

# SES Water Drought Plan

## Strategic Environmental Assessment Non-Technical Summary

SES Water

November 2022

5198463



# Notice

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## Client signoff

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# Contents

| Chapter   | Page      |
|---|-----------|
| <b>Glossary</b>   | <b>4</b>  |
| <b>1. Introduction</b>  | <b>6</b>  |
| <b>2. Consideration of Alternatives</b>                         | <b>9</b>  |
| <b>3. Assessment of Options</b>                                 | <b>9</b>  |
| 3.1. Demand Side Options  | 10        |
| 3.2. Supply Side Options  | 16        |
| <b>4. Mitigation</b>  | <b>24</b> |
| <b>5. Cumulative effects</b>                                    | <b>29</b> |
| In-plan cumulative effects                                      | 29        |
| In-combination cumulative effects with other plans and projects | 30        |
| <b>6. Monitoring</b>  | <b>30</b> |
| <b>7. Summary and Conclusions</b>                               | <b>30</b> |
| <br>  |           |
| <b>Tables</b>   |           |
| Table 3-1 - Assessment Scoring Scale                            | 10        |
| Table 3-2 - Demand Side Options - Assessment Overview           | 10        |
| Table 3-3 - Supply Side Options - Assessment Overview           | 16        |
| Table 4-1 - Embedded Mitigation considered in Option assessment | 25        |
| Table 4-2 - Additional Mitigation derived from Assessment       | 26        |
| <br>  |           |
| <b>Figures</b>  |           |
| Figure 1-1 - SES Water Drought Plan area                        | 7         |

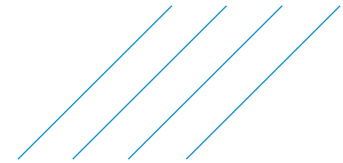


## Glossary

| Abbreviation | Explanation  |
|--------------|--|
| ALC          | Agricultural Land Classification                     |
| 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                                |
| CO2          | Carbon dioxide                                       |
| 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   |
| EAR          | Environmental Appraisal Report                       |
| ER           | Environmental Report                                 |
| GHG          | Greenhouse Gas                                       |
| GVA          | Gross Value Added                                    |
| HRA          | Habitats Regulation Assessment                       |
| INNS         | Invasive Non Native Species                          |
| LSE          | Likely Significant Effects                           |
| LFRMS        | Local Flood Risk Management Strategies               |
| LNR          | Local Nature Reserve                                 |
| MRF          | Minimum Residual Flow                                |
| NCA          | National Character Areas                             |
| NGO          | Non-Governmental Organisation                        |
| NHS          | National Health Service                              |
| NIA          | Noise Action Planning Important Area                 |
| NNR          | National Nature Reserve                              |
| NO2          | Nitrogen dioxide                                     |
| NPPF         | National Planning Policy Framework                   |
| MCHLG        | Ministry of Housing Communities and Local Government |
| MI/d         | Mega litres per day / Million litres per day         |
| NEUB         | Non-Essential Use Ban                                |
| ODPM         | Office of the Deputy Prime Minister                  |
| PM           | Particulate Matter                                   |
| PPPs         | Plans, Policies and Programmes                       |
| PRoW         | Public Right of Way                                  |



| Abbreviation | Explanation                            |
|--------------|--|
| pSPA         | Potential Special Protection Area      |
| RBD          | River Basin District                   |
| 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                 |
| SSSI         | Site of Special Scientific Interest    |
| SuDS         | Sustainable Drainage Systems           |
| TUBs         | Temporary Use Bans                     |
| UKWIR        | UK Water Industry Research             |
| ULEV         | Ultra Low Emission Vehicle             |
| WFD          | Water Framework Directive              |
| WHS          | World Heritage Site                    |
| WPS          | Water Pumping Station                  |
| WRMP         | Water Resource Management Plan         |
| WRSE         | Water Resources South East             |
| WRZ          | Water Resource Zone                    |
| WTW          | Water Treatment Works                  |



## 1. Introduction

This is the Non-Technical Summary of the Strategic Environmental Assessment (SEA) of SES Water's Drought Plan 2021. The purpose of this Non-Technical Summary is to set out the SEA process and the outcomes derived from this and is intended to inform people who have a general interest in the Drought Plan, but who are not concerned with its detailed technical assessment. Readers are advised to read the full contents of the Drought Plan and associated SEA Report for more detailed information if required.

The Drought Plan that this SEA relates to is a revision to that published in May 2019. In the Drought Plan, SES Water sets out the operational activities and associated monitoring to be considered in response to drought events of different severities which have the potential to impact on the 745,000 people that SES Water supply. The aim of the Plan is to identify a balance of measures, including restrictions on customers' use of water appropriate to the seriousness of the drought, to ensure that essential supplies are maintained in all but the most severe events.

It is to be noted that actions which reduce demand would be prioritised before those that involve abstracting more water, whilst if there is a need to implement a drought permit for a supply source, then those which are the least environmentally damaging would be selected first. The Drought Plan is made up of two types of action – 'Demand Side' and 'Supply Side'.

**Demand side actions** will include:

- Customer awareness
- Leakage management and operational usage
- Temporary water use restrictions (Temporary Use Bans)
- Restrictions on use of water through an Ordinary Drought Order (Non-essential use bans)
- Additional demand restrictions
- Emergency Drought Orders including phased pressure reduction, rota cuts and standpipes

**Supply side actions** will include:

- Changes in use of existing licences / internal transfers
- Transfers from Bough Beech WTW
- Use of peak resources
- Other internal conjunctive use / transfer schemes
- Planned outage
- River Eden Drought Permits
- Groundwater abstraction Drought Permit sites
- Hackbridge / Goat Bridge / Bishopsford Road
- Kenley Group
- Outwood Lane
- Level 3B Supply-side Measures ('More before 4')

Consideration was made of the water supply area under the responsibility of SES Water, which covers 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. See Figure 1-1. Consideration was also made of other company plans adjacent to the SES Water area, as well as environmental issues in these areas as appropriate.

Drought Plans are short-term operational plans (reviewed and updated at least every five years). The SES Water Drought Plan is linked to the Company's Water Resource Management Plan (WRMP) in that both plans have the objective of maintaining water supplies to customers, at least for essential purposes, up to a defined drought severity or level of resilience. The WRMP is a long term (currently 60 years) plan and assesses future demand against supply availability, and determines any measures needed to address a future gap in supplies.

