. The WRPG describes a best value plan as:

*"one that considers factors alongside economic cost and seeks to achieve an outcome that the overall benefit to customers, the wider environment and overall society"*.

The adaptive WRMP24 resolves the supply demand deficit identified in SES Waters baseline supply demand deficit using a selection of the feasible options identified. Their Best Value Plan (BVP) provides a solution for all nine branches following an iterative process as described in the WRSE Method Statement (Appendix 8A).

SES Waters best value plan consists of the following components:

**Table 1-1 - BVP Scheme Options**

Option Name	Option description
<b>Supply Options</b>	
Raising Bough Beech reservoir (11.5MI/d)	This scheme option seeks to raise the reservoir embankment to facilitate additional storage, providing 11.5MI/d benefit (ADO). This option would not change the existing abstraction licence conditions. A lead in time of ten years is required, before the option could be utilised
Outwood Lane groundwater (2.7MI/d)	This scheme options seeks to increase the daily licence of an existing source from 3.02MI/d to 8MI/d, with the equivalent increase in pump capacity required. The increase in deployable output from the scheme is approximately 2.66MI/d and this option would require a one-year lead in.
Duckpit Wood (1.4MI/d)	A scheme option to construct a new borehole to replace the Duckpit Wood and Paines Hill spring licences, providing an additional 1.37MI/s (ADO). Additional scheme optioneering would be required and a lead in time of eight years has been outlined.
Water Lane borehole enhancement (2.2MI/d)	Option to increase pump capacity and treat pesticides, thereby removing a water quality constraint. This would provide 2.2MI/d (ADO) and require three years lead in time.
Secombe Centre UV (2.1MI/d)	This scheme option provides UV treatment for the Secombe Centre groundwater source, currently providing limited supply and with bacti detections on the raw water. Due to the limited footprint available at the



	Secombe Centre site, the UV treatment plant would be located at Cheam WTW. This option would provide 2.07MI/d (ADO) and require three years lead in time.
SES Water to Southern Water (4MI/d)	A 4MI/day export between SES Water and Southern Water.
SES Water to Southern Water (10MI/d) 'Outwood to Turners Hill'	A reverse 10MI/d transfer from Outwood to Southern Water Turners Hill.
SES Water to South East Water (10MI/d) 'Bough Beech to Riverhill'	This option considers the construction of an approximately 7km pipeline between SES Water's Bough Beech and Riverhill SR in the SEW RZ1 to provide for the transfer of treated water.
SES Water to South East Water (5MI/d) 'Outwood to Whitely Hill'	Options for a transfer at Maidenbower / Whiteley Hill, with capacity options at 5MI/d or 10MI/d (not mutually exclusive). This would require a new treated water transfer and softening plant at Outwood prior to distribution into the network.
SES Water to Thames Water (15MI/d) 'Cheam to Merton'	Options for a transfer at an existing site in Merton, with capacity of 15MI/d. This would require network enhancements to support transfer levels.

### Demand Management Options

Consumption Reduction Activities (High+)	<p>Activities include:</p> <ul style="list-style-type: none"> <li>• Home water efficiency audits outside of the smart metering programme</li> <li>• Education</li> <li>• General broadcast messages (multi-channel proactive comms)</li> <li>• Community campaign</li> <li>• Universal smart metering and continuous flow identification</li> <li>• Household flow reduction (pressure control)</li> <li>• Household Incentives: Innovative tariffs</li> <li>• Non-Household efficiency checks / audits</li> <li>• Vulnerability / Inclusion and Equality</li> <li>• Leading by example</li> </ul>
Leakage Reduction Activities (High+)	<p>Activities include:</p> <ul style="list-style-type: none"> <li>• Find and Fix/Active Leakage Control</li> <li>• New Sounding Techniques</li> <li>• Comm PermaNet/Comm ZoneScan fixed networks</li> <li>• Enigma Sweeps</li> <li>• Fixed Sensor Plastic Network</li> <li>• New DMAs/DMA Integrity (inc. DMA Playbook)</li> <li>• Smart Network – Digital Twin</li> <li>• AI Enabled sound loggers (e.g., FIDO bugs)</li> <li>• Digital Sounding Sticks (e.g., Iquarius/LS1)</li> <li>• Universal Smart Metering</li> <li>• Project Calm – Network Calming Strategy</li> <li>• Trunk and rural mains strategy</li> </ul>

	<ul style="list-style-type: none"> <li>• Satellite Imagery</li> <li>• Mains Replacement</li> </ul>
Government Interventions (HybridC++)	This option assumes that the government introduces measures to save water through water labelling, minimum standard for products and new building regulations.
Temporary use Bans (TUBs)	These restrictions cover the outdoor use of water for household purposes. TUBs can be introduced quickly – seven days after an advert has been placed in newspapers in the area. SES Water can grant exceptions from these restrictions for customers and businesses. These exceptions aim to minimise the impact on vulnerable customers and the economy.
Non-Essential Use Bans (NEUBs)	This option follows the implementation of TUBs where drought conditions continue to worsen. NEUBs target non-domestic users and may only be implemented following approval of an Ordinary Drought Order by the Secretary of State. The potential timescales for introducing restrictions by recourse to a Drought Order are significantly longer than those for TUBs. A decision on approval is normally made within 28 days assuming no objections.

### Drought Measures

River Eden Drought Permit (May)	This drought permit would extend the abstraction period at the Chiddingstone river intake, which refills Bough Beech Reservoir, to allow abstraction up to 272.2 MI/d from the River Eden during May, subject to a Minimum Residual Flow (MRF) in the river. The normal licensed abstraction period is September to April.
River Eden Drought Permit (Summer)	This drought permit would allow abstraction at the Chiddingstone river intake, which refills Bough Beech Reservoir, up to 272.2 MI/d from the River Eden during June, July, and August, subject to a Minimum Residual Flow (MRF) in the river. The normal licensed abstraction period is September to April.
Outwood Lane Drought Permit	An increase in the daily licence of 2 MI/d and a 360 MI increase in the Woodmansterne Group annual licence to accommodate 6 months (180 days) of pumping at the higher rate at Outwood Lane.
Hackbridge Drought Permit	Decoupling the maximum abstraction at Hackbridge from the volume recharged in the preceding winter to allow the full permissible abstraction at the licence rate of 19 MI/d over a 6-month (180 day) period.
Kenley and Purley Drought Permit	An increase of 380 MI in the annual licence limit at Kenley and Purley to enable a 2.11 MI/d increase in MDO over a 6-month (180 day) period

It is important to note, the options in SES Water's reported Pathway 4 remain largely unchanged across the variety of adaptive planning situations considered. The implementation dates of interventions and options SES Water need to deliver under the nine adaptive planning branches are shown in Table 1-1. The lack of variation of dates shows that for SES Water, the branches do not make a significant difference to their investment needs and that their investment, **particularly in the first 15 years is no regret.**

Optimising the best value metrics, has meant the regional investment model has identified alternative solutions for other companies in the region to maintain their supply demand balance. This includes:

- the development of South East Water's option at Arlington Reservoir to support their demand needs; and
- the improved utilisation of Thames Water's options – possibly as a result of reduced transfers between Thames Water and Affinity Water – to support their demand needs.

As a result, there is a reduced reliance on sources from SES Waters water resource zone (WRZ), and therefore reduced need for hard infrastructure. SES Water consequently see two supply schemes; the raising of Bough



Beech (11.5MI/d) and Duckpit Wood (1.4MI/d), optimised out of SES Water's best value plan in Situation 4. In the WRMP24, the option to raise Bough Beech is now only selected in Pathway 1 (high growth scenario) in the year 2047/48 (the adaptive planning period).

SES Water consider that the raising of Bough Beech being optimised out of the programme and the preferred pathway aligns with their intention to develop a series of nature-based solutions across the Eden catchment, thereby supporting a more resilient catchment without the need for full scale hard infrastructure to maintain their supply demand balance. SES Water have outlined their environmental ambition and proposals for the catchment in Chapter 3B of the WRMP24.

### WRSE Adaptive Planning Situations (DYAA)

Option	S1	S2	S3	S4	S5	S6	S7	S8	S9
Consumption Reduction Activities (High+)	2025/26	2025/26	2025/26	<b>2025/26</b>	2025/26	2025/26	2025/26	2025/26	2025/26
Leakage Reduction Activities (High+)	2025/26	2025/26	2025/26	<b>2025/26</b>	2025/26	2025/26	2025/26	2025/26	2025/26
Government Interventions (HybridC++)	2025/26	2025/26	2025/26	<b>2025/26</b>	2025/26	2025/26	2025/26	2025/26	2025/26
River Eden Drought Permit (May)	-	2039/40	2041/42	<b>2041/42</b>	2041/42	2041/42	2041/42	2041/42	2041/42
River Eden Drought Permit (Summer)	-	2039/40	2041/42	<b>2041/42</b>	2041/42	2041/42	2041/42	2041/42	2041/42
Outwood Lane Drought Permit	-	2039/40	2041/42	<b>2041/42</b>	2041/42	2041/42	2041/42	2041/42	2041/42
Hackbridge Drought Permit	-	2039/40	2041/42	<b>2041/42</b>	2041/42	2041/42	2041/42	2041/42	2041/42
Kenley and Purley Drought Permit	-	2039/40	2041/42	<b>2041/42</b>	2041/42	2041/42	2041/42	2041/42	2041/42
Temporary use Bans (TUBs)	2025/26	2025/26	2025/26	<b>2025/26</b>	2025/26	2025/26	2025/26	2025/26	2025/26
Non-Essential Use Bans (NEUBs)	2025/26	2025/26	2025/26	<b>2025/26</b>	2025/26	2025/26	2025/26	2025/26	2025/26
SES Water to Southern Water (4MI/d)	2025/26 to 2030/31	2025/26 to 2030/31	2025/26 to 2030/31	<b>2025/26 to 2030/31</b>	2025/26 to 2030/31				
SES Water to Southern Water (10MI/d) 'Outwood to Turners Hill'	2033/34 to 2038/39 Import from 2039/40	2033/34	2033/34	<b>2033/34</b>	2033/34	2033/34	2033/34	2033/34	2033/34
SES Water to South East Water (10MI/d) 'Bough Beech to Riverhill'	2038/39	2038/39	2038/39	<b>2038/39</b>	2038/39	2038/39	2039/40	2039/40	-
SES Water to South East Water (5MI/d) 'Outwood to Whitely Hill'	2039/40	2039/40	-	<b>2048/49</b>	-	-	2052/53	-	-



SES Water to Thames Water (15MI/d) 'Cheam to Merton'	2039/40	2039/40	2039/40	-	-	-	-	-	-
Outwood Lane groundwater (2.7MI/d)	2049/50	-	-	<b>2048/49</b>	-	-	-	-	-
Raising Bough Beech reservoir (11.5MI/d)	2047/48	-	-	-	-	-	-	-	-
Water Lane borehole enhancement (2.2MI/d)	2053/54	-	-	<b>2061/62</b>	-	-	-	-	-
Secombe Centre UV (2.1MI/d)	2053/54	-	-	<b>2054/55</b>	-	-	-	-	-
Duckpit Wood (1.4MI/d)	-	-	-	-	-	-	-	-	-

Further detail on the Options proposed within the WRMP24 and the assessment of these options are presented in Chapter 11. Note that not all Options contained within the WRMP24 have been subject to SEA for a range of reasons including if they are baseline options such as existing bulk supplies or previously approved bulk supplies. These are discussed further in Chapter 9.

#### 1.4.4. Alternative plans

In addition to developing the BVP, and as required by the revised Water Resources Planning Guidelines (WRPG), WRSE completed further optimisation runs to benchmark and appraise the BVP against. All alternative plans were constrained to securing a wholesome supply of water to customers and other sectors (multi-sector plan) over the planning period. WRSE developed two reasonable alternatives for each water company, this included a Least Cost Plan (LCP) and a Best Environmental and Societal Plan (BESP):

- **Least Cost Plan:** The model was run in adaptive mode, solving all the future branches and design drought conditions simultaneously, but optimising to minimise cost only (i.e., no other objectives are optimised). The outputs from various runs of the least cost plan helped to identify the options that are selected most frequently, and the potential tipping points along the adaptive pathways. This helped to inform decision-making around best value.
- **Best Environmental and Societal Plan:** This programme is not optimised on cost, but the programme that SES Water consider delivers best overall environment and society value outcomes. This takes into account overall performance across the SEA, Natural Capital and Biodiversity Net Gain metrics, and through engagement with stakeholders.

Table 1-2 sets out implementation dates of interventions and options SES Water need to deliver under each of the alternative plans (pathway 4). The results show that for the majority of the planning period the selection of options is broadly consistent. This largely results from the requirement of demand reductions to meet Environmental Improvement Plan (EIP) targets (see section 2.2 for details).

The plans deviate post 2040 where, as discussed in section 1.4.3, there is a reduced reliance on sources from SES Waters water resource zone (WRZ) and therefore reduced need for hard infrastructure. SES Water consequently see two supply schemes; the raising of Bough Beech (11.5MI/d) and Duckpit Wood (1.4MI/d), optimised out of SES Water's best value plan. The optimisation of the BVP (seeking an improvement in the BVP metrics) is undertaken at a WRSE level, not a WRMP level.

The consistency of the selection of options gives confidence in the option selection process for SES Waters plan. The assessment of these alternative plans is presented in Chapter 10 of this Report.

**Table 1-2 - Comparison between options selected between Least Cost Plan (LCP), Best Environmental and Societal Plan (BESP) and Best Value Plan (BVP)**



Option Name	LCP	BESP	BVP
Consumption Reduction Activities (High+)	2025/26	2025/26	2025/26
Leakage Reduction Activities (High+)	2025/26	2025/26	2025/26
Government Interventions (HybridC++)	2025/26	2025/26	2025/26
River Eden Drought Permit (May)	2041/42	2041/42	2041/42
River Eden Drought Permit (Summer)	2041/42	2041/42	2041/42
Outwood Lane Drought Permit	2041/42	2041/42	2041/42
Hackbridge Drought Permit	2041/42	2041/42	2041/42
Kenley and Purley Drought Permit	2041/42	2041/42	2041/42
Temporary use Bans (TUBs)	2025/26	2025/26	2025/26
Non-Essential Use Bans (NEUBs)	2025/26	2025/26	2025/26
SES Water to Southern Water (4MI/d)	2025/26 – 2030/31	2025/26 – 2030/31	2025/26 - 2030/31
SES Water to Southern Water (10MI/d) 'Outwood to Turners Hill'	2033/34	2033/34	2033/34
SES Water to South East Water (10MI/d) 'Bough Beech to Riverhill'	2038/39	2038/39	2038/39
SES Water to South East Water (5MI/d) 'Outwood to Whitely Hill'	2039/40	2050/51	2048/49
SES Water to Thames Water (15MI/d) 'Cheam to Merton'	2049/50	2052/53	-
Outwood Lane groundwater (2.7MI/d)	2049/50	2050/51	2048/49
Raising Bough Beech reservoir (11.5MI/d)	2050/51	2052/53	-
Water Lane borehole enhancement (2.2MI/d)	2050/51	2054/55	2061/62
Secombe Centre UV (2.1MI/d)	2050/51	2050/51	2054/55
Duckpit Wood (1.4MI/d)	2067/68	2067/68	-

**For full technical detail of how the WRMP24 was arrived at, please see both the WRSE regional plan and the SES Water WRMP24.**



## 2. 25-year Environmental Plan

### 2.1. Environmental destination

Environmental destination is a new term that was introduced through the Environment Agency's Water Resources National Framework document, published in March 2020. The term refers to the consideration of actions to build environmental 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 Plan, which also pledges to improve resilience to drought and minimise interruption to water supplies. The 25-year plan also includes a commitment to work with the water industry to set an ambitious personal consumption target. More widely, the 25-year plan embeds an 'environmental net gain' principle for development and sets out ten environmental goals:

1. Clean air;
2. Clean and plentiful water;
3. Thriving plants and wildlife;
4. A reduced risk of harm from environmental hazards such as flooding and drought;
5. Using resources from nature more sustainably and efficiently;
6. Enhanced beauty, heritage and engagement with the natural environment;
7. Mitigating and adapting to climate change;
8. Minimising waste;
9. Managing exposure to chemicals; and
10. Enhancing biosecurity.

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 and individual water companies' water resources management plans within a given region.

WRSE regional resilience plan has sought to address this by incorporating an environmental forecast which sets out potential futures, looking at the potential water quality and availability requirements of the environment. 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.

WRSE has developed an environmental assessment process (see Figure 2-1) to be applied in the development of the regional resilience plan. SES Water is adopting the same approach as far as possible for the WRMP24 environmental assessment. It is noted that the environmental assessment process includes six different assessments:

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

As such, SES Water have conducted an environmental assessment process grounded on using the SEA process as the umbrella process under which the parallel environmental assessments listed above will take place as advised in the UKWIR and WRSE environmental assessment guidance (see Figure 2-1).

WRSE have prepared and consulted upon a SEA Scoping Report for the Regional Plan with the statutory consultation bodies in 2020. WRSE have subsequently carried out (2021) a high level screening (for all six



## 2.2. Environmental Improvement Plan

In January 2023 the Government published its Environmental Improvement Plan<sup>5</sup>. This is the first revision of the 25-year Environment Plan. One of the ten Goals presented in this plan was, 'Goal 3: Clean and plentiful water'. The following three targets and commitments found on page 99 of the EIP have therefore directly influenced revisions to SES Waters WRMP24:

- Reduce the use of public water supply in England per head of population by 20% from the 2019 to 2020 baseline reporting figures, by 31 March 2038, with interim targets of 9% by 31 March 2027 and 14% by 31 March 2032, and to reduce leakage by 20% by 31 March 2027 and 30% by 31 March 2032.
- Water companies to cut leaks by 50% by 2050. We will reduce leakage by 20% by 31 March 2027 and 30% by March 2032.
- Target a level of resilience to drought so that emergency measures are needed only once in 500-years.

Since publishing their draft WRMP24, SES Water have reviewed options in the context of this additional policy. SES Water have added a constraint to the model relating to their demand management strategies, to ensure the selected strategy aligned with the expectations on them from the Environmental Improvement Plan. SES Waters WRMP24 now features ambitious demand management strategies in the initial stages of the planning horizon so that they can align with the Government's expectations of the Environmental Improvement Plan. These strategies remain in all the programmes considered (such as the least cost, best value programmes) and a significant proportion of the cost of the plan therefore remains consistent in the first ten years of their plan.

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<sup>5</sup> [Environmental Improvement Plan 2023 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/consultations/environmental-improvement-plan-2023)

## 3. Approach to the SEA

### 3.1. Introduction

Due to the various options contained in the WRMP24, as detailed in Chapter 10, and their potential for these to have significant effects on the environment, it has been decided that SEA is undertaken under the European Directive 2001/42/EC 'on the assessment of certain plans and programmes on the environment' (the 'SEA Directive'). This Directive came into force in the UK on 20 July 2004 through the Environmental Assessment of Plans and Programmes Regulations 2004. The Directive applies to a variety of plans and programmes including water resource planning and planning for droughts. While the United Kingdom has now left the EU, these SEA Regulations still apply to a wide range of plans and programmes, including water resource management plans, and modifications to them.

These SEA Regulations still reflect the overarching objective of the SEA Directive which 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, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans...which are likely to have significant effects on the environment.”* (Article 1)

The main requirements introduced by the SEA Regulations are that:

- the findings of the SEA are published in an Environmental Report (ER), which sets out the significant effects of the draft plan;
- consultation is undertaken on the plan and the ER;
- the results of consultation are taken into account in decision-making relating to the adoption of the plan; and
- information on how the results of the SEA have been taken into account is made available to the public.

As noted by WRSE, the WRSE regional plan environmental assessments including the SEA has 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<sup>6</sup>. This SEA has utilised this information upon which to build upon this more detailed assessment of 'local' effects in the SES Water plan area.

### 3.2. Geographical and temporal scope of the WRMP24

The SES Water supply area is shown in Figure 1-1 and is the area to which WRMP24 applies. SES Water supply approximately 160 million litres of clean water every day to over 745,000 people in parts of Surrey, Kent and south London. The supply area is 322 square miles extending from Morden and South Croydon in the north to Gatwick Airport in the south and from Cobham, Leatherhead and Dorking in the west to Edenbridge in the east.

The Plan area intersects with 12 Local Authority areas, as follows:

- Sevenoaks;
- Elmbridge;
- Epsom and Ewell;
- Guildford;
- Mole Valley;
- Reigate and Banstead;

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<sup>6</sup> See Section 4.7 of WRSE Draft Regional Plan SEA Environmental Report

- Tandridge;
- Crawley;
- Croydon;
- Kingston upon Thames;
- Merton; and
- Sutton.

It is to be noted that effects could be experienced outside of the Plan area for example, from transfer of water outside the plan area or from options close to the plan boundary with potential pathways affecting receptors outside the plan area. Such potential for 'transboundary' effects is considered in the assessment (mainly via the work undertaken by WRSE). It should also be noted however, that it is not anticipated that this WRMP24 will have any effect in any Devolved administration within the United Kingdom, or in any other state outside the United Kingdom – in short, it is considered that significant effects will be confined to England only.

WRMPs are long term operational plans (reviewed and updated at least every five years). The SES Water 'Water Resource Management Plan 24' (WRMP24) is linked to the Company's Drought Plan in that both plans have the objective of maintaining water supplies to customers, at least for essential purposes, up to a defined level of resilience or drought severity. The WRMP is a long-term plan to cover the 50 year period from 2025-2075 and assesses future demand against supply availability, and determines any measures needed to address a future gap in supplies.

In both plans, the supply area (classed as a single Water Resource Zone) is the geographical unit of assessment used in water resource planning. All actions, including demand restrictions on customers, would be implemented consistently and uniformly across the area.

### 3.2.1. Technical scope of the SEA

The SEA Directive and the SEA regulations require that the likely significant effects on the environment are assessed, considering the following factors and interrelationship between them:

- Biodiversity;
- Population;
- Human health (covering noise issues among other effects on local communities and public health);
- Fauna and flora;
- Soil;
- Water;
- Air;
- Noise;
- Climatic factors;
- Material assets (covering infrastructure, waste and other assets);
- Cultural heritage including architectural and archaeological heritage; and
- Landscape.

In addition to consideration of the above factors within the SEA, more detailed assessment of particular elements has been made and have been used to help inform the SEA. These elements are:

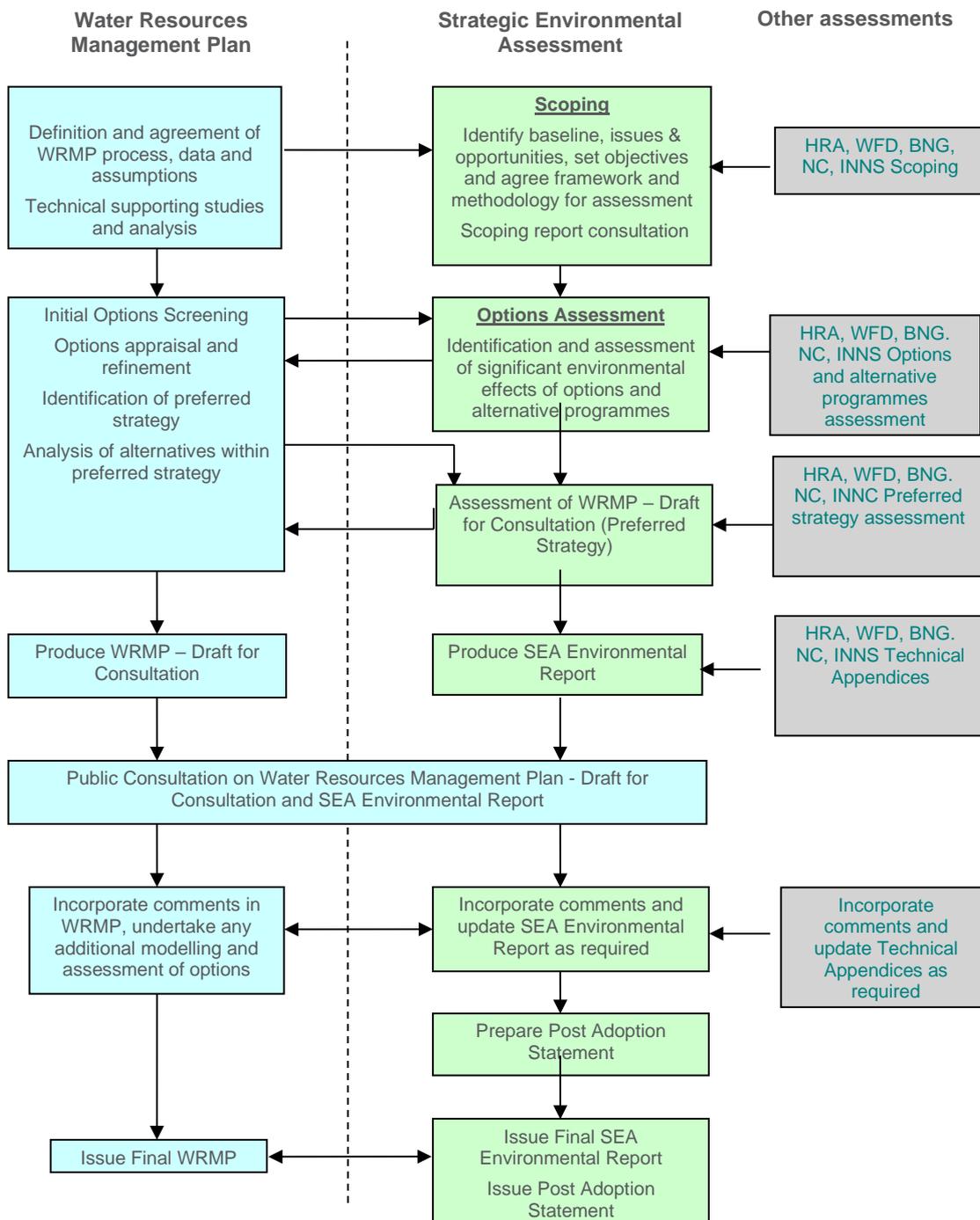
- Habitats Regulations Assessment (HRA);
- Water Framework Directive (WFD) Assessment;
- Biodiversity Net Gain (BNG) Assessment;
- Natural Capital (NC) Assessment;
- Invasive Non-Native Species (INNS) Assessment;



- Heritage Impact Assessment (HIA); and
- Assessment of potential for effects on Site of Special Scientific Interest.

Figure 3-1 shows the relationship between these assessments and the SEA. Note, in reference to the HIA and assessment of effects on SSSI, these reflect additional considerations arising from consultation feedback on the dWRMP SEA.

**Figure 3-1 - Relationship between WRMP24, SEA and other environmental assessment processes**



An introduction to each of these other assessments is presented in turn as follows.

### 3.3. Introduction to Habitats Regulation Assessment

Habitats Regulation Assessment (HRA) is required by the Conservation of Habitats and Species Regulations 2017 (SI No. 2017/1012, as amended by The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (SI 2019/579)) for all plans and projects which may have likely significant effects on a European site and are not directly connected with or necessary to the management of the European site. The WRMP24 itself is not directly connected with, or necessary to, the nature conservation management of any European sites.

European sites include Special Areas of Conservation (SAC) and Special Protection Areas (SPA). As a matter of UK Government policy, potential SPAs (pSPA), possible SACs (pSAC), listed or proposed Wetlands of international importance (Ramsar sites) and sites identified, or required, as compensatory measures for adverse effects on European sites, pSPA, pSAC, and listed or proposed Ramsar sites, are included for the purposes of considering plans and projects which may affect them. Hereafter all of the above designated nature conservation sites are referred to as 'European sites'.

There are four stages to the HRA process. These are summarised below:

- Stage 1 – Screening: To test whether a plan or project either alone or in combination with other plans and projects is likely to have a significant effect on a European site;
- Stage 2 – Appropriate Assessment: To determine whether, in view of a European site's conservation objectives, the plan (either alone or in combination with other projects and plans) would have an adverse effect on the integrity of the site with respect to the site structure, function and conservation objectives. If adverse impacts are anticipated, potential mitigation measures to alleviate impacts should be proposed and assessed;
- Stage 3 – Assessment of alternative solutions: Where a plan is assessed as having an adverse impact (or risk of this) on the integrity of a European site, there should be an examination of alternatives (e.g. alternative locations and designs of development); and
- Stage 4 – Assessment where no alternative solutions remain and where adverse impacts remain: In exceptional circumstances where no alternative solutions remain and where adverse impacts remain (e.g. where there are imperative reasons of overriding public interest). Compensatory measures would usually be required to offset negative impacts.

As part of the regional level work, WRSE completed the Stage 1 'screening' assessments on all the options selected in SES Waters Preferred Plan. Where a scheme was assessed as having likely significant effects on a European site, either alone or in-combination, a Stage 2 'Appropriate Assessment' was undertaken. The results of the Stage 2 assessments were reported back to WRSE, as part of the iterative process, and fed into the modelling and the option selection process. Please refer to the HRA report.

All the European sites within the WRMP24 area and up to 30km from its boundaries have been identified and are listed in Table 3-1 (see also Figures in Level 2 Appendix B4 Baseline Figures of this report, as well as the HRA report).

Relevant designated sites have been identified and are reported in Table 3-1 below.

**Table 3-1: European sites identified within the plan area and up to 30km from the plan boundary**

Natura 2000 site name	Type	Location
Mole Gap to Reigate Escarpment	SAC	Within the SES Water Supply area
Thames Basin Heaths	SPA	Within the SES Water Supply area
Richmond Park	SAC	Extended study area*
Wimbledon Common	SAC	Extended study area*
Thames Estuary and Marshes	SPA and Ramsar	Extended study area*
Peter's Pit	SAC	Extended study area*
Medway Estuary and Marshes	SPA and Ramsar	Extended study area*

\*An extended study area has been defined by aquifer units and catchments within which the supply-side actions would operate or downstream of their location. This recognises the potential for hydrological and hydrogeological mechanisms by which drought actions could theoretically affect European Sites.

### 3.4. Introduction to Water Framework Directive

The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 require all natural water bodies to achieve both Good Chemical Status (GCS) and Good Ecological Status (GES) which, collectively, result in a water body classification of good status. The River Basin Management Plans (RBMP) outline the actions required to enable natural water bodies to achieve good status. Artificial and Heavily Modified Water Bodies (A/HMWB) may be prevented from reaching GES due to the modifications necessary to maintain their function, or 'human use'. They are, however, required to achieve Good Ecological Potential (GEP).

New activities and schemes that affect the water environment may adversely impact biological, hydromorphological, physico-chemical and/or chemical quality elements (WFD quality elements), leading to a deterioration in the baseline water body status. They may also render proposed improvement measures ineffective, precluding the ability of the water body to meet its WFD objectives for GES/GEP. Under the WFD Regulations, and to attain WFD 'compliance', activities and schemes must not cause deterioration in water body status or prevent a water body from meeting GES/GEP by invalidating improvement measures.

The overall ecological status of a water body is primarily based on consideration of its biological quality elements and is determined by the lowest scoring of these elements. These biological elements are, however, supported by the physico-chemical and hydromorphological quality elements. Assessment of hydromorphological quality is not explicitly required for a water body to achieve GES or lower. However, for a water body to be classed as high status hydromorphological quality must be considered to be at near reference conditions within the classification assessment.

In addition, to achieve the overall WFD aim of GES, a water body must pass a separate chemical status assessment to reach Good Chemical Status, relating to pass/fail checks on the concentrations of various identified priority/dangerous substances.

There are two key objectives against which the impacts of proposed works on a water body need to be assessed and met to determine compliance and to avoid infraction of the WFD Regulations:

- The scheme will not cause a deterioration in any element of water body classification.
- The scheme will not prevent the WFD status objectives from being reached within the water body or other downstream water bodies.

A third objective that is central to the Environment Agency's implementation of the WFD is:

- The scheme will contribute to the delivery of the relevant WFD objectives. In this case, it will be what contribution the scheme can make towards the water body reaching its objective GES, or GEP directly via planned RBMP mitigation measures.



If a WFD assessment<sup>7</sup> concludes that a scheme is likely to cause deterioration in water body status or prevent a water body from meeting its ecological objectives, then an assessment is required against the conditions listed in Article 4.7 of the WFD. Article 4.7 can be invoked if; 'new modifications' (relating only to new physical modification and/or changes in groundwater levels) are of overriding public interest and/or the environmental and social benefits of achieving the WFD objectives are outweighed by the benefits of the new modifications to human health, safety and sustainable development; there are no significantly better environmental options that are technically feasible or not disproportionately costly; and, all practicable steps for mitigation have been taken.

The River Basin District (RBD) which makes up the plan area is the South East RBD. There are three surface water management catchments in the South East RBD and 282 surface water bodies in the South East RBD. See Figures in Level 2 Appendix B4 Baseline Figures of this report, as well as Level 2 Appendix B7 Water Framework Directive.

The All Company Working Group (ACWG)<sup>8</sup> developed a consistent framework for undertaking WFD assessments for Strategic Resource Options (SROs) to demonstrate where options would or would not cause deterioration in status of any WFD water bodies. The assessment considers mitigation that would need to be put in place to protect water body status. The assessment also considers WFD future objectives. This methodology is also being used in the development of WRMP's and has been followed for this assessment.

Two stages of assessment are completed under the ACWG WFD approach, an initial Level 1 basic screening and a Level 2 detailed impact screening. These are conducted/reported using a spreadsheet assessment tool which is automated based on option information for Level 1 and expert judgment for Level 2. The Level 1 assessment broadly aligns to the Screening and Scoping stages of the PINS guidance and the Level 2 assessment the Impact assessment.

The Level 1 WFD assessments were completed by WRSE as part of the Emerging Regional Plan.

Where water bodies and option impacts were 'screened in', they have been taken forward to Level 2 assessment which utilises the 2022 RBMP WFD data and classifications, and the results of this work has been fed back to WRSE, as part of the iterative process, and fed into the modelling and the option selection process. Please see Level 2 Appendix B7 Water Framework Directive of this SEA for full WFD report which outlines the detailed methodology and results.

## 3.5. Introduction to Biodiversity Net Gain and Natural Capital Assessment

Biodiversity Net Gain (BNG) is an approach that aims to leave the natural environment in a measurably better state than beforehand. Natural England have produced a Biodiversity Metric that provides a way of measuring and accounting for biodiversity losses and gains resulting from development or land management change.

Natural capital is defined in the 25 Year Environment Plan (England) as "the elements of nature that either directly or indirectly provide value to people". As a new and emerging approach, natural capital incorporates methodologies and approaches (such as ecosystem services) to understand the value that natural assets provide. For the water industry, these can be substantial. The Water Resource Planning Guidelines (WRPG) (England and Wales) states that Water Resource Management Plans (WRMPs) should "use natural capital in decision-making", "use a proportionate natural capital approach", "deliver environmental net gain", and provide cost information on monetised ecosystem service costs and benefits where monetisation is used. WRSE conducted both these assessments in full.

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<sup>7</sup> Note in 2021 the UK Government sought to drop reference to any European legislation post BREXIT and thus has started to call the previously named WFD assessments as Water Environment Regulations (WER) assessments. However, as the terminology needs to be consistent across several ongoing assessments across the UK, WFD terminology has been retained for this assessment.

<sup>8</sup> A group of Water Companies involved in developing Strategic Resource Options for the future, as required by Ofwat. The group of six water companies forming the ACWG are Affinity, Anglian, Severn Trent, Southern and Thames Water and United Utilities.



As documented in WRSE's Regional Plan – Natural capital and Biodiversity Net Gain Report (2022) WRSE decided to use the most appropriate methodology for assessing and quantifying NCA and BNG and therefore based assessments on Defra's "Enabling and Natural Capital Approach" ENCA and Defra's BNG assessment methodology. It was important to ensure there was no double counting of benefits or disbenefits when assessing the effects of the options. Therefore, the assessment of those services that would be included in other metrics such as those for water quality, which were included in WFD assessments have been excluded from NCA.

### 3.6. Introduction to Invasive Non-Native Species

As part of the WRMP SEA, water companies are required to undertake invasive non-native species (INNS) investigations to determine the threat of spreading INNS throughout their asset network and specific resource options and assess ways of mitigating this spread. The INNS investigation may be activated in the case that the selected options require it, or otherwise used at a high level to inform any significant environmental constraints for options assessment (see Figure 3-1). The INNS investigation would be completed in accordance with the Environment Agency SRO Aquatic INNS Risk Assessment Tool (SAI-RAT) which has been developed based on working principles within the well-established Wessex Water and Northumbrian Water tools.

The results of these INNS investigations will form part of the SEA process for the biodiversity and water objectives. INNS dispersal can occur through a range of recreational and operational (water company) 'pathways', which may include water or land-based recreation and sports, and water company operations, such as ground maintenance and the operation of raw water transfers (RWTs).

Considering the potential for INNS dispersal and the requirement to assess this risk and mitigate where appropriate, the INNS process can be split into three distinct phases, including:

- Data gathering and water network understanding, including;
- Understanding the source, pathways and receptors of each resource option;
- Identify INNS present at key assets, and at the source, pathway and receptor of RWTs;
- Identify presence of INNS dispersal pathways and the frequency in which they occur;
- Risk assessment of each resource option; and
- Options appraisal of mitigation measures for higher-risk options.

During the first stages of the investigation, screening criteria were developed by WRSE to determine which of the WRMP24 options required an INNS assessment. This was based on the frequency in which transfers would be operational and the severity of their impact. These criteria formed the screening matrix for assessment in which only schemes scoring 'low', 'medium' or 'high' were to be taken forward for a Level 2 (L2) assessment. The results of any L2 INNS assessment were fed back into the regional model as part of the iterative approach.

### 3.7. Introduction to Heritage Impact Assessment

This Heritage Impact Assessment (HIA) has been prepared to inform the development of SES Water's 2024 Water Resource Management Plan (WRMP24). This report provides high-level heritage impact assessments for all options that feature in the Core ('Least regrets') Plan or one of their alternative plans up to 2035. This includes the Drought Permits for the Hackbridge, Kenley and Purley and Outwood Lane sources.

Consultation with Historic England (February 2023) identified the need for heritage impact assessment (HIA) to be undertaken during preparation of the WRMP to inform site selection. In their response, Historic England highlighted that 'it is important that a degree of heritage impact assessment is undertaken at plan-making stage' and the need to 'ensure that there is sufficient heritage impact assessment and an appropriate evidence base to inform the site selections including the selection of broad locations'.

Due to the uncertainty over which options would be progressed under from 2035 under the adaptive planning approach, and the limited location and design information for these, it was agreed that HIA would be undertaken for those options which are being progressed in the short term from 2025 to 2035. The selection of these options has been policy-driven and is supported by a reasonable level of certainty with regard to location and design information, which will enable effective consideration in this HIA.

In accordance with the guidance provided in Historic England Advice Note 3 The Historic Environment and Site Allocations in Local Plans<sup>9</sup>, this assessment has been agreed to be proportionate to the level of detail currently available for the scheme options. This comprises a high-level assessment of the potential for impacts upon designated and non-designated heritage assets, prepared using desk-based sources. The HIA will consider impacts resulting from the options including:

- Physical impacts on archaeological remains;
- Impacts on the setting of heritage assets;
- Opportunities for conserving and enhancement of heritage assets, and improvement in their access, understanding and enjoyment; and
- The potential for hydro-morphological and groundwater changes to impact heritage assets will be assessed as far as possible, however, this will be based on the limited water resource modelling data currently available.

Recommendations for further work have been identified for each option, including desk-based assessments and potential evaluation and mitigation measures. These will be progressed in tandem with design development, ensuring that opportunities to avoid, reduce or mitigate potential impacts upon heritage assets can be identified early in the design process, fully explored and incorporated into the proposals where possible.

The results of HIA will form part of the SEA option assessment through integration with SEA Objective 9 'To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains'. Please refer to Level 2 Appendix B11 Heritage Impact Assessment of this SEA for full report.

### 3.8. Introduction to Sites of Special Scientific Interest Assessment

SES Water, in its capacity as a 'Statutory Undertaker' must take reasonable steps to conserve and enhance the special features of SSSIs. Through the WRMP24, a range of options for potable water supply have the potential to impact on the condition of SSSIs in, or adjacent to, the Plan area. Impacts on the condition of SSSIs could be through impact of activities related to the construction of the required water supply infrastructure, or through its operation. It is therefore considered pragmatic and proportionate to undertake and collate a separate assessment of potential effects on SSSIs that can be used to inform the SEA.

The assessment of potential effects on SSSI's identifies those SSSIs that may be impacted owing to the proximity and nature of WRMP24 options. A GIS based screening exercise was first undertaken to derive a list of potentially impacted SSSIs. For each option with the WRMP BVP and Alternative Plans, a 5km search radius was employed to identify potentially relevant SSSIs. This was supplemented with the SSSI Impact Risk Zone tool, derived by NE, which has been used to inform rapid initial assessment of the potential risks to SSSIs posed by development. This exercise resulted in the identification of 31 no. SSSIs. A SSSI proforma citing the SSSI description, pressures, summary feature condition and operations likely to damage the special interest (ORNECs) has been collated for each of those SSSIs and provided in the SSSI Assessment Report (attached to this SEA as Level 2 Appendix B12 Assessment for potential effects on SSSIs).

It is acknowledged that greater certainty is attributed to those options to be developed prior to 2035. It is also recognised that in respect of the identified SSSIs, summary feature condition and pressures will continue to change. Therefore, those options to be developed prior to 2035 have been selected for further assessment. The assessment considers the potential for impact on the SSSIs identified in light of relevant ORNECs. Where relevant, mitigation has been recommended and the requirement for further assessment and discussion with Natural England set out. Please see the assessment for potential effects on SSSI's attached to the SEA as Level 2 Appendix B12 Assessment for potential effects on SSSIs for further information.

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<sup>9</sup> <https://historicengland.org.uk/images-books/publications/historic-environment-and-site-allocations-in-local-plans/heag074-he-and-site-allocation-local-plans/>

### 3.9. Reporting and Consultation

Key consultation requirements are those set in the SEA Regulations which identify three organisations (in England) to act as statutory consultation authorities in the SEA process: Environment Agency, Natural England and Historic England.

Two consultation periods involving the statutory consultation authorities and, in the latter period, the public are also set in the SEA Regulations. The consultation periods relate to:

- **Scoping.** The responsible authority is required to send details of the plan or programme to each consultation authority so that they may form a view on the scope, level of detail and appropriate consultation period of the Environmental Report. The consultation authorities are required to give their views within five weeks. It is to be noted that in relation to this SEA, reliance for Scoping has been via the WRSE Scoping approach<sup>10</sup>. While the results of this Scoping by WRSE<sup>11</sup> have been used to help inform the development of the SEA Framework for this assessment, additional work was undertaken as part of this SES Water WRMP24 assessment to ensure that understanding of Baseline data reflected local issues relevant to the SES Water area, as well as a review of local Plans and Policies. This work was further informed by Scoping consultation that took place in respect of SES Water’s Drought Plan.
- **The Environmental Report.** The responsible authority is required to invite the consultation authorities and the public to express their opinions on the Environmental Report and the plan or programme to which it relates.

Key reporting requirements are those set by the SEA Regulations:

*'An Environmental Report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated.'*

Table 3-2 sets out the way the specific SEA requirements have been met in this report.

**Table 3-2: Schedule of SEA Requirements**

Information to be included in the Environmental Report under the SEA Regulations (Regulation 12 and Schedule 2)		Where covered in the SEA Report
1	An outline of the contents, main objectives of the plan, and of its relationship with other relevant plans and programmes	Chapters 1 and 5 and Level 2 Appendix B2 Review of relevant Plans, Policies & Programmes
2	The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan	Chapter 6 and Level 2 Appendix B3 Baseline Information and B4 Baseline Figures
3	The environmental characteristics of areas likely to be significantly affected	Chapter 6 and Level 2 Appendix B3 Baseline

<sup>10</sup> See WRSE Draft Regional Plan SEA Environmental Report. This approach has also been agreed with consultation bodies such as Environment Agency.

<sup>11</sup> As noted by WRSE, the WRSE 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.



		Information and B4 Baseline Figures
4	Any existing environmental problems which are relevant to the plan 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	Chapter 6 and Level 2 Appendix B3 Baseline Information and B4 Baseline Figures
5	The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation	Chapter 5 and 6 and Level 2 Appendix B2 Review of relevant Plans, Policies and Programmes
6	The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as: biodiversity; population; human health; fauna; flora; soil; water; air; climatic factors; material assets; cultural heritage including architectural and archaeological heritage; landscape; the interrelationship between the above factors	Chapter 11 and Level 2 Appendix B5 Assessment Tables
7	The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan	Chapter 12 and Level 2 Appendix B5 Assessment Tables
8	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	Chapter 10 – see also WRSE SEA draft Environmental Report.
9	A description of measures envisaged concerning monitoring in accordance with Regulation 17	Chapter 14
10	A non-technical summary of the information provided under paragraphs 1 to 9	Level 2 Appendix A

The SEA Environmental Report is thus an important consultation document and likely to be of interest to a wide variety of readers including decision makers, other plan/programme practitioners, statutory consultees, Non-Governmental Organisations (NGOs) and members of the public.

## 4. SEA Methodology

### 4.1. Introduction

SEA is a process that follows a number of sequential stages. This report has been structured to reflect the way in which work has been undertaken, presenting a logical progression through the various tasks that water companies must complete in order to satisfy formal SEA requirements.

The work presented in this report represents the findings of Stage A and Stage B. This Report forms Stage C of the SEA process.

The approach to SEA was based on a range of guidance documents, including of note, the following:

- Department for Communities and Local Government (2005). A Practical Guide to the Strategic Environmental Assessment Directive.
- Environment Agency, Natural Resources Wales, The Water Services Regulation Authority (published 2021 and updated 2023) Water Resources Planning Guideline.
- Environmental Assessments for Water Resources Planning, UKWIR, 2021

It is also important to note that a number of other assessments (as outlined in Chapter 3) were used to inform the SEA. Consideration of these assessments is set out in Level 2 Appendix B7 - B12 and the HRA report – note the HRA Report has been published separately. These assessments were:

- Habitats Regulations Assessment (HRA);
- Water Framework Directive (WFD) Assessment;
- Biodiversity Net Gain (BNG) Assessment;
- Natural Capital (NC) Assessment;
- Invasive Non-Native Species (INNS) Assessment;
- Heritage Impact Assessment; and
- Assessment of potential for effects on Sites of Special Scientific Interest

### 4.2. Strategic Environmental Assessment

#### 4.2.1. Stage A - Setting the Context and Establishing the Baseline

##### 4.2.1.1. Other Relevant Legislation, Plans and Programmes

The WRMP will both influence and be influenced by other plans, policies and programmes (PPPs) produced by local and combined authorities, by statutory agencies and other bodies with plan making responsibilities. Legislation is a further driver that sets the framework for the WRMP, both directly and indirectly. Relevant legislation, plans and programmes have been identified and considered to inform the preparation of this Environmental Report (see Chapter 5 and Level 2 Appendix B2 Review of relevant Plans, Policies and Programmes of this report).

##### 4.2.1.2. Baseline information and Key Sustainability Issues

To predict accurately how potential WRMP24 proposals will affect the current baseline, it is first important to understand its current state and then examine the likely evolution of the environment without the implementation of the plan. Baseline information provides the basis for understanding existing local environmental, economic and social issues, in particular in respect of health and equality, and alternative ways of dealing with them; formulating objectives to address these issues and predicting and monitoring effects.

Key environmental issues, across the SES Water area have been identified as a result of the analysis of the baseline data and the review of other plans and programmes. The identification of these issues helped focus

the SEA processes on the aspects that really matter. Implications to WRMP development and opportunities for how the WRMP could assist in addressing these issues were also identified.

Information on key baseline and sustainability issues is presented in Chapter 6 of this report.

It is important to note that no issues were Scoped out at the Scoping stage of this assessment.

#### 4.2.1.3. Developing the SEA Framework

A set of SEA Objectives has been developed, against which the policies and proposals in the WRMP could be assessed.

For each objective, assessment aid questions were set out to form the SEA framework. The assessment aid questions provided a clarification of the intended interpretation of each objective to support direction of change sought through the implementation of the WRMP. The questions have guided the WRMP assessment process.

The SEA Objectives and assessment aid questions were refined via the results of the SEA Scoping undertaken by WRSE<sup>12</sup> of the regional plan and have been used to help inform the development of the SEA Framework for this assessment. Additional work was undertaken as part of this SES Water WRMP24 assessment to the Baseline data and a review of local Plans and Policies. This work was further informed by Scoping consultation that took place in respect of SES Water's Drought Plan. The SEA Objectives and assessment aid questions are presented in Chapter 7 of this report. It is important to note that the decision aid questions developed, enable a like for like comparison in the decision making process, ensuring that a common level of detail has been applied to each option as required by the UKWIR guidance<sup>13</sup>.

### 4.2.2. Stage B – Developing alternatives

#### 4.2.2.1. Developing, refining and appraising Strategic Alternatives

WRSE have carried out an assessment of strategic alternatives and this has informed WRMP24. As noted in Chapter 1, the approach has been to identify an Adaptive Plan, with different scenarios being considered and outlined in a 'situational 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 programme appraisal is a cumulative assessment of the chosen programmes of options selected by the WRSE investment model and includes the following three plans:

- 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.

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<sup>12</sup> As noted by WRSE, the WRSE 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.

<sup>13</sup> UKWIR Strategic Environmental Assessment – Guidance for Water Resources Management Plans and Drought Plans

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.

#### 4.2.2.2. Assessing the effects of the draft WRMP

Assessing the significance of predicted effects is essentially a matter of judgement. There are a number of factors that will determine the significance of an effect, e.g. its scale and permanence and the nature and sensitivity of the receptor. It is very important that judgements of significance are systematically documented, in terms of the characteristics of the effect which are deemed to make it significant and whether and what uncertainty and assumptions are associated with the judgement. The assessment of significance also includes information on how the effect may be avoided or its severity reduced.

In the current practice of SEA, the prediction and evaluation of effects can be often based on a qualitative seven point scale in easily understood terms. In general, this assessment has adopted the scale shown in Table 4-1 to assess the significance of effects of the schemes and proposals in the WRMP24. Note that this scale is aligned with that utilised by WRSE at the regional level assessment. In addition, Table 4-2 sets out the characteristics of effect: magnitude, scale, duration, permanence and certainty.

**Table 4-1: Assessment scale**

Assessment Scale	Assessment Category	Significance of Effect
+++	Major beneficial	Significant
++	Moderate beneficial	
+	Slight beneficial	
0	Neutral or no obvious effect	Not Significant
-	Slight adverse	
--	Moderate adverse	
---	Major adverse	Significant

**Table 4-2: Characteristics of Effect**

Magnitude (size of effect)	Scale (implications of effect)	Duration (length of time over which effect will be present)	Permanence (lasting of effect)	Certainty (that effect will occur)
Large (L) Medium (M) Small (S)	Local (L) Regional (R) National (N) Global (G)	Long term (LT) Medium term (MT) Short term (ST)	Temporary (T) Permanent (P)	High (H) Medium (M) Low (L)

Moderate and strong beneficial and adverse effects (and combination of this type of effect) have been considered of significance, whereas no effect and slight beneficial and adverse effects (and combination of this type of effect) have been considered non-significant.

Assessments have been undertaken for proposals contained in the draft WRMP. The results are discussed in Chapter 10.

For the purposes of the assessment, the “short term” has been defined as the effects arising generally during the infrastructure construction period typically 2-5 years (different technologies have different construction times); the “medium term” as typically between 5 and 30 years (operational lifetimes vary with the characteristics of different technologies); and the “long term” as beyond 30 years (and including decommissioning where relevant).

In respect of effect magnitude and scale attributes, professional judgement is applied and includes consideration of the level of designation afforded to a receptor and how widespread an effect may be felt, accounting for geographic boundaries including those at a local authority, regional and national level. Certainty is an important attribute used to reflect the level of detail known of an option and then the certainty attributed to any effect arising from the option. Low certainty may reflect those options where design detail is poor or further investigation is required. Certainty also reduces for those options promoted later in the plan period where (unknown/unclear) changes in future baseline give rise to uncertainty in current assessment.

The term mitigation encompasses any approach that is aimed at preventing, reducing or offsetting significant adverse environmental effects that have been identified. A range of measures applying one or more of these approaches has been considered in mitigating any significant adverse effects predicted as a result of implementing the WRMP. In addition, measures aimed at enhancing positive effects have also been considered. All such measures are generally referred to as mitigation measures.

However, the emphasis of the assessments has been in the first instance on proactive avoidance of adverse effects. Only once alternative options or approaches to avoiding an effect have been examined, then ways of reducing the scale/importance of the effect have been examined and proposed.

Mitigation can take a wide range of forms, including:

- Refining intervention measures in order to improve the likelihood of positive effects and to minimise adverse effects;
- Technical measures (such as setting guidelines) to be applied during the implementation stage;
- Identifying issues to be addressed in project environmental impact assessments for certain projects or types of projects; and
- Proposals for changing other plans and programmes.

The assessment also considered cumulative, indirect (secondary) and synergistic effects of the WRMP as outlined in the following section.

It should be noted that whilst the assessment tables (provided in Appendix E) provide effect scores pre and post mitigation, characteristics of effect are only presented for residual effects. This is in line with the UKWIR 'Environmental Assessment Guidance for Water Resource Management Plans and Drought Plans' that states options assessment should 'focus on reporting of the residual effects after consideration of mitigation and enhancement measures', which is what has been presented in this SEA Environmental Report.

#### 4.2.2.3. Secondary and Cumulative Effects Assessment

The SEA Regulations require that the assessment of effects include secondary, cumulative and synergistic effects.

Secondary or indirect effects are effects that are not a direct result of the plan but occur away from the original effect or as a result of the complex pathway e.g. a development that changes a water table and thus affects the ecology of a nearby wetland. These effects are not cumulative and have been identified and assessed primarily through the examination of the relationship between various objectives during the Assessment of Effects.

Cumulative effects arise where several proposals individually may or may not have a significant effect, but in combination have a significant effect due to spatial crowding or temporal overlap between plans, proposals and actions and repeated removal or addition of resources due to proposals and actions. Cumulative effects can be:

- Additive - the simple sum of all the effects;
- Neutralising - where effects counteract each other to reduce the overall effect; and
- Synergistic – is where the effect of two or more effects acting together is greater than the simple sum of the effects when acting alone. For instance, a wildlife habitat can become progressively fragmented with limited effects on a particular species until the last fragmentation makes the areas too small to support the species at all.

Many environmental problems result from cumulative effects. These effects are very hard to deal with on a project by project basis through Environmental Impact Assessment. It is at the strategic level that they are most effectively identified and addressed.

Cumulative effects assessment is a systematic procedure for identifying and evaluating the significance of effects from multiple activities. The analysis of the causes, pathways and consequences of these effects is an essential part of the process.

Cumulative (including additive, neutralising and synergistic) effects have been considered throughout the entire SEA process, as described below:

- Identification of key environmental issues as part of the review of relevant strategies, plans and programmes and baseline data analysis.
- Establishing the nature of likely cumulative effects, causes and receptors.
- Identifying key receptors in the process of collecting baseline information and information on how these have changed with time, and how they are likely to change without the implementation of the WRMP.
- The development of SEA objectives and assessment aid questions has been influenced by cumulative effects identified through the process above and SEA objectives that consider cumulative effects have been identified.

Regulatory consultation feedback received as part of the dWRMP SEA Environmental Report submission identified the need to reconsider the cumulative impacts from options selected across the region, not just the plan area. Following discussions with Natural England, SES Water have completed an In-Combination Assessment (ICA) that considers:

- Impacts between options within the plan;
- Impacts between options in neighbouring water companies' plans; and
- Impacts between other plans and projects in the area, including operations outside SES Water's WRMP, e.g drought plan, Non-Government Organisations (NGOs) and Nationally Significant Infrastructure Projects (NSIPs).

In addition, WRSE have completed a regional ICA to ensure consistency and ensure no potential in combination effects have been overlooked. Reference should be made to the WRSE regional plan report in respect of cumulative effects of Options across Plan boundaries.

#### 4.2.2.4. [Monitoring the effects of the WRMP implementation](#)

The SEA has indicated a series of possible monitoring indicators that could be implemented through the WRMP.

It is anticipated that the monitoring programme will cover significant environmental effects and which will involve measuring indicators that will enable the establishment of a causal link between the implementation of the WRMP24 and the likely significant effects (both positive and negative) being monitored. This will allow identification at an early stage of unforeseen adverse effects and allow appropriate remedial action to be undertaken.

Since the dWRMP24, SES Water have produced a monitoring plan to detail the metrics they anticipate monitoring at a regional and company level to inform which adaptive pathway / alternative future is emerging and what interventions are needed. The intention is to align with the regional monitoring that will form part of the final regional resilience plan. SES Water will monitor several components including:

- Demand - distribution Input / demand (ML/d);
- Climate change - experienced weather, outage; and
- Environmental destination – WINEP studies.

Full details of SES Water's adaptive plan monitoring plan is set out in chapter 7 of the WRMP24 and will inform, and be informed by, the SEA monitoring plan which will be constantly reviewed and updated as results are available. The SEA monitoring indicators are presented in Chapter 13 of this report.



### 4.2.3. Stage C – Preparing the SEA Report

This SEA Environmental Report has been prepared to accompany the WRMP24. It is to be noted that this SEA is being published for information only, and not for a further period of public consultation.

### 4.2.4. Stage D - Consulting on the draft WRMP and SEA Environmental Report

#### 4.2.4.1. Assessing significant changes

This SEA Environmental Report has been updated to reflect consultation regulatory and non-regulatory feedback received from the draft WRMP24 consultation process. The results of the formal public consultation exercise, as discussed in section 3.8, has resulted in changes to the schedule of interventions required to meet the anticipated future water supply and demand challenges at both the regional and company level. As a result, the consultation exercise has resulted in direct changes to the contents of the SEA Environmental Report. These will be reported in the Post Adoption Statement.

It is important to note, that the changes to the dWRMP24, both at the regional and water company level, are not considered 'material' for which a second round of consultation would be required. WRSE completed a 'Materiality Assessment' based on the All Company Working Group (ACWG) 'Assessing materiality' guidance document. The document sets out a framework to allow such changes to be reviewed and determine if any changes to the plan are material. The key principle used in the framework is whether the changes to input data have materially affected early or late decisions that are required in the plan and whether this changes the basis on which stakeholders' views were sought for decisions that need to be taken in the near term. Changes that cause a different / increased scale of scheme to be selected in the early years of the plan are likely to be material, whereas changes that lead to different scheme decisions over time periods covered by future plan updates and consultations will be less material. Given the options selected in the SES Water dWRMP24 and WRMP24 remain largely unchanged in the BVP core path in the first 25 years, in line with the 'Materiality Principles' of the ACWG guidance document', changes in the plan can be considered immaterial.

#### 4.2.4.2. Post Adoption Statement

Following completion of the public consultation and adoption of the WRMP24, a statement (separate document) will be prepared setting out the following:

- How environmental considerations have been integrated into the plan, for example any changes to or deletions from the plan in response to the information in the SEA Environmental Report.
- How the SEA Environmental Report has been taken into account.
- How the opinions and consultation responses have been considered and addressed. The summary should be sufficiently detailed to show how the plan was changed to take account of issues raised, or why no changes were made.
- The reasons for choosing the plan as adopted in the light of other reasonable alternatives dealt with.
- The measures that are to be taken to monitor the significant environmental effects of implementation of the WRMP24.

## 5. Review of relevant legislation and other Plans and Programmes

### 5.1. Introduction

The current WRMP updates SES Water's previous WRMP that was issued in 2019 (WRMP19). The WRMP19 defined the work to be carried out during the five-year period commencing April 2020 in SES Water's Business Plan, and also set out a plan for 2025 to 2080 of how to meet the forecast demand for water for this period. SES Water has also used data produced for the next round of resource plans (WRMP24) which will be derived from the Regional Resilience Plan (RRP) currently being created for the south east region by Water Resource South East (WRSE). As part of the creation of the WRMP24, SES Water works closely with the other five water companies that make up the WRSE group.

The WRMP will both influence and be influenced by other plans, policies and programmes (PPPs) produced by local authorities, statutory agencies (at a national, regional and local level) and other bodies with plan making responsibilities. Legislation is a further driver that sets the framework for the WRMP, both directly and indirectly. This interaction is reflected by the requirement of the SEA Regulations that information be provided on:

*"The relationship [of the plan or programme] with other relevant plans and programmes"*

*"The environmental protection objectives, established at international, [European] Community or [national] level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation"*

Therefore, the SEA sets out the relationship between the WRMP24 and relevant legislation, other relevant plans and programmes and the environmental protection objectives established at international (European), national (UK wide), regional (taken for the purposes of this study to be the WRSE area) and local (local authorities within and immediately adjacent to the WRMP area) levels. This ensures that the SEA Objectives generally adhere to and are not in conflict with, objectives found in other plans, programmes and legislation and also assists in the setting of objectives for the SEA. It can also be used to ascertain potential conflicts between objectives, which will need to be addressed as part of the process.

Building on the comprehensive review undertaken to inform the WRSE Regional Plan SEA Scoping Report and which covered international, European, national and regional plans, programmes and legislation, those plans, programmes and legislation of particular note to the WRMP24 listed in Level 2 Appendix B2 Review of relevant Plans, Policies and Programmes of this report have been reviewed. Level 2 Appendix B2 Review of relevant Plans, Policies and Programmes of the SEA Report also provides the full list of plans, programmes and legislation that were reviewed under the WRSE process.

The focus of the review undertaken has been recent plans, programmes and legislation published after the WRSE SEA Scoping Report was published such as the National Policy Statement for water resources infrastructure; UK Environment Act; UK Net Zero Strategy and updates to the National Planning Policy Framework.

The review has also focussed on local policies, plans and programmes that fall within the boundary of the SES Water's WRMP24 including local plans such as Sevenoaks, Elmbridge, Epsom and Ewell and Guildford local plans.

A series of key themes and messages relating to environmental sustainability within the context of water management planning which have emerged from the review are presented below.

### 5.2. Environmental Themes

The review of PPPs revealed a large number of common themes in terms of their objectives relating to sustainability within the context of water resource and drought planning. These are listed below:



### Air Quality

- Reduce emissions of Nitrogen dioxide (NO<sub>2</sub>)
- Increase use of low emission / zero emission at point of use vehicles
- Reduce emissions of Particulate Matter (PM): PM<sub>10</sub> and PM<sub>2.5</sub>

### Greenhouse gas (GHG) Emissions

- Reduce GHG emissions, particularly CO<sub>2</sub>
- Maximise the use of renewable energy
- Increase energy efficiency and make use of new technology
- Minimise use of fossil fuels
- Contribute to the achievement of Net Zero Carbon

### Adaptation to a Changing Climate and Flooding

- Prepare for extreme weather events and sea level rise
- Minimise the risk and impact of flooding and droughts
- Avoid development in floodplains when possible
- Help meet objectives of Flood Risk Management Plans allowing for climate change

### Biodiversity, Fauna and Flora

- Protection of sites designated for nature conservation purposes
- Protect and enhance endangered or important species and habitats
- Contribute to the delivery of biodiversity strategies and plans
- Increase important habitat
- Protect, maintain and where possible enhance natural habitat networks and green infrastructure, to avoid fragmentation and isolation of networks
- Contribute to the achievement of Biodiversity Net Gain

### Cultural Heritage

- Conserve and protect historic assets (designated and undesignated) and those of cultural note, including archaeology and historic landscapes
- Improve access to historic assets, including buildings and landscapes of value where appropriate.

### Water Resources

- Protect and improve the quality of ground and surface water
- Help to meet objectives of the Water Framework Directive (WFD)
- Make use of Sustainable Drainage Systems (SuDS)

### Land Use, Soil and Agriculture

- Prioritise development on brownfield sites
- Seek to reclaim derelict and contaminated land
- Protect farmland and soils

### Landscapes and Townscapes

- Protect and enhance landscape and townscape character and local distinctiveness

- Protect tranquillity from the impacts of noise and light pollution

#### Natural Resources and Waste

- Ensure efficient resource use and minimise resource footprint
- Use secondary and recycled materials
- Consider opportunities to maximise on-site re-use of materials
- Employ waste reduction methods to minimise construction and maintenance waste
- Reduce the amount of waste disposed of at landfill
- Promote circular economy
- Avoid the sterilisation of mineral resources

#### Population and Health

- Tackle poor health by improving the health of everyone, and of the worst off in particular
- Create a green economy and promote sustainable growth
- Promote sustainable and healthy communities
- Promote social inclusion and community participation
- Address pockets of deprivation
- Provide for an ageing population

#### Cross cutting

- Support the UK Government's 25 Year Plan to Improve the Environment 2018 goals and key actions as follows:
  - Using and managing land sustainably, including embedding an “environmental net gain” principle into development.
  - 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.
- Support Environment Act 2021 stipulations:
  - targets for four priority areas: (a) air quality; (b) water; (c) biodiversity; (d) resource efficiency and waste reduction to be set.
  - two priority areas: air quality (PM<sub>2.5</sub> air quality target) and biodiversity (species abundance target) and important new target to reverse the decline in species abundance by the end of 2030.
  - environmental improvement plan for significantly improving the natural environment for a period no shorter than 15 years.
  - 10% biodiversity net gain required for new development.
  - prevent waste/reduce the amount of a product that becomes waste and increase re-use, redistribution, recovery and recycling.
- Adhere to SES Water's net zero route map. This will be achieved through a combination of:



- Reduce demand for water (and therefore reduce energy consumption)
- Become more energy efficient
- Phase out our use of fossil fuels
- Generate energy from renewable sources
- Decarbonise our fleet of vehicles

## 6. Baseline information and key environmental issues

### 6.1. Introduction

In order to assess the potential sustainability effects of the WRMP on the SES Water area of responsibility and surrounding areas, it is necessary to establish a baseline against which predicted effects can be assessed, and then to identify issues and trends that are related to each of the environmental and social (population) interests that may be affected by, or affect, the proposed plan. This is in keeping with the SEA Regulations which state that the Environmental Report should provide information on:

*"The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme" and "The environmental characteristics of areas likely to be significantly affected" (Schedule 2)*

And

*"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 on the conservation of wild birds and the Habitats Directive " (Schedule 2).*

To accurately predict how WRMP proposals will affect the environmental characteristics, it is important to understand the current state of the environment and then examine the likely evolution of the environment without the implementation of the plan.