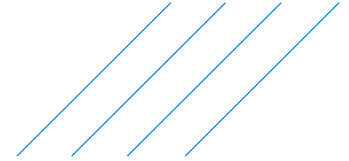
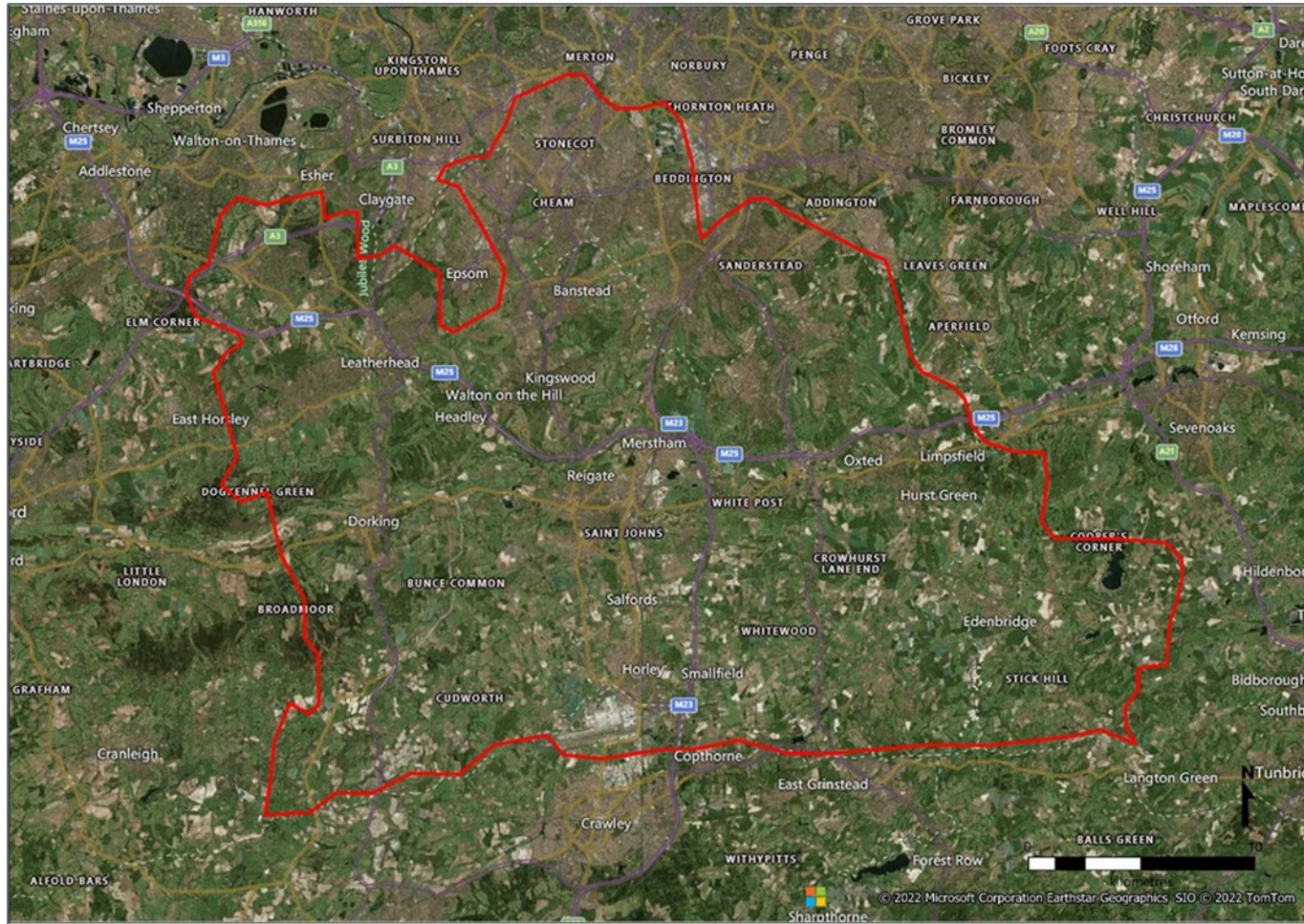
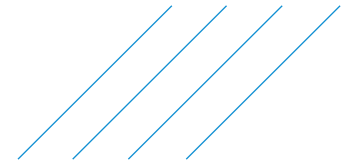


Figure 1-1 - SES Water Drought Plan area





While it is clearly vital that supplies of potable water are maintained through a drought period, it is also important that this is done in a way which protects the environment as much as possible. Therefore, the Drought Plan has been subjected to an assessment process that allows environmental effects from implementation of the Drought Plan to be identified and importantly, identifies methods by which negative effects can be reduced, while beneficial effects are increased.

Identification of the environmental effects of the Drought Plan is achieved through examining a series of environmental topics that are set out in the legislation that requires SEA to be carried out (the Environmental Assessment of Plans and Programmes Regulations 2004). The environmental topics are:

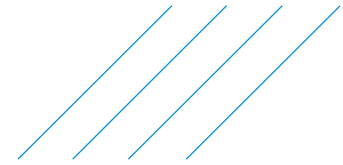
- Biodiversity;
- Population;
- Human health;
- Flora and fauna;
- Soil;
- Water;
- Air;
- Climatic factors;
- Material assets;
- Cultural heritage, including architectural and archaeological heritage; and
- Landscape.

These environmental topics are considered through a series of Objectives and associated questions and how these interact with the Plan. These Objectives are set out in an SEA Framework, which details a set of criteria against which the performance of the Drought Plan can be predicted and evaluated. Development of the SEA Framework considers baseline data relevant to the Plan area and other areas where it may have an influence, as well as a review of relevant legislation, plans and programmes, to arrive at a set of Objectives that recognise the key environmental issues in the Plan area and which may be influenced by the implementation of the Drought Plan. The SEA Objectives are:

1. Increase resilience to climate change and reduce flood risk
2. Reduce embodied and operational carbon emissions
3. Protect and enhance the quality of the water environment and water resources
4. Deliver reliable and resilient water supplies
5. Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity
6. To maintain and where possible improve freshwater fisheries
7. Protect and enhance the functionality, quantity and quality of soils
8. Reduce and minimise air and noise emissions
9. Conserve, protect and enhance landscape, townscape and visual amenity
10. Conserve, protect and enhance the historic environment and assets, including archaeology
11. Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing
12. Minimise resource use and waste production
13. Avoid negative effects on built assets and infrastructure

It is also important to note that as there is a potential that the Drought Plan could lead to a direct or indirect effect on sites which have been designated for nature conservation purposes (such as Special Areas of Conservation), a Habitats Regulation Assessment (HRA) was also carried out and is reported separately. Similarly, the nature of the Drought Plan means that it is important that consideration was made of how the Plan will interact with the water environment, to ensure that adverse effects are minimised. Therefore, a series of comprehensive hydrological and hydroecological assessments have been completed to help inform the development of pre-prepared 'shelf copy' Environmental Assessment Reports that are available to support any future drought permit application that may be required to implement the Drought Plan. It was determined that no mechanism existed by which Demand Management actions can give rise to a deterioration in the





status of any waterbody. Similarly, close examination of the Supply Side Options showed that none of the Options had predicted effects that would lead to a deterioration in the status of any waterbody.

## 2. Consideration of Alternatives

The SEA Regulations require that when an SEA is carried out, it must identify, describe and evaluate the likely significant effects of implementing reasonable alternatives to the plan which it assesses.

Drought Plans include a range of management measures that will only be implemented in the event of certain conditions arising during a particular drought event. It is to be noted that each drought event is unique in relation to its severity, the time of year during which it takes place, where precisely the area affected by the drought is located, as well as the length of time over which the drought lasts. All these factors may require a different response in terms of the measures to be implemented, as well as the sequence and order in which they are implemented.

In the context of Drought Planning, maintaining a supply of potable water is vital in order to ensure continued public health and safety. It is also important that this is done in a manner in which the environment is protected as much as possible during a period in which many environmental elements will already be under stress due to the prevailing climatic conditions.

In recognition of the above and the emergency nature of Drought Planning, in relation to this Drought Plan, each individual drought Option is considered to be reasonable alternatives and each Option (or 'Alternative') has been assessed against the SEA Framework.

The assessment therefore provides information on the relative environmental performance of each of the alternatives and is intended to make the decision-making process for the selection of preferred options more transparent.