The current environment and socio-economic baseline has been reviewed and summarised for the WRSE region in the WRSE Scoping Report. The baseline summarised is a high-level overview of the baseline conditions for the region but more detailed location specific baseline information has been developed in a GIS database which WRSE has made available as the starting point for this baseline exercise.

Baseline information also plays a key role in the other environmental assessments (HRA, WFD, BNG, NC and INNS), as well as those carried out in relation to heritage impact and potential for effect on SSSI's.

### 6.2. Data collection methodology

Existing baseline information provides the basis for the prediction and monitoring of the effects of the implementation of the WRMP and helps identify environmental and social issues and alternative ways of dealing with them (implications and opportunities).

As SEA is an iterative process, subsequent stages in its preparation and assessment might identify other issues and priorities that require the sourcing of additional data and/or information and identification of monitoring strategies. This makes the SEA process flexible, adaptable and responsive to changes in the baseline conditions and enables trends to be analysed over time.

The most efficient way to collate relevant baseline data is through the use of indicators whenever possible (see below). This ensures that the data collation is both focused and effective. The identification of relevant data has taken place alongside the review of other relevant legislation, plans, policies and programmes (Chapter 5 and Level 2 Appendix B2 Review of relevant Plans, Policies and Programmes of this report), the identification of environmental and social issues (this section) and developing the SEA framework (Chapter 7).

Baseline sources include that from WRSEs regional work including scoping exercise, previous WRMP19 reporting and through more localised baseline gathering exercises undertaken through this SEA and Scoping. Baseline gathering has been with the aide of GIS software and open source datasets that are reflective of the SEA topics.

The datasets used to form environmental baseline are presented in Table 6-1 below.

**Table 6-1 - Datasets used in Environmental Baseline**

Topic	Environmental datasets used to form environmental baseline
1. Biodiversity	SAC, SPA, Ramsar, Marine Protection Areas/Marine Conservation Zones, SSSI, SSSI Impact Risk Zones, NNR, LNR, Ancient Woodland, Local Wildlife Sites, Priority Habitat, Nature Improvement Areas, National Priority Focus Areas, RSPB Reserves, Woodland Priority Habitat,
2. Cultural Heritage	Grade I, II, II* Listed Structures, Grade I, II, II* Registered Parks and Gardens, Protected Wreck, Heritage at Risk, Registered Battlefields, Scheduled Monuments, Conservation Areas, World Heritage Sites
3. Landscape	AONB, National Landscape Character Areas, Woodland, Urban grade Agricultural Land, Green Belt
4. Air Quality	Air Quality Management Areas, Noise Action Planning Important Areas, Air Quality monitoring points and data
5. Community Health and Wellbeing	Allotments or Community Growing Spaces, Borough, Bowling Green, Cemetery, Country Parks, Golf Course, Medical facilities, National Parks, National Trails, Indices of Multiple Deprivation, Population and Migration Projections, Local Authority area profiles (NOMIS and Public Health England information)
6. Geology and Soils	Agricultural Land Classification, Geologically designated SSSIs, EA Special Sites
7. Water Quality and Resources	Source Protection Zones, Groundwater Vulnerability Zones, Drinking Water Safeguard Zones, WFD Groundwater status, Main Rivers, Surface Water Features, Bathing Waters, Shellfish Waters, Catchments and River Basins
8. Flood Risk	Flood Zones, Flood Alert/Warning Areas, EA Flood Defences
9. Infrastructure / Material Assets	Open access areas, Other Sports Facility, Play Space, Playing Field, Public Park Or Garden, Registered Common Land, Religious Buildings, Religious Grounds, Schools, Tennis Courts, Transport Route Major Roads, Railway tracks, Nationally designated cycle routes, National Grid Infrastructure (high voltage electricity lines and substations), Authorised and Historic Landfill sites

### 6.3. Data Analysis

Data have been collated and analysed for the following indicators (as detailed in Level 2 Appendix B3 Baseline Information of this report):

**Table 6-2 - Data Topics**

Environmental Data	Economic Data	Social Data
<ul style="list-style-type: none"> <li>• CO2 emissions</li> <li>• Climate change</li> <li>• Local air quality</li> <li>• Noise / Light pollution ('Tranquillity')</li> <li>• Biodiversity, fauna and flora (including designated sites)</li> <li>• Landscape and townscape</li> <li>• National Character Areas</li> </ul>	<ul style="list-style-type: none"> <li>• Employment</li> <li>• Long term trends in GVA</li> <li>• Long term trends in population</li> <li>• Identification of economic centres</li> </ul>	<ul style="list-style-type: none"> <li>• Population and diversity</li> <li>• General health statistics</li> <li>• Physical activity in children and adults</li> <li>• Multiple deprivation</li> </ul>

- Heritage assets
- Green space
- Soil / land classification
- Water quality
- Flooding
- Waste and resources

The baseline data provide an overview of the environmental and social characteristics of the WRMP area. This overview, together with contextual information, is presented in Level 2 Appendix B3 Review of relevant Plans, Policies and Programmes of this report. The analysis of the baseline has highlighted a number of key issues across the SES Water area of responsibility. These, together with implications and opportunities arising for the WRMP, have been summarised in Table 6-2.

## 6.4. Data Limitations

It is believed that the data sets available and utilised in this assessment, along with the output from the WRSE process, provide a comprehensive and robust overview of the environmental and social situation across the SES Water area of responsibility and the wider south east region as a whole.

It is to be noted that option development is in most cases at an outline or preliminary stage and as such may be subject to change or further development. In some instances, option routes (e.g. new transfers) or locations (e.g. new treatment works) are not sufficiently developed and point or coordinate data has been used to represent indicative locations. Each option assessment significance of effect has been attributed with a 'certainty' classification that reflects limitations in locational understanding, data availability and reliability among other considerations that have an impact on the certainty of effect.

Specific data limitations with regard the technical environmental assessments (HRA, WFD, Biodiversity Net Gain, Natural Capital, assessment of potential effect on SSSI's, HIA and INNS) have been set out within the corresponding Technical Reports (Level 2 Appendix B7 – B12 of this report), as well as the HRA Report (published separately).

## 6.5. Key environmental and social issues

The SEA Regulations state that the Environmental Report should provide information on:

*"Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC on the conservation of wild birds and the Habitats Directive."* (Schedule 2)

The key environmental and social issues have been identified from the review of baseline information and other plans and programmes. These key issues are summarised in Table 6-3 below. This table also provides a discussion on the implications/opportunities of such issues to the WRMP and provides clear links to the proposed SEA Objectives. The analysis of key environmental and social issues has influenced the development of the SEA Framework (see Chapter 7), in particular in formulating decision making questions. Please note the following table is not an exhaustive examination of all the issues, rather it is a summary and synthesis of the baseline information contained within Level 2 Appendix B3 Baseline Information of this report and the review of Plans and Policies within Level 2 Appendix B2 Review of Relevant Plans, Policies and Programmes, in order to help inform how the SEA Objectives and related decision aid questions have been identified.



**Table 6-3 - Key issues, implications and opportunities for the WRMP**

Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
<p><b>Adaptation to a Changing Climate</b></p> <p>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°C. 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 average<sup>28</sup>. 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.</p> <p>These general trends have also been witnessed in the SES Water area.</p> <p><b>Likely evolution of the baseline</b></p> <p>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.</p> <p>Nevertheless, some degree of climate change will occur, with the UK's Climate Projections showing that the UK as a whole is likely to experience hotter, drier summers, warmer, wetter winters and rising sea levels. This is likely to have a significant effect on a range of environmental conditions, including the water environment.</p>	<p>A greater degree of resilience will have to be incorporated into the WRMP24 optioneering and design processes to increased river, surface and groundwater flooding due to extreme winter rainfall events and increase in winter mean rainfall as well as increased coastal flooding and erosion damage due to sea level rise and storms sea level rise and the potential risks posed by increased heatwaves, wildfires, reduced water availability and soil desiccation due to increased summer temperatures and reduction in summer mean rainfall.</p> <p>There is a need to manage the risks associated with flooding over the infrastructure's lifetime, without increasing the flood risk elsewhere and identifying opportunities to reduce the risk overall, including through working with nature based solutions. There are multiple benefits associated with the use of nature based solutions to reduce vulnerability such as tree planting or peat restoration. Flood risk should be considered in any design and the implementation of multi-functional green infrastructure including SuDS and other similar appropriate measures or new approaches should be considered and encouraged where feasible. This should include Natural Flood Management and other means of increasing flood storage capacity. WRMP24 should seek to explore the possibilities for creating blue infrastructure which can both help to manage localised flood risk and simultaneously create new habitats.</p>	<p><b>Climate Factors:</b></p> <p>Increase resilience to climate change and reduce flood risk</p>



Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
	<p>There is also a need to manage risks related to periods of limited water availability. It is possible limitations of abstraction could mean water infrastructure may have to cease to operate for periods of time and abstraction could cause environmental damage, including for sites with legal habitats and water protections (e.g. SSSIs, SACs, Water Framework Directive etc.).</p>	
<p><b>Greenhouse gas emissions</b></p> <p>Based on the local authorities which intersect the Plan Area, as detailed in Level 2 Appendix B3 Baseline Information of this report, the total carbon dioxide (CO<sub>2</sub>) emissions for 2018 across all sectors is estimated at 7,722 ktCO<sub>2</sub>.</p> <p>Croydon is identified as having the highest emissions of all relevant LAs. This is attributed to carbon-intensive industries like freight transport and civil engineering.</p> <p>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 CO<sub>2</sub> emissions may increase and further contribute to climate change.</p>	<p>WRMP24 must work to minimise water demand from households and businesses as this will result in reduced need to abstract, treat and transport water (and also less wastewater to treat) and consequently lesser carbon emissions.</p> <p>The options within WRMP24 have the potential to result in carbon emissions during the construction and operation phase which will further contribute to climate change. The impact of such emissions should be considered through the optioneering and design processes.</p> <p>WRMP24 should also ensure that opportunities are taken for maximising tree planting. Amongst other benefits, such flood protection, biodiversity enhancement and recreation, careful tree species selection can contribute to carbon sequestration by absorbing increased amounts of CO<sub>2</sub> from the atmosphere.</p>	<p><b>Greenhouse gas emissions:</b></p> <p>Reduce embodied and operational carbon emissions</p>
<p><b>Water</b></p> <p>There are considerable pressures on water resources with resulting major impacts on many of the waterbodies across the UK. For the purposes of taking a holistic approach to management of water resources and to address the pressures on the water environment, under the Water</p>	<p>WRMP24 options should seek to implement and maximise opportunities to improve waterbody status through the suite of options proposed.</p>	<p><b>Water:</b></p> <p>Increase resilience to climate change and reduce flood risk Protect and enhance the quality of the water</p>



Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
<p>Framework Directive (WFD), the UK has been divided into a series of 10 River Basin Districts (RBD). Those of relevance to the Plan Area are:</p> <ul style="list-style-type: none"><li>o South East</li><li>o Thames</li></ul> <p>There are 498 surface water bodies within the Thames RBD and 282 within the South East RBD.</p> <p>As with most water bodies in England, there are a range of significant water management issues manifested in these RBD, with pollution from towns, cities and transport noted as being an issue for 9% of those water bodies within the South East RBD and 17% in Thames RBD.</p> <p>Groundwater provides a third of drinking water in England, and it also maintains the flow in many rivers. In some areas of Southern England, groundwater supplies up to 80% of the drinking water. Protecting these sources (along with any private water supplies) will help ensure that water is safe to drink.</p> <p>In order to help protect sources, Source Protection Zones (SPZs) for groundwater sources such as wells, boreholes and springs used for public drinking water supply have been defined. 5 Surface Drinking Water Safeguard Zones (DWSZs) and 11 Groundwater DWSZ fall entirely or partially within the Plan Area.</p> <p>Similarly, parts of the country at which there is increased risk of contamination to groundwater supplied from activities which might cause pollution are covered by Source Protection Zones (SPZs). There are several SPZs noted within the Plan area.</p> <p><b>Likely evolution of the baseline</b></p> <p>Maintained and improving - Surface and ground water quality is predicted to increase through legislation such as WFD, though significant challenges remain as noted in the River Basin Management Plan.</p>	<p>Improving network and preventing leaks and bursts is a key outcome of many of the options contained within the WRMP24 and the plan should seek out areas that stand to benefit most from such interventions.</p> <p>Pollution prevention should also be sought during construction through robust construction management plans and pollution prevention plans.</p> <p>In parallel with the SEA of the WRMP24, the WFD assessment is being undertaken which will identify if options will likely deteriorate water body classification or prevent the WFD objectives from being reached and propose appropriate avoidance and mitigation measures early in the development of the WRMP24.</p> <p>The WRMP24 should also seek to reduce the need for drought permits / orders through the suite of options proposed.</p> <p>The Plan should seek to avoid over-abstraction of both groundwater and surface water sources (River Eden). Climate change is likely to affect future availability of water in the region.</p>	<p>environment and water resources</p> <p>Deliver reliable and resilient water supplies</p>



Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
<p>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.</p>		
<p><b>Biodiversity</b>            Within the South East region, there are a wide range of sites designated for nature conservation. Of note, there are 21 Ramsar sites, 25 Special Protection Areas, 69 Special Areas of Conservation and 1,189 Sites of Special Scientific Interest.</p> <p>Specifically within the Plan area there are:</p> <ul style="list-style-type: none"> <li>• <b>One SPA</b> (Thames Basin Heath);</li> <li>• <b>One SAC</b> (Mole Gap to Reigate Escarpment); and</li> <li>• <b>29 SSSIs.</b></li> </ul> <p>Within the South East region, 52 National Nature Reserves and 623 Local Nature Reserves can be found. Within the Plan area there is one NNR and 43 LNRs. Key pressures and risks in respect of biodiversity and nature conservation that are particularly relevant have been identified from air pollution and climate change, which can change distribution of species and habitats.</p> <p>Areas of Ancient Woodland, i.e. those areas that have been continuously wooded since at least 1600AD are scattered across the South East region. The Ancient Woodland Inventory for England identifies over 2,000 sites of Ancient Woodland within the Plan area.</p> <p><b>Likely evolution of the baseline</b>            Abstraction and public water supply contribute to a decline in habitat and species. Drought conditions that necessitate drought permits exacerbate pressures on habitat and wildlife. Climate change will likely result in decline of some habitats and species further, though may afford opportunities for other species, including invasive species.</p>	<p>WRMP24 should aim to protect and enhance all sites of biodiversity importance and should place a particular emphasis on protecting sites designated for nature conservation and geodiversity purposes.</p> <p>Consideration should be made of protected and priority species and their habitats including local wildlife sites, as well as consideration of issues such as Suitable Alternative Natural Greenspace.</p> <p>Opportunities for new habitat creation and enhancement associated with water resources should be explored. There should be achievement of Biodiversity Net Gain in areas not formally designated, recognising that a target of 10% has been set out in the Environment Act 2021 for new development.</p> <p>WRMP24 should avoid the fragmentation of green infrastructure, by seeking the integration and enhancement of the green infrastructure network to contribute to protecting natural habitats and delivering biodiversity net gain through all new developments.</p> <p>WRMP24 should help create cohesive habitat networks to help habitats and species adapt to the consequences of</p>	<p><b>Biodiversity:</b>            Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity (no loss and improve connectivity where possible)</p>



Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
<p>England's wildlife habitats have also become increasingly fragmented and isolated, leading to declines in the provision of some ecosystem services, and losses to species populations'.</p>	<p>climate change in particular. consider the support of water-dependent designated sites and priority habitat/species to adapt to climate change more specifically.</p> <p>WRMP24 should promote the increased accessibility to appropriately designed multi-functional green infrastructure which can play a significant role in diverting pressure away from more sensitive sites or areas.</p> <p>In parallel with the SEA of the WRMP24, HRA is being undertaken which will identify the internationally designated nature conservation areas, where possible establish the likelihood of impacts on the integrity of these sites and identify appropriate avoidance and mitigation measures early in the development of the WRMP24.</p> <p>The INNS assessment also being undertaken in parallel with the SEA will in turn consider potential for INNS dispersal and assess this risk and mitigate where appropriate.</p>	
<p><b>Population and Human Health</b> There are approximately 19 million people living within the South East Region, which accounts for 30% of the UK's population. From the local authorities falling entirely or partially within the Plan Area, Croydon as the highest population of 388,600, whilst Epsom and Ewell has the lowest at 81,000. Population is expected to grow which will likely place additional pressure on the water environment within the Plan Area. Economic growth and climate change will also add to this pressure. Health within the region is generally good., with 83% of people describing their health as good or very good.</p>	<p>The options within WRMP24 have the potential to result in temporary disturbance effects during the construction phase and disturbance effects for the local community must be prevented.</p> <p>There is also potential for impacts on the water or natural environment which could have impacts on recreation and wellbeing. WRMP24 should aim to protect public health and promote well-being.</p> <p>There is an opportunity for WRMP24 to engage with the local community and maximise opportunities for recreation</p>	<p><b>Population and Human health:</b> Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing</p>



Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
<p>Of the 12 local authorities wholly or partially intersecting the plan area, all performed better than England for under 75 mortality rate from all cardiovascular diseases and all but four performed better than South East England. In regards to under 75 mortality rate from cancer all local authorities with the exception of Crawley performed better than England and the South East. Nine of the local authorities at a lower rate of overweight or obese adults than South East England.</p> <p><b>Likely evolution of the baseline</b></p> <p>Stable / Uncertain – while population levels are likely to continue to rise, there is uncertainty over migration levels due to a lack of clarity on issues such as ‘Brexit’. Population profiles are also likely to continue to get older – this will likely result in changes to overall health outcomes with an increased number of long-term conditions.</p> <p>Water available for consumptive use may also be affected by climate change whereby access to water is limited through more frequent droughts or floods</p>	<p>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>WRMP24 also has the opportunity to ensure a resilient and reliable water supply for customers now and in the future, through continuing to increased awareness of water conservation in one hand and adapting to climate change in the other so that there is enough water for a growing population and to support economic growth.</p>	
<p><b>Material Assets</b></p> <p>Within the UK, the south east is the most populated region with a population of approximately 19 million and expected long-term growth of around four million. Settlements within the South East are diverse and range from large population centres such as London to towns, villages and small rural hamlets. Key urban areas within the SES Water Drought Plan area include:</p> <ul style="list-style-type: none"> <li>• Banstead - 10,480</li> <li>• Horley - 26,851</li> <li>• Reigate - 23,589</li> <li>• Dorking – 17,690</li> <li>• Leatherhead - 33,597</li> <li>• Redhill - 38,171</li> </ul>	<p>WRMP24 has the opportunity to consider the efficiency in the use of resources within the option development and reduce the use of energy, materials and prevent waste generation through the promotion of low/zero carbon energy, use of recycled or secondary materials and furthering concepts of circular economy.</p> <p>WRMP24 area contains important transport links which could be affected during construction works. There is also significant water and wastewater treatment infrastructure across the area operated by SES Water.</p>	<p><b>Material Assets:</b></p> <p>Minimise resource use and waste production</p> <p>Avoid negative effects on built assets and infrastructure</p>



Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
<ul style="list-style-type: none"> <li>Caterham - 23,652</li> </ul> <p>Gatwick Airport is also within the Plan area and would be considered a major material asset, along with the wider transport network (road and rail).</p> <p><b>Likely evolution of the baseline</b> 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.</p>		
<p><b>Air</b> Air pollution impacts on public health, the natural environment and the economy. Air quality has improved in the UK over the last sixty years as a result of the switch from coal to gas and electricity for heating of domestic and industrial premises, stricter controls on industrial emissions, higher standards for the composition of fuel and tighter regulations on emissions from motor vehicles. Poor air quality is generally associated with urban/industrial areas and major road infrastructure and this is reflected in the typical location for Air Quality Management Areas (AQMA), many of which have been designated due to high NO<sub>2</sub> and PM<sub>10</sub> levels. A high proportion of the local authorities which fall within the South East region contain at least one AQMA and are predominately designated for Nitrogen Dioxide (NO<sub>2</sub>) and Particulate Matter (PM<sub>10</sub>). There are 13 AQMAs declared within the Plan Area. 180 Noise Action Important Areas have been identified within the Plan Area. The source of noise in these areas is predominately roads, with the exception of a small number in which the source is rail.</p> <p><b>Likely evolution of the baseline</b> Improving - At the national level air quality is generally improving as industrial practices, energy sources and tighter environmental legislation have contributed to reductions in pollutants.</p>	<p>The options within WRMP24 have the potential to impact air quality and noise. This could include the generation of air pollutants and noise from treatment plants and there is also likely to be effects from the construction phase.</p> <p>The Plan should meet Government targets for air quality and noise and be reflective of appropriate legislation and should consider ecological receptors alongside human receptors.</p> <p>There is potential for the WRMP24 to mitigate any increases in air pollutants as a result of the options and improve air quality in the region.</p>	<p><b>Air:</b> Reduce and minimise air and noise emissions</p>



Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
<p>Nevertheless, while air quality is generally improving at a national level, new development, economic growth and tourism may lead to increased pollution emissions due to higher numbers of transport journeys and congestion could continue to lead to localised air quality effects.</p>		
<p><b>Landscapes</b>            The South East region's landscape is diverse and there are important landscapes within the region, including two National Parks, eight Area of Outstanding Natural Beauty (AONBs) and 34 National Character Areas (NCAs).            Specifically within the Plan area there are:</p> <ul style="list-style-type: none"> <li>• One AONB (Surrey Hills); and</li> <li>• 6 NCAs (Thames Basin Heaths; North Downs; High Weald; Low Weald; Wealden Greensand; and Thames Basin Lowlands NCA).</li> </ul> <p>There are a range of pressures on landscape, many of which are altering landscapes in a direction which could be regarded as inconsistent with the traditional landscape vernacular of the area. These changes are a reflection of the fact that the landscape of the UK has changed over many years due to a range of issues such as urbanisation, changes to agriculture, reduced tranquillity, loss of habitats and forests, etc. In an effort to preserve the best landscapes a series of National Parks and AONBs were designated.            The Plan Area has 81 designated Conservation Areas with the first areas designated in 1968 and the most recent being 2010, covering a range of building characters and reflecting a diverse array of architectural styles.</p> <p><b>Likely evolution of the baseline</b>            Stable - Many of the region's most exceptional landscape and townscapes benefit from protection through designations that will persist in the absence of the Drought Plan. In general terms, modern design / landscaping principles and interested parties expectations are promoting a renewed</p>	<p>There is potential for the options within WRMP24 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. WRMP24 should seek to preserve and enhance the character of the region's landscape and seascape by ensuring that its integrity and valuable natural open space is not lost..</p> <p>WRMP24 should also aim to ensure that sensitive areas are avoided and respect particular landscape settings, with consideration made of design quality in both an urban, rural or sea setting.</p> <p>Opportunities for landscape enhancement should be explored, e.g. through sympathetic design and enhancements to existing landscape improvement areas, new planting opportunities.</p> <p>Where a scheme would involve physical development in within a Conservation Area or a wider area for which a townscape/urban character appraisal has been undertaken, the design of the scheme should take account of relevant guidance for the Conservation Area / townscape character area.</p>	<p><b>Landscape:</b>            Conserve, protect and enhance landscape, townscape and visual amenity</p>



Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
<p>focus on the quality of scheme design and this trend is likely to continue, though risks from increased urbanisation and infrastructure development remain.</p>		
<p><b>Soil</b>            There are a mix of land uses across the Plan Area, ranging from rural areas of open countryside or arable farmland and pasture to extensive heavily urbanised. There are also areas of suburban and urban fringe associated with the main towns and distinct pockets of 'isolated' urban development in the form of villages and small towns.            Soils in England are already, and continue to be, degraded by human activity including intensive agriculture, historic levels of industrial pollution and urban development (including transportation networks), making them vulnerable to erosion (by wind and water), compaction and loss of organic matter.            Many areas of land in the UK have been contaminated by past industrial and other human activities, including former factories, storage depots and landfills. Land at the full range of potentially contaminated sites could be contaminated by a wide range of harmful substances such as oils and tars, heavy metals, asbestos and chemicals.            By its nature, it is often very difficult to know where land has been contaminated previously or is currently suffering ongoing contamination. As such the number of known sites of contamination is likely to be only a very small fraction of the overall number of potentially contaminated sites.</p> <p><b>Likely evolution of the baseline</b>            Declining - it is likely that greenfield sites will experience increasing pressure for development in preference to the complexities of redeveloping previously developed and potentially contaminated sites. This could reduce available high quality soil resources and fail to realise the potential of existing capacity within existing urban and previously developed areas.</p>	<p>Soil is a non-renewable resource and is vulnerable to erosion, degradation and contamination. In addition, historic land uses have contributed to contamination across large areas.</p> <p>WRMP24 should seek to make best use of areas that are already urbanised and provide an opportunity for regeneration / improvements to land quality. Where use of agricultural land is unavoidable, measures should be taken to avoid those areas of the highest quality and aim to protect soil and agricultural holdings through avoidance of impacts such as erosion, contamination or severance.</p> <p>WRMP24 must protect soils as they are essential for achieving a range of important ecosystem services and functions.</p> <p>Dealing with the past pollution / contamination legacy is a major issue and should be addressed at all opportunities due to its ongoing environmental impact.</p> <p>WRMP24 should seek to avoid land that is covered by Mineral Safeguarding Area designations, to prevent the sterilisation of key mineral resources.</p>	<p><b>Soils:</b>            Protect and enhance the functionality, quantity and quality of soils</p>



Key Environmental Issue	Implications / Opportunities for the WRMP	SEA Objective
Remediation of contamination is likely to remain sporadic and reflective of individual site requirements		
<p><b>Cultural Heritage</b></p> <p>While there are eight World Heritage Sites within the South East Region, none of which are located with the Plan Area. Alongside this, there are a wide range of other historic and cultural heritage features located across the region and which span the full range of human settlement, from the prehistoric to the present. These include Scheduled Monuments, Registered Parks and Gardens, Listed Buildings and Heritage at Risk sites. Numbers of sites within the Plan Area are as follows:</p> <p>Listed Buildings – 2,834 Registered Parks and Gardens – 17 Scheduled Monuments – 91 Heritage at Risk sites - 24</p> <p>It is important to note that the nature of cultural heritage features means that not all are known at present; in particular, buried archaeological remains.</p> <p><b>Likely evolution of the baseline</b></p> <p>Stable / Declining - Designated heritage assets benefit from protection that will continue without the Drought Plan. However, there is a risk or uncoordinated and piecemeal development resulting in the successive erosion of the quantum and integrity of the region's cultural heritage resource.</p>	<p>WRMP24 should aim to protect and preserve designated and non-designated heritage assets and their contexts and settings.</p> <p>The options within WRMP24 have the potential to directly or indirect impact the historic environment through effecting the asset's fabric or setting. It is to be noted that some heritage features can be affected by changes to hydrological conditions.</p> <p>Infrastructure should be sensitively designed to be sympathetic to existing character and quality and opportunities for improving settings should be examined.</p> <p>Where schemes would involve physical development that could affect previously undiscovered archaeological assets the design of the scheme and site selection should be informed by early investigation of the potential archaeological interest of the affected land.</p>	<p><b>Cultural Heritage:</b></p> <p>Conserve, protect and enhance the historic environment and heritage assets, including archaeological remains</p>

## 7. SEA Framework

### 7.1. Introduction

The SEA Framework is a key component in completing the SEA and comprises a bespoke series of objectives. The purpose of the SEA Framework is to provide a set of criteria against which the performance of the WRMP can be predicted and evaluated. As discussed in Chapter 6, it is developed by synthesising the baseline information and sustainability issues into a systematic and easily understood tool that allows the assessment of effects arising from the implementation of the WRMP in key areas.

A framework of 13 objectives and associated decision-making questions has been drawn up, developed through the analysis of baseline information and identification of key environmental issues and opportunities, as well as the PPP review.

The 13 identified objectives (Table 7.1) have been worded so that they reflect one single desired direction of change for the theme concerned and do not overlap with other objectives. They include both externally imposed environmental objectives and others devised specifically in relation to the Plan being prepared. Decision-making criteria have been identified for each objective to aid in the assessment.

In order to assess how each aspect of the WRMP performs against each of the SEA objectives, a series of decision-making criteria have been developed. The decision-making criteria are a way of guiding the assessment and helping to ensure consistency of approach across the assessment of all the WRMP elements. They are not the only considerations to be taken into account when determining likely effects arising from the WRMP, as it is unlikely that every relevant question can be known at this stage. But they do provide a useful starting point and a transparent structure to help demonstrate how the assessment of the effects arising from the implementation of the WRMP have been undertaken. As the SEA progressed, they also helped in the development of a set of indicators to be included in the monitoring programme.

In deriving the SEA Framework, the information contained within the WRSE SEA Scoping Report has been considered (together with the comments received from statutory consultees on the WRSE SEA Scoping Report) have also been taken into account alongside a review of specific baseline data relevant to the SES Water area. An overview of the key issues identified that are specific to the SES Water area has been provided in the previous chapter. Allied to the identification of detailed baseline data relevant to the SES Water area, the SEA Objectives identified in the 'All Companies Working Group SEA Core Objective Identification Report' (2020) were considered and a revised set of SEA Objectives has been developed that allow examination of a greater level of detail than would be expected at WRSE regional level. This has led to the addition of an important separate objective to reduce greenhouse gas emissions reflecting the climate emergency and adjustments in the wording of other WRSE SEA Objectives and decision-making criteria to better reflect SES Water priorities.

It should be noted that, from an assessment perspective, all SEA objectives are considered equally important to be achieved by the WRMP and that there is no inherent prioritisation of objectives. The ultimate aim is for the WRMP24 to achieve net sustainability benefits.

It is also to be noted that there is a certain degree of cross-over of Assessment Aid Questions within the SEA Framework i.e. the same question may be asked across a number of Objectives. The rationale for this is that while the question may be the same, it is considered from a differing viewpoint and within a different context. This is the role of the Decision Aid Questions i.e. to help consider all aspects of an Objective in arriving at an assessment of the performance.



Table 7-1: SEA Framework

No.	SEA Objective	Assessment aid questions	SEA topic
<b>Environment</b>			
1	To reduce vulnerability of built infrastructure to climate change risks and hazards	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Avoid development in areas likely to be affected by flooding or where this is not possible ensure that flooding can be managed throughout the lifetime of the infrastructure?</li><li>• Avoid development in areas likely to be affected by coastal erosion or where this is not possible ensure that coastal change can be managed throughout the lifetime of the infrastructure?</li><li>• Avoid development which would cause or exacerbate climate related issues such as freshwater and coastal squeeze?</li><li>• Manage the risks associated to periods of limited water availability during droughts over the lifetime of the infrastructure?</li><li>• Manage the risks associated with heatwaves and wildfires over the lifetime of the infrastructure?</li><li>• Manage the risks of flooding and coastal erosion, particularly through working with nature-based solutions?</li></ul>	Climate
2	To reduce or manage flood risk, taking climate change into account	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Avoid development in flood risk areas (whether existing or future) when possible?</li><li>• Lead to infrastructure development that is flood resilient over its lifetime, considering the effects of climate change, without increasing the flood risk elsewhere and identifying opportunities to reduce the risk overall?</li></ul>	
3	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Affect surface water quality or quantity?</li><li>• Affect groundwater quality or quantity?</li><li>• Affect estuarine or coastal water quality or quantity?</li><li>• Affect bathing waters?</li></ul>	Water



No.	SEA Objective	Assessment aid questions	SEA topic
		<ul style="list-style-type: none"><li>• Affect shellfish water protected areas?</li><li>• Affect chalk rivers?</li><li>• Reduce the flashy nature of surface waters?</li><li>• Slow the flow in upper catchments and reduce soil losses to river systems?</li><li>• Support achievement of environmental objectives set out in River Basin Management Plans and Shoreline Management Plans</li><li>• Protect and enhance the environmental resilience of the water environment to climate change?</li><li>• Contribute to the achievement of WFD objectives (taken from the WFD assessment results)?</li></ul>	
4	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain.	<p><i>Will WRMP24:</i></p> <ul style="list-style-type: none"><li>• Protect and enhance the conservation status of designated sites and their qualifying features (SPAs, SACs, Ramsar sites, MCZs, SSSIs, National Nature Reserves and Ancient Woodland)?</li><li>• Ensure HRA compliance with regards to international sites? (taken from HRA results)</li><li>• Affect directly or indirectly a priority habitat on the priority habitat inventory?</li><li>• Protect and enhance priority habitats and species, including surface and groundwater dependent habitats and species?</li><li>• Affect the marine environment, habitats and species (including MCZs and MPAs)?</li><li>• Contribute to the loss or gain in habitat connectivity at local, regional and national level?</li><li>• Create or restore habitat delivering a 10% net gain for biodiversity? (taken from BNG assessment results)</li><li>• Avoid the possibility for INNS to be spread/ introduced?</li><li>• Create an opportunity to improve biodiversity value through removal of INNS? (taken from the INNS assessment results)</li></ul>	Biodiversity



No.	SEA Objective	Assessment aid questions	SEA topic
5	To protect and enhance the functionality, quantity and quality of soils	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Affect high grade agricultural land?</li><li>• Promote the efficient use of land?</li><li>• Prevent soil erosion and retain soil stocks as a natural resource?</li><li>• Involve use of brownfield or greenfield land?</li><li>• Prevent mineral sterilisation?</li><li>• Result in soil contamination or involve soil remediation?</li><li>• Affect SSSIs of geological importance?</li></ul>	Soils
6	To reduce and minimise air and noise emissions	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Minimise air emissions (pollutants and noise) that affect human health and biodiversity?</li><li>• Affect an existing air quality management area (AQMA) or lead to the creation of a new one?</li><li>• Promote enhancements to green infrastructure networks to help improve air quality?</li></ul>	Air Quality
7	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Reduce direct and indirect emissions of all greenhouse gases, including carbon dioxide, during construction, operation and decommissioning of schemes?</li><li>• Maximise supply of energy from low carbon/renewable energy sources / use of low carbon/renewable energy?</li><li>• Maximise opportunities for making use of waste heat?</li><li>• Use negative carbon emissions technologies to offset residual emissions such Nature Based Solutions?</li><li>• Create new carbon sinks/removals through natural sequestration including that provided by green infrastructure and soils which contribute to carbon sequestration?</li></ul>	Greenhouse Gas Emissions



No.	SEA Objective	Assessment aid questions	SEA topic
8	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Protect and enhance designated landscapes and features?</li><li>• Affect the character of the landscape, townscape or seascape, including tranquillity and views?</li><li>• Protect conservation areas or historic landscape/townscape areas?</li><li>• Minimise noise and light pollution from construction and operational activities on residential amenity and on sensitive locations, receptors and views?</li><li>• Improve access to the countryside?</li><li>• Create or improve green infrastructure which contributes to access to the landscape?</li></ul>	Landscape
9	To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Protect designated heritage assets and their settings, sites and features?</li><li>• Protect heritage assets at risk?</li><li>• Protect non-designated heritage assets, including important archaeological remains (including unknown archaeological remains)?</li><li>• Alter the hydrological conditions of water-dependent heritage assets, including organic remains?</li></ul>	Cultural Heritage
10	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Allow for green economic development?</li><li>• Provide employment opportunities and economic diversity?</li><li>• Minimise disturbance from noise, light, visual, and transport due to construction and operational activities?</li><li>• Minimise disturbance to active travel (pedestrian and cycle routes, Public Rights of Way) during construction and operational activities?</li><li>• Secure resilient water supplies for the health and wellbeing of customers?</li></ul>	Population and human health



No.	SEA Objective	Assessment aid questions	SEA topic
11	To maintain and enhance tourism and recreation	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Affect terrestrial, freshwater or marine water resources that are used for tourism and recreation?</li><li>• Maintain or enhance tourism in the region through the creation or improvement of terrestrial or water-based attractions?</li><li>• Improve access to the natural environment for recreation, including those living within deprived areas?</li><li>• Provide education or information resources for the public about the natural environment?</li></ul>	
12	To minimise resource use and waste production	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Minimise the use of materials, energy and resources?</li><li>• Promote water efficiency and encourage a reduction in water consumption?</li><li>• Minimise the production of waste?</li><li>• Promote sustainable waste management practices in line with the waste hierarchy?</li><li>• Encourage the use of recycled and / or secondary materials?</li><li>• Promote the use of low carbon materials and technologies?</li><li>• Promote the use of local suppliers that use sustainably-sourced and locally produced materials?</li></ul>	Material assets
13	To avoid negative effects on built assets / infrastructure	<i>Will WRMP24:</i> <ul style="list-style-type: none"><li>• Reuse existing infrastructure?</li><li>• Affect major built assets and infrastructure, including transport infrastructure?</li></ul>	

## 8. Existing Supply Options

### 8.1. Existing Abstractions

It is important to recognise that the WRMP24 is not starting from a 'blank sheet of paper' and SES Water (as with all water companies) operate a water supply network that has been developed over many decades and is the result of previous Plans and investment decisions made during periods when environmental matters were often not considered as important as they are today.

SES Waters existing abstractions are listed in Level 2 Appendix B2 Review of relevant Plans, Policies and Programmes and B3 Baseline Information of this report.

#### 8.1.1. Abstractions subject to WINEP

Recognising that the current water supply network does have adverse effects on the environment, the WRMP24 includes commitments to assess the effects of SES Water's current abstractions and to implement mitigation to protect and enhance the aquatic environment.

To deliver their environmental destination, and fully explore whether other abstractions are having an impact on sensitive environments, SES Water are proposing a programme of investigations in their business plan to map out their reduced abstractions.

SES Water have developed in consultation with the Environment Agency and various catchment partners their most ambitious WINEP to date for AMP8. An overview of their environmental destination and landscape proposals (relating to water abstraction) are provided in Table 8-1.

**Table 8-1 - SES Water WINEP Proposals**

Hogsmill	River restoration project. We are also in the process of developing options from our recent investigation.	A low flow investigation (completed in May 2023) indicated in a modelled scenario that one of SES Water's abstractions could impact the Hogsmill river flow. SES Water currently operate an augmentation scheme to support the flow of the Hogsmill River. At this stage several options to reduce their abstraction are too costly, and SES Water would also risk moving the necessary water requirement to another sensitive catchment in the wider area. SES Water are therefore proposing to undertake some initial river restoration work, and consider whether the augmentation can be more effective, to enhance the environment in the near term. This catchment will form part of a separate investigation (as below).
Hogsmill, Wandle, Upper Darent and Eden	Environmental destination investigation	These catchments neighbour each other across the north of the SES Water supply area, and in some of their more densely populated areas. SES Water have committed to an environmental destination across all these catchments in this plan.  The outcomes of the investigation will specifically define an achievable profile of reductions in the catchments, linked to specific sources within a licence. SES Water intend to develop an operational blueprint from this and undertake additional network analysis so that they can understand where their network may need to be altered to enable the reduced abstractions. These outputs will be fed into WRMP29 and the next regional plan.
Beverley Brook	Low flow investigation	SES Water have also committed to reduced abstractions across their sources in the Beverley Brook, albeit they understand there is not a hydrological link between the groundwater and surface water. SES



		Water are proposing to undertake a desk-study to explore the hydrological regime between the ground and surface waters and define an appropriate profile of reductions in response.
Regional	Environmental destination investigation	The Environment Agency have worked with the regional groups to include a regional investigation each company will feed into. Within WRSE, SES Water have proposed to use this investigation to reconcile each company’s individual investigation (to ensure there is no duplication of effort) and investigate further catchments as required. SES Water also intend to use this investigation to develop some of their supply options in more sustainable catchments so that further rounds of resource planning can include additional options to maintain their supply demand balance. For the purpose of this investigation, SES Water believe the Mole catchment will be a focus to develop their source options.
Reigate Heath	SSSI (Sites of Special Scientific Interest) (Protected landscapes)	SES Water have three sources and a treatment works in proximity to Reigate Heath. Whilst SES Water do not operate those sources and the treatment works on a day-to-day basis, due to the limited capacity and reduced cost benefit, they are aware of the significance of their location to a SSSI – a protected landscape. SES Water have included an investigation in their WINEP to explore the impacts of abstraction on Reigate Heath (SSSI) and, following the results of that investigation, will consider the operational future of those sources.

SES Water rdWRMP24

## 8.2. Alternatives

Water companies in their revised draft plans have been asked by Natural England to address the deterioration risk from existing abstractions. Since more water is licenced than actually used in many cases, there is a perceived risk that growth in demand could cause environmental damage – even if abstraction remains within licenced constraints.

Following consultation on the draft plan SEA and HRA, extensive discussions were held with Natural England regarding their requirement to set out, and assess, alternatives for existing options should that perceived risk become a reality.

Specifically, NE highlighted that there is an absence of like-for-like replacements for sources being investigated in the WINEP, should they be shown to no longer be viable in the future. This is in part due to the complexities of the regional modelling approach, as well as the fact that the WINEP investigations are still on-going and as such conclusions can’t be drawn.

However, as part of the regional approach to water resource management planning, SES Water’s future scenarios for supply and demand, together with their water resource options have been shared with WRSE and, working with them, have developed a resilient and adaptive water resource management plan. Therefore, although it has not been possible to identify individual replacement options for existing sources, there is capacity and flexibility in the strategically developed plan to accommodate such losses without jeopardising supply.

It should further be noted, that the Environment Agency (EA) completed a risk assessment on all the SES Water existing licences, by comparing the maximum peak and annual average volumes abstracted over a six year period (2016 – 2021). Criteria are applied to each catchment to determine if a licence change is required and whether this should be set at average or peak abstraction rates. Any changes should then be progressed through the WINEP process, with no growth in abstraction (i.e. capped) until the WINEP options appraisal is concluded. The EA analysis concluded that their licences that met the preliminary criteria should be scoped out due to the type of groundwater body (such as confined chalk which is not hydraulically linked to the surface waters) or where the water was used for augmentation of rivers only (River Wandle and Hogsmill River chalk (chalk fed)), and therefore SES Water do not have any licences where the cap should apply.



Nevertheless, as agreed with Natural England, SES Water will complete options appraisal, following the completion of the WINEP investigations, when potential effects are better understood. SES Water will also continue working with WRSE and the regulators and consultants to better understand how this issue can be approached in AMP8 and in future iterations of SES Waters and the regional water resources plans.

## 9. Technical Environmental Assessment

The SEA objectives, as set out in Section 7, have been formulated to incorporate the findings of the various technical environmental assessments, specifically the Habitats Regulations Assessment, Water Framework Directive Assessment, Biodiversity Net Gain and Natural Capital assessments. In addition, further assessment has been made of effects on heritage assets and potential effects on SSSI's. This has helped to provide an integrated environmental assessment of the plan.

It is however important to note, that whilst the results of the various technical environmental assessments have been used to inform the SEA, care has been taken to align the approaches to ensure there is no risk of double counting where overlaps between some of the SEA objectives and various metrics used in the technical assessments may have occurred (introducing undue bias).

### 9.1. Habitat Regulation Assessment

The HRA Technical Note found in the HRA report reports on the Stage 1 Screening Assessment (Test of Likely Significance) undertaken by Water Resources South East (WRSE) for options being considered by SES Water, as part of the environmental assessment work to support the development of the WRSE Emerging Regional Plan. The HRA assessments presented have been undertaken by WRSE and results considered in the undertaking of the SEA of SES Water's WRMP24. Each of the following schemes were considered through the HRA process:

- Outwood Lane groundwater (2.7MI/d);
- Secombe Centre UV (2.1MI/d); and
- Raising Bough Beech reservoir (11.5MI/d).

As a result of the Level 1 HRA Screening exercise, WRSE finds that each of the three supply options featuring in at least one of the Preferred Plan (BVP), LCP and/or BESP can be appropriately screened out and do not require further assessment in the form of Appropriate Assessment. This was reasoned through the sufficient distance at which options were located from N2k designated sites, with no effect pathways identified.

### 9.2. Water Framework Directive

The WFD TN available as Level 2 Appendix B7 of this report presents the findings of the Water Framework Directive (WFD) assessment that has been undertaken as part of the environmental assessment process to support the development of the WRSE Emerging Regional Plan.

The Level 1 WFD assessments have been reviewed and updated for the WRMP24 Schemes. The Level 2 assessment has been undertaken only on those supply options selected before 2050 by the WRSE Best Value Plan (BVP), Best Environmental and Societal Plan (BESP) or the Least Cost Plan (LCP) and is based on the All Companies Working Group methodology for each of the Schemes.

The pre-2050 SES Water options selected in the WRSE BVP, BESP and LCP are listed as follows:

- Outwood Lane groundwater (2.7MI/d);
- Secombe Centre UV (2.1MI/d); and
- Raising Bough Beech reservoir (11.5MI/d).

Each of the three schemes progressed to Level 2 as a result of the screening exercise. A medium remaining risk score (2) was concluded for each of the three schemes for one or more waterbodies, coastal water body or groundwater body. This reflected new or increased groundwater abstraction and increase in surface water and groundwater abstraction licence (Outwood Lane groundwater (2.7MI/d) and Secombe Centre UV (2.1MI/d) options) and modification of an existing reservoir (Raising of Bough Beech reservoir (11.5 MI/d) option). As such, the results of the WFD screening undertaken by WRSE, along with the Level 2 assessments have been considered in the undertaking of the SEA of SES Water's WRMP24.



### 9.3. Biodiversity Net Gain

Biodiversity Net Gain (BNG) is a specific, measurable outcome of project activities that deliver demonstrable and quantifiable benefits to biodiversity compared to the baseline situation. Biodiversity metrics provide a way of measuring and accounting for biodiversity losses and gains resulting from development and/or land management change.

A BNG assessment forms an integral part of the Strategic Environmental Assessment and the inclusion of BNG as part of the WRMP24 environmental assessment process is supported by the updated Water Resources Planning Guideline Supplementary Guidance 'Environmental Society in Decision Making' (November 2021).

BNG assessments for the five emerging SES options comprising drought permits were screened out as they will not result in a change in land use.

BNG assessments of the remaining three options were scoped out on the basis of the current available option information.

### 9.4. Natural Capital

Natural capital assessments (NCA) are required in order to evaluate the impact of the proposed SES Water options on the natural environment through an assessment of the impact of the option on the natural capital stocks and subsequent ecosystem services these stocks provide.

This was undertaken by WRSE in accordance with the WPRG SG. A condition under this is that only supply-side options are within scope of a NCA, of which there are three options for SES Water.

All three supply side options were scoped out of a natural capital assessment by WRSE. This means that there are no numerical outputs of the NCAs of SES Water's options due to no expected natural capital impacts based on all available option information.

This analysis contributes to the wider WRMP objectives of SES Water through highlighting that the proposed options are not expected to materiality harm the natural capital stocks of the region.

### 9.5. Invasive Non-Native Species

This INNS risk assessment (the risk of INNS being introduced and spread through the functioning of each scheme via transfer pathways that may become active once the scheme is operational) has been undertaken through a Level 1 screening assessment only. The Level 1 screening assessment is used to determine whether any schemes are considered high-enough risk to warrant a Level 2 risk assessment using the Environment Agency's standardised risk assessment tool.

Water Resources South East's (WRSE) high-level screening methodology was used for this assessment which accounts for frequency in which transfers would be operational and the severity of their impact, as inferred by the nature and volume of water being transferred. These criteria formed a screening matrix for assessment, in which only schemes scoring 'low', 'medium' or 'high' are taken forward for a Level 2 assessment.

The Level 1 WRSE screening outcome (considering the general scheme type only) for the three schemes concluded that none required a further Level 2 risk assessment, as all were considered to have 'very low' INNS transfer risk.

### 9.6. Heritage Impact Assessment

This HIA provides high-level heritage impact assessments for all options that feature in either SES Water's Best Value Plan (BVP), or one of their alternative plans (Best Environmental & Societal Plan, Least Cost Plan or Low Demand Strategy), up to 2035.

Demand side options include measures such as demand reduction, addressing leakage, water efficiency and catchment management. These options do not have any potential for impact on heritage assets and are therefore not considered in the HIA.

The HIA report was prepared following the consultation on the dWRMP24. At the time of writing the drought permits, that now feature in 2041 in the WRMP24 (following WRSE remodelling), were selected earlier in the



plan (pre-2035). As such, a heritage assessment of the drought permits was completed to satisfy HE consultation comments. This includes the Drought Permits for the Hackbridge, Kenley and Purley and Outwood Lane sources.

As the Hackbridge, Kenley and Purley and Outwood Lane Drought Permits may result in the extension of dry periods within the usual range of wet and dry cycles, this is not anticipated to result in an appreciable impact on potential waterlogged archaeological remains as these are already likely to be subjected to seasonal wetting and drying cycles. The significance of this effect is difficult to determine without further assessment, but it is likely to be **Neutral to Moderate**. Given that the zone of influence for the options is not discrete or constrained within a known area, there may be potential for impact to unknown archaeological remains, should impacts be identified beyond those anticipated herein. No impact is predicted to the Roman Villa East of Beddington Park, Scheduled Monument (NHLE 1001990). This asset is located on London Clay geology, which is unlikely to be impacted by the drought permits as they abstract from the hydrogeologically isolated Chalk aquifer. The scheme will not have any permanent setting impact to the conservation areas or to the listed buildings within the study area as the anticipated changes to the water environment will not change any aspects of setting that contribute to their significance. Significance of effect will be **Neutral**, for built heritage.

Further detailed, assessment of potential heritage receptors and impacts should be carried in advance of these options being implemented and may be helpfully informed by targeted groundwater modelling.

## 9.7. Sites of Special Scientific Interest Assessment

This SSSI Assessment sets out the WRMP24 Options and identifies those SSSI where an Option, being progressed early in the plan period (<2035), (and its related construction / operation) could potentially pose a risk to that SSSI.

Although all of SES Water's WRMP24 options (featuring in the BVP, BESP and/or LCP) were screened against relevant ORNECs, none of the options have been selected by the model to feature before 2050. As such, no further assessment was made of the Options. However, the SSSI assessment notes that this will be kept under review and assessment made if required.

Achieving sustainable abstraction is a key component of SES Water's WRMP24, who are taking action to address the risk of deterioration on SSSI sites in working towards their long-term environmental destination. SES Water have included an investigation in their WINEP to explore the impacts of abstraction on Reigate Heath (SSSI), where SES Water have three sources and a treatment works in proximity, and following the results of that investigation, will consider the operational future of those sources. As more detail about the proposed WRMP24 options are available, SES Water, in collaboration with Natural England, will plan further investigations in their WINEP and monitoring where necessary to help work toward achieving NEs target of 'favourable condition' status for all SSSIs in the Plan area.

# 10. Assessment of Alternatives

## 10.1. Introduction

Stage B2 of the SEA process normally involves the generation and assessment of plan options. This exercise is undertaken in part to fulfil the requirements of the SEA Regulations, which requires that the Environmental Report should consider:

*'reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme'* (SEA Regulations Part 3 Section 12 (2)b).

It is normal practice when developing a Plan to propose different ways (options) of fulfilling its objectives. SES Water carried out a staged approach to decide on potential options to either increase supplies or reduce demand, including third party solutions. The unconstrained options list was screened to produce a shortlist of feasible options for the next stage of assessment.

Forty one options or option groups, relating to hard infrastructure, demand management and drought measures were considered feasible, and SES Water calculated costs, including capex, opex, social, environmental and carbon for each option. The results of the assessment were uploaded to the WRSE database to be used in the regional programme appraisal.

WRSE, using their regional investment model, inputted the results of the feasible options identified and produced three programmes; a Best Value Plan, and as required by the revised Water Resources Planning Guidelines (WRPG), two alternative plans: a Least Cost Plan (LCP), and Best Environmental and Societal Plan (BESP).

As set out in Chapter 1, both alternative plans are constrained to securing the necessary water resources, whilst meeting regulatory and policy requirements. In addition, the LCP is programmed to deliver the set of options that meet the balance in the most cost-effective way. The BESP increases the overall benefit to customers, the environment and wider society.

To assess the alternatives, comparison has been made of the options featuring in the identified alternative plans to those in the Best Value Plan (BVP) as set out in Table 10-1. It is important to note that the majority of options are common to all plans. Therefore, to allow robust comparison between alternatives, comment has only been made on the options in the alternative plans not common to the BVP.

The 'non common' options, both supply (measures that increase supply) and demand (measures that reduce demand for water), have been discussed as follows:

1. the schemes selected in the BVP, but not in an alternative plan; and
2. the schemes selected in an alternative plan, but not the BVP.

The assessment of options featuring in the alternative plans set out here has been fed back to WRSE in development of the preferred plan.

Each option has been assessed against the SEA Framework in respect of construction and operation phases and considering positive and negative effects separately. Full details of the assessment for each option is provided within Level 2 Appendix B5 Assessment Tables of this report. Where available, the assessment tables have been supplemented with Option IDs, descriptions and mitigation that is considered embedded as part of the option.

The SEA objectives are:

1. To reduce vulnerability of built infrastructure to climate change risks and hazards
2. To reduce or manage flood risk, taking climate change into account
3. To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats
4. To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain



5. To Protect and enhance the functionality, quantity and quality of soils
6. To reduce and minimise air and noise emissions
7. To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050
8. To conserve, protect and enhance landscape, townscape and seascape character and visual amenity
9. To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains
10. To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing
11. To maintain and enhance tourism and recreation
12. To minimise resource use and waste production
13. To avoid negative effects on built assets / infrastructure



In the following table green is used to denote inclusion of an option in a particular plan, red where an option does not feature.

**Table 10-1 – Table showing utilised options featuring in each of the Alternative Plans in comparison to the BVP**

Options	Option Description	LCP	BESP	BVP
<b>Supply</b>				
Outwood Lane groundwater (2.7MI/d)	This scheme option seeks to increase the daily licence of an existing source from 3.02MI/d to 8MI/d, with the equivalent increase in pump capacity required. The increase in deployable output from the scheme is approximately 2.7MI/d and this option would require a one year lead in.	2049/50	2050/51	2048/49
Water Lane borehole enhancement (2.2MI/d)	Option to increase pump capacity and treat pesticides, thereby removing a water quality constraint. This would provide 2.2MI/d Average Deployable Output (ADO) and require three years lead in time.	2050/51	2054/55	2061/62
Secombe Centre UV (2.1MI/d)	This scheme option provides UV treatment for the Secombe Centre groundwater source, currently providing limited supply and with bacti detections on the raw water. Due to the limited footprint available at the Secombe Centre site, the UV treatment plant would be located at Cheam WTW. This option would provide 2.07MI/d (ADO) and require three years lead in time.	2050/51	2050/51	2054/55
Duckpit Wood (1.4MI/d)	A scheme option to construct a new borehole to replace the Duckpit Wood and Paines Hill spring licences, providing an additional 1.37MI/s (ADO). Additional scheme optioneering would be required and a lead in time of eight years has been outlined.	2067/68	2067/68	-
Raising Bough Beech reservoir (11.5MI/d)	A scheme option to raise the reservoir embankment to facilitate additional storage, providing 11.5MI/d benefit (ADO). This option would not change the existing abstraction licence conditions. A lead in time of ten years is required, before the option could be utilised.	2050/51	2052/53	-
Hackbridge drought permit	The Hackbridge licence is complicated due to the recharge component, which determines how much water can be abstracted in the following summer, and the aggregation with Wandle Laundry. It is proposed that the drought option decouples abstraction from the	2041/42	2041/42	2041/42



	<p>volume recharged and allows abstraction to be maximised (19 MI/d) regardless of the volume recharged in the preceding winter. On the assumption that typically 250-350 MI/d is recharged, which permits a 15 MI/d abstraction in the following summer, this permit would generate 4 MI/d benefit. A condition of this permit could be a commitment that a minimum volume is recharged in the preceding and following winter, subject to the drought not continuing into a multi-year drought (in which scenario the water may not be available for recharge). The Hackbridge Group licence comprises three sources in the confined Chalk: Hackbridge (two operational boreholes), Goatbridge (one operational borehole) and Bishopsford Road.</p> <p>The drought permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September). Should indicators of future water resource availability within the SES Water supply area return to sufficient levels to provide confidence that water supply can be maintained by normal licensed abstraction, the drought permit would be suspended.</p>			
<p>Kenley and Purley drought permit</p>	<p>Kenley and Purley are licence constrained at MDO (22.79 MI/d). The PDO (41.28 MI/d) which is almost double that of the MDO, is constrained by pump capacity. Therefore, there is the potential for a drought option to increase the annual average licence such that the PDO could be sustained, generating up to 18.5 MI/d. The capacity at the WTW and pump capacity limits the potential to increase PDO further.</p> <p>The drought permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September). Should indicators of future water resource availability within the SES Water supply area return to sufficient levels to provide confidence that water supply can be maintained by normal licensed abstraction, the drought permit would be suspended.</p>	<p>2041/42</p>	<p>2041/42</p>	<p>2041/42</p>
<p>Outwood Lane drought permit</p>	<p>The purpose of this drought permit is to allow for increased abstraction at Outwood Lane. It is proposed that the current daily licence limit is increased from 3.02 to 5 MI/d, equivalent to the Outwood Lane pump capacity. The permit also allows for a proportional increase in the Woodmansterne group annual licence limit to avoid output from the other sources in the group from being curtailed.</p>	<p>2041/42</p>	<p>2041/42</p>	<p>2041/42</p>



	<p>This drought option would therefore be to increase both the annual licence at Outwood Lane and the Woodmansterne Group to allow an additional 2 MI/d pumping from Outwood Lane for a maximum 6-month duration.</p> <p>The drought permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September). Should indicators of future water resource availability within the SES Water supply area return to sufficient levels to provide confidence that water supply can be maintained by normal licensed abstraction, the drought permit would be suspended.</p>			
River Eden May drought permit	<p>Bough Beech reservoir is refilled primarily via an abstraction from the River Eden which normally operates during the autumn/winter. A drought permit to enable the winter abstraction from the River Eden to continue for an additional period of time; historically this has been into May, so this permit is often termed the May drought permit. The benefit of the proposed drought permit abstraction would be up to 272.2MI/d of refill volume to the reservoir during May subject to a Minimum Residual Flow (MRF) in the River Eden. A MRF of 22MI/d would apply and the annual abstraction limit of 29,000MI/d would apply (it is assumed that the cap would extend from the preceding September through to the end of May). No construction would be required in order to facilitate the increased abstraction associated with the drought permit. Due to operational practice and infrastructure constraints, the abstraction would cease well before natural flows in the river reduce to 22MI/d and when flows are recovering would not start until flows are much higher than 22MI/d.</p>	2041/42	2041/42	2041/42
River Eden Summer drought permit	<p>Bough Beech reservoir is refilled primarily via an abstraction from the River Eden which normally operates during the autumn/winter. A drought permit to enable summer abstraction from the River Eden (after any May drought permit has ceased) to permit abstraction of up to 272.2MI/d through June, July and August. A Minimum Residual Flow of 22MI/d would apply and the annual abstraction limit of 29,000MI/d would apply (it is assumed that the cap would extend from the preceding September through to the end of August). No construction would be required in order to facilitate the increased abstraction associated with the drought permit. Due to operational practice and infrastructure constraints, the abstraction would cease well before natural flows in the river reduce to 22MI/d and when flows are recovering would not start until flows are much higher than 22MI/d.</p>	2041/42	2041/42	2041/42



SES Water to Thames Water (15MI/d) 'Cheam to Merton'	Options for a transfer at an existing site in Merton, with capacity of 15MI/d. This would require network enhancements to support transfer levels.	2049/50	2052/53	
SES Water to South East Water (10MI/d) 'Bough Beech to Riverhill'	<p>This option considers the construction of an approximately 7km pipeline between SES Waters Bough Beech service reservoir (SR) and Riverhill SR in the SEW RZ1 to provide for the transfer of treated water. Key features of this option are:</p> <ul style="list-style-type: none"> <li>• Design capacity of 10MI/d (ADO: 2.5 MI/d, PDO: 10 MI/d);</li> <li>• A pump station at Bough Beech SR operating 365 days a year and 18 hours a day. Four (including one standby) fixed speed pumps installed with the design criteria of 361m<sup>3</sup>/hr and 83kW;</li> <li>• One pipeline section with design parameters of 500mm diameter and 6.8km long; and</li> <li>• An expansion of Riverhill SR to add additional 10MI in capacity for 24 hour storage.</li> </ul>	2038/39	2038/39	2038/39
SES Water to South East Water (5MI/d) 'Outwood to Whitely Hill'	Options for a transfer at Maidenbower/Whiteley Hill, with capacity options at 5MI/d or 10MI/d (not mutually exclusive). This would require a new treated water transfer and softening plant at Outwood prior to distribution into our network.	2039/40	2050/51	2048/49
SES Water to Southern Water (10MI/d) 'Outwood to Turners Hill'	A 10MI/d reverse transfer from Outwood to Southern Water Turners Hill.	2033/34	2033/34	2033/34
SES Water to Southern Water (4MI/d)	A 4MI/d export between SES Water and Southern Water.	2025/26 – 2030/31	2025/26 – 2030/31	2025/26 – 2030/31

**Demand**



<p>Consumption Reduction Activities (High+)</p>	<p>Activities include:</p> <ul style="list-style-type: none"> <li>• Home water efficiency audits outside of the smart metering programme</li> <li>• Education</li> <li>• General broadcast messages (multi-channel proactive comms)</li> <li>• Community campaign</li> <li>• Universal smart metering and continuous flow identification</li> <li>• Household flow reduction (pressure control)</li> <li>• Household Incentives: Innovative tariffs</li> <li>• Non-Household efficiency checks / audits</li> <li>• Vulnerability / Inclusion and Equality</li> <li>• Leading by example</li> </ul>	2025/26	2025/26	2025/26
<p>Leakage Reduction Activities (High+)</p>	<p>Activities include:</p> <ul style="list-style-type: none"> <li>• Find and Fix/Active Leakage Control</li> <li>• New Sounding Techniques</li> <li>• Comm PermNet/Comm ZoneScan fixed networks</li> <li>• Enigma Sweeps</li> <li>• Fixed Sensor Plastic Network</li> <li>• New DMAs/DMA Integrity (inc. DMA Playbook)</li> <li>• Smart Network – Digital Twin</li> <li>• AI Enabled sound loggers (e.g., FIDO bugs)</li> <li>• Digital Sounding Sticks (e.g., Iquarius/LS1)</li> <li>• Universal Smart Metering</li> <li>• Project Calm – Network Calming Strategy</li> <li>• Trunk and rural mains strategy</li> <li>• Satellite Imagery</li> </ul>	2025/26	2025/26	2025/26



	<ul style="list-style-type: none"> <li>• Mains Replacement</li> </ul>			
Government Interventions (HybridC++)	This option assumes that the government introduces measures to save water through water labelling, minimum standard for products and new building regulations.	2025/26	2025/26	2025/26
Non-Essential Use Ban (NEUB)	<p>This option follows the implementation of TUBs where drought conditions continue to worsen. NEUBs target non-domestic users and may only be implemented following approval of an Ordinary Drought Order by the Secretary of State. The potential timescales for introducing restrictions by recourse to a Drought Order are significantly longer than those for TUBs. A decision on approval is normally made within 28 days assuming no objections.</p> <p>NEUBs include:</p> <ul style="list-style-type: none"> <li>• Watering outdoor plants on commercial premises</li> <li>• Filling or maintaining a non-domestic swimming or paddling pool</li> <li>• Filling or maintaining a pond</li> <li>• Operating a mechanical vehicle-washer</li> <li>• Cleaning any vehicle, boat, aircraft or railway rolling stock;</li> <li>• Cleaning non-domestic premises</li> <li>• Cleaning a window of a non-domestic building</li> <li>• Cleaning industrial plant</li> <li>• Suppressing dust</li> <li>• Operating cisterns</li> </ul> <p>It is estimated that an additional demand saving of approximately 8.5% could be expected from a full NEUB, over and above savings achieved by the temporary water use restrictions.</p>	2025/26	2025/26	2025/26
Temporary Use Ban (TUB)	<p>These restrictions cover the outdoor use of water for household purposes. TUBs can be introduced quickly – seven days after an advert has been placed in newspapers in the area. SES Water can grant exceptions from these restrictions for customers and businesses. These exceptions aim to minimise the impact on vulnerable customers and the economy.</p> <p>Two phases would be brought in, in sequence if necessary, as follows:</p>	2025/26	2025/26	2025/26



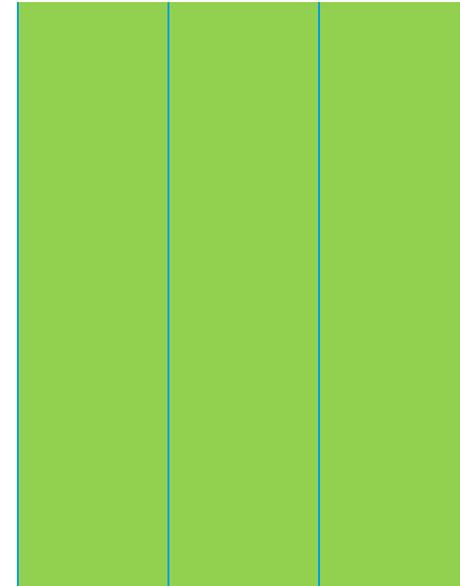
### Phase 1

- Watering a garden using a hosepipe

### Phase 2

- Cleaning a private motor-vehicle using a hosepipe
- Watering plants on domestic or other non-commercial premises using a hosepipe
- Cleaning a private leisure boat using a hosepipe
- Filling or maintaining a domestic swimming or paddling pool
- Drawing water, using a hosepipe, for domestic recreational use
- Filling or maintaining a domestic pond using a hosepipe
- Filling or maintaining an ornamental fountain
- Cleaning walls, or windows, of domestic premises using a hosepipe
- Cleaning paths or patios using a hosepipe

Savings based on a dry year of up to 1.5% at average and 3.5% during peak periods could be expected. A full (Phase 2) hosepipe ban may be anticipated to result in a saving of up to 4% at average and 6% at peak.