## 3. Assessment of Options

It is normal practice when developing a Plan to propose different ways (options) of fulfilling its objectives. In respect of the Drought Plan, a series of options were set out which can be implemented in a phased approach to address a developing drought situation i.e. the Drought Plan sets out options which SES Water can consider taking in response to drought events of different severities. Decision making will be guided by the position of water availability in terms of reservoir and groundwater levels in relation to specified triggers. The aim is to identify a balance of measures, including restrictions on customers' use of water appropriate to the seriousness of the drought, to ensure that essential supplies are maintained in all but the most severe events.

Building on experience and consideration of the benefits and impacts of restricting certain uses, SES Water propose a phased approach, prioritising water saving measures subject to the severity of the drought conditions being experienced, the impact on customers, particularly small businesses, and reflecting regional drought impact and coordination of measures being implemented by water companies in the region. In this plan, SES Water have started to explore additional demand restrictions that may be needed in an extreme drought to further avoid the need for emergency measures.

Each Option has been assessed against the SEA Framework in respect of construction and operation phases and considering positive and negative effects separately.

To allow for the identification of different levels of effects when assessing the Drought Plan proposals, a scoring system has been used to differentiate in terms of magnitude and significance of effects. This scoring system is widely used in SEA and is based around the following scale to reflect the assessment aid questions in the SEA Framework.



**Table 3-1 - Assessment Scoring 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             | Significant            |
| ---              | Major adverse                |                        |

It is to be noted that the scores derived will be considered 'in the round' in light of the assessment aid questions (detailed in the SEA Framework) and a judgement made as to an appropriate summary score for that aspect of the Drought Plan being considered.

### 3.1. Demand Side Options

The following table provides an overview of assessment results for six types of Demand Side Options considered. The effects shown are after any mitigation has been applied to reduce adverse effects, or maximise beneficial effects.

**Table 3-2 - Demand Side Options - Assessment Overview**

| Demand Side Options  |                           | SEA Objective |     |     |     |     |     |     |     |     |     |     |     |     |
|--|---------------------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|  |                           | 1             | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  |
| <b>Customer Awareness</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   |
|  | Negative Residual Effects | 0             | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   | 0   |
| <b>Leakage management and operational usage</b>              |                           |               |     |     |     |     |     |     |     |     |     |     |     |     |
| Construction   | Positive Residual Effects | 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   | +   | +   |
|  | Negative Residual Effects | 0             | 0   | 0   | 0   | 0   | 0   | -   | 0   | 0   | 0   | 0   | 0   | 0   |
| <b>Temporary water use restrictions (Temporary Use Bans)</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   | -   | 0   | -   | 0   | -   | 0   | -   |



| Demand Side Options  |                           | SEA Objective |     |     |     |     |     |     |     |     |     |     |     |     |
|--|---------------------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|  |                           | 1             | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  |
| <b>Restrictions on use of water through an Ordinary Drought Order (Non-essential use bans)</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   | -   | 0   | -   | 0   | -   | 0   | -   |
| <b>Additional demand restrictions</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   | -   | 0   | --  | 0   | --  | 0   | --  |
| <b>Emergency Drought Orders including phased pressure reduction, rota cuts and standpipes</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   | --  | --  | --  |

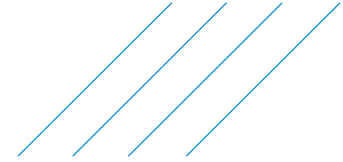
N/A – not applicable

The SEA Objectives are:

1. Increase resilience to climate change and reduce flood risk
2. Reduce embodied and operational carbon emissions
3. Protect and enhance the quality of the water environment and water resources
4. Deliver reliable and resilient water supplies
5. Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity
6. To maintain and where possible improve freshwater fisheries
7. Protect and enhance the functionality, quantity and quality of soils
8. Reduce and minimise air and noise emissions
9. Conserve, protect and enhance landscape, townscape and visual amenity
10. Conserve, protect and enhance the historic environment and assets, including archaeology
11. Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing
12. Minimise resource use and waste production
13. Avoid negative effects on built assets and infrastructure

### 3.1.1. Customer Awareness

This Option is to increase customer awareness of the resource situation and is to be achieved by use of some or all of the following: social media (Twitter, Facebook) newsletters, press releases to local media, liaison with community and stakeholder groups, awareness raising programmes on local radio and providing regular updates on key section of SES Water website. As such, this Option can be considered ‘soft’ with no additional or modified infrastructure requirements and therefore there are no construction activities associated with this Option.



A key feature of this Option is that by raising awareness of a developing drought situation, or potential constraints on supply, it will encourage people to conserve water, with the result of this maintaining water within the supply system and wider environment. It is anticipated that this will provide beneficial effects in terms of resilience to a changing climate and will reduce the need for water treatment and pumping, with slight beneficial effects in terms of reducing operational carbon emissions. Similarly, it will help to protect the wider water environment and help ensure the ongoing delivery of reliable and resilient water supplies.

Protection of water resources are anticipated to have beneficial effects for biodiversity by increasing or maintaining availability of water resources for water dependent habitat and species, as well as fisheries.

A reduction in treatment and pumping requirements may provide benefits in terms of reducing air and noise, though this is not anticipated to be significant. These elements could also help to improve wellbeing of people in the vicinity of treatment plants or pumping facilities temporarily. Wellbeing can also be protected via this Option due to reducing the need for more disruptive Options for maintaining potable water supply. Reducing the need for treatment and pumping will also act to minimise resource use and waste production.

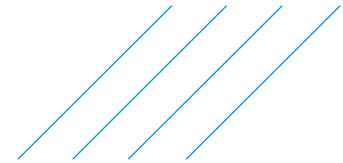
All of the above noted effects are considered to be slight beneficial i.e. not significant and will be short term and temporary, though they are anticipated to be felt across the region. No adverse effects are anticipated from implementation of this Option in respect of any of the SEA Objectives and no additional mitigation has been identified. As such, as would be expected by its nature, Customer Awareness would be the most sustainable early intervention Option to take in the event of a drought.

### 3.1.2. Leakage management and operational usage

In respect of this Option, construction activities will be required. While it is not expected that leakage can be reduced significantly during drought periods, SES Water consider this an important issue to consumers and proactive reduction of leakage reinforces the message that water needs to be conserved. The options available include:

- Increased resources on leakage detection
- Reduce leak repair 'run times' on company apparatus
- Increased focus on leak repairs of customers supply pipes
- Increase awareness of the need for customers to repair leaks on internal plumbing systems
- Additional pressure management within District Metered Areas that are pressure controlled, to reduce leakage and customer consumption
- Restrict mains flushing activities to essential operations only
- Restrict service reservoir cleaning operations to essential operations only
- Postpone or cancel planned outages at water treatment works

Only one slight positive effect has been identified in relation to the construction activities and that is whereby construction activities related to leakage repair may provide some opportunity to identify previously unknown heritage features. On the whole though, construction effects are anticipated to be either neutral or slight adverse. Slight adverse effects are anticipated in respect of Climate Change, Carbon Emissions, Water Environment, Water Supplies, Biodiversity, Landscape, Historic Environment, Resource Use and Built Assets and are due to construction activities potentially resulting in emissions (air and water pollution), causing disruption to service, directly affecting habitats or species, having an effect in townscapes or landscapes, potentially impacting known or unknown heritage assets, using new resources / materials such as new piping, bedding material, road surfacing material etc., as well as general effects on built assets or infrastructure such as road or path surfacing. One slight adverse effect has been identified in relation to Soils though effects are limited to construction. All such effects related to construction though are anticipated to be small in scale, short term and temporary and confined to the local area. Recommendations are made in respect of additional mitigation and this relates to Air and Noise Emissions and Population and Human Health, where it is considered plant and equipment should be well maintained and ideally low or zero emission – this will act to reduce air and noise emissions. Effective community



engagement should also be made in relation to maintaining the health and wellbeing of people in the vicinity of proposed works.