### 10.1.1. Least Cost Programme

SES Water have produced a Least Cost Plan (LCP) as a benchmark to appraise the Best Value Plan (BVP) against. It is the programme that delivers the least cost solution but meets statutory requirements and is informed by the SEA and HRA. The LCP also meets policy expectations around demand management. The options featuring in the LCP are presented in Table 10-2.

**Table 10-2: Options selected in the LCP**

Name	Year Utilised
<b>Demand Options</b>	
Consumption Reduction Activities (High+)	2025/26
Government Interventions (HybridC++)	2025/26
Leakage Reduction Activities (High+)	2025/26
Non-Essential Use Bans (NEUBs)	2025/26
Temporary Use Bans (TUBs)	2025/26
<b>Supply Options</b>	
Outwood Lane groundwater (2.7MI/d)	2049/50
Water Lane borehole enhancement (2.2MI/d)	2050/51
Secombe Centre UV (2.1MI/d)	2050/51
Duckpit Wood (1.4MI/d)	2067/68
Raising Bough Beech reservoir (11.5MI/d)	2050/51
Hackbridge drought permit	2041/42
Kenley and Purley drought permit	2041/42
Outwood Lane drought permit	2041/42
River Eden May drought permit	2041/42
River Eden Summer drought permit	2041/42

### 10.1.2. Comparison of options selected against the BVP

Each of the options that feature in the BVP also feature in the LCP and BESP. Table 10-3 below presents the options that feature in the LCP, but not the BVP. Table 10-4 displays the associated SEA for those options that feature in the LCP.

**Table 10-3: Schemes selected in the LCP but not in the BVP**

Name	Year Utilised
<b>Supply Options</b>	
Duckpit Wood (1.4MI/d)	2067/68
Raising Bough Beech reservoir (11.5MI/d)	2050/51



**Table 10-4: SEA scores for schemes selected in the LCP but not in the BVP**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Duckpit Wood (1.4MI/d)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	0	-	-	-	-	-	0	-	-	-	-
Operation	Positive Residual Effects	+	0	+	0	0	0	0	0	0	0	0	0	
	Negative Residual Effects	-	0	--	-	0	0	-	0	0	0	0	0	
Raising Bough Beech reservoir (11.5MI/d)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	
	Negative Residual Effects	0	-	-	-	0	-	-	-	-	-	-	-	
Operation	Positive Residual Effects	++	0	+	++	0	0	0	0	0	0	0	0	
	Negative Residual Effects	0	-	--	-	0	0	-	-	-	-	0	0	

### 10.1.3. Least Cost Plan Summary

The LCP sees the addition of two supply options.

#### Duckpit Wood (1.4MI/d)

The scheme involves the construction of a new Lower Greensand borehole to replace Duckpit Wood and Paines Hill spring licences. It is contingent on neither the Duckpit Wood nor Pains Hill Spring treatment options being implemented. The anticipated increase in ADO is 1.37MI/d and in PDO is 2.14 MI/d. Option is mutually exclusive with R24. If R6 is implemented as well as R23, R6 requires its own 3.4MI/d independent licence.

The construction of this option is not anticipated to result in significant (moderate or major) beneficial or adverse effects in relation to any of the SEA objectives.

The operation of the borehole would likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Obj. 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats.’**, as further WFD assessment will be required due to operational effects. The option also falls within a Surface Water DWSZ and SPZ.

#### Raising of Bough Beech reservoir (11.5MI/d)

Raising the Bough Beech reservoir embankment would increase the volume of stored water, which would provide an increase in the average yield from the reservoir. This option has been included to demonstrate the costs and likely increases in average yield from such a scheme. Based on available drawings of the earth dam alignment, a 3m raising of the embankment would appear to be feasible. It is likely that some realignment of the embankment locally to the small housing development on the north side of the embankment would be required. A detailed study would be necessary to confirm the viability of this scheme. A 3m raising of the embankment would increase the storage volume of the reservoir by approximately 3,600MI. The Aquator model of the Bough Beech reservoir system was used to estimate the additional yield created by the dam raising. It is estimated that the scheme would provide an additional annual average yield of 5.5MI/d, but no increase in peak output which is constrained by the WTW capacity.



The construction of this option is not anticipated to result in significant (moderate or major) beneficial or adverse effects in relation to any of the SEA objectives.

The operation of the option would likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Obj. 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats.’**, as Level 2 WFD assessment finds significant adverse effects on ‘Lower Eden’ (River) and Bough Beech Reservoir (Lake) as effects on these waterbodies cannot be ruled out from the modification of an existing reservoir.

The operation of the option would likely produce significant (moderate) beneficial effects in relation to two SEA objectives:

- **Obj 1: ‘To reduce vulnerability of built infrastructure to climate change risks and hazards’**, as the implementation of this measure will increase resilience to drought events which are expected to be exacerbated by climate change
- **Obj 4: ‘To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain’**, as the works may give rise to opportunities to improve on existing habitat within the immediate area and integrate biodiversity improvement opportunities as part of works. This may be achieved through enhanced planting, wildflower banks, improved connectivity with woodland or integration of National Priority Focus Area objectives of Woods and Parks and Kent Downs.

This significant adverse and beneficial effects are anticipated to be long term, permanent and confined to the local area.

#### 10.1.4. Best Environmental and Social Plan

This programme is not optimised on cost, but will be the programme that SES Water consider delivers best overall environment and society value outcomes. SES Water have identified this by taking into account overall performance across the SEA, Natural Capital and Biodiversity Net Gain metrics, and through engagement with stakeholders. The options featuring in the BESP are presented in Table 10-5.

**Table 10-5: Schemes selected in the BESP**

Name	Year Utilised
<b>Demand Options</b>	
Consumption Reduction Activities (High+)	2025/26
Government Interventions (HybridC++)	2025/26
Leakage Reduction Activities (High+)	2025/26
Non-Essential Use Bans (NEUBs)	2025/26
Temporary Use Bans (TUBs)	2025/26
<b>Supply Options</b>	
Outwood Lane groundwater (2.7MI/d)	2050/51
Water Lane borehole enhancement (2.2MI/d)	2054/55
Secombe Centre UV (2.1MI/d)	2050/51
Duckpit Wood (1.4MI/d)	2067/68
Raising Bough Beech reservoir (11.5MI/d)	2052/53
Hackbridge drought permit	2041/42



Name	Year Utilised
Kenley and Purley drought permit	2041/42
Outwood Lane drought permit	2041/42
River Eden May drought permit	2041/42
River Eden Summer drought permit	2041/42

### 10.1.5. Comparison of options selected against the BVP

Each of the options that feature in the BVP also feature in the BESP. Table 10-6 below presents the options that feature in the BESP, but not the BVP. Table 10-7 displays the associated SEA for those options that feature in the BESP.

**Table 10-6: Schemes selected in the BESP but not in the BVP**

Name	Year Utilised
<b>Supply Options</b>	
Duckpit Wood (1.4MI/d)	2067/68
Raising Bough Beech reservoir (11.5MI/d)	2052/53

**Table 10-7: SEA scores for schemes selected in the BESP but not in the BVP**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
Duckpit Wood (1.4MI/d)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	0	-	-	-	-	-	0	-	-	-	-
Operation	Positive Residual Effects	+	0	+	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	0	--	-	0	0	-	0	0	0	0	0	0
Raising Bough Beech reservoir (11.5MI/d)														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	-	-	-	0	-	-	-	-	-	-	-	-
Operation	Positive Residual Effects	++	0	+	++	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	-	--	-	0	0	-	-	-	-	0	0	-

### 10.1.6. BESP Summary

The BESP sees the addition of two supply options.

#### Duckpit Wood (1.4MI/d)

The scheme involves the construction of a new Lower Greensand borehole to replace Duckpit Wood and Paines Hill spring licences. It is contingent on neither the Duckpit Wood nor Pains Hill Spring treatment options being implemented. The anticipated increase in ADO is 1.37MI/d and in PDO is 2.14 MI/d. Option is mutually exclusive with R24. If R6 is implemented as well as R23, R6 requires its own 3.4MI/d independent licence.



The construction of this option is not anticipated to result in significant (moderate or major) beneficial or adverse effects in relation to any of the SEA objectives.

The operation of the borehole would likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Obj. 3: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats.'**, as further WFD assessment will be required due to operational effects. The option also falls within a Surface Water DWSZ and SPZ.

#### Raising of Bough Beech reservoir (11.5MI/d)

Raising the Bough Beech reservoir embankment would increase the volume of stored water, which would provide an increase in the average yield from the reservoir. This option has been included to demonstrate the costs and likely increases in average yield from such a scheme. Based on available drawings of the earth dam alignment, a 3m raising of the embankment would appear to be feasible. It is likely that some realignment of the embankment locally to the small housing development on the north side of the embankment would be required. A detailed study would be necessary to confirm the viability of this scheme. A 3m raising of the embankment would increase the storage volume of the reservoir by approximately 3,600MI. The Aquator model of the Bough Beech reservoir system was used to estimate the additional yield created by the dam raising. It is estimated that the scheme would provide an additional annual average yield of 5.5MI/d, but no increase in peak output which is constrained by the WTW capacity.

The construction of this option is not anticipated to result in significant (moderate or major) beneficial or adverse effects in relation to any of the SEA objectives.

The operation of the option would likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Obj. 3: 'To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats.'**, as Level 2 WFD assessment finds significant adverse effects on 'Lower Eden' (River) and Bough Beech Reservoir (Lake) as effects on these waterbodies cannot be ruled out from the modification of an existing reservoir.

The operation of the option would likely produce significant (moderate) beneficial effects in relation to two SEA objectives:

- **Obj 1: 'To reduce vulnerability of built infrastructure to climate change risks and hazards'**, as the implementation of this measure will increase resilience to drought events which are expected to be exacerbated by climate change
- **Obj 4: 'To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain'**, as the works may give rise to opportunities to improve on existing habitat within the immediate area and integrate biodiversity improvement opportunities as part of works. This may be achieved through enhanced planting, wildflower banks, improved connectivity with woodland or integration of National Priority Focus Area objectives of Woods and Parks and Kent Downs.

This significant adverse and beneficial effects are anticipated to be long term, permanent and confined to the local area.

# 11. Assessment of WRMP Options

## 11.1. Introduction

In order to meet the requirements of WRMP24 to ensure SES Water customers and communities have continued adequate amounts of clean drinking water supplies available, a series of Options, both 'demand side' Options (measures that reduce demand for water) and 'supply side' Options (measures that increase supply) have been identified and included within the Plan.

Stage B2 of the SEA process normally involves the generation and assessment of plan options. This exercise is undertaken in part to fulfil the requirements of the SEA Regulations, which requires that the Environmental Report should consider:

*'reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme' (SEA Regulations Part 3 Section 12 (2)b).*

## 11.2. Development of Options

Previous Water Resource Management Plans were derived by considering costs that included the economic cost of delivering and operating a scheme, plus a carbon cost.

As noted in Section 1.3.1, SES Water's WRMP24, along with five other water companies WRMPs in the south east, were produced alongside the Water Resources South East (WRSE) regional resilience Plan, in order to give a complete picture of the nation's water resources for the first time. The regional plan, and by association water company plans, were derived by considering a wider set of criteria, that builds on a cost-efficient plan, ensuring that it delivers regulatory and government policy, whilst also protecting and enhancing the environment.

Details on how the SEA informed both the regional and Portsmouth Water's company plan has been set out below.

### 11.2.1. Regional Planning

The WRSE regional plan is a 'best value plan' that delivers wider benefits to society. It considers a range of factors alongside economic cost in the identification of the preferred water resource programme. The development of a best value plan was promoted by the Environment Agency, Ofwat, **Natural England** and Natural Resources Wales in the Water Resources Planning Guideline. WRSE were required to ensure the regional plan met several legal and regulatory requirements and policy expectations at the most efficient cost possible; however, through engagement with customers and stakeholders, the WRSE group identified a range of areas where it could go further. This means that the water resource programme that forms the basis of the WRSE regional plan might not be lowest cost, but it will deliver additional value in the areas that matter most to the people of the region. The Water Resources Planning Guideline (WRPG)<sup>14</sup> sets out the requirements for companies to follow in producing their WRMPs. The supporting Environment Agency National Framework<sup>15</sup> gives details of the indicative scale of challenge facing future water resource provision in England and requires water companies to work together in regional groups to meet the challenge and develop a cohesive set of water resource plans. A best value plan therefore builds from a cost-efficient plan but ensures it delivers regulatory and government policies.

WRSE developed the best value plan objectives, criteria, and metrics through a consultation process in 2021, before the regional plan was developed. The metrics were developed based on the UKWIR guidance, the

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<sup>14</sup> April 2023 [Water resources planning guideline - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/114444/water-resources-planning-guideline.pdf)

<sup>15</sup> Environment Agency, March 2020 [Meeting our future water needs: a national framework for water resources - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/86444/meeting-our-future-water-needs-a-national-framework-for-water-resources.pdf)



National Framework, and the WRPG, to ensure the regional plan met legal, regulatory and policy expectations through a consultation process. Eight broad metrics used to develop the WRSE regional best value plan:

- **Environmental**
  - Strategic Environmental Assessment – positive
  - Strategic Environmental Assessment – negative
  - Natural Capital
  - Biodiversity Net Gain
- **Resilience**
  - Reliability
  - Evolvability
  - Adaptability
- **Customer**
  - Customer option preferences

As the WRSE objectives were high-level, they were turned into measurable indices on which best value could be assessed. Each objective was represented by a set of value criteria which, in turn, had an associated metric<sup>16</sup> that measured the additional value it delivered. WRSE used the criteria and metrics to assess the different water resource programmes that were produced through investment modelling. WRSE also used them to compare the shortlisted good value programmes and explain the differences between them and the additional value each delivered. Each programme comprised a series of options and each option has a series of metrics associated with it.

The overarching process for deriving the best value plan (a best value programme of options) was as follows:

1. The individual water companies and teams working on Strategic Regional Options (SROs) uploaded their option information to the WRSE central data landing platform, which contains over 2,000 options.
2. All options that were uploaded into the WRSE Data Landing Platform (DLP) were assessed at an option level for environmental (including SEA, HRA Screening, WFD Level 1 assessment, Natural Capital Assessment, BNG Assessment and INNS Screening) and resilience metric evaluation.
3. The environmental metrics (translated from the assessment results) were included in the investment model to influence the selection of options.
4. The WRSE investment model then constructed adaptive programmes<sup>17</sup> to meet the challenges based on this information.
5. These candidate programmes were appraised and discussed with customers and stakeholders to gain their views before a regional WRSE adaptive plan was selected for reconciling with the other regions.

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<sup>16</sup> By its nature SEA does not include numerical values for scoring effects. However, in order to incorporate environmental considerations directly into the programme appraisal optimisation model, a SEA metric was developed by WRSE to summarise the environmental performance of each option in numerical form. The SEA metric was developed from the results of the SEA, HRA and WFD assessment processes, and included non-monetised natural capital. For full details refer to WRSE's WRSE Regional Plan Environmental Assessment Methodology Guidance, WRSE / Mott Macdonald June 2020. [wrse\\_file\\_1347\\_wrse-regional-plan-environmental-assessment-methodology-guidance.pdf](#)

<sup>17</sup> WRSE developed a 'root and branch' adaptive tree as the base for forecast for its regional plan investment modelling. This included the most likely set of future challenges and uncertainties facing the south east region over the next 50 years. This required examination of nine different pathways with different combinations of population growth, climate change impacts and levels of environmental ambition. The regional plan identifies the immediate investment needed in all the future pathways. It can then adapt depending on which future occurs. This ensures water companies, including Portsmouth Water, will make the right immediate investment decisions so they can provide resilient water supplies to their customers in the years ahead

6. Following reconciliation, which ensures consistency between regional plans, the WRSE regional plan was then consulted on, and where appropriate, updated. When each candidate regional plan was determined by the investment model, a value for each objective was calculated by aggregating the scores from individual options selected in the plan for each adaptive planning 'situation' through the duration of the plan. Therefore, each situation in a regional plan has its own best value plan score, albeit that the first part of the plan contains common options.

It is important to recognise that the assessment stage followed a two-stage process, including an initial high level screening assessment and a detailed assessment stage. The above details the process for the later stage. The initial environmental assessments for the 'screening' stage of WRMP24 option appraisal, completed by SES Water, helped to shape the feasible option data set that was offered to the WRSE investment model. It acted to validate the unconstrained list screening that SES Water undertook to ensure environmentally damaging options were not considered further and to flag options with high environmental risk, that can still be considered, but where mitigation will be needed. Therefore, a degree of professional judgement, informed by regulator and stakeholder engagement, was applied at an early stage of the options appraisal and prior to the investment modelling that determines the least cost and best value plans. It means that the residual feasible list of options used in the investment modelling is already expected to provide 'better value'.

### 11.2.2. Water Company Planning

The option identification and appraisal process was an important stage in the development of SES Water's WRMP24. A multi-stage process was used to develop a feasible option list to be taken forward into the regional investment model; the key steps were:

7. Identified an extensive list of all potential options, the 'Unconstrained Options' List, which increased available water resource. It should be noted that no new options were identified since WRMP19. All options included in the long list of options came from WRMP14 and WRMP19 and focused on 'traditional' supply side options, e.g. new sources, treatment capacity upgrades, bulk transfers, artificial recharge (AR) schemes and reservoir raising options.
8. Screening of the unconstrained options (a two stage process including initial and secondary screening criteria) was completed to refine the options down to a Feasible Options List, removing options which have an unacceptable environmental impact, a high risk of failure or an insufficient yield or demand reduction. The initial screening stage criteria included consideration of whether the option may affect the status of, or cause deterioration to, a Water Framework Directive (WFD) body, or a designated site. The secondary screening criteria included consideration of whether an option was sustainable, or impacted flood resilience, or impacted the natural landscape or heritage sites.
9. For the remaining feasible options, a review of the multi-criteria assessment AECOM produced to identify whether any options should be rejected was undertaken.
10. The Refined Feasible (41 no.) options were then taken forward for optimisation modelling and programme appraisal from which the Best Value Programmes was derived (as discussed above in the regional planning section).

Full details on the appraisal process used to screen the options is contained within WRMP24 Appendix G 'Options Appraisal Methodology'<sup>18</sup>.

Once the feasible option list had been offered to the regional investment model (IVM), WRSE completed further assessment on the options. This included SEA, HRA Screening, WFD Level 1 assessment, Natural Capital Assessment, BNG Assessment and INNS Screening as noted above. Where the Level 1 assessments

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<sup>18</sup> [WRSE investment model option data inputs \(seswater.co.uk\)](https://www.seswater.co.uk)



identified the need for further assessment, water companies completed the more detailed Level 2 assessments. This included HRA Appropriate Assessment, WFD Level 2 assessment and INNS Risk Assessment.

Revised SEA metrics were populated, reflecting the refined, plan area specific SEA Framework scoring and the results of any Level 2 assessment work, in addition to two additional environmental assessment streams that were requested as part of the consultation exercise, including a Heritage Impact Assessment (that impacted the heritage objective score) and SSSI assessment (that informed the biodiversity objective score).

The metrics for the revised SEA and stage 2 assessments were in turn fed back into the regional model as part of the iterative option selection process.

It should also be noted that if new detailed scheme information (e.g design information) was available at the time of company level assessment stage, the assessment utilised the information and allowed for increased certainty of effect in the assessment.

As such, the SEA has been applied iteratively with the preparation of the regional and company Plan. Three main teams were involved in this iterative process – the SEA team, WRSE and the plan making team. While there was a good working relationship between the teams, it is to be noted that as per good practice, these teams were independent of each other, with the SEA team consisting of employees of AtkinsRéalis, while the plan making team comprised of staff in SES Water and WRSE (Mott MacDonald). It was the role of the SEA Team to iteratively challenge the plan making team.

Environmental and social considerations made in WRMP24 were aligned with the following Themes:

- Biodiversity;
- Population;
- Human health (covering noise issues among other effects on local communities and public health);
- Fauna and flora;
- Soil;
- Water;
- Air;
- Noise;
- Climatic factors
- Material assets (covering infrastructure, waste and other assets
- Cultural heritage including architectural and archaeological heritage; and
- Landscape.

SES Water’s Preferred Plan, as set out in Section 1.4.2 of this report and section 6 of the WRMP24, is based on the Best Value Programme, which not only secures the necessary water resources whilst meeting regulatory and policy requirements, but also increases the overall benefit to customers, the environment and wider society. The approach is detailed in the Best Value Planning Method Statement and the Resilience Framework Method Statement available on the WRSE platform.

The options contained in the BVP are detailed in Table 11-1 (supply options) and 11-2 (demand options) below. As per the alternative plans, the options featuring under Pathway 4 (the reported pathway) have been compared as this pathway is considered compliant with the Water Resources Planning Guideline produced by the Environment Agency.

**Table 11-1: Options in BVP Supply Side Schemes**

Component	Year Utilised
Outwood Lane groundwater (2.7MI/d)	2048/49
Water Lane borehole enhancement (2.2MI/d)	2061/62

Secombe Centre UV (2.1MI/d)	2054/55
Hackbridge drought permit	2041/42
Kenley and Purley drought permit	2041/42
Outwood Lane drought permit	2041/42
River Eden May drought permit	2041/42
River Eden Summer drought permit	2041/42
SES Water to Southern Water (4MI/d)	2025/26 - 2030/31
SES Water to Southern Water (10MI/d) 'Outwood to Turners Hill'	2033/34
SES Water to South East Water (10MI/d) 'Bough Beech to Riverhill'	2038/39
SES Water to South East Water (5MI/d) 'Outwood to Whitely Hill'	2048/49

**Table 11-2: Options in BVP Demand Side Schemes**

Component	Year
Government Interventions (HybridC++)	2025/26
Consumption Reduction Activities (High+)	2025/26
Leakage Reduction Activities (High+)	2025/26
Non-Essential Use Bans (NEUBs)	2025/26
Temporary Use Bans (TUBs)	2025/26

More information on the above Options are contained within the relevant Assessment tables within Level 2 Appendix B5 Assessment Tables of this report, with further detail also available within WRMP24.

The SEA Objectives are:

1. To reduce vulnerability of built infrastructure to climate change risks and hazards
2. To reduce or manage flood risk, taking climate change into account
3. To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats
4. To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain
5. To Protect and enhance the functionality, quantity and quality of soils
6. To reduce and minimise air and noise emissions
7. To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050
8. To conserve, protect and enhance landscape, townscape and seascape character and visual amenity
9. To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains
10. To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing
11. To maintain and enhance tourism and recreation



12. To minimise resource use and waste production
13. To avoid negative effects on built assets / infrastructure

### 11.2.3. Options Assessed by Recipient Water Companies

As set out in Table 12-1, SES Water's BVP contains bulk exports to neighbouring water companies (two exports to SEW and two exports to SWS). As per the agreed WRSE methodology, the onus to assess the associated export option infrastructure sits with the recipient water company and have been assessed by SEW and SWS accordingly.

Bulk export options may be selected when a company forecasts a future surplus in its supply:demand balance. This is exactly how the 2039-40 14.45 MI/d bulk export to Thames Water via Cheam option in SES Water's Least Cost Plan (LCP) (and other bulk export options in this and other plans) has been selected. SES Water forecasts show that they will have surplus 'Water Available for Use' (WAFU) in 2039 due to the balance of their forecast supplies (including earlier selected options) and demand. WRMP24 shows, SES Water forecast demand reductions of 23.74 MI/d by 2034/35 and 48.2 MI/d by 2049/50. These forecast demand reductions more than offset the total exported supplies SES Water forecast over all their plans and therefore they will not need to abstract more water than they currently do now to be able to provide these exports. SES Water is a single Water Resource Zone (WRZ) company, and their source supplies can effectively be deployed throughout the supply area. The source of water required to supply this option may be derived from anywhere within the WRZ and is likely to be derived from multiple sources. The complexity of identifying the relative geographical and temporal contribution of different sources within a WRZ to meet the demand from any newly selected bulk export option and the associated environmental impact of this potentially widely distributed change in abstraction requires detailed water resource scenario modelling. SES Water propose to undertake this as part of their AMP8 WINEP Environmental Destination programme, agreed with Natural England and Environment Agency. However, as indicated above SES Water's export options are not met by increased abstraction, they are met by reductions in demand.

The four bulk export options include:

- SES Water to South East Water (10MI/d) 'Bough Beech to Riverhill'
- SES Water to South East Water (5MI/d) 'Outwood to Whitely Hill'
- SES Water to Southern Water (10MI/d) 'Outwood to Turners Hill'
- SES Water to Southern Water (4MI/d)

A summary of the SEAs for the infrastructure associated with each of these options has been provided below, but full details can be found within the WRMP24s for South East Water and Southern Water for the respective options.

### SES Water to South East Water (10MI/d) 'Bough Beech to Riverhill'

**This option has been assessed by SEW and the information found in their SEA has been summarised below.**

This option involves the construction of an approximately 7km pipeline between Bough Beech service reservoir (SR) of Sutton and East Surrey Water (SES Water) and Riverhill SR in the SEW RZ1 to provide for the transfer of treated water. Key features of this option are:

- Design capacity of 10MI/d (ADO: 2.5 MI/d, PDO: 10 MI/d);
- A pump station at Bough Beech SR operating 365 days a year and 18 hours a day. Four (including one standby) fixed speed pumps installed with the design criteria of 361m<sup>3</sup>/hr and 83kW;
- One pipeline section with design parameters of 500mm diameter and 6.8km long; and

- An expansion of Riverhill SR to add additional 10MI in capacity for 24 hour storage.

The construction of this pipeline will likely produce significant (moderate) adverse effects in relation to biodiversity due to the option intersecting Hubbards Hill SSSI and areas of ancient woodland, soil due to the potential to impact Best and Most Versatile Soils (Grade 3a) and the intersection through Hubbard Hills geological SSSI and greenhouse gases, due to the carbon generated from materials used to construct the new infrastructure (embodied) and construction activities. In addition, there is a reduction in the stock of ancient woodland which is associated with reduced carbon sequestration.

Significant adverse construction effects in relation to biodiversity and soil are expected to be of regional scale, short term and permanent. In terms of carbon emissions, significant adverse effects are anticipated to be short term, temporary and confined to local areas.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its operation.

### SES Water to South East Water (5MI/d) 'Outwood to Whitely Hill'

**This option has been assessed by SEW and the information found in their SEA has been summarised below.**

This option considers the construction of an approximately 13km pipeline between Outwood SR of Sutton and East Surrey Water (SESW ESU) and Whitely Hill service reservoir (SR) in the SEW RZ2 to provide for the transfer of treated water.

Key features of this option are:

- Design capacity of 5MI/d (ADO/ PDO);
- A pump station at Outwood SR operating 365 days a year and 20 hours a day. Two (including one standby) fixed speed pumps installed with the design criteria of 361m<sup>3</sup>/hr and 96kW;
- One pipeline section with design parameters of 350mm diameter and 12.9km long; and
- Treatment facilities at Whitely Hill to remove the chloramination issues.

The construction of this pipeline will likely produce significant (moderate) adverse effects in relation to greenhouse gases, due to the carbon generated from materials used to construct the new infrastructure (embodied) and construction activities. The relative carbon scale identified that the option has expected moderate construction carbon emissions (relative to other WRSE Regional Plan options).

It is considered that this significant adverse effect would be short term and temporary and confined to the local scale.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its operation.

### SES Water to Southern Water (10MI/d) 'Outwood to Turners Hill'

This Southern Water option proposes a new bi-directional transfer from SES Outwood to SWS Buchen Hill, Crawley with a 10MI/d transfer flow rate. No significant effects are anticipated in the SEA in relation to this option.

The HRA screening identifies no Likely Significant Effects on Mole Gap to Reigate Escarpment SAC.

The WFD screening confirms the option as WFD compliant.

### SES Water to Southern Water (4MI/d)

This Southern Water option involves an extension of current re-zoning of supplies from SES Water in SNZ beyond 2025 for up to 4MI/d. No significant effects are anticipated in the SEA in relation to this option.

The HRA screens out all designated European sites from further assessment.

The WFD screening confirms the option as WFD compliant.



### 11.3. Overview of assessment results

The following tables provide an overview of the assessment 'scores' for all of the Options considered within the SEA, for both the construction and operation phases (post mitigation). The assessment findings of each option is then discussed in turn, with full detail provided in Level 2 Appendix B5 Assessment Tables of this report.



**Table 11-3: Construction Scores (Post Mitigation)**

Option Name	Plan Featured	Climate Factors		Water		Biodiversity		Soil		Air Quality		Greenhouse Gas Emissions		Landscape		Cultural Heritage		Population and human health				Material Assets					
		To reduce vulnerability of built infrastructure to climate change risks and hazards	To reduce or manage flood risk, taking climate change into account	To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	To protect and enhance the functionality, quantity and quality of soils	To reduce and minimise air and noise emissions	To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	To maintain and enhance tourism and recreation	To minimise resource use and waste production	To avoid negative effects on built assets / infrastructure													
		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Outwood Lane groundwater (2.7MI/d)	BVP, BESP, LCP	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	-	0	0	
Water Lane borehole enhancement (2.2MI/d)	BVP, BESP, LCP	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0
Secombe Centre UV (2.1MI/d)	BVP, BESP, LCP	0	0	0	0	0	-	0	-	0	0	0	-	0	-	0	-	+	-	0	-	0	-	0	-	0	-
Duckpit Wood (1.4MI/d)	BESP, LCP	0	0	0	0	0	0	0	-	0	-	0	-	0	-	0	-	0	0	0	-	0	-	0	-	0	-
Raising Bough Beech reservoir (11.5MI/d)	BESP, LCP	0	0	0	-	0	-	0	-	0	0	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-
Hackbridge drought permit	BVP, BESP, LCP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Kenley and Purley Drought Permit	BVP, BESP, LCP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Outwood Lane Drought Permit	BVP, BESP, LCP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
River Eden May Drought Permit	BVP, BESP, LCP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
River Eden Summer Drought Permit	BVP, BESP, LCP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Consumption Reduction Activities (High+)	BVP, BESP, LCP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Government Interventions (HybridC++)	BVP, BESP, LCP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Leakage Reduction Activities (High+)	BVP, BESP, LCP	0	0	0	0	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	-	0	0	0	-	0	-
Non-Essential Use Bans (NEUBs)	BVP, BESP, LCP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Temporary Use Bans (TUBs)	BVP, BESP, LCP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A



Table 11-4: Operation Scores (Post Mitigation)

Option Name	Plan Featured	Climate Factors				Water		Biodiversity		Soil		Air Quality		Greenhouse Gas Emissions		Landscape		Cultural Heritage		Population and human health				Material Assets			
		To reduce vulnerability of built infrastructure to climate change risks and hazards		To reduce or manage flood risk, taking climate change into account		To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats		To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain		To protect and enhance the functionality, quantity and quality of soils		To reduce and minimise air and noise emissions		To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050		To conserve, protect and enhance landscape, townscape and seascape character and visual amenity		To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains		To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing		To maintain and enhance tourism and recreation		To minimise resource use and waste production		To avoid negative effects on built assets / infrastructure	
		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Outwood Lane groundwater (2.7MI/d)	BVP, BESP, LCP	+	-	0	0	+	-	0	-	0	0	0	-	0	-	0	0	0	0	0	0	0	0	0	0	0	0
Water Lane borehole enhancement (2.2MI/d)	BVP, BESP, LCP	+	-	0	0	+	-	0	-	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0
Secombe Centre UV (2.1MI/d)	BVP, BESP, LCP	+	0	0	0	+	-	0	0	0	0	0	0	0	-	0	-	0	0	0	0	0	0	0	-	0	0
Duckpit Wood (1.4MI/d)	BESP, LCP	+	-	0	0	+	-	0	-	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0
Raising Bough Beech reservoir (11.5MI/d)	BESP, LCP	++	0	0	0	+	-	++	0	0	0	0	0	0	-	0	-	0	-	0	0	0	0	0	0	0	0
Hackbridge drought permit	BVP, BESP, LCP	++	-	0	0	++	-	0	-	0	-	+	-	+	-	0	-	0	0	++	-	0	-	++	0	+	0
Kenley and Purley Drought Permit	BVP, BESP, LCP	++	-	0	0	++	-	0	-	0	-	+	-	+	-	0	-	0	0	++	-	0	-	++	0	+	0
Outwood Lane Drought Permit	BVP, BESP, LCP	++	-	0	-	++	-	0	-	0	-	+	-	+	-	0	-	0	0	++	-	+	-	++	0	+	0
River Eden May Drought Permit	BVP, BESP, LCP	++	-	0	0	++	-	0	-	0	-	+	-	+	-	0	0	0	0	++	-	+	-	++	0	+	0
River Eden Summer Drought Permit	BVP, BESP, LCP	++	-	0	0	++	-	0	-	0	-	+	-	+	-	0	0	0	0	++	-	+	-	++	0	+	0
Consumption Reduction Activities (High+)	BVP, BESP, LCP	+	0	0	0	++	0	+	0	0	0	+	0	+	0	0	0	0	0	+	0	0	0	+	0	0	0
Government Interventions (HybridC++)	BVP, BESP, LCP	+	0	0	0	++	0	+	0	0	0	+	0	+	0	0	0	0	0	+	0	0	0	+	0	0	0
Leakage Reduction Activities (High+)	BVP, BESP, LCP	+	0	+	0	++	0	++	0	0	0	+	0	+	0	+	-	0	0	+	0	0	0	++	0	0	0
Non-Essential Use Bans (NEUBs)	BVP, BESP, LCP	+	0	0	0	+	0	+	-	0	-	+	0	+	0	-	0	0	0	0	-	0	-	+	0	0	-
Temporary Use Bans (TUBs)	BVP, BESP, LCP	+	0	0	0	+	0	+	-	0	-	+	0	+	0	-	0	0	0	0	-	0	-	+	0	0	-

### 11.3.1. Demand Side Options

The following provides an overview of assessment results for Demand Side Options considered. Note that the assessment of significance is presented in terms of residual effects (i.e., after any additional mitigation is applied) in respect of construction and operation. A discussion on these assessment results follows, with full details of the assessment for each Option provided within Level 2 Appendix B5 Assessment Tables of this report.