However, during operation, a greater range of beneficial effects are anticipated. In relation to slight beneficial effects, it is anticipated that flood risk will be reduced due to network improvements, and a reduction in water loss should benefit biodiversity and fisheries. Reduced leakage should also reduce the requirement for resource use and waste and reduce pressures on wider infrastructure.

Moderate beneficial effects are anticipated in respect of reducing carbon emissions (through a reduced need to treat and pump water to make up for losses due to leakage). Reduced leakage and customer consumption as well as measures to reduce maintenance water resource requirements (mains flushing and reservoir cleaning) will improve efficiency and reduce water consumption, with moderate benefits in respect of the water environment and delivering reliable and resilient water supplies. These effects are considered long term and permanent beneficial, though only to the local area.

### 3.1.3. Temporary water use restrictions (Temporary Use Bans)

Temporary Use Bans (TUBs) 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. Two phases would be brought in, in sequence if necessary, as follows:

#### Phase 1

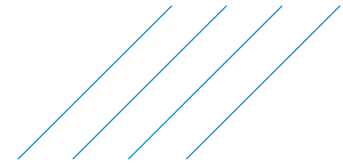
- Watering a garden using a hosepipe

#### 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, so no effects have been identified. In relation to residual effects from operation of this Option, a number of slight beneficial effects have been identified 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, reducing emissions and noise, maintaining river flows and protecting groundwater, maintaining supply, protecting biodiversity and fisheries, as well as minimising resource use and waste. All beneficial effects are considered small in scale, temporary and confined to the very local area.

Minor adverse effects have also been identified during operation of the Option. These relate to restrictions on water use which could have effects on biodiversity such as that found in domestic gardens – ponds etc. There could also be increased dust related erosion to soils, though this would be marginal and temporary effects on visual amenity as watering of private gardens and use of ornamental fountains etc will be restricted. A temporary use ban is likely to have minor negative effects on the community and social well-being as there will be restrictions on irrigation of gardens and allotment gardens and use of water for recreational purposes. There may also be a small increased risk of fires in allotments and parks and gardens as vegetation dries out. Wellbeing impacts associated with reduced water based recreational activities which improve tolerance and capacity to enjoy higher temperatures. Residential built assets may also not be cleaned as often as desired. All adverse effects are considered small in scale, temporary and confined to the very local area.



One area of additional mitigation has been identified in relation to Population and Human Health, which notes that allotments could be allowed limited supplies of water, as well as ensuring high levels of communication before, during and following the implementation of these measures.

### 3.1.4. Restrictions on use of water through an Ordinary Drought Order (Non-essential use bans)

This option follows the implementation of TUBs where drought conditions continue to worsen. Non-essential use bans (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.

NEUBs 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

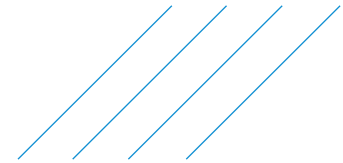
No construction activities are required in relation to this Option, so no effects have been identified. In relation to Operational effects, a number of slight beneficial effects have been identified, and these are mainly associated with the outcome of reducing demand and potentially reducing abstraction / treatment. This is considered likely to have beneficial effects in terms of increasing resilience, reducing emissions and noise, maintaining river flows and protecting groundwater, maintaining supply, protecting biodiversity and fisheries, as well as minimising resource use and waste. All beneficial effects are considered small in scale, temporary and confined to the very local area.

In relation to adverse effects, slight adverse effects have been identified in relation to an increased risk of non-native species transfer due to cleaning of boats and industrial plant not being permitted. Mitigation has been suggested that the risk of non-native species transfer is to be considered when banning washing of water craft, as well as consideration of mandating visual inspections of craft / equipment to ensure risk is reduced. A non-essential use ban may marginally impact soil quality due to increased dust related erosion, however as it a temporary solution the effects are not anticipated to be significant. This Option may also have some minor temporary, local effects on visual amenity as watering of private gardens, washing of domestic and commercial premises and use of ornamental fountains etc will be restricted.

A non-essential use ban is likely to have minor negative effects on the community and social well-being 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 be increased where dust suppression measures cannot be implemented and cleaning of paths and other infrastructure restricted. This may increase health and safety risks. Mitigation has been suggested to allow allotment gardens limited supplies of water. Ensuring high levels of communication before, during and following the implementation of these measures.

Consider of exemptions could also be made where dust suppression would alleviate impacts on particularly vulnerable groups e.g. construction works near hospitals, schools, nursery and care homes.



Slight adverse effects have also been identified in relation to maintenance of built assets and infrastructure, but this effect will be minimal and as with all other adverse effects identified in respect of this Option, are considered to be small scale, short term and temporary and confined to the very local area.

### 3.1.5. Additional demand restrictions

This option follows the implementation of TUBs and NEUBs by removing the exemptions and placing limits on consumption down to 50 litres per person per day. No construction activities are required in relation to this Option and as such no effects have been identified. In relation to Operational effects, a number of slight beneficial effects have been identified, 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, reducing emissions and noise, maintaining river flows and protecting groundwater, ensuring continued supply, protecting biodiversity and fisheries, as well as minimising resource use and waste. All beneficial effects are considered small in scale, temporary and confined to the very local area.

In relation to adverse effects, slight adverse effects have been identified in relation to an increased risk of non-native species transfer due to cleaning of boats and industrial plant not being permitted. Mitigation has been suggested that the risk of non-native species transfer is to be considered when banning washing of water craft, as well as consideration of mandating visual inspections of craft / equipment to ensure risk is reduced.

Additional demand restrictions may marginally impact soil quality due to increased dust related erosion, however as it a temporary solution the effects are not anticipated to be significant.

Moderate adverse effects have been identified as the option may have temporary, local effects on visual amenity as watering of private gardens, commercial premises use of ornamental fountains etc will be restricted. Where exemptions placed on parks, gardens open to the public and other green space through the TUBs and NEUBs are removed as a result of the additional demand restrictions, effects, while temporary, are anticipated to be more significant. Similarly, moderate adverse effects have been identified in relation to hygiene and wellbeing. Risk to human health may be increased where dust suppression measures cannot be implemented and typical hygiene/cleaning routines are disrupted.

Additional demand restrictions remove the exemption list associated with TUBs and NEUBs. Where this is anticipated to remove exemptions associated with vulnerable groups i.e disability, medical condition or similar, blue badge holders or customers who are registered on the SES Water Priority Services list due to a lack of mobility, effects on health and wellbeing, though temporary, may be greater. As such, mitigation is proposed in the form of consideration being given to exemptions with the intention of alleviating effects on the most vulnerable groups.

While temporary, the option is likely to impact on built assets and infrastructure. This may include the maintenance and operation of public or private buildings, transport, amenity resource, machinery and plant.

While some moderate adverse effects are identified, all adverse effects are anticipated to be short term and temporary, as well as confined to the very local area.

### 3.1.6. Emergency Drought Orders including phased pressure reduction, rota cuts and standpipes

This Option permits the use of standpipes and rota cuts, and is the last resort in extreme droughts that would be taken under this Drought Plan. Implementation of an emergency drought order requires application and approval from the Secretary of State and it is expected that this process may take approximately 4 to 5 months. Pressure reduction would be introduced first, followed by the introduction of standpipes and/or rota cuts.

No construction activities are required in relation to this Option, so no effects have been identified. In relation to Operational effects, a number of slight beneficial effects have been identified, 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, reducing emissions and noise, maintaining river flows and protecting groundwater, ensuring continued supply, protecting biodiversity and fisheries, as well as minimising resource use



and waste. All beneficial effects are considered small in scale, temporary and confined to the very local area.

A number of residual adverse effects have been identified in relation to the operation of this Option. In relation to carbon emissions, it is anticipated that transport to standpipes to collect water would lead to increased carbon emissions and have a moderate adverse effect on this objective. Further alternative domestic and commercial water sources may also be sought by some with a consequent increase in carbon emissions. Other moderate adverse effects are anticipated as the Emergency Drought Order may exacerbate soil quality issues during prolonged dry periods. While temporary, restrictions on irrigation coupled with prolonged dry periods may result in significant adverse effects on soils. There could also be significant adverse effects to landscape, townscape and visual amenity. This includes open green space, parks and gardens where restrictions include cleaning and watering which has the potential to result in deterioration of these assets.

Risk to human health may be increased owing to the reduction in access to water. The requirement to collect water at standpipes may disproportionately impact on vulnerable groups i.e disability, medical condition or similar, blue badge holders or customers who are registered on the SES Water Priority Services list due to a lack of mobility. It is proposed that consideration is given to exemptions for the most vulnerable groups.

Waste associated with the alternative arrangements that may be sought, such as bottled water provision and increase in private transport to collect water is anticipated to result in adverse impacts on waste production.

While temporary, the option is likely to impact 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.

Restrictions of water use may also result in an increased risk of Invasive Non Native Species (INNS) transfer where cleaning of boats and industrial plant is not permitted, though this is not considered significant. The transport required to collect water from standpipes would be anticipated to increase air and noise emissions, though again this is not considered to be significant.

While some moderate adverse effects are identified, all adverse effects are anticipated to be short term and temporary, as well as confined to the local area.

## 3.2. Supply Side Options

The following table provides an overview of assessment results for Supply Side Options. The effects shown are after any mitigation has been applied to reduce adverse effects, or maximise beneficial effects.

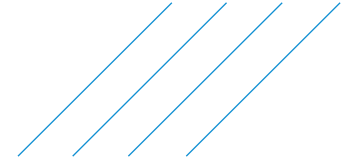
**Table 3-3 - Supply Side Options - Assessment Overview**

| Supply Side Options   |                           | SEA Objective |     |     |     |     |     |     |     |     |     |     |     |     |
|---|---------------------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|   |                           | 1             | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  |
| <b>Changes in use of existing licences / internal transfers</b>   |                           |               |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>Transfers from Bough Beech WTW, Use of Peak Resources, Other internal conjunctive use / transfer schemes and planned outage.</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   |
| Operation   | Positive Residual Effects | ++<br>+       | ++  | ++  | ++  | ++  | ++  | 0   | ++  | 0   | 0   | ++  | ++  | 0   |
|   | Negative Residual Effects | -             | -   | -   | 0   | 0   | 0   | 0   | -   | 0   | 0   | -   | 0   | 0   |
| <b>River Eden Drought Permits (May / Winter)</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 |





| Supply Side Options  |                           | SEA Objective |     |     |     |     |     |     |     |     |     |     |     |     |
|--|---------------------------|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
|  |                           | 1             | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | 10  | 11  | 12  | 13  |
|  | 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   |
| <b>River Eden Drought Permits (Summer)</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   |
| <b>Groundwater abstraction Drought Permit sites</b>              |                           |               |     |     |     |     |     |     |     |     |     |     |     |     |
| <b>Hackbridge / Goat Bridge / Goat Bridge / Bishopsford Road</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   |
| <b>Kenley Group</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   |
| <b>Outwood Lane</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   |
| <b>Level 3B Supply-side Measures ('More before 4')</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   | 0   |
| Operation  | Positive Residual Effects | ++            | 0   | 0   | +   | 0   | 0   | 0   | 0   | 0   | 0   | +   | 0   | 0   |
|  | Negative Residual Effects | 0             | --  | --  | --  | --  | --  | --  | --  | -   | 0   | --  | --  | 0   |



### 3.2.1. Changes in use of existing licences / internal transfers - Transfers from Bough Beech WTW, Use of Peak Resources, Other internal conjunctive use / transfer schemes and planned outage.

This option includes:

#### ***Transfers from Bough Beech WTW***

Up to 18Ml/d of potable water can be transferred from Bough Beech Water Treatment Works (WTW) and Elmer WTW to the Burgh Heath, Margery and Nork zones via Buckland Pumping Station. Further work has been carried out in the 2015-2020 Business Plan to increase transfer capacity from Bough Beech WTW, with additional upgrade work planned for the current period from 2020 to 2025. This work includes mains reinforcements and upgrades to booster pumping stations in order to take full advantage of the uprating of Bough Beech WTW, currently at 55Ml/d but increasing to 65 Ml/d. The overall scheme will increase resilience to treatment works outages, (by 2025 it will be possible to supply all customers from more than one WTW), facilitate greater flexibility and conjunctive use of groundwater and surface water sources and improve peak deployable output across the SES supply area.

#### ***Use of peak resources***

Operation of a number of relatively drought resilient peak sources at Hackbridge, Goat Bridge and Cliftons Lane. These sources draw groundwater from confined Chalk and Lower Greensand aquifers.

#### ***Other internal conjunctive use/transfer schemes***

Capacity to transfer water using the Kenley to How Green and the Buckland transfer schemes. Operated within existing licences and infrastructure capacities.

#### ***Planned Outage***

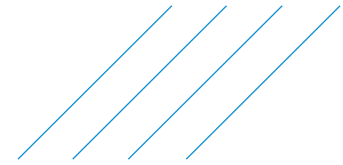
Review the need for any planned outage, taking into account the need for maintenance and the potential impacts on source outputs.

It is anticipated that this Option will have not result in any beneficial effects during construction (relating to transfers from Bough Beech WTW), though there are a number of adverse effects identified during this stage. These include minor adverse effects being possible on the water environment, biodiversity, as well as air and noise emissions due to construction activities. These activities may also have a slight adverse effect on landscape, townscape or visual amenity and potentially effect the setting of cultural heritage assets or disturb previously unknown assets. There may also be a requirement to disrupt supplies for particular construction elements, as well as impact wellbeing, though this would be temporary. All adverse effects identified via construction are anticipated to be short term and temporary to this phase. They are also anticipated to effect local areas only.

Operation of this Option provides opportunities for a range of beneficial effects, some of which are considered significant. In terms of beneficial effects, it is anticipated that there will be major beneficial effects in relation to increasing resilience to a changing climate. Greater interconnectivity will also reduce the need for tanker transfer and this will have moderate beneficial effects in relation to reducing carbon emissions and reducing air and noise emissions and requirement for resource use / waste, though there will also be an increased requirement for pumping. Greater inter connectivity of supply will also help to ensure that resources which are under stress can be alleviated by moving water from other areas, thereby ultimately helping to protect water resources and biodiversity, including fisheries. This will also of course also help to maintain reliable and resilient water supplies, which will help to provide clean water for the wider population.

All beneficial effects during operation are anticipated to be short term and temporary to local areas.

However, there are also adverse effects identified during this operation phase also. In relation to a changing climate, there is a potential that while relatively drought resilient, climate change may increase pressures on the confined Chalk and Lower Greensand aquifers. While significance is uncertain, it is anticipated that this may result in adverse effects. Adverse effects are also anticipated in relation to carbon, air and noise emissions due to the need for pumping of water



across the network. Additional mitigation has been proposed to consider integrating low emission or 'clean' energy sources to power pumping stations. All adverse effects are anticipated to be slight, of local scale and short term.