### Consumption Reduction Activities (High+)

**Table 11-5: Consumption Reduction Activities (High+)**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Consumption Reduction Activities (High+)</b>														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	++	+	0	+	+	0	0	+	0	+	0
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

It is to be noted that this Option applies across the whole of the SES area. The option involves:

- Home water efficiency audits outside of the smart metering programme
- Education
- General broadcast messages (multi-channel proactive comms)
- Community campaign
- Universal smart metering and continuous flow identification
- Household flow reduction (pressure control)
- Household Incentives: Innovative tariffs
- Non-Household efficiency checks / audits
- Vulnerability / Inclusion and Equality
- Leading by example

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to the operation phase of this Option, it is anticipated that there will be no adverse effects on any of the SEA Objectives. A number of slight positive effects have been identified. Keeping water in the environment may also help avoid negative effects on the built environment (Objective 1). These positive effects include in relation to Biodiversity (Objective 4), where it is anticipated that these measures will help to keep water in the environment and reduce resource pressures and with consequent benefits for water dependent habitat and species. A reduction in demand may also provide slight benefits in respect of air, noise and carbon emissions (Objective 6 and 7) through reduced need for treatment and pumping. An increased awareness through education and community campaigns should also result in improved health and wellbeing (e.g. reduced stress), where the measures will reduce the need for more disruptive action (Objective 10). This Option will also help to reduce and minimise the use of water which is considered a valuable resource and help reduce waste in its treatment (Objective 12).



These noted beneficial effects, though slight, can be considered of regional scale and permanent.

The operation of this pipeline will likely produce moderate significant beneficial effects in relation to one SEA objective:

- **Obj 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’**, due to water being kept within the environment, the protection of water resources, reduced pressures on water supplies and improved efficiency.

It is anticipated that this effect will be of regional scale and can be considered permanent.

## Government Interventions (HybridC++)

**Table 11-6: Government Interventions (HybridC++)**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Government Interventions (HybridC++)</b>														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	++	+	0	+	+	0	0	+	0	+	0
	Negative Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0

This option assumes that the government introduces measures to save water through water labelling, minimum standard for products and new building regulations. It is to be noted that this Option applies across the whole of the SES area.

There is no construction phase associated with this option thus no effects on the SEA objectives emerging from construction.

In relation to the operation phase of this Option, it is anticipated that there will be no adverse effects on any of the SEA Objectives. A number of slight positive effects have been identified. Keeping water in the environment may also help avoid negative effects on the built environment (Objective 1). These positive effects include in relation to Biodiversity (Objective 4), where it is anticipated that these measures will help to keep water in the environment and reduce resource pressures and with consequent benefits for water dependent habitat and species. A reduction in demand may also provide slight benefits in respect of air, noise and carbon emissions (Objective 6 and 7) through reduced need for treatment and pumping. An increased awareness through labelling should also result in improved health and wellbeing (e.g. reduced stress), where the measures will reduce the need for more disruptive action (Objective 10). This Option will also help to reduce and minimise the use of water which is considered a valuable resource and help reduce waste in its treatment (Objective 12).

These noted beneficial effects, though slight, can be considered of regional scale and permanent.

The operation of this pipeline will likely produce moderate significant beneficial effects in relation to one SEA objective:

- **Obj 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’**, due to water being kept within the environment, the protection of water resources, reduced pressures on water supplies and improved efficiency.

It is anticipated that this effect will be of regional scale and can be considered permanent.

Leakage Reduction Activities (High+)



**Table 11-7 – Leakage Reduction Activities (High+)**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Leakage Reduction Activities (High+)</b>														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	-	-	-	-	-	-	-	-	0	-	-
Operation	Positive Residual Effects	+	+	++	++	0	+	+	+	0	+	0	++	0
	Negative Residual Effects	0	0	0	0	0	0	0	0	-	0	0	0	0

It is to be noted that this Option applies across the whole of the SES area. The option involves:

- Find and Fix/ALC -Active Leakage Control
- New Sounding Techniques
- Comm Permanent/Comm ZoneScan fixed networks
- Enigma Sweeps
- Fixed Sensor Plastic Network
- New DMAs/DMA Integrity (inc. DMA Playbook)
- Smart Network – Digital Twin
- AI Enabled sound loggers (e.g., FIDO bugs)
- Digital Sounding Sticks (e.g., Iquarius/LS1)
- Universal Smart Metering
- Project Calm – Network Calming Strategy-
- Trunk and rural mains strategy
- Satellite Imagery
- Mains Replacement

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. During construction though, a number of slight adverse effects have been identified. These include on Biodiversity (Objective 4), due to the potential for negative effects on biodiversity and priority habitats during leakage works, and Soil (Objective 5) as construction has the potential to disturb contaminated material and impact on BMV agricultural land. Slight adverse effects could be expected through the activities associated with leakage works on water quality (Objective 3), air, noise and carbon emissions (Objective 6 and 7), landscape and visual amenity (Objective 8), the historic environment (Objective 9) and health and wellbeing due to disturbance causing effects on wellbeing (stress) induced by repair works (Objective 10). Repair works will also lead to the use of resources and increase waste (Objective 12), while there may be effects on built infrastructure (Objective 13) such as road surfacing.

Such construction adverse effects are anticipated to be local scale, excluding the regional impact on biodiversity, short term and temporary to the construction / repair phase.

A range of slight beneficial effects have been identified associated with the operation phase of this Option. These include in relation to air, noise and carbon emissions (Objective 6 and 7) as reduced water pumping and treatment is required. Keeping water in the environment may also help avoid negative effects on the built environment (Objective 1). Network improvements are also likely to lead to a reduction in pipe bursts and help to reduce the risk of accidental flooding (Objective 2). More water will also be retained in the environment and



help maintain visual amenity (Objective 8). Securing a more resilient water supply will also help maintain health and wellbeing (Objective 10).

Such construction / repair benefits, while small scale, will be long term and can be considered permanent.

The operation of this Option will likely produce significant beneficial effects in relation to three SEA objectives:

- **Obj 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’**, due to awareness campaigns, retrofitting, metering and leakage reduction works resulting in water being kept within the environment. Reduced resource pressures, protection of water resources and increasing availability for water dependant habitat and species.
- **Obj 4: ‘To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain’**, due to reduced demand for water leading to greater volumes being retained within the environment.
- **Objective 12: ‘To minimise resource use and waste production’**, as leakage works will reduce resource use and wastage.

These beneficial effects can be considered of local scale, excluding the regional effect on Biodiversity, but long term and can be considered permanent.

## Non-Essential Use Bans (NEUBs)

**Table 11-8: Non-Essential Use Bans (NEUBs)**

Supply Side Option		SEA Objective													
		1	2	3	4	5	6	7	8	9	10	11	12	13	
<b>Non-Essential Use Bans (NEUBs)</b>															
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	0	+	+	0	0	0	0	+	0	
	Negative Residual Effects	0	0	0	-	-	0	0	-	0	-	-	0	-	

This Option would apply to the whole of the SES area. NEUBs target non-domestic users and may only be implemented following approval of an Ordinary Drought Order by the Secretary of State. Typically, NEUBs would include:

- Watering outdoor plants on commercial premises
- Filling or maintaining a non-domestic swimming or paddling pool
- Filling or maintaining a pond
- Operating a mechanical vehicle-washer
- Cleaning any vehicle, boat, aircraft or railway rolling stock;
- Cleaning non-domestic premises
- Cleaning a window of a non-domestic building
- Cleaning industrial plant
- Suppressing dust
- Operating cisterns



There is no construction phase associated with this Option thus no effects on the SEA objectives emerging from construction. In relation to operational effects, while no significant beneficial effects have been identified, there are anticipated to be a number of slight beneficial effects, and these are mainly associated with the outcome of reducing demand and potentially reducing abstraction / treatment. This is considered likely to have beneficial effects in terms of increasing resilience (Objective 1). Reduced abstraction will help maintain river and groundwater levels (Objective 3). Slight beneficial effects are anticipated in relation to Biodiversity (Objective 4) as more water will remain in the environment, with consequent benefits for water dependant species and habitats. Reduced treatment and pumping will reduce air, noise and carbon emissions (Objectives 6 and 7). Reduced abstraction, treatment and pumping will also reduce the use of resources and waste produced (Objective 12).

It is considered that all slight beneficial effects will be at the very local scale, short term and temporary.

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. A number of slight adverse effects have been identified though. In relation to Biodiversity (Objective 4), the restrictions on watering plants and using hosepipes may have minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. There could also be effects on soils (Objective 5) through dust generation and erosion e.g. in gardens or other such open spaces. Lack of ability to water open spaces, or operate ornamental fountains etc. could impact visual amenity and landscapes (Objective 8). Non-essential use ban is likely to have minor negative effects on the community and social well-being (Objective 10) as there will be restrictions on irrigation of gardens and allotments and use of water for recreational purposes. There may also be a small increased risk of fires in allotments as vegetation dries out. Risk to human health and wellbeing may also be increased where dust suppression measures cannot be implemented and cleaning of paths and other infrastructure restricted. This may increase health and safety risks. Assuming commercial properties including gardens are exempt from bans and restrictions there is likely to be only a minor effect on tourism and recreation (Objective 11). Non-commercial tourism sites may be affected. In addition, while temporary, the Option is likely to impact on the maintenance of buildings and industrial plant (Objective 13).

It is considered that all slight adverse effects will be short term and temporary and confined to the local scale.

## Temporary Use Bans (TUBs)

**Table 11-9: Temporary Use Bans (TUBs)**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Temporary Use Bans (TUBs)</b>														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	+	0	+	+	0	+	+	0	0	0	0	+	0
	Negative Residual Effects	0	0	0	-	-	0	0	-	0	-	-	0	-

This Option would apply to the whole of the SES area. TUBs are restrictions which cover the outdoor use of water for household purposes and can be introduced quickly. It is considered that these would be introduced in phases and include the following components:

### Phase 1

- Watering a garden using a hosepipe

## Phase 2

- Cleaning a private motor-vehicle using a hosepipe
- Watering plants on domestic or other non-commercial premises using a hosepipe
- Cleaning a private leisure boat using a hosepipe
- Filling or maintaining a domestic swimming or paddling pool
- Drawing water, using a hosepipe, for domestic recreational use
- Filling or maintaining a domestic pond using a hosepipe
- Filling or maintaining an ornamental fountain
- Cleaning walls, or windows, of domestic premises using a hosepipe
- Cleaning paths or patios using a hosepipe

No construction activities are required in relation to this option and as such no effects on SEA objectives emerging from construction have been identified. In relation to operational effects of this option, while no significant beneficial effects are identified, there are a number of slight beneficial anticipated and these are mainly associated with the outcome of reducing demand and potentially reducing abstraction / treatment. This is considered likely to have beneficial effects in terms of increasing resilience (Objective 1). The option aims to reduce the water required for supply, therefore resulting in a reduction in abstraction which will help maintain river flows and protect ground water and surface water bodies (Objective 3). Slight beneficial effects are anticipated in relation to Biodiversity (Objective 4) as more water will remain in the environment, with consequent benefits for water dependant species and habitats. Reduced treatment and pumping will reduce air, noise and carbon emissions (Objectives 6 and 7). Reduced abstraction, treatment and pumping will also reduce the use of resources and waste produced (Objective 12).

It is considered that all slight beneficial effects will be at the very local scale, short term and temporary.

It is not anticipated that the operation of this option will produce significant adverse effects in relation to any of the SEA objectives. A number of slight adverse effects have been identified though. In relation to Biodiversity (Objective 4), the restrictions on watering plants and using hosepipes may have minor adverse effects on pollinators, insects, fish (domestic ponds) and birds (bird baths) where gardens are found to support such biodiversity. There could also be effects on soils (Objective 5) through dust generation and erosion e.g. in gardens or other such open spaces. Lack of ability to water open spaces, or operate ornamental fountains etc. could impact visual amenity and landscapes (Objective 8). Non-essential use ban is likely to have minor negative effects on the community and social well-being (Objective 10) as there will be restrictions on irrigation of gardens and allotments and use of water for recreational purposes. There may also be a small increased risk of fires in allotments as vegetation dries out. Wellbeing impacts associated with reduced water based recreational activities which improve tolerance and capacity to enjoy higher temperatures. Assuming commercial properties including gardens are exempt from bans and restrictions there is likely to be only a minor effect on tourism and recreation (Objective 11). Non-commercial tourism sites may be affected. In addition, while temporary, the option is likely to impact on private assets / residential properties (Objective 13).

It is considered that all slight adverse effects will be short term and temporary and confined to the local scale.

### 11.3.2. Supply Side Options

The following provides an overview of assessment results for Supply Side Options considered. Note that the assessment of significance is presented in terms of residual effects (i.e., after any additional mitigation is applied) in respect of construction and operation. A discussion on these assessment results follows, with full details of the assessment for each Option provided within Level 2 Appendix B5 Assessment Tables of this report.

## Outwood Lane groundwater (2.7MI/d)

**Table 11-10: Outwood Lane groundwater (2.7MI/d)**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Outwood Lane groundwater (2.7MI/d)</b>														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	0	0	0	0	-	0	0	0	0	-	0
Operation	Positive Residual Effects	+	0	+	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	0	--	-	0	-	-	0	0	0	0	0	0

This scheme seeks an increase in daily licence from 3MI/d to 8 MI/d and requires an equivalent increase in pump capacity. The hydraulic capacity of the source has been proved during previous test pumping. The increase in PDO associated with the scheme would be 5 MI/d. Potential for an ADO scheme has been considered by comparing the Woodmansterne group daily average licence limit with abstraction returns for the group from 2010-2016. The group licence offers an average headroom of 3.4 MI/d if the borehole can be made to yield it.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. No slight beneficial effects during construction were identified either, though slight adverse effects are anticipated during construction in respect of Objective 7 as carbon will be generated from materials used to construct the new infrastructure (embodied carbon). Slight adverse effects are also anticipated in relation to Objective 12 (resource use) as an increase in pump capacity is required which will require some material consumption.

It is anticipated that all construction effects would be local, short term and temporary to the construction phase.

It is anticipated that this option would not result in any significant beneficial effects during its operation. During operation, slight beneficial effects are anticipated in respect of Objective 1 as the option may increase the resilience of the surface water environment to climate change as it would allow the use of a source further away up-catchment from the Carshalton and Waddon springs in preference to those sources nearer the springs. However, slight negative effects are anticipated in respect of Objective 1 as the option, by itself, may result in small groundwater level reductions leading to reductions spring flow rate and duration. Slight beneficial effects are also anticipated in relation to water (Objective 3) as the works will supply water on completion and therefore reduce pressure on other sources as described under Objective 1. However, the potential for Moderate (which fall into Significant) negative effects is identified under Objective 3 in relation to potentially reducing springflow driving groundwater heads, and slight negative effectiveness in relation to Objectives 1, 4, 6 and 7. Previous WINEP and Drought Permit Environment Assessment investigations of SES Water's and Thames Water's existing abstractions closer to the ponds have demonstrated complex surface water and groundwater interactions without a directly proportional impact of abstraction on spring flow. Improved insight into the impact of this option is likely to require groundwater modelling. The Environment Agency's London Basin Model has only just been updated with better calibration in the North Downs area and with the option not selected until 2049, SES Water proposes to undertake further investigation of the sustainability of this option as part of future WINEP in liaison with NE and EA.

Slight adverse effects are anticipated in relation to Objective 1 as resilience of the groundwater environment to climate change likely to be affected by increased abstraction. Chipstead SSSI may be adversely affected by increased abstraction during the operational phase thus slight adverse impacts are expected for Objective 4 (biodiversity). Slight adverse effects would be associated with increased pumping requirements in relation to noise, air and carbon emissions (Objective 6 and 7).



The operation of this pipeline will likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Objective 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’**, as the WFD assessment finds significant adverse effects on Epsom North Downs Chalk (Ground waterbody) cannot be ruled from the increased abstraction during operation.

It is anticipated that the operational effects would be at the local scale, but would be long term (as per the lifespan of the infrastructure) and effectively permanent.

## Water Lane borehole enhancement (2.2MI/d)

**Table 11-11 – Water Lane borehole enhancement (2.2MI/d)**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Water Lane borehole enhancement (2.2MI/d)</b>														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	0	0	0	0	-	0	0	0	0	0	0
Operation	Positive Residual Effects	+	0	+	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	-	0	--	--	0	0	-	0	0	0	0	0	0

Scheme seeks to increase ADO and PDO by increasing pump capacity and lowering pump cut-out at Water lane groundwater source. The scheme aims to remove water quality constraint increasing ADO and PDO to potential yield of the borehole.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. No slight beneficial effects during construction were identified either, though slight adverse effects are anticipated during construction in respect of Objective 7 as carbon will be generated from materials used to construct the new infrastructure (embodied carbon). It is anticipated that this construction effect would be local, short term and temporary to the construction phase.

It is anticipated that this option would not result in any significant beneficial effects during its operation. During operation, slight beneficial effects are anticipated in respect of Objective 1 as the option may increase the resilience of the surface water environment to climate change as it would be using an alternative source. Slight beneficial effects are also anticipated in relation to water (Objective 3) as the works will supply water on completion and therefore reduce pressure on other sources.

Slight adverse effects are anticipated in relation to Objective 1 as resilience of the groundwater environment to climate change likely to be affected by increased abstraction. Slight adverse effects would be associated with increased pumping requirements in relation to carbon emissions (Objective 7).

The operation of this pipeline will likely produce significant (moderate) adverse effects in relation to two SEA objectives:

- **Objective 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’**, as the WFD screening assessment (2020) identified that further WFD assessment is required. There is likely to be an increase in abstraction which will therefore potentially impact on groundwater levels and quality during operation.
- **Objective 4: ‘To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain’**, as there may be effects on Woldingham & Oxted Downs SSSI / GWDTE and Titsey Woods SSSI / GWDTE during operation. Also, Chalk rivers



were identified within 0.5km and no hydrological connections were noted however impacts via hydrogeological connection have not been ruled out.

It is anticipated that the significant operational effects would be at the local scale, but would be long term (as per the lifespan of the infrastructure) and effectively permanent.

## Secombe Centre UV (2.1MI/d)

**Table 11-12 – Secombe Centre UV (2.1MI/d)**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Secombe Centre UV (2.1MI/d)</b>														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	+	0	0	0
	Negative Residual Effects	0	0	-	-	0	-	-	-	-	-	-	-	-
Operation	Positive Residual Effects	+	0	+	0	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	--	0	0	0	-	-	0	0	0	-	0

This scheme provides UV treatment for the Secombe Centre groundwater source which is currently out of supply due to bacti detections on the raw water. Due to the limited footprint available at the Secombe Centre site, the UV treatment plant would be located at Cheam WTW on the 'East Main' which feeds water from Hackbridge, Goatbridge, Woodcote, Oaks, Langley Park, Sutton and Sutton Court Rd boreholes as well as Secombe Centre.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. One slight beneficial effect during construction was identified in respect of SEA Objective 9 'to conserve, protect and enhance the historic environment and heritage assets, including archaeological remains' as there is the potential to improve local archaeological understanding.

Significant adverse (moderate) affects have been identified in relation to:

- **SEA Objective 3 'to protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats'** as the option falls within a Drinking Water Safeguard Zone (DWSZ) for groundwater within a Source Protection Zone.

It should be noted, that SES Water have made a commitment to review this option during detailed design and planning stage and have not ruled out an alternative option should these effects prove to be unmitigatable to a satisfactory level.

## Raising of Bough Beech reservoir (11.5MI/d)

**Table 11-13: Raising Bough Beech reservoir (11.5MI/d)**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Raising Bough Beech reservoir (11.5MI/d)</b>														
Construction	Positive Residual Effects	0	0	0	0	0	0	0	0	0	0	0	0	0



Operation	Negative Residual Effects	0	-	-	-	0	-	-	-	-	-	-	-	-
	Positive Residual Effects	++	0	+	++	0	0	0	0	0	0	0	0	0
	Negative Residual Effects	0	0	--	0	0	0	-	-	-	0	0	0	0

Raising the Bough Beech reservoir embankment would increase the volume of stored water, which would provide an increase in the average yield from the reservoir. This option has been included to demonstrate the costs and likely increases in average yield from such a scheme. Based on available drawings of the earth dam alignment, a 3m raising of the embankment would appear to be feasible. It is likely that some realignment of the embankment locally to the small housing development on the north side of the embankment would be required. A detailed study would be necessary to confirm the viability of this scheme. A 3m raising of the embankment would increase the storage volume of the reservoir by approximately 3,600MI. The Aquator model of the Bough Beech reservoir system was used to estimate the additional yield created by the dam raising. It is estimated that the scheme would provide an additional annual average yield of 5.5MI/d, but no increase in peak output which is constrained by the WTW capacity.

It is anticipated that this option would not result in any significant adverse or beneficial effects during its construction. No slight beneficial effects during construction were identified either, though slight adverse effects are anticipated during construction in respect of Objective 2 as the reservoir is largely within Flood Zones 2 and 3 and construction works may increase risk of pollution incidents due to flooding. Impacts are anticipated in relation to water (Objective 3) as the option requires construction works in proximity to an existing surface water receptor with potential to result in deterioration of water quality/flow. Due to the potential permanent loss of Ancient Woodland slight adverse impacts are anticipated for Biodiversity (Objective 4). However it should be noted that the Bough Beech estate is due to be nominated into PR24 Biodiversity Performance Commitment (PC). As such the development of the Bough Beech reservoir embankment will need to adhere to the strict requirements underlined in the PC. The estate represents the largest of SES Water’s three company land holdings that will be nominated into the PC and contains stipulations that would see a major focus on protection and restorative development. This commitment, alongside a commitment to achieving 10% BNG with the option development, will see the Bough Beech design go through significant iterations with detailed mitigation and enhancement opportunities being sought that will result in a restorative development process and the enhancement of both biodiversity and ecosystem services.

There is potential for temporary deterioration in air and noise environment (Objective 6) during construction. Also, carbon will be generated from materials used to construct the new infrastructure (embodied carbon) thus slight adverse impacts are anticipated for Objective 7. The option is partially within Kent Downs AONB and London Area Greenbelt and there will potentially be minor effects on landscape character and visual amenity (Objective 8) as a result of raising an existing embankment. There is potential for the option to adversely impact heritage assets (Objective 9) during construction, particularly listed buildings in close proximity as well as buried archaeology. Slight adverse effects are also anticipated from construction on the local community using the area for recreation, tourism and water based recreation (Objectives 10 and 11), resource use and waste production (Objective 12) and built assets due to disruption to the local road network (Objective 13).

It is anticipated that all construction effects would be small scale, short term and temporary to the construction phase.

During operation, slight beneficial effects were identified for Objective 3 as the option will facilitate increased water storage.

The operation of this pipeline will likely produce significant (moderate) adverse effects in relation to two SEA objectives:

- **Objective 1: ‘To reduce vulnerability of built infrastructure to climate change risks and hazards’** as by storing more water, the reservoir is anticipated to increase resilience to drought events which are expected to be exacerbated by climate change.

- **Objective 4: ‘To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain’** as works may give rise to opportunities to improve on existing habitat within the immediate area.

Slight adverse effects during operation are anticipated during operation in relation to Objective 7 as carbon will be generated during operation. Slight adverse effects on landscape character and visual amenity (Objective 8) will continue through operation though reducing as planting and landscaping/reinstatement becomes established. The setting of heritage assets (Objective 9) including listed buildings in close proximity may be adversely affected during operation.

The operation of this pipeline will likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Objective 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’**, as until further WFD assessment has been undertaken the potential for significant adverse effects on the Lower Eden during operation cannot be ruled out.

It is anticipated that the operational effects would be at the local scale, but would be long term (as per the lifespan of the infrastructure) and effectively permanent.

## Hackbridge Drought Permit

**Table 11-14: Hackbridge Drought Permit**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Hackbridge Drought Permit</b>														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	++	0	++	0	0	+	+	0	0	++	0	++	+
	Negative Residual Effects	-	0	-	-	-	-	--	-	0	-	-	0	0

The Hackbridge licence is complicated due to the recharge component, which determines how much water can be abstracted in the following summer, and the aggregation with Wandle Laundry. It is proposed that the drought option decouples abstraction from the volume recharged and allows abstraction to be maximised (19 MI/d) regardless of the volume recharged in the preceding winter. On the assumption that typically 250-350 MI/d is recharged, which permits a 15 MI/d abstraction in the following summer, this permit would generate 4 MI/d benefit. A condition of this permit could be a commitment that a minimum volume is recharged in the preceding and following winter, subject to the drought not continuing into a multi-year drought (in which scenario the water may not be available for recharge). The Hackbridge Group licence comprises three sources in the confined Chalk: Hackbridge (two operational boreholes), Goatbridge (one operational borehole) and Bishopsford Road.

As a condition of the licence, outflow from Carshalton Ponds (as measured at the Grove on the River Wandle, also referred to as the Carshalton Gauging Station (GS)) has to be maintained at greater than 4.5 MI/d before abstraction can take place at the Hackbridge Group boreholes along with a number of SES Water’s other unconfined Chalk sources. To achieve this, SES Water operates an augmentation scheme whereby river water is drawn from the River Wandle at the Goatbridge intake and pumped back up to Carshalton Ponds. It is also possible to use the water from Goatbridge borehole which normally pumps into supply if required, although this option has never been required. The scheme essentially re-circulates the flow in the upper stretches of the Carshalton branch when the natural spring flow into the Ponds is less than 4.5 l/d.

The drought permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September). Should indicators of future water resource availability within the SES Water supply area return to sufficient levels to provide confidence that water supply can be maintained by normal licensed abstraction, the drought permit would be suspended.

No construction activities are required in relation to this option and as such no effects on SEA objectives emerging from construction have been identified. During operation, slight beneficial effects are anticipated in respect of air, noise and carbon (Objectives 6 and 7) as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in more significant impacts. Slight beneficial impacts are also anticipated in respect of built assets and infrastructure should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions).

The operation of this pipeline will likely produce significant (moderate) beneficial effects in relation to four SEA objectives:

- **Objective 1: ‘To reduce vulnerability of built infrastructure to climate change risks and hazards’** as the implementation of this measure will increase resilience to climate change.
- **Objective 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’** as the option, as part of the wider Drought Plan will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.
- **Objective 10: ‘To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing’** as its capacity to ensure provision of water during periods of drought will be beneficial to health and wellbeing.
- **Objective 12: ‘To minimise resource use and waste production’** as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.

During operation, slight adverse effects are anticipated in respect of Objective 1 as climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. During drought situations, where there is limited recharge to the aquifer system, the abstraction may mainly be at the expense of groundwater storage in the aquifer. This can, in the long run, delay groundwater level recovery and have a knock-on effect on baseflow contributions to watercourses and water dependent habitats (Objective 3). There may be potential impacts on priority species and therefore slight adverse impacts are anticipated for biodiversity (Objective 4). Slight adverse effects are also anticipated in relation to deposition of sediment in river (Objective 5) – lower flows result in the river having less energy to carry sediment. The hydrological changes are expected to result in only short term impacts on sediment dynamics, the river channel and/or the river bank, which are unlikely to lead to significant changes in wetted areas or the integrity of river function. While abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational air and noise emissions (Objective 6). Waddon Ponds are an important feature for recreational use in the area, especially for walkers. A visual eyesore would be created should these ponds dry up which may adversely impact walkers. Whilst this may be a likely situation during an extreme drought, it is not anticipated as an outcome from the drought permit though it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond (Objective 8, 10 and 11).

The operation of this pipeline will likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Objective 7: ‘To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050’** as while abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational carbon emission.



It is anticipated that operational effects would be at the local scale, with the exception of Biodiversity which would be at a regional scale. The effects would be long term (as per the lifespan of the infrastructure) and temporary.

## Kenley and Purley Drought Permit

**Table 11-15: Kenley and Purley Drought Permit**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Kenley and Purley Drought Permit</b>														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	++	0	++	0	0	+	+	0	0	++	0	++	+
	Negative Residual Effects	-	0	--	-	-	-	--	-	0	-	-	0	0

Kenley and Purley are licence constrained at MDO (22.79 MI/d). The PDO (41.28 MI/d) which is almost double that of the MDO, is constrained by pump capacity. Therefore, there is the potential for a drought option to increase the annual average licence such that the PDO could be sustained, generating up to 18.5 MI/d. The capacity at the WTW and pump capacity limits the potential to increase PDO further.

Previous drought plans also included a drought option at Kenley and Purley. The option sought to increase the annual licence to allow the pumping at the then PDO rate of 24.9 MI/d. The PDO has now significantly changed; in WRMP19 the PDO increased from 24.9 MI/d to 41.28 MI/d and has since been confirmed in WRMP24. There is therefore the potential for a larger drought option at Kenley and Purley than previously identified. However, this is not currently believed to be required. Whilst the results of the current round of water resource modelling are not yet available to clearly demonstrate this, initial modelling does not indicate larger deficits would be encountered than in previous plans. Therefore, it is assumed the volume of water provided by the previous drought permit/orders (9 MI/d) remains sufficient, and consequently no adjustment to Kenley and Purley option is required.

The drought permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September). Should indicators of future water resource availability within the SES Water supply area return to sufficient levels to provide confidence that water supply can be maintained by normal licensed abstraction, the drought permit would be suspended.

No construction activities are required in relation to this option and as such no effects on SEA objectives emerging from construction have been identified. During operation, slight beneficial effects are anticipated in respect of air, noise and carbon (Objectives 6 and 7) as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in more significant impacts. Slight beneficial impacts are also anticipated in respect of built assets and infrastructure should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions).

The operation of this pipeline will likely produce significant (moderate) beneficial effects in relation to four SEA objectives:

- **Objective 1: 'To reduce vulnerability of built infrastructure to climate change risks and hazards'** as the implementation of this measure will increase resilience to climate change.



- **Objective 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’** as the option, as part of the wider Drought Plan will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.
- **Objective 10: ‘To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing’** as its capacity to ensure provision of water during periods of drought will be beneficial to health and wellbeing.
- **Objective 12: ‘To minimise resource use and waste production’** as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.

During operation, slight adverse effects are anticipated in respect of Objective 1 as climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. There may be potential impacts on priority species and therefore slight adverse impacts are anticipated for biodiversity (Objective 4). Slight adverse effects are also anticipated in relation to deposition of sediment in river (Objective 5) – lower flows result in the river having less energy to carry sediment. The hydrological changes are expected to result in only short term impacts on sediment dynamics, the river channel and/or the river bank, which are unlikely to lead to significant changes in wetted areas or the integrity of river function. While abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational air and noise emissions (Objective 6). Waddon Ponds are an important feature for recreational use in the area, especially for walkers. A visual eyesore would be created should these ponds dry up which may adversely impact walkers. Whilst this may be a likely situation during an extreme drought, it is not anticipated as an outcome from the drought permit though it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond (Objective 8, 10 and 11).

The operation of this pipeline will likely produce significant (moderate) adverse effects in relation to two SEA objectives:

- **Objective 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’** as the EAR notes in summary that the Drought permit may create an interference drawdown with SES and Thames Water groundwater sources, also identifying ‘Poor’ and ‘Bad’ WFD status in associated waterbodies.
- **Objective 7: ‘To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050’** as while abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational carbon emission.

## Outwood Lane Drought Permit

**Table 11-16 – Outwood Lane Drought Permit**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>Outwood Lane Drought Permit</b>														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	++	0	++	0	0	+	+	0	0	++	+	++	+
	Negative Residual Effects	-	-	-	-	-	-	--	-	0	-	-	0	0



The purpose of this drought permit is to allow for increased abstraction at Outwood Lane. It is proposed that the current daily licence limit is increased from 3.02 to 5 Ml/d, equivalent to the Outwood Lane pump capacity. The permit also allows for a proportional increase in the Woodmansterne group annual licence limit to avoid output from the other sources in the group from being curtailed.

This drought option would therefore be to increase both the annual licence at Outwood Lane and the Woodmansterne Group to allow an additional 2 Ml/d pumping from Outwood Lane for a maximum 6-month duration.

The drought permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September). Should indicators of future water resource availability within the SES Water supply area return to sufficient levels to provide confidence that water supply can be maintained by normal licensed abstraction, the drought permit would be suspended.