### 3.2.2. River Eden Drought Permits (May / Winter)

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. 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 associated with this Option, so no effects are identified. In relation to Operational effects, a number of residual positive effects are identified. It is anticipated that with the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change.

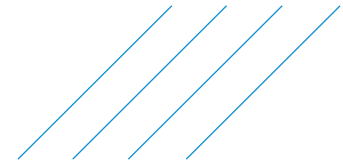
Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. Protections are however afforded to the River Eden by the MRF, operational practice and infrastructure constraints. The abstraction would cease well before natural flows in the river reduce to 22MI/d and when flows are recovering would not start until flows are much higher than 22MI/d. As such, it is anticipated resilience to a changing climate will be increased. The Drought Permit also has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon, air and noise emissions and will also have the beneficial effect of helping to ensure reliability and resilience of the water supply, as well as reduce resource use and waste production and help avoid negative effects on built assets / infrastructure.

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. The drought permit is also anticipated to result in beneficial impacts on health and wellbeing owing to its capacity to ensure provision of drinking water during periods of drought.

All beneficial effects during operation are anticipated to be short term and temporary to local areas.

Abstracting additional water from the River Eden to supplement Bough Beech Reservoir supply will increase operational carbon emissions. While abstractions already take place over winter months (September to April) this option would extend this abstraction through the month of May thereby introducing additional pumping requirements and operational carbon, air and noise emissions. There is a potential that abstraction will effect water quality, though this is not anticipated to be significant. Similarly in terms of biodiversity or fisheries, no significant impacts are predicted. For example, ecological community assessment has been undertaken within the zone of influence (i.e. from the abstraction point down to the Eden confluence) to inform the likely impacts of the drought permit. No detailed ecological community assessment has been undertaken downstream of the confluence with the River Medway. The hydrological impact of the Eden drought permit on the River Medway is diminishingly small, to the point it is considered negligible for the ecological communities of the River Medway. The protection of low flows is a significant consideration when assessing potential impacts of the proposed drought actions. There is evidence from previous operations of comparable drought actions that the fish population is resilient to the scale of predicted hydrological and water quality effects. It is not anticipated that the proposed drought action will lead to the loss of juvenile habitat, lead to fish stranding/isolation or undermine fish passage. Whilst flows will be affected, there is evidence from previous events that the community is resilient to the predicted change.

Slight adverse effects are also anticipated in relation to deposition of sediment in river - 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. Whilst lower flows are likely to occur for longer than normal during periods of drought permit



operation, the lowest flows are not affected by the permit as they are protected by the MRF, and the flushing flows that are an important to the overall sediment dynamics of the river are unlikely to occur in the drought permit period, more likely occurring over the autumn or winter period.

In terms of the angling amenity in the Eden, the effect of the proposed drought permit may impact the fishing both upstream and downstream of the Bough Beech intake. The Environment Agency designated Principal Coarse fishery located upstream of the intake could be affected by any reductions in the free movement of fish populations between the two reaches of the Eden. However, due to the presence of both the indicator and additional species of angling interest recorded upstream of the Principal Coarse fishery, the impact of the proposed drought permit on angling upstream of the intake is considered to be low and temporary.

All adverse effects during operation are anticipated to be short term and temporary to local areas and no additional mitigation was identified.

### 3.2.3. River Eden Drought Permits (Summer)

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.

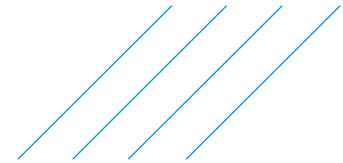
No construction activities are associated with this Option, so no effects are identified. In relation to Operational effects, a number of residual positive effects are identified. It is anticipated that with the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change.

Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. Protections are however afforded to the River Eden by the MRF, 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. As such, it is anticipated resilience to a changing climate will be increased. The Drought Permit also has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon, air and noise emissions and will also have the beneficial effect of helping to ensure reliability and resilience of the water supply, as well as reduce resource use and waste production and help avoid negative effects on built assets / infrastructure.

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. The drought permit is also anticipated to result in beneficial impacts on health and wellbeing owing to its capacity to ensure provision of drinking water during periods of drought.

All beneficial effects during operation are anticipated to be short term and temporary to local areas.

Abstracting additional water from the River Eden to supplement Bough Beech Reservoir supply will increase operational carbon emissions. While abstractions already take place over winter months (September to April) this option would extend this abstraction through months of June, July and August thereby introducing additional pumping requirements and operational carbon, air and noise emissions. There is a potential that abstraction will effect water quality, though this is not anticipated to be significant. Similarly in terms of biodiversity or fisheries, no significant impacts are predicted. For example, ecological community assessment has been undertaken within the zone of influence (i.e. from the abstraction point down to the Eden confluence) to inform the likely impacts of the drought permit. No detailed ecological community assessment has been undertaken downstream of the confluence with the River Medway. The hydrological impact of the Eden drought permit on the River Medway is diminishingly small, to the point it is considered negligible for the ecological communities of the River Medway. The protection of low flows is a significant consideration when assessing potential impacts of the proposed drought actions. There is evidence from previous



operations of comparable drought actions that the fish population is resilient to the scale of predicted hydrological and water quality effects. It is not anticipated that the proposed drought action will lead to the loss of juvenile habitat, lead to fish stranding/isolation or undermine fish passage. Whilst flows will be affected, there is evidence from previous events that the community is resilient to the predicted change.

Slight adverse effects are also anticipated in relation to deposition of sediment in river - 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. Whilst lower flows are likely to occur for longer than normal during periods of drought permit operation, the lowest flows are not affected by the permit as they are protected by the MRF, and the flushing flows that are an important to the overall sediment dynamics of the river are unlikely to occur in the drought permit period, more likely occurring over the autumn or winter period.

In terms of the angling amenity in the Eden, the effect of the proposed drought permit may impact the fishing both upstream and downstream of the Bough Beech river intake. The Environment Agency designated Principal Coarse fishery located upstream of the intake could be affected by any reductions in the free movement of fish populations between the two reaches of the Eden. However, due to the presence of both the indicator and additional species of angling interest recorded upstream of the Principal Coarse fishery, the impact of the proposed drought permit on angling upstream of the intake is considered to be low and temporary.

All adverse effects during operation are anticipated to be short term and temporary to local areas and no additional mitigation was identified.

### 3.2.4. Groundwater abstraction Drought Permit sites - Hackbridge / Goat Bridge / Bishopsford Road

It is proposed that the drought option decouples abstraction from the volume recharged and allows abstraction to be maximised irrespective of the volume recharged in the preceding winter. The permit is anticipated to bring about a 4Ml/d benefit. The Hackbridge Group licence comprises three sources in the confined Chalk: Hackbridge (two operational boreholes), Goat Bridge (one operational borehole) and Bishopsford Road.

The option also considers the operation of an augmentation scheme (Carshalton Ponds/River) whereby the outflow from Carshalton Ponds has to be maintained at greater than 4.5Ml/d before abstraction can take place at Hackbridge and Goat Bridge boreholes. This operates by drawing water from the River Wandle at Goat Bridge and pumping it back up to Carshalton Ponds.