No construction activities are required in relation to this option and as such no effects on SEA objectives emerging from construction have been identified. During operation, slight beneficial effects are anticipated in respect of air, noise and carbon (Objectives 6 and 7) as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in more significant impacts. Slight beneficial impacts are also anticipated in respect of tourism and recreation through for example provision of water for major consumers such as hotels and for built assets and infrastructure should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions).

The operation of this drought permit will likely produce significant (moderate) beneficial effects in relation to four SEA objectives:

- **Objective 1: ‘To reduce vulnerability of built infrastructure to climate change risks and hazards’** as the implementation of this measure will increase resilience to climate change.
- **Objective 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’** as the option, as part of the wider Drought Plan will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.
- **Objective 10: ‘To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing’** as its capacity to ensure provision of water during periods of drought will be beneficial to health and wellbeing.
- **Objective 12: ‘To minimise resource use and waste production’** as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.

During operation, slight adverse effects are anticipated in respect of Objective 1 and 2 as climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. In terms of water and biodiversity (Objective 3 and 4) slight adverse effects are anticipated as during drought situations, where there is limited recharge to the aquifer system, the abstraction may mainly be at the expense of groundwater storage in the aquifer. This can, in the long run, delay groundwater level recovery and have a knock-on effect on baseflow contributions to watercourses and water dependent habitats. Slight adverse effects are also anticipated in relation to deposition of sediment in river (Objective 5) - lower flows result in the river having less energy to carry sediment. The hydrological changes are expected to result in only short term impacts on sediment dynamics, the river channel and/or the river bank, which are unlikely to lead to significant changes in wetted areas or the integrity of river function. While abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational air and noise emissions (Objective 6). Waddon Ponds are an important feature for recreational use in the area, especially for walkers. A visual eyesore would be created should these ponds dry up which may adversely impact walkers. Whilst this may be a likely situation during an extreme drought, it is not anticipated as an outcome from the drought permit though it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond (Objective 8, 10 and 11).



The operation of this drought permit will likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Objective 7: ‘To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050’** as while abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational carbon emission.

## River Eden May Drought Permit

**Table 11-17 – River Eden May Drought Permit**

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>River Eden May Drought Permit</b>														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	++	0	++	0	0	+	+	0	0	++	+	++	+
	Negative Residual Effects	-	0	-	-	-	-	--	0	0	-	-	0	0

Bough Beech reservoir is refilled primarily via an abstraction from the River Eden which normally operates during the autumn/winter. A drought permit to enable the winter abstraction from the River Eden to continue for an additional period of time; historically this has been into May, so this permit is often termed the May drought permit. The benefit of the proposed drought permit abstraction would be up to 272.2MI/d of refill volume to the reservoir during May subject to a Minimum Residual Flow (MRF) in the River Eden. A MRF of 22MI/d would apply and the annual abstraction limit of 29,000MI/d would apply (it is assumed that the cap would extend from the preceding September through to the end of May). No construction would be required in order to facilitate the increased abstraction associated with the drought permit. Due to operational practice and infrastructure constraints, the abstraction would cease well before natural flows in the river reduce to 22MI/d and when flows are recovering would not start until flows are much higher than 22MI/d.

No construction activities are required in relation to this option and as such no effects on SEA objectives emerging from construction have been identified. During operation, slight beneficial effects are anticipated in respect of air, noise and carbon (Objectives 6 and 7) as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in more significant impacts. Slight beneficial impacts are also anticipated in respect of tourism and recreation, through for example provision of water for major consumers such as hotels, and for built assets and infrastructure should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions).

The operation of this drought permit will likely produce significant (moderate) beneficial effects in relation to four SEA objectives:

- **Objective 1: ‘To reduce vulnerability of built infrastructure to climate change risks and hazards’** as the implementation of this measure will increase resilience to climate change.
- **Objective 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’** as the option, as part of the wider Drought Plan will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.



- **Objective 10: ‘To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing’** as the drought permit will support and sustain the water-related recreation which takes place within Bough Beech reservoir and therefore the drought permit provides a benefit to these activities.
- **Objective 12: ‘To minimise resource use and waste production’** as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.

During operation, slight adverse effects are anticipated in respect of Objective 1 as climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. In terms of water (Objective 3) slight adverse effects are anticipated as future drought permit abstraction during May is expected to have a Minor ‘overall category of impact’ on the water quality in the River Eden (from Bough Beech abstraction point to confluence with River Medway). Slight adverse effects are anticipated in relation to biodiversity (Objective 4) due to potential impacts on designated sites. Slight adverse effects are also anticipated in relation to deposition of sediment in river (Objective 5) – lower flows result in the river having less energy to carry sediment. The hydrological changes are expected to result in only short term impacts on sediment dynamics, the river channel and/or the river bank, which are unlikely to lead to significant changes in wetted areas or the integrity of river function. While abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational air and noise emissions (Objective 6). The option may lead to increased pressures on fisheries/angling and other water based recreational activities, adversely impacting tourism and recreation, as well as the local community’s health and wellbeing (Objectives 10 and 11).

The operation of this drought permit will likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Objective 7: ‘To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050’** as while abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational carbon emission.

## River Eden Summer Drought Permit

Table 11-18 – River Eden Summer Drought Permit

Supply Side Option		SEA Objective												
		1	2	3	4	5	6	7	8	9	10	11	12	13
<b>River Eden Summer Drought Permit</b>														
Construction	Positive Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Negative Residual Effects	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operation	Positive Residual Effects	++	0	++	0	0	+	+	0	0	++	+	++	+
	Negative Residual Effects	-	0	-	-	-	-	--	0	0	-	-	0	0

Bough Beech reservoir is refilled primarily via an abstraction from the River Eden which normally operates during the autumn/winter. A drought permit to enable summer abstraction from the River Eden (after any May drought permit has ceased) to permit abstraction of up to 272.2MI/d through June, July and August. A Minimum Residual Flow of 22MI/d would apply and the annual abstraction limit of 29,000MI/d would apply (it is assumed that the cap would extend from the preceding September through to the end of August). No construction would

be required in order to facilitate the increased abstraction associated with the drought permit. Due to operational practice and infrastructure constraints, the abstraction would cease well before natural flows in the river reduce to 22MI/d and when flows are recovering would not start until flows are much higher than 22MI/d.

No construction activities are required in relation to this option and as such no effects on SEA objectives emerging from construction have been identified. During operation, slight beneficial effects are anticipated in respect of air, noise and carbon (Objectives 6 and 7) as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in more significant impacts. Slight beneficial impacts are also anticipated in respect of tourism and recreation (Objective 11), through for example provision of water for major consumers such as hotels, and for built assets and infrastructure (Objective 13) should the drought permit act to alleviate demand restrictions which have the potential to impact on built assets and infrastructure (by enforcing cleaning and maintenance restrictions).

The operation of this drought permit will likely produce significant (moderate) beneficial effects in relation to four SEA objectives:

- **Objective 1: ‘To reduce vulnerability of built infrastructure to climate change risks and hazards’** as the implementation of this measure will increase resilience to climate change.
- **Objective 3: ‘To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats’** as the option, as part of the wider Drought Plan will help ensure reliability and resilience of the water supply during extreme or prolonged dry periods.
- **Objective 10: ‘To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing’** as the drought permit will support and sustain the water-related recreation which takes place within Bough Beech reservoir and therefore the drought permit provides a benefit to these activities.
- **Objective 12: ‘To minimise resource use and waste production’** as the drought permit has the potential to reduce the need for more resource intensive external transfers and abstractions.

During operation, slight adverse effects are anticipated in respect of Objective 1 as climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. In terms of water (Objective 3) slight adverse effects are anticipated as future drought permit abstraction during June-August is expected to have a Minor ‘overall category of impact’ on the water quality in the River Eden (from Bough Beech abstraction point to confluence with River Medway). Slight adverse effects are anticipated in relation to biodiversity (Objective 4) due to potential impacts on designated sites. Slight adverse effects are also anticipated in relation to deposition of sediment in river (Objective 5) – lower flows result in the river having less energy to carry sediment. The hydrological changes are expected to result in only short term impacts on sediment dynamics, the river channel and/or the river bank, which are unlikely to lead to significant changes in wetted areas or the integrity of river function. While abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational air and noise emissions (Objective 6). The option may lead to increased pressures on fisheries/angling and other water based recreational activities, adversely impacting tourism and recreation, as well as the local community’s health and wellbeing (Objectives 10 and 11).

The operation of this drought permit will likely produce significant (moderate) adverse effects in relation to one SEA objective:

- **Objective 7: ‘To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050’** as while abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational carbon emission.

## 12. Mitigation

### 12.1. Introduction

The term mitigation encompasses any approach that is aimed at preventing, reducing or offsetting any significant adverse environmental effects that have been identified. In practice, a range of measures applying one or more of these approaches is likely to be considered in mitigating any significant adverse effects predicted as a result of implementing the WRMP24. In addition, it is also important to consider measures aimed at enhancing positive effects. All such measures are generally referred to as mitigation measures.

However, the emphasis should be in the first instance on proactive avoidance of adverse effects. Only once alternative options or approaches to avoiding an effect have been examined, should mitigation then examine ways of reducing the scale / importance of the effect.

Mitigation can take a wide range of forms, including:

- Refining Intervention measures in order to improve the likelihood of positive effects and to minimise adverse effects;
- Technical measures (such as setting guidelines) to be applied during the implementation phase;
- Identifying issues to be addressed in project assessment, such as Environmental Impact Assessment and the development of Environmental Management Plans for certain projects or types of project;
- Proposals for changing other plans and programmes; and
- Contingency arrangements for dealing with possible adverse effects.

Note that SES Water are committed to ensuring that mitigation is applied at all appropriate stages of planning and design and will be implemented on site during construction. Mitigation will be further developed through for example the Environmental Impact Assessment process which would apply to many of the Options within the Plan.

### 12.2. Mitigation approaches applied through the SEA

A number of mitigation approaches have been considered through the development of the Water Resource Management Plan, in order to mitigate potential effects (significant or otherwise). 'Embedded mitigation' has been considered as part of the assessment process. 'Embedded mitigation' are measures that have been incorporated into the development of the Option and is set out for each Option in the following tables. Through the SEA process and following assessment, further 'additional mitigation' has also been identified. 'Additional mitigation' is mitigation that is required to address specific issues relating to significant effects in addition to 'embedded mitigation' and identified through the SEA process. This is further set out in Table 12-1 to 12-15.

Minor (not significant) adverse effects have been identified during construction (for six options) in relation to climate change, biodiversity, air, noise and climate emissions, landscape, historic assets, health and wellbeing, resource use and effects on assets. These adverse effects are largely anticipated to be local scale, short term and temporary to the construction / repair phase. These would be expected of any construction activities, and it is expected that these will be mitigated by well-known and readily understood techniques, for example use of Best Available Techniques (BAT) and a Construction Environmental Management Plan (CEMP). The precise measures will be refined at project level in discussion with the relevant Statutory bodies and will be incorporated as requirements under any construction contract or operational procedures.

Significant adverse effects during operation have been identified for all 'supply' Options. Such significant effects relate to the water environment, typically due to potential effects on groundwater levels and flows in the Chalk aquifer or due to proximity to a water body and it not being possible to rule out effects on water quality or quantity. In addition, significant effects have been identified for carbon emissions on an individual option basis due to increased abstraction and therefore increased pumping. It is to be noted that mitigation has been identified to ensure that significant effects are reduced as far as possible and that these measures will be further developed as scheme design progresses. However it is important to note that SES Water forecast demand reductions of 23.74 MI/d by 2034/35 and 48.2 MI/d by 2049/50 and these demand reductions more



than offset the total exported supplies SES Water forecast over all their plans. Therefore, SES Water will not need to abstract more water than they do now to be able to provide these exports. Localised increases in abstraction will be directed to areas of least environmental impact and expected to be offset by reductions in abstraction in more environmentally sensitive areas. Identifying potential adverse impacts from our existing operations and redistribution of our abstraction to least environmental impact areas is, and will, continue to be investigated through SES Water's 25-Year Plan WINEP investigations and Environmental Destination Programme. SES Water are committed to the development and delivery of any required mitigation or compensatory measures, in discussions with statutory bodies, should conclusions of the studies identify adverse impacts.

SES Water are committed to reviewing the option and refining the mitigation to address any residual adverse effects at project level, when detailed environmental assessments have been completed. Our Environmental Team and consultants will work with our assets and engineering teams to build upon the findings of the SEA throughout development and delivery of construction to ensure that we are working within the principles of the mitigation hierarchy of:

- Complete avoidance;
- Minimisation, where possible;
- Restoration of areas within the development; and
- Offsetting, either onsite or offsite.

**Table 12-1 – Embedded and Additional Mitigation identified for the Outwood Lane groundwater (2.7MI/d) option**

**Outwood Lane groundwater (2.7MI/d)**

**Embedded Mitigation considered in Option assessment**

None Identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	Monitor groundwater levels.
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	<p>Monitor groundwater levels to ensure over abstraction is avoided and no deterioration in water quality. WFD Mitigation as follows:</p> <ul style="list-style-type: none"> <li>Operational controls and monitoring of groundwater levels and associated surface water bodies.</li> <li>Further assessment required re sustainability of GW licence amendment likely required by EA.</li> <li>Abstraction licensing to be undertaken in accordance with EA legislation including S32 consent and water features surveys as applicable</li> </ul>
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Best practicable means to prevent change in GWDTE habitat as a result of changes in water levels/quality. This includes further investigation in respect of potential hydrogeological connection with chalk rivers
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	Consider the use of renewable energy in pumping which would reduce emissions/adverse impacts on air quality.
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.



Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	None identified
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

**Table 12-2 – Embedded and Additional Mitigation identified for the Raising Bough Beech reservoir (11.5Ml/d) option**

**Raising Bough Beech reservoir (11.5Ml/d)**

**Embedded Mitigation considered in Option assessment**

None Identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified.
Objective 2: To reduce or manage flood risk, taking climate change into account	Measures to reduce the impact on flooding during the construction phase may include a robust CEMP which outlines construction methods and measures such as the consideration of storm water runoff and dewatering operations to reduce risk of pollution incidents.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Best practicable means to prevent impacts to surface water receptors. CEMP which outlines construction methods and measures to reduce risk of pollution incidents and works in proximity to water.
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Best practice methods to be implemented to minimise disturbance effects and habitat loss including designing embankment to avoid loss of woodland habitat, in particular Ancient Woodland. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Future design will need to undertake ecology surveys.  Integrate biodiversity improvement opportunities as part of works. This may be achieved through enhanced planting, wildflower banks, improved connectivity with woodland or integration of National Priority Focus Area objectives.
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	Land reinstated upon completion. Care of topsoil for future reuse.
Objective 6: To reduce and minimise air and noise emissions	Best practice mitigation measures to be implemented during construction e.g. ensuring all plant and machinery are well maintained and not emitting excessive fumes.  Consideration of air and noise quality in CEMP.



Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Best practice measures to be implemented to minimise effects during construction and operation although effects may remain. CEMP to ensure that the character and quality of landscapes and townscapes are maintained as far as practical during construction.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Best practicable means to minimise disruption to heritage assets during construction. Given there is potential to impact buried archaeology, an Archaeology Watching Brief may be required during the construction phase. Reinstatement of land once operational in order to minimise setting impacts on nearby heritage assets.
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Engagement with local residents of proposed works and key activities, any disruption anticipated and alternative arrangements (e.g. access). Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction. This should be addressed in a CEMP.
Objective 11: To maintain and enhance tourism and recreation	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction and land will be reinstated.
Objective 12: To minimise resource use and waste production	Seek opportunity to implement sustainable design measures, such as reuse and recycling of materials, including reuse of excavated material to reduce the impact, however it is likely that minor negative effects will remain. This may involve a Site Waste Management Plan and consideration of the waste hierarchy.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction.

**Table 12-3 – Embedded and Additional Mitigation identified for the Hackbridge Drought Permit option**

**Hackbridge Drought Permit**

**Embedded Mitigation considered in Option assessment**

SES Water provide alternative supplies for the duration of the impact  
 Cessation rules if water quality parameters fall below pre-agreed levels.  
 Ensure Carshalton augmentation scheme operates as normal for duration of permit  
 Agile mitigation. Options could include fish rescue, aeration devices, flushing flows and creation of refugia through localised modification of bed levels (temporary pools). Identification of need through catchment walkovers  
 Development of a plan for monitoring of fish stress and fish rescue/recovery implementation should it be required

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	None identified
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified



Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Detailed assessment of potential heritage receptors and impacts should be carried in advance of these options being implemented and may be helpfully informed by targeted groundwater modelling. This may include a desk top assessment covering the receptors identified by future modelling and may also include on site assessments following guidance provided by Historic England on the preservation of remains.
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	None identified
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified



**Table 12-4 – Embedded and Additional Mitigation identified for the Kenley and Purley Drought Permit option**

**Kenley and Purley Drought Permit**

**Embedded Mitigation considered in Option assessment**

SES Water provide alternative supplies for the duration of the impact

Flow level monitoring during droughts and fluvial audit to improve assessment confidence for geomorphology

Monitoring of OP, total ammonia, DO and parameters causing WFD failures (in respective waterbodies) before, during and after the drought permit is in operation. Data collected should be routinely reviewed by a water quality expert and triggers which indicate the need for further action should be agreed. Monitoring of surface water flows before, during and after the drought permit is in operation

Development of a plan for monitoring of fish stress and fish rescue/recovery implementation should it be required. Agile mitigation. Options could include fish rescue, aeration devices, flushing flows and creation of refugia through localised modification of bed levels (temporary pools)

Ensure Carshalton augmentation flow is maintained.

Cessation rules if water quality parameters fall below pre-agreed levels

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	None identified
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified



Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Detailed assessment of potential heritage receptors and impacts should be carried in advance of these options being implemented and may be helpfully informed by targeted groundwater modelling. This may include a desk top assessment covering the receptors identified by future modelling and may also include on site assessments following guidance provided by Historic England on the preservation of remains.
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	None identified
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

**Table 12-5 – Embedded and Additional Mitigation identified for the Government Interventions (HybridC++) option**

**Government Interventions (HybridC++)**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	None identified
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified



Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	None identified
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified



**Table 12-6 – Embedded and Additional Mitigation identified for the Consumption Reduction Activities (High+) option**

**Consumption Reduction Activities (High+)**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	None identified
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified



Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	None identified
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

**Table 12-7 – Embedded and Additional Mitigation identified for the Non-Essential Use Bans (NEUBs) option**

**Non-Essential Use Bans (NEUBs)**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Risk of INNS to be considered when banning washing of water craft. Consider mandating of visual inspections to ensure no transfer of INNS.
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified



Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures will mitigate these effects. Consider exemptions where dust suppression would alleviate impacts on particularly vulnerable groups e.g. construction works near hospitals, schools, nursery and care homes.
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified



**Table 12-8 – Embedded and Additional Mitigation identified for the Temporary Use Bans (TUBs) option**

**Temporary Use Bans (TUBs)**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	None identified
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified



Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures.
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

**Table 12-9 – Embedded and Additional Mitigation identified for the Leakage Reduction Leakage Reduction Activities (High+) option**

**Leakage Reduction Activities (High+)**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	Measures to reduce the impact on flooding during the construction phase (leakage works) should still be implemented. This may include implementation of CEMP.
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Measures to reduce pollution risk during construction associated with capital works may include implementation of CEMP.
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Ensure best practicable means to prevent loss of habitat during construction. Use of access shafts (or similar) for leakage works would be used to avoid ecologically sensitive locations.
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	Land reinstated upon completion of leakage works. Best practice construction measures to be implemented. Complete appropriate contaminated land investigations where necessary.
Objective 6: To reduce and minimise air and noise emissions	Best practice mitigation measures implemented during construction.
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Best practice measures will likely be implemented to minimise effects during construction (leakage works), however minor and temporary impacts may remain.



Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Best practice measures will likely be implemented to minimise effects during construction (leakage works), however minor and temporary impacts may remain.
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction (leakage works). However, minor and temporary effects are likely to still occur
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	Consider use of Waste Management Plan and KPIs in respect of waste reuse for capital projects.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures including a Traffic Management Plan to be implemented to minimise disturbance during construction (leakage works). However, minor and temporary effects are likely to still occur.

**Table 12-10 – Embedded and Additional Mitigation identified for the Water Lane borehole enhancement (2.2MI/d) option**

**Water Lane borehole enhancement (2.2MI/d)**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	Monitor groundwater levels.
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Monitor groundwater levels to ensure over abstraction is avoided and no deterioration in water quality.
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Best practice mitigation to minimise impacts on SSSIs / GWDTE during operational phase. This includes monitoring and further investigation in respect of potential hydrogeological connection with chalk rivers. Future design will need to undertake ecology surveys.
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified



Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	None identified
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

**Table 12-11 – Embedded and Additional Mitigation identified for the Secombe Centre UV (2.1MI/d) option**

**Secombe Centre UV (2.1MI/d)**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	<p>Best practicable means to prevent impacts to surface water receptors during construction phase may include provision of CEMP which outlines measures to protect water environment. WFD mitigation for Epsom North Downs Chalk:</p> <ul style="list-style-type: none"> <li>Operational controls and monitoring of groundwater levels and associated surface water bodies.</li> <li>Further WFD assessment required.</li> </ul> <p>Monitoring of groundwater source to ensure no adverse effects.</p>
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	<p>Best practice methods to be implemented to minimise disturbance effects and habitat loss. Habitat to be reinstated on completion, or if unavoidable compensatory habitat to be considered to replace damaged or lost habitat. Future design will need to undertake ecology surveys.</p>
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	<p>Best practice mitigation measures to be implemented during construction, this may include dust management plan, use of low or no-emissions plant/machinery and noise monitoring. UV plant to operate within agree air quality limits.</p>
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	<p>Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available</p>



Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Best practice measures to be implemented to minimise effects during construction although temporary effects during construction may remain. UV plant to be designed to be in keeping with local townscape character.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Best practice measures to be implemented to minimise setting effects during construction. UV plant to be designed to be in keeping with local character. Further work may be required to determine significance of effect, depending on the presence or absence of buried archaeology.
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction and land will be reinstated. Engagement with local residents outlining construction activities and any disruptions anticipated.
Objective 11: To maintain and enhance tourism and recreation	Best practice mitigation measures e.g. noise management to be implemented to minimise effects during construction.
Objective 12: To minimise resource use and waste production	Seek opportunity to implement sustainable design measures, such as reuse and recycling of materials, to reduce the impact, however it is likely that minor negative effects will remain.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice measures including a Traffic Management Plan will likely be implemented to minimise disturbance during construction.

**Table 12-12 – Embedded and Additional Mitigation identified for the Duckpit Wood (1.4MI/d) option**

**Duckpit Wood (1.4MI/d)**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	Monitor groundwater levels.
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	Best practice construction measures to be implemented. Monitor groundwater levels and quality. Monitor effects on groundwater dependant habitats. Further WFD assessment required.
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	Best practice mitigation to minimise impacts, including reinstatement of priority habitats, and woodland where required. Monitoring of groundwater levels and chalk rivers during operation to ensure no deterioration in habitat. Future design will need to undertake ecology surveys.
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	Infrastructure associated with the borehole should avoid BMV agricultural land.
Objective 6: To reduce and minimise air and noise emissions	Best practice mitigation measures likely to be implemented during construction phase, however minor and temporary impacts on air quality are likely to still occur.
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon. Carbon footprint study could help identify areas for carbon savings or alternative materials. As the electricity grid is decarbonised, greener energy will be available.



Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	Best practice will be implemented to avoid negative effects, ground will be reinstated.
Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Best practice mitigation measures will likely be implemented to minimise effects during construction.
Objective 11: To maintain and enhance tourism and recreation	Best practice mitigation measures will likely be implemented to minimise effects during construction, however some disruption likely to remain.
Objective 12: To minimise resource use and waste production	Consider opportunities to implement sustainable design measures to reduce the impact.
Objective 13: To avoid negative effects on built assets / infrastructure	Best practice mitigation measures will likely be implemented to minimise effects during construction.



**Table 12-13 – Embedded and Additional Mitigation identified for the Outwood Lane Drought Permit option**

**Outwood Lane Drought Permit**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	None identified
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified



Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures.
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

**Table 12-14 – Embedded and Additional Mitigation identified for the River Eden May Drought Permit option**

**River Eden May Drought Permit**

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	None identified
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified



Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures.
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

**Table 12-15 – Embedded and Additional Mitigation identified for the River Eden Summer Drought Permit option**

River Eden Summer Drought Permit

**Embedded Mitigation considered in Option assessment**

None identified

**Additional Mitigation derived from Option assessment**

Objective 1: To reduce vulnerability of built infrastructure to climate change risks and hazards	None identified
Objective 2: To reduce or manage flood risk, taking climate change into account	None identified
Objective 3: To protect and enhance the quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats	None identified
Objective 4: To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain	None identified
Objective 5: To Protect and enhance the functionality, quantity and quality of soils	None identified
Objective 6: To reduce and minimise air and noise emissions	None identified
Objective 7: To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050	None identified
Objective 8: To conserve, protect and enhance landscape, townscape and seascape character and visual amenity	None identified



Objective 9: To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	None identified
Objective 10: To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	Allowing allotments limited supplies of water and ensuring high levels of communication before, during and following the implementation of these measures.
Objective 11: To maintain and enhance tourism and recreation	None identified
Objective 12: To minimise resource use and waste production	None identified
Objective 13: To avoid negative effects on built assets / infrastructure	None identified

# 13. Cumulative, synergistic and indirect effects

## 13.1. Introduction

Within SEA, there is a requirement to consider cumulative, synergistic and indirect effects of implementation of the Drought Plan. Cumulative effects arise where several proposals or elements individually may or may not have significant effect but in-combination have a significant effect due to spatial crowding or temporal overlap. Synergistic effects are when two or more effects act together to create an effect greater than the simple sum of the effects when acting alone. Secondary and indirect effects are effects that are not a direct result of the Drought Plan, but which occur away from the original effect or as the result of a complex pathway.

Following consultation from Natural England on the draft WRMP24 SEA, concerns raised relating to the methodology used to complete the In-Combination assessment, have been addressed in this WRMP24 SEA. The methodology used has been developed in discussion with Natural England and satisfies their concerns and is considered appropriate to the level of detail available for the Options outlined in the WRMP24.

## 13.2. Likely cumulative effects

SEA Objectives which have the potential for cumulative effects have been identified (as required by the SEA Regulations) from the analysis of plans and programmes, the baseline data, consultation responses and an examination of the identified key issues and cumulative, synergistic and indirect effects have also been considered during the SEA.

## 13.3. In-plan cumulative effects

The results of the direct effects of the WRMP options are discussed in Chapters 10 and 11. It is considered that the options can interact cumulatively across sustainability issues either through construction or operation.

In respect of Habitats Regulations Assessment, as each of the options were assessed as having no impact pathways, there is no scope for the options to have any effect on European Sites. Therefore, there is no potential for LSEs in-combination and an in-combination assessment is deemed not required.

With regards to the WFD Assessment, other than the drought permit options, which are temporary and cumulatively assessed within SES Water's Drought Plan SEA, only one permanent supply option is selected under the WRSE BVP before 2050 (R22 Outwood Lane). A further supply option (R1 Raising of Bough Beech reservoir (11.5ML/d)) not selected by the BVP until 2055, has been included in cumulative impact assessment as its construction would need to commence before 2050 for this option to deliver supply benefit by 2055. The assessment finds that there is no potentially impacted water body common to the two BVP selected non-temporary water supply options. There is therefore considered to be negligible risk that implementation of these two options together would result in a cumulative impact on a WFD water body that is greater than the impact of the individual option on its own.

### 13.3.1. Construction In-plan cumulative effects

There are two supply side options that feature in the BVP however owing to their distance (over 20km from each other) cumulative effects as a result of any construction activities are considered unlikely.

In respect of demand management schemes, while there may be some construction activities associated with leakage management, it is not possible to say precisely where such activities will take place, it is anticipated that there will be no cumulative effects as these construction activities will be localised, with none or minimal spatial overlap and likely to take place at different times.

### 13.3.2. Operational In-plan cumulative effects

It is anticipated that savings in water as a result of wider demand management side schemes would likely have cumulative beneficial effects in respect of resilience to climate change (Obj. 1), the water environment (Obj. 3), biodiversity (Obj. 4), reducing air and noise emissions and reducing carbon, (Obj. 6 and Obj. 7), maintaining health and wellbeing (Obj. 10), as well as minimising resource use (Obj. 12). While some of the savings made are in themselves small and benefits would be slight, it is to be noted that cumulatively effects could be



significant and of importance particularly during drought situations when the environment is under increased stress.

The two supply side options that feature in the BVP are over 20km from each other and therefore any localised cumulative effects as a result of their operation is unlikely however, wider cumulative benefits associated with increased network resilience, security of supply and water availability across the SES Water operating area may be anticipated with resulting beneficial cumulative effects on the water environment (Obj.3) and maintaining health and wellbeing (Obj.10).

### 13.4. In-combination cumulative effects with other plans and projects

The SEA has considered other plans and projects that might lead to cumulative effects when combined with the WRMP, as outlined in Table 13-1.

Of note WRSE have undertaken a cumulative effects assessment for the programme of WRMP options selected before 2050 and post 2050 for each of its constituent water companies. Those options have been identified from the WRSE investment model within Situation 4 for each of the BVP, LCP and BESP.

The WRSE assessment considered the options identified in the three plans of each water company that were selected by 2050 are within 500m of the water company boundaries. Where an environmental 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. Options that do not have defined geographical locations such as temporary use bans (TUBs), non-essential use bans (NEUBs), catchment management options, media campaigns and demand management options are also considered within the WRSE cumulative effects assessment.

In respect of SES Water supply options, WRSE have identified the following options that were included in the WRSE cumulative assessment:

- Raising of Bough Beech Reservoir (11.5Ml/d)

WRSE consider that while this option may not impact upon the same assets, there is the potential for cumulative effects on the historic environment as a whole, noting that Bough Beech Reservoir is located within a conservation area within the buffer between the Thames Water and SES Water boundaries.

Cumulative assessment of this option is provided in WRSEs Draft Regional Plan (Section 5) Table 5.2 – Table 5.4 and a summary of the assessment provided in Section 5.3.1.4 of that report.

**Table 13-1: Cumulative effects with other plans and projects**

Plan or Project	Overview	Potential for cumulative effects with the WRMP
As noted by the Infrastructure and Projects Authority <sup>19</sup> , over the next 10 years (from 2021) total infrastructure investment across the UK is expected to be nearly £650 billion. As such, there are a range of major developments or infrastructure projects underway or expected to commence within the South East of England, across a range of sectors. Notable examples include (but are not limited to): Lower Thames Crossing, Flood defence works on River	Each of the noted schemes (along with other developments not noted) will require significant construction activities, with potential implications for the environment.	While locationally spread across the South East of England and likely to be constructed at varying periods, such schemes have the potential to interact with Schemes derived from the WRMP and have a cumulative effect on the environment (beneficial or adverse). However, no significant cumulative effects are identified. Construction works associated with the WRMP are anticipated to be relatively small scale, with localised effects and for the most part likely to be spatially and temporally isolated from major infrastructure developments.  It is also the case that any major infrastructure project will be subject to its own environmental assessment process and development of mitigation e.g. through EIA and Environmental Management Plans. Mitigation measures will be

<sup>19</sup> Analysis of the National Infrastructure and Construction Pipeline 2021



<p>Itchen and Elmley Intertidal, HS2, M25 RTMC Replacement, Farlington Marshes, schools refurbishment / renewal.</p>		<p>developed to minimise adverse effects and maximise beneficial effects.</p>
<p>There will also be a range of development projects set out in Local Plans – this would include housing, commercial and transport infrastructure.</p>	<p>New development will attract / accommodate increased population, with a requirement for additional water supplies.</p>	<p>Consideration of new development and population increases within the Plan is a key element for future planning through the iterations of WRMP. These are key considerations within the regional WRMP that has been developed to examine such issues across the South-East region and help to inform the development of company level plans. New development outlined within a Local Plan such as housing or industrial / commercial developments would typically be subject to their own assessment process and development of mitigation e.g. through EIA and Environmental Management Plans. Mitigation measures will be developed to minimise adverse effects and maximise beneficial effects.</p>

### 13.4.1. Nationally Significant Infrastructure Projects

Review of the National Infrastructure Planning website identifies one NSIP which is considered likely to interact with the SES study area. This is considered in Table 13-2, as follows:

**Table 13-2 – Nationally Significant Infrastructure Projects within proximity to SES Water WRMP24 area**

Nationally Significant Infrastructure Project	Likely Cumulative Effects	Mitigation Proposed
<p>Gatwick Airport Northern Runway</p> <p><b>Description:</b></p> <p>The Northern Runway is currently only available when the Main Runway is out of use. By repositioning the centre line of the Northern Runway 12m north, this would enable dual runway operations, aligning with international safety standards and helping the airport to meet future passenger demand.</p> <p>(14.4km north of the nearest SES option Outwood Lane groundwater (2.7Ml/d))</p>	<p><b>Construction</b></p> <p>While the program for construction in relation to the Northern Runway project is not confirmed (potentially set for 2025) it is considered unlikely that construction activities have the potential to give rise to cumulative effects owing to the distance from the nearest SES WRMP24 option (14.4km from the Outwood Lane groundwater (2.7Ml/d) option)</p> <p><b>Operation</b></p> <p>Operation of this project is not anticipated to give rise to significant cumulative effects. The project is anticipated to add between 10 and 15 additional hourly aircraft movements, contribute to economic growth and provide good operational performance.</p>	<p>None anticipated.</p>



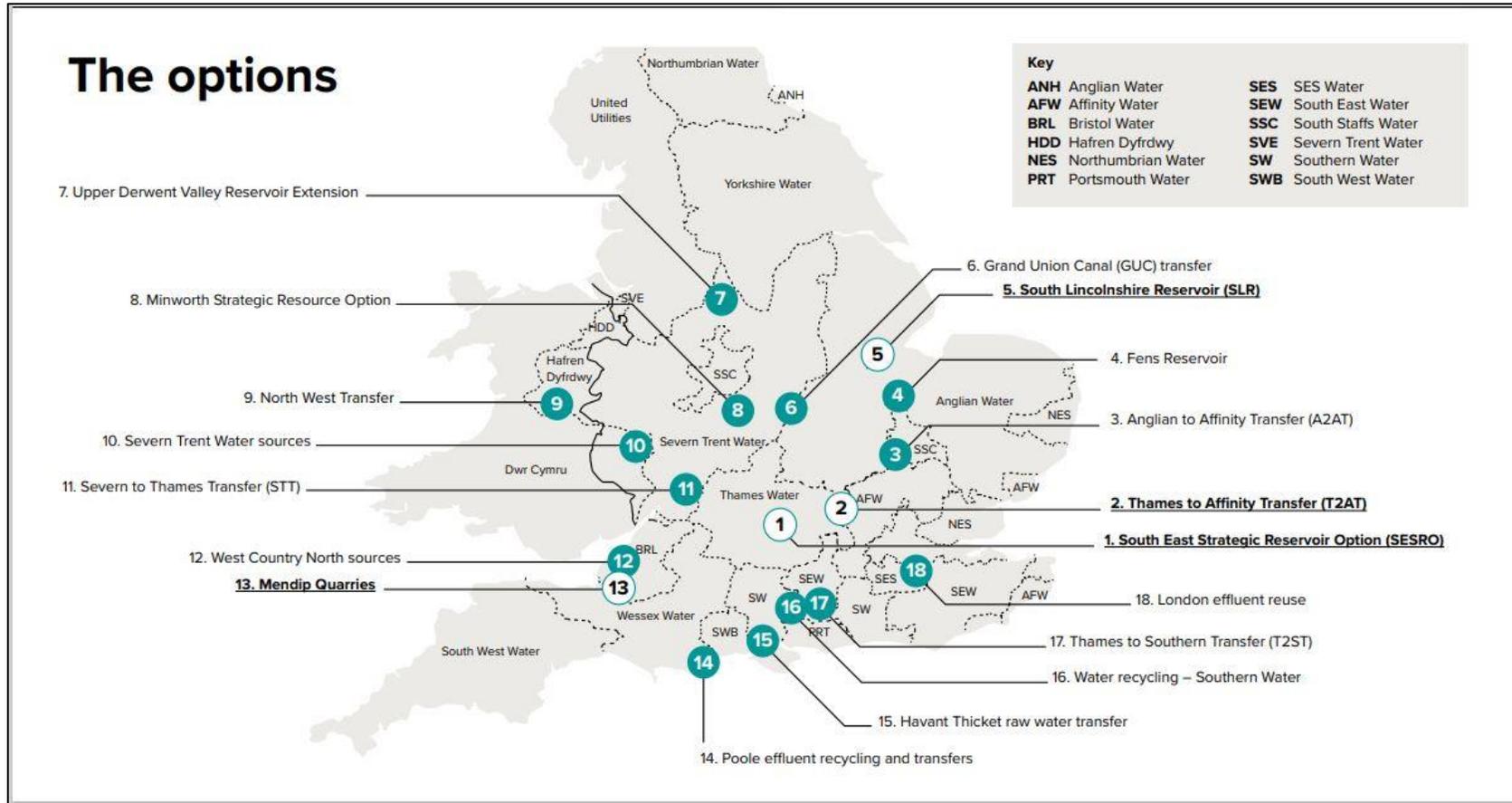
### 13.4.2. Strategic Resource Options

SRO's are large infrastructure schemes, that are developed between water companies and with RAPID to ensure water supplies across the network, often in the form of reservoirs and bulk water transfers. Their locations are shown in Figure 13-1 below.

No SROs have been identified within the SES Water plan area and as such the potential for significant cumulative effects as a result of SRO development is reduced.



Figure 13-1 - Strategic Resource Option Locations



Source: Safeguarding England's water future, Mott Macdonald



## 13.5. Cumulative effects with neighbouring water companies

A key focus of the in-combination effects with other plans and policies is that of neighbouring water companies, specifically supply options contained in their respective WRMPs. There is potential for SES WRMP24 options to interact cumulatively either through construction or operation with options contained in the following, neighbouring water companies WRMP24:

- Southern Water;
- Affinity Water;
- South East Water; and
- Thames Water

While this cumulative effects assessment will need to be updated once the findings of the WRSE Regional Plan assessment is completed and constituent WRMP and SEAs finalised, SES have engaged with each of the neighbouring water companies in order to understand the nature of their respective WRMPs, the options contained and the likely effects arising through assessments including SEA, HRA, WFD and other supporting technical work.

### 13.5.1. Southern Water

Engagement with project and environmental leads working on behalf of Southern Water in support of their RdWRMP24 identified a number of supply options featuring in their BVP. Of those 54 options are expected to feature on or before 2055. Of those options, no Southern Water options are within 1km of a SES option. Further, as the HRA identified no impact pathways and no scope for effects on European sites there is no potential for LSEs in-combination and an in-combination assessment is not required. The WFD cumulative assessments did not identify any options likely to be non-complaint when considered cumulatively during construction or operation.

### 13.5.2. Affinity Water

Engagement with project and environmental leads working on behalf of Affinity Water in support of their RdWRMP24 identified a number of supply options featuring in their BVP. Of those 18 options are expected to feature on or before 2055. Of those options, no Affinity options are within 1km of a SES option. Further, as the HRA identified no impact pathways and no scope for effects on European sites there is no potential for LSEs in-combination and an in-combination assessment is not required. The WFD cumulative assessments identified no Affinity Water options that would potentially impact SES Water option potentially affected WFD waterbodies.

### 13.5.3. South East Water

Engagement with project and environmental leads working on behalf of SEW Water in support of their RdWRMP24 identifies 36 supply options featuring in their BVP. Of those 24 options are expected to feature on or before 2055. Of those options, no SEW options are within 1km of a SES option. Further, as the HRA identified no impact pathways and no scope for effects on European sites there is no potential for LSEs in-combination and an in-combination assessment is not required. The WFD Level 2 assessment identified possible deterioration, impediment to GEP, and compromise to objectives from the SEW RZ1 Transfer - Bough Beech to Riverhill option on the Lower Eden waterbody but as it was already having a residual risk of WFD deterioration from the Level 2 assessment and was therefore excluded from the in-combination assessment. No other options were identified as being likely to be non-complaint when considered cumulatively during construction or operation.



### 13.5.4. Thames Water

Engagement with project and environmental leads working on behalf of Thames Water in support of their rdWRMP24 identified a number of supply options featuring in their BVP. 18 options are expected to feature on or before 2050 in their BVP. Of those options, no Thames options are within 1km of a SES option. Further, as the HRA identified no impact pathways and no scope for effects on European sites there is no potential for LSEs in-combination and an in-combination assessment is not required. The WFD Level 2 assessment identified potential risks of WFD deterioration (impact score 2) on the quantitative dependent surface water and water balance status from the TW Groundwater Addington option on the Epsom North Downs Chalk waterbody but as it was already having a residual risk of WFD deterioration from the Level 2 assessment and was therefore excluded from the in-combination assessment. No other options were identified as being likely to be non-complaint when considered cumulatively during construction or operation.

# 14. Monitoring

## 14.1. Introduction

The SEA Regulations state that those responsible for the Plan 'shall monitor the significant environmental effects of the implementation of each plan or programme with the purpose of identifying unforeseen adverse effects at an early stage and being able to undertake appropriate remedial action' (Part 4 Post Adoption Procedures Regulation 17). In addition, the Environmental Report should provide information on a 'description of the measures envisaged concerning monitoring' (Schedule 2 Information for Environmental Reports).

In line with the SEA Regulations, monitoring will cover significant environmental effects and it will involve measuring indicators that will enable the establishment of a causal link between the implementation of the WRMP24 and the likely significant effects (both positive and negative) being monitored. The SEA Regulations make clear that it is not necessary to monitor everything, or to monitor an effect indefinitely, rather monitoring should focus on those identified significant environmental effects. 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.

In short, it is the intention that the results of the monitoring will be of particular benefit to those involved with the further iterations of WRMP24 (which will be of particular importance to help further consideration of this Adaptive Plan) and if required, will allow early remediation to be undertaken of any identified adverse effects.

## 14.2. Monitoring programme

It is important that the monitoring and assessment is kept up to date so that it uses the best available data. SES Water are aware of the updated River Basin Management Plans (January 2024)<sup>20</sup> and have therefore reviewed and updated the approach to monitoring to take account of any relevant information.

Baseline monitoring can be used to gain an understanding of the natural variation in water quality, ecology, fisheries, geomorphology and biodiversity that occurs in water bodies such as the River Eden, River Wandle and groundwater under a range of hydrological conditions.

It should be noted that many of the effects identified that would arise from implementation of the Options contained within the WRMP24 will be experienced during construction of infrastructure only and will not be experienced during operation of these facilities. In these circumstances monitoring will be restricted to the construction phase only.

It is also to be noted that as options are brought forward for development, further specific monitoring requirements may be incorporated in detailed designs and plans accompanying scheme development (including, where applicable, formal applications for any required environmental permits or abstraction licences, planning permission, as well as any scheme-specific HRA and WFD assessments). These will be discussed with relevant regulatory and statutory bodies and stakeholders to agree the appropriate scale and duration of such scheme-specific monitoring activities proportionate to the assessed environmental risks.

To understand how SES Water's operations are impacted by the environment, how they themselves impact the environment and inform how such impacts may be mitigated, the Company undertakes targeted environmental investigations (e.g. WINEP) and also monitors various company-wide and option specific metrics. SES Water will continue to do so. Aside from the targeted WINEP investigations that are listed in the WRMP24 'Our Monitoring plan', SES Water propose to monitor those metrics described in Table 14.1 where the environmental

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<sup>20</sup> <https://www.gov.uk/guidance/river-basin-management-plans-updated-2022>



impact is summarised in the first three columns and the specific metrics, frequency of monitoring and actions are detailed the last four columns.



**Table 14-1: Proposed Monitoring**

Objective	Options to which monitoring applies*	Overview of typical effect	Requirement for monitoring	Applicable in Construction (Frequency)	Applicable in Operation (Frequency)	Monitoring Action**
To reduce vulnerability of built infrastructure to climate change risks and hazards.	Company wide and across all Options	The climate is changing. This is anticipated to result in more extreme weather events which could disrupt or destroy infrastructure, including that related to water supply, on a more frequent basis.	<ul style="list-style-type: none"> <li>No. of days / hours when water infrastructure disrupted (loss of service) due to extreme weather events</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
To reduce or manage flood risk, taking climate change into account.	Company wide and across all Options	Increased occurrence of extreme weather events due to a changing climate could increase flood risk, or increase the area at risk of flooding. Flood risk can also occur due to the increase in areas of hardstanding or loss of floodplain due to the construction of infrastructure, including that related to water supply infrastructure.	<ul style="list-style-type: none"> <li>No. of days / hours when water infrastructure disrupted (loss of service) due to flooding</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
			<ul style="list-style-type: none"> <li>Area (Ha) of flood plain lost</li> </ul>	Y (Pre and post construction)	N	Measure pre construction and review post construction.
			<ul style="list-style-type: none"> <li>No. of projects where flood risk compensation was required or increase provided</li> </ul>	N	Y (Annually)	Review annually during operation to monitor and if activity needs to be stepped up
To protect and enhance the		Construction and operation of the water supply network can	<ul style="list-style-type: none"> <li>Changes in WFD condition (positive or</li> </ul>	Y	Y	Review monthly during construction



<p>quantity and quality of surface, groundwater, estuarine, coastal waterbodies and water dependent habitats.</p>	<p>Company wide and across all Options</p>	<p>have a wider range of effects on the water environment, resulting in changes in water quantity within the environment, for example due to increased abstraction and water quality through pollution incidents.</p>	<p>negative) of relevant waterbodies.</p>	<p>(Monthly)</p>	<p>(Monthly)</p>	<p>and monthly during operation to ensure no adverse effects and whether further work is required.</p>
			<ul style="list-style-type: none"> <li>No. of pollution incidents (both during construction and operation)</li> </ul>	<p>Y (Monthly)</p>	<p>Y (Annually)</p>	<p>Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.</p>
			<ul style="list-style-type: none"> <li>Continuation of monitoring at raw water intakes.</li> </ul>	<p>Y (Monthly)</p>	<p>Y (Monthly)</p>	<p>Review monthly during construction and monthly during operation to ensure no adverse effects and whether further work is required.</p>
<p>To protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity and achieve biodiversity net gain.</p>	<p>Company wide and across all Options</p>	<p>Construction and operation of the water supply network can have implications for biodiversity, for example through loss of habitat or disturbance to species. There is a potential that invasive species can spread through activities associated with moving water around the network, or through activities such as maintenance.</p>	<ul style="list-style-type: none"> <li>Area (Ha) of designated site (including geological sites) directly affected by WRMP Options</li> </ul>	<p>Y (Monthly)</p>	<p>Y (Annually)</p>	<p>Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required. This should include habitat or species impacts through hydrological connection.</p>



			<ul style="list-style-type: none"> <li>• Area or length of Priority Habitat affected / restored or created</li> </ul>	Y (Pre and post construction)	N	Measure pre construction and review post construction.
			<ul style="list-style-type: none"> <li>• Area of Green / Blue Infrastructure created</li> </ul>	Y (Pre and post construction)	N	Measure pre construction and review post construction.
To protect and enhance the functionality, quantity and quality of soils.	Company wide and across all Options	Soil is a non-renewable resource and is vulnerable to erosion, degradation and contamination. Valuable soil resources can be lost or degraded due to construction of water supply infrastructure. Pollution incidents during construction and operation can lead to contamination of the soil resource.	<ul style="list-style-type: none"> <li>• Area of Best and Most Valuable (Grade 1-3a) soils lost to WRMP Options</li> </ul>	Y (Pre and post construction)	N	Measure pre construction and review post construction.
			<ul style="list-style-type: none"> <li>• Total area of soil reinstated for agricultural use</li> </ul>	Y (Pre and post construction)	N	Measure pre construction and review post construction to ensure completion or whether further work is required.
			<ul style="list-style-type: none"> <li>• No. of pollution / contamination incidents during construction or operation of water supply infrastructure.</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
	Company wide and across all Options	Construction or repair activities are likely to have	<ul style="list-style-type: none"> <li>• Scheme-specific monitoring during construction works /</li> </ul>	Y	Y	Reviews to be carried out in line



To reduce and minimise air and noise emissions.		implications for air and noise emissions. These could include dust or other particulate matter generated by the activities themselves or the required plant and vehicles. Treatment and pumping of water is likely to lead to an increase in air and noise emissions. While most facilities will operate using energy mains supply, there may be a requirement for standby generators.	during operation (where applicable) would be monitored through an Environmental Management Plan agreed as part of the planning permission process	(as directed by Environmental Management Plan)	(as directed by Environmental Management Plan)	with Environmental Management Plan.
			<ul style="list-style-type: none"> <li>Number of electric generators in use and period of usage.</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
To achieve SES target of reducing operational carbon emissions and contribute to national target of Net Zero by 2050.	Company wide and across all Options	As with air and noise, construction activities are likely to result in carbon emissions. Options would also result in embedded carbon, but also potentially ongoing emissions through the requirement for energy for pumping / treating water.	<ul style="list-style-type: none"> <li>Percentage of energy use from renewable sources</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
			<ul style="list-style-type: none"> <li>Renewable energy generated on Company property</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
			<ul style="list-style-type: none"> <li>Tonnes of embedded carbon in construction of Option</li> </ul>	Y (Post Construction)	N	Review post construction.



			<ul style="list-style-type: none"> <li>Carbon emissions from Company operations</li> </ul>	N	Y (Annually)	Review annually during operation to monitor and if activity needs to be stepped up
			<ul style="list-style-type: none"> <li>Area (Ha) planted / restored for sequestration</li> </ul>	Y (Pre and post construction)	N	Measure pre construction and review post construction to ensure completion or whether further work is required.
			<ul style="list-style-type: none"> <li>Net greenhouse gas emissions per MI (million litres) of treated water (kg CO2 equivalent emissions per MI)</li> </ul>	N	Y (Annually)	Review annually during operation to monitor and if activity needs to be stepped up
			<ul style="list-style-type: none"> <li>Company fleet fuel consumption</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
To conserve, protect and enhance landscape,	Company wide and across all Options	Construction activities can lead to effects on landscape or visual amenity, though reinstatement would remove	<ul style="list-style-type: none"> <li>Area / length of Option located within areas designated for landscape protection</li> </ul>	Y (Pre and post construction)	N	Measure pre construction and review post construction.



townscape and seascape character and visual amenity.		these effects or provide opportunities to improve visual amenity. Options may lead to the creation of new infrastructure in the landscape.	<ul style="list-style-type: none"> <li>Area / length of completed reinstatement</li> </ul>	Y (Post Construction)	N	Review post construction.
To conserve, protect and enhance the historic environment and heritage assets, including archaeological remains	Company wide and across all Options	Construction activities can lead to effects on historic assets, including unknown artefacts though reinstatement would remove these effects or provide opportunities to improve the setting of these assets. Note that effects on archaeological remains cannot be undone. Dewatering of areas could damage buried assets. Archaeological investigation may provide opportunities to understand the past history of the SES Water area better	<ul style="list-style-type: none"> <li>Number of scheduled monuments or other historic asset (designated &amp; non-designated) harmed / damaged or conserved / enhanced by WRMP Option[JA1] [JA2]</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
			<ul style="list-style-type: none"> <li>Length of pipeline routes realigned to avoid heritage assets</li> </ul>	Y (Pre and post construction)	N	Measure pre construction and review post construction.
To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing.	Company wide and across all Options	Construction activities could result in direct and indirect effects on health and wellbeing, as well as impact on access to community facilities or provision of services.	<ul style="list-style-type: none"> <li>Monitoring to be discussed and agreed in light of prevailing conditions with relevant Health Officers of Local Authorities in the Plan area, or any other relevant parties e.g. health or educational</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.



			establishments. Consideration to be given to need for monitoring of air and noise emissions.			
			<ul style="list-style-type: none"> <li>Number of days / hours when water supply to people on the vulnerable groups register is disrupted.</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
			<ul style="list-style-type: none"> <li>Duration of highways works</li> </ul>	Y (Monthly)	N	Review monthly during operation to monitor and if activity needs to be stepped up
			<ul style="list-style-type: none"> <li>Number of complaints relating to construction works</li> </ul>	Y (Monthly)	N	Review monthly during construction to ensure no adverse effects and whether further work is required.
To maintain and enhance tourism and recreation.	Company wide and across all Options	Tourism and recreation are two important sectors to the South East region. Construction and operation of WRMP Options could affect both tourism and recreational facilities through direct	<ul style="list-style-type: none"> <li>No net loss of important recreational / tourism amenity caused by WRMP Option</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.



		disturbance or loss. This could be both temporary or permanent.	<ul style="list-style-type: none"> <li>• Generation of new recreational facilities</li> </ul>	N	Y (Upon operation of the option)	Review upon operation of the option
			<ul style="list-style-type: none"> <li>• Area of greenfield / Open Space disturbed or lost</li> </ul>	Y (Monthly and pre and post construction)	N	Review monthly during construction to ensure no adverse effects and whether further work is required. Review pre and post construction to determine greenfield / Open Space lost.
			<ul style="list-style-type: none"> <li>• Km of PRoW affected / lost / created by WRMP Option</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
To minimise resource use and waste production	Company wide and across all Options	Construction activities are likely to result in resource use and waste production, as may some operational activities.	<ul style="list-style-type: none"> <li>• Quantity of resources used and waste produced through construction</li> </ul>	Y (Monthly)	N	Review monthly during construction and annually during operation to monitor and if activity needs to be stepped up
			<ul style="list-style-type: none"> <li>• Quantity of resources used and waste produced through operation</li> </ul>	N	Y (Annually)	Review annually during operation to monitor and if



						activity needs to be stepped up
To avoid negative effects on built assets / infrastructure.	Company wide and across all Options	Likely effects on built assets and infrastructure. This may include the maintenance and operation of public or private buildings, transport, amenity resource, machinery and plant.  Major users such as hospitals, factories and food producers may be most susceptible unless protected.	<ul style="list-style-type: none"> <li>Number and nature of complaints to be measured and discussions to take place with sensitive operators in light of prevailing conditions.</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.
			<ul style="list-style-type: none"> <li>Complaints / incidence of strategic infrastructure disruption or loss of service</li> </ul>	Y (Monthly)	Y (Annually)	Review monthly during construction and annually during operation to ensure no adverse effects and whether further work is required.

## 15. Summary and Conclusions

SES Water is a supply-only water company supplying an area of 834 km<sup>2</sup> within Surrey, Kent, West Sussex and south London. SES Water supplies, on average, 160 million litres of water per day (Ml/d) in the area, however, during the summer 2022 drought period this increases to above 210 Ml/d. SES Water's supply area, alongside those of Affinity Water, South East Water and Southern Water are classed as experiencing serious water stress and among the driest areas in the UK. 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 SES Water area.

The SEA and assessments of Biodiversity Net Gain, Natural Capital, Invasive Non Native Species, Habitats Regulation and Water Framework Directive have each been thorough and comprehensive. Assessment was made of an initial long list of sites and environmental issues were considered through all stages of short listing and Option development. This was at both a regional level (carried out by WRSE) and at a more 'local' level that considered issues in light of the environmental and planning policy context of the plan area. Consideration of both the regional and local level has meant that two SEA teams have been involved and have acted independently of each other, though liaison has been maintained and results of assessments shared. These teams have also liaised closely with the SES WRMP making team and have challenged the Plan development team when appropriate.

Based on the findings of the SEA, it is possible to recognise a number of key considerations and draw conclusions with regards to the WRMP24 and its 'environmental performance'. These are outlined as follows.

In the first instance, it is important to recognise that while WRMP24 clearly fits within a regional context, it also needs to reflect the issues and opportunities of the SES Water area. Similarly, there are a range of challenges and uncertainties facing both the region and the Plan area. The approach to assessment made, of considering wider regional issues (by WRSE), as well as considering a 'local' SES Water baseline and review of relevant plans and policies to develop a bespoke SEA Framework has resulted in an enhanced understanding of environmental issues in the Plan area and the surrounding region and this has allowed full and robust consideration of Options proposed under WRMP24.

The Adaptive plan approach that has been developed, recognises the inherent uncertainties involved in water resource planning and has been specifically designed to help water companies adopt a forward-looking approach to allow companies to plan for schemes that may be required from 2025 and beyond. The essence of this approach is that the Plan can adapt depending on which of the potential future scenarios identified occurs.

Consideration by WRSE of the adaptive planning approach identified the following three plans:

- 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

Examination was made of the trade-offs between the anticipated additional value that different portfolios of options could provide against the least cost criterion to try to derive something that is best value – for the environment, society and SES Water customers. The WRMP24 has taken the adaptive planning approach and having identified the three Plan types, further identified what is considered the most realistic scenario, alongside the most realistic future pathway and from this has outlined a series of supply options (i.e. those which in general will increase the amount of water in the supply system), alongside a series of demand options (i.e. those which will act to reduce the need for water). Having identified the Options in the Best Value Plan, WRSE carried out initial assessment of these for SEA and the associated environmental assessments of Habitats Regulations Assessment, Water Framework Directive, Biodiversity Net Gain, Natural Capital Assessment and Invasive Non-Native Species. These assessments were further built upon by SES Water, with a particular emphasis on trying to identify issues of note in a local context.



The Options identified in the Best Value Plan included both 'demand side' Options (measures that reduce demand for water) and 'supply side' Options (measures that increase supply). Assessment of the Options outlined considered both construction effects and those which are anticipated to occur during operation of the Option. A series of mitigation measures were also identified, with the aim of reducing or nullifying any adverse effects, while potentially maximising any beneficial effects from the Option.

For the most part, it is anticipated that the Options within WRMP24 will not require any construction activities. This is applicable to each of the drought permits, Consumption Reduction Activities (High+), Government Interventions (HybridC++), NEUBs and TUBs. Construction effects were identified for six of the options (Outwood Lane groundwater (2.7MI/d); Water Lane borehole enhancement (2.2MI/d); Secombe Centre UV (2.1MI/d); Duckpit Wood (1.4MI/d); Raising Bough Beech reservoir (11.5MI/d); and Leakage Reduction Activities (High+)), although none of these were considered significant.

One slight beneficial effect was identified during construction in relation to the potential to improve local archaeological understanding if buried archaeology is uncovered during construction of Secombe Centre UV (2.1MI/d) (Objective 9). Slight adverse effects were anticipated for all six options in relation to carbon (Objective 7), which will be generated from materials used during construction. All options with the exception of Water Lane borehole enhancement (2.2MI/d) are anticipated to have slight adverse effects on resource use (Objective 12) during construction. Slight adverse effects are anticipated for four of the options (Secombe Centre UV (2.1MI/d); Duckpit Wood (1.4MI/d); Raising Bough Beech reservoir (11.5MI/d); and Leakage Reduction Activities (High+)), for biodiversity (Objective 4), air and noise (Objective 6), landscape (Objective 8), health and wellbeing (Objective 10) and built assets / infrastructure (Objective 13) due to potential impacts during construction. For a small number of the options slight adverse effects are also anticipated for climate change (Objective 2), water (Objective 3), soils (Objective 5), cultural heritage (Objective 9) and tourism and recreation (Objective 11).

Such construction adverse effects for these Options are anticipated to be local scale, short term and temporary to the construction / repair phase, with the exception of Leakage Reduction Activities (High+) where effects on biodiversity are anticipated to be regional.

During operation, effects have been identified for all Options. Significant adverse effects been identified for all 'supply side' Options. Significant beneficial effects are anticipated in relation to Raising Bough Beech reservoir (11.5MI/d); Hackbridge drought permit; Kenley and Purley Drought Permit; Outwood Lane Drought Permit; River Eden May Drought Permit; River Eden Summer Drought Permit; Consumption Reduction Activities (High+); Government Interventions (HybridC++); and Leakage Reduction Activities (High+).

Each of the Drought Permits are associated with likely significant beneficial effects in respect of Objectives 1, 3, 10 and 12. The Drought Permits are in themselves responses to prolonged dry weather events which are anticipated to be exacerbated by climate change. As a result, significant beneficial effects are attributed to each of the Drought Permits for SEA Objective 1 (Increase resilience to climate change and reduce flood risk). They will also help ensure reliability and resilience of supply (Objectives 3 and 10) and reduce the need for more resource intensive external transfers and abstractions (Objective 12) during the period for which they are operational.

Significant beneficial effects are also anticipated for Raising Bough Beech reservoir (11.5MI/d) for Objective 1 as it anticipated to increase resilience to drought events which are expected to be exacerbated by climate change. Due to water being kept within the environment, the protection of water resources, reduced pressures on water supplies and improved efficiency (Objective 3) significant beneficial effects are anticipated for Consumption Reduction Activities (High+), Government Interventions (HybridC++) and Leakage Reduction Activities (High+). Significant beneficial effects are anticipated in respect of biodiversity (Objective 4) for Raising Bough Beech reservoir (11.5MI/d) due to opportunities to improve existing habitat within the immediate area and Leakage Reduction Activities (High+) as more water is being retained within the environment. Leakage Reduction Activities (High+) is expected to result in significant beneficial effects as resource use and wastage will be reduced (Objective 12).

Slight beneficial effects are also anticipated for a large number of the options in respect of climate change (Objective 1), water (Objective 3), air quality (Objective 6) and carbon (Objective 7). Such effects are also anticipated for a smaller number of options in respect of climate change (Objective 2), biodiversity (Objective



4), landscape (Objective 8), population and human health (Objective 10 and 11) and material assets (Objectives 12 and 13).

Significant adverse effects for all of the Drought Permits have been identified in respect of Objective 7 (carbon emissions). Increased abstraction at any of the sites is associated with greater pumping requirements and therefore increased operational carbon emissions. In respect of the Kenley Group Drought Permit an additional significant adverse effect has been identified in respect of Objective 3 (water). Watercourses in the area have unfavourable WFD statuses and the permit may create an interference drawdown with SES Water and Thames Water groundwater sources.

Significant adverse effects are also identified in respect of Objective 3 (water) for all other supply options as a result of the WFD assessment findings. During the operation of Water Lane borehole enhancement (2.2Ml/d) effects on SSSIs are possible and therefore significant adverse effects are anticipated in respect of biodiversity (Objective 4).

Slight adverse effects are also anticipated for a large number of the options in respect of climate change (Objective 1), biodiversity (Objective 4), soils (Objective 5), air quality (Objective 6), landscape (Objective 8) and population and human health (Objective 10 and 11). Such effects are also anticipated for a smaller number of options in respect of climate change (Objective 2), water (Objective 3), carbon (Objective 7), cultural heritage (Objective 9) and material assets (Objectives 12 and 13).

In relation to the drought permit options, these effects are anticipated to be local, short term and temporary in nature with the exception of biodiversity where effects are expected to be regional. For all other supply side options, effects are anticipated to be local, long term and permanent.

Mitigation (embedded and additional) is included to alleviate effects of the Plan where feasible.

It is important to recognise that the Demand Management Options will apply across the whole of the SES area and are anticipated to have cumulative beneficial effects from reducing the demand for water. For example, while Demand Management Options such as NEUBs and TUBs would typically be implemented in a phased, sequential manner, it is the intention that such measures will act to reduce pressure on water resources by reducing demand for water and as such, reduce the need for abstraction, treatment and onward pumping. This will act cumulatively across the Plan area and into nearby / linked resource areas. Savings in water would likely have cumulative beneficial effects in respect of resilience to climate change (Obj. 1), the water environment (Obj. 3), biodiversity (Obj. 4), reducing air and noise emissions and reducing carbon, (Obj. 6 and Obj. 7), maintaining health and wellbeing (Obj. 10), as well as minimising resource use (Obj. 12). While some of the savings made are anticipated in themselves small and benefits would be slight, it is to be noted that cumulatively effects could be significant and of importance given that these will be implemented in a drought situation when the environment is naturally under stress. Other Demand Management measures would apply at all times and act cumulatively to continually reduce pressure on sources, with consequent permanent benefits for people and the environment.

It is recognised that WRMP24 will not act or be delivered in isolation and will influence and be influenced by, other Plans and Policies or developments across and beyond the SES Water area and the south east as a whole. While there is a potential for cumulative effects during construction, it is anticipated that for the most part construction works associated with the WRMP are anticipated to be relatively small scale, with localised effects and for the most part likely to be spatially and temporally isolated from major infrastructure developments.

It is also the case that any major infrastructure project, or other Plans and Policies, will be subject to their own environmental assessment process and development of mitigation e.g. through EIA and Environmental Management Plans. Mitigation measures will be developed to minimise adverse effects and maximise beneficial effects.

It is important that SES Water understand the effect of the implementation of their WRMP24 and this SEA sets out a potential series of monitoring indicators / performance metrics that will be used to monitor the implementation of the WRMP24. It is the intention that monitoring will enable the establishment of a causal link between the implementation of the WRMP24 and the likely significant effects (both positive and negative) being monitored. This will be of particular importance as this is an Adaptive Plan which will be able to react to changes in the environment, as well as changes in factors such as economic or population growth. This



monitoring will also be of particular benefit to those involved with the further iterations of the WRMP and if required, will allow early remediation to be undertaken of any identified adverse effects.

**In conclusion, SES Water have developed a Water Resource Management Plan (WRMP24) which has been subject to a set of thorough and comprehensive environmental assessments, at both a regional level and at a level local to the SES Water area. The assessments undertaken have been consistent in approach and resulted in iterative development of the Plan, thereby allowing the Plan to be developed in the context of a thorough understanding of the key environmental issues and constraints of the SES Water area and beyond. This allowed for a robust consideration of alternatives to the Plan and allowed identification of a Preferred set of Options. The range and significance of anticipated effects to be anticipated from implementation of the WRMP24, including both beneficial and adverse, have been identified and mitigation proposed where required. Monitoring will help to protect the environment by allowing action from unexpected effects to be taken and will help inform future iterations of the Plan. It is therefore concluded that the WRMP24 is a well-balanced Plan in terms of environmental protection, while still meeting the requirements for helping to ensure customers and communities have adequate water supplies available.**



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