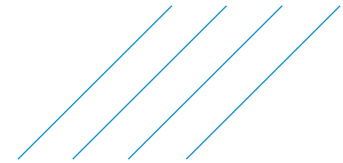
The Drought Permit could potentially start at any time of the year, although the implementation of it is most likely to begin in during typical hydrological recession months (April to September).

No construction activities are associated with this Option, so no effects are identified. In relation to Operational effects, a number of residual positive effects are identified. It is anticipated that with the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change.

Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. As such, it is anticipated resilience to a changing climate will be increased. The Drought Permit also has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon, air and noise emissions and will also have the beneficial effect of helping to ensure reliability and resilience of the water supply, as well as reduce resource use and waste production and help avoid negative effects on built assets / infrastructure. The drought permit is anticipated to result in beneficial impacts on health and wellbeing owing to its capacity to ensure provision of drinking water during periods of drought.

All beneficial effects during operation are anticipated to be short term and temporary to local areas.

Abstracting additional water from Hackbridge will increase operational carbon emissions. While abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational carbon, air and noise emissions. There is a potential that abstraction will effect water quality, though this is not anticipated to be significant.



Similarly in terms of biodiversity or fisheries, no significant impacts are predicted. For example, surveys on the Lower branch have yielded a total of 18 species which is considered likely to reflect the increased size in watercourse, greater depth provision and more varied flow character. With the exception of brown trout, bullhead and chub, all other species recorded are tolerant to environmental disturbance. The EAR reports minor adverse impacts as a result of the Drought Permit (medium confidence). Slight adverse effects are also anticipated in relation to deposition of sediment in river - 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.

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 thought it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond.

All adverse effects during operation are anticipated to be short term and temporary to local areas and no additional mitigation was identified.

### 3.2.5. Groundwater abstraction Drought Permit sites – Kenley Group

Kenley and Purley are two existing Chalk groundwater sources located in their namesake suburban areas in the London Borough of Croydon. The purpose of the Drought Permit is to allow for increased abstraction from Kenley and Purley. A 2.1MI/d increase over an anticipated six month permit duration is noted in the Drought Permit EAR, with a proposed drought permit daily abstraction of 24.9MI/d.

The drought permit could potentially start at any time of year, although the implementation of it is most likely to begin during typical hydrological recession months (April to September).

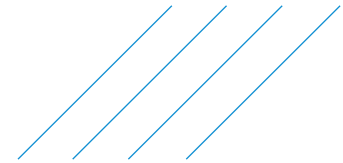
No construction activities are associated with this Option and as such no effects are identified. In relation to Operational effects, a number of residual positive effects are identified. It is anticipated that with the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change.

Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. As such, it is anticipated resilience to a changing climate will be increased. The Drought Permit also has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon, air and noise emissions and will also have the beneficial effect of helping to ensure reliability and resilience of the water supply, as well as reduce resource use and waste production and help avoid negative effects on built assets / infrastructure. The drought permit is anticipated to result in beneficial impacts on health and wellbeing owing to its capacity to ensure provision of drinking water during periods of drought.

All beneficial effects during operation are anticipated to be short term and temporary to local areas.

Abstracting additional water from Kenley and Purley groundwater sources will increase operational carbon emissions. While abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational carbon, air and noise emissions. 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. In terms of biodiversity or fisheries, no significant impacts are predicted. Slight adverse effects are also anticipated in relation to deposition of sediment in river - lower flows result in the river having less energy to carry sediment. 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 thought it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond.

All adverse effects during operation are anticipated to be short term and temporary to local areas and no additional mitigation was identified.



### 3.2.6. Groundwater abstraction Drought Permit sites – Outwood Lane

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.

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.

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 associated with this Option, so no effects are identified. In relation to Operational effects, a number of residual positive effects are identified. It is anticipated that with the body of evidence and forward planning set out in the EAR and Drought Permit, the implementation of this measure will increase resilience to climate change.

Climate change may exacerbate drought conditions within the river and therefore increase pressure on remaining water resources. As such, it is anticipated resilience to a changing climate will be increased. The Drought Permit also has the potential to reduce the need for more resource intensive external transfers and abstractions which would result in greater embodied and operational carbon, air and noise emissions and will also have the beneficial effect of helping to ensure reliability and resilience of the water supply, as well as reduce resource use and waste production and help avoid negative effects on built assets / infrastructure. The drought permit is anticipated to result in beneficial impacts on health and wellbeing owing to its capacity to ensure provision of drinking water during periods of drought.

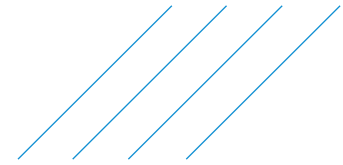
All beneficial effects during operation are anticipated to be short term and temporary to local areas.

Abstracting additional water from Outwood Lane will increase operational carbon emissions. While abstractions already take place this option would increase this abstraction thereby introducing additional pumping requirements and operational carbon, air and noise emissions. For groundwater abstractions, the residual impact of a drought permit could extend beyond the six-month operational period of the drought permit depending on the local hydrogeology of the area and the scale of the abstraction. 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. In terms of biodiversity or fisheries, no significant impacts are predicted. Slight adverse effects are also anticipated in relation to deposition of sediment in river - lower flows result in the river having less energy to carry sediment. 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 thought it is possible that the drought permit may delay recovery to springflow and thereby extend the duration of drought impacts on the pond. All adverse effects during operation are anticipated to be short term and temporary to local areas and no additional mitigation was identified.

### 3.2.7. Level 3B Supply-side Measures ('More before 4')

These measures would include trades and transfers with third party abstractors and the use of non-potable supplies. The use of several disused abstractions sites is included, affording supply to farmers and other customers that are able to collect and use these supplies in times where their own abstraction points have dried up.

Level 3b would also be the trigger to use drought permits classified as having a significant environmental impact however SES note that all of their drought permits have been assessed as having a 'minor' environmental impact and no further permits would be sought at this point.



Significant beneficial effects have been identified in relation to the options capacity to increase resilience to climate change. The measures identified in this option are a response to prolonged dry weather events which are anticipated to be exacerbated by climate change. By providing the mechanism to implement these options (through inclusion in the Drought Plan) the option will increase resilience to climate change. Minor beneficial effects are also anticipated in respect of Water Supplies and Population and Human Health through the provision of water supplies during drought periods.

All beneficial effects are considered small in scale, temporary and confined to the local area.

Trades and transfers with third party abstractors and the use of non-potable supplies is anticipated to result in a significant increase in operational carbon emissions. There is also significant potential for adverse effects on the water environment owing to increased pressure placed on potentially unreliable resources through abstraction. This is anticipated to have consequent effects on water dependant habitat and species and on freshwater fisheries.

New and additional abstractions may also have significant adverse effect on soils (quality and functionality) and the transport (pumping or via road using tankers) is associated with significant air and noise impacts. The use of previously abandoned or disused abstraction sites may pose an increased risk to human health where used inappropriately and its abstraction and transfer is associated with increased resource and waste production. Minor adverse effects may be associated with the drawdown of water resources that support surface waters that afford visual amenity or contribute to landscape.

All adverse effects are considered small in scale, temporary and confined to the local area.

Provision of signage regarding water quality and appropriate uses of non-potable supplies is considered a key additional mitigation measure to reduce the potential for adverse effects on human health.

## 4. Mitigation

A number of mitigation approaches have been used through the development of the Drought Plan, in order to mitigate potential effects. Of note is that within a number of proposed Options (particularly 'Supply Side Options'), 'embedded mitigation' has been considered. 'Embedded mitigation' is mitigation that has been incorporated into the development of the Option and is set out for the applicable Options in the following table.





**Table 4-1 - Embedded Mitigation considered in Option assessment**

| Option  | Embedded Mitigation  |
|---|--|
| Temporary water use restrictions (Temporary Use Bans)   | See list of exemptions from restrictions aimed to minimise the impact on vulnerable customers and economy (Table 3.1 and 3.2 of Draft Drought Plan)  |
| River Eden Drought Permits (Summer and Winter)  | <p>Walkover surveys are proposed to look for evidence of distress and to observe potential changes in the habitat characteristics of the impacted reach. Plan for fish rescue if required.</p> <p>Macrophyte, fish and macroinvertebrate samples should be used to identify the presence and distribution of INNS</p> <p>Implementation of Drought monitoring Plan (See Drought Permit EAR for further details). Weed cutting if necessary around the two continuous water quality monitoring sites to ensure monitoring results are representative of the conditions in the River Eden channel.</p> <p>Production of a monitoring and environmental impact report following the period of the drought permit. This will review the impacts associated with the drought permit, based on evidence collected as part of the monitoring regime and mitigation actions.</p> <p>River Habitat Surveys to be completed along three 500m reaches of the River Eden downstream of the abstraction by an accredited RHS surveyor and following the approved methodology. This will set the baseline going into the drought. The survey will be repeated if the drought continues in a second year (if there have not been flushing flows) to record the effect of the low flows.</p> <p>Dissolved oxygen will be used as a trigger for a cessation clause.</p> |
| Groundwater abstraction Drought Permit sites<br>Hackbridge / Goat<br>BridgeGoat Bridge / Bishopsford Road | <p>SES Water provide alternative supplies for the duration of the impact.</p> <p>Cessation rules if water quality parameters fall below pre-agreed levels.</p> <p>Ensure Carshalton augmentation scheme operates as normal for duration of permit.</p> <p>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.</p> <p>Development of a plan for monitoring of fish stress and fish rescue/recovery implementation should it be required.</p>  |
| Kenley Group  | <p>SES Water provide alternative supplies for the duration of the impact.</p> <p>Flow level monitoring during droughts and fluvial audit to improve assessment confidence for geomorphology.</p>   |

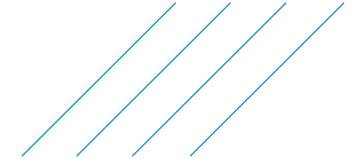


| Option       | Embedded Mitigation  |
|--------------|--|
|              | <p>Monitoring of OP, total ammonia, DO and parameters causing WFD failures (in respective waterbodies) before, during and after the drought permit is in operation. Data collected should be routinely reviewed by a water quality 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.</p> <p>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).</p> <p>Ensure Carshalton augmentation flow is maintained.</p> <p>Cessation rules if water quality parameters fall below pre-agreed levels.</p>  |
| Outwood Lane | <p>SES Water provide alternative supplies for the duration of the impact.</p> <p>Flow level monitoring during droughts and fluvial audit to improve assessment confidence for geomorphology.</p> <p>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.</p> <p>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).</p> <p>Ensure Carshalton augmentation flow is maintained.</p> <p>Cessation rules if water quality parameters fall below pre-agreed levels.</p> |

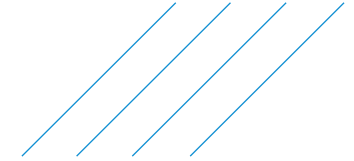
Through the SEA process, further ‘additional mitigation’ has also been identified. ‘Additional mitigation’ is mitigation that is required to address specific issues relating to significant effects in addition to ‘embedded mitigation’ and identified through the SEA process. This is set out in the following table for the applicable options.

**Table 4-2 - Additional Mitigation derived from Assessment**

| Option                                   | Additional Mitigation   |
|--|---|
| Leakage management and operational usage | <p>In relation to ‘Objective 8 - Reduce and minimise air and noise emissions’ and ‘Objective 11 - Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing’ it is proposed that plant is well maintained and the use of low or zero emission equipment / plant is prioritised on any projects related to leakage management and operational usage.</p> |



| Option  | Additional Mitigation  |
|---|--|
|   | In relation to 'Objective 11 - Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing', it is proposed that effective community engagement is undertaken in relation to any projects related to leakage management and operational usage.   |
| Temporary water use restrictions (Temporary Use Bans)                                   | In relation to 'Objective 11 - Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing', consideration could be given to allowing allotments limited supplies of water, in addition to ensuring high levels of communication before, during and following the implementation of these measures.  |
| Restrictions on use of water through an Ordinary Drought Order (Non-essential use bans) | <p>In relation to 'Objective 5 - Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity', it is recommended that consideration is given to banning the washing of water craft / equipment, alongside consideration of mandating visual inspections to help reduce risk / ensure no transfer of invasive non-native species.</p> <p>In relation to 'Objective 11 - Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing', consideration could be given to allowing allotments limited supplies of water, in addition to ensuring high levels of communication before, during and following the implementation of these measures. It is also recommended that consideration is given to exemptions where dust suppression would alleviate impacts on particularly vulnerable groups e.g. construction works near hospitals, schools, children's nurseries and care homes.</p> |
| Additional demand restrictions  | <p>In relation to 'Objective 5 - Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity', it is recommended that consideration is given to banning the washing of water craft / equipment, alongside consideration of mandating visual inspections to help reduce risk / ensure no transfer of invasive non-native species.</p> <p>In relation to 'Objective 11 - Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing', it is recommended that consideration is given to exemptions from enforcement of this Option in order to alleviate impacts on the most vulnerable groups'.</p>  |
| Emergency Drought Orders including phased pressure reduction, rota cuts and standpipes  | <p>In relation to 'Objective 5 - Protect and enhance biodiversity, priority species, vulnerable habitats and habitat connectivity', it is proposed that visual inspection of boats and / or equipment is recommended to take place / mandated to reduce the risk of spreading invasive non-native species.</p> <p>In relation to 'Objective 11 - Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing', it is recommended that consideration is given to exemptions from enforcement of this Option in order to alleviate impacts on the most vulnerable groups.</p> <p>In relation to 'Objective 13 - Avoid negative effects on built assets and infrastructure', it is recommended that consideration is given to ensuring protection of essential major users such as hospitals.</p>   |



| Option   | Additional Mitigation  |
|--|--|
| <p><b>Changes in use of existing licences / internal transfers</b><br/>                     Transfers from Bough Beech WTW<br/>                     Use of peak resources<br/>                     Other internal conjunctive use / transfer schemes<br/>                     Planned outage</p> | <p>In relation to 'Objective 2 - Reduce embodied and operational carbon emissions', it is recommended that consideration is made of low emission or 'clean' energy sources to power pumping stations.</p>  |
| <p>Level 3B Supply-side Measures ('More before 4')</p>   | <p>In relation to 'Objective 11 - Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing', consideration is given to provision of signage regarding water quality and appropriate uses of non-potable supplies.</p> |

## 5. Cumulative effects

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.

SEA Objectives which have the potential for cumulative effects have been identified 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.

### In-plan cumulative effects

#### Demand-side options

Implementation of Demand-side Options depends on the timing and severity of the drought and is to be noted that these Options 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. The Drought Plan notes the estimated savings from Demand-Side Options. Note that the cumulative savings are calculated from the savings of each measure added to those previously implemented.

It is anticipated that such savings in water would likely have cumulative beneficial effects in respect of resilience to climate change, reducing carbon, air and noise emissions, the water environment, delivering resilient and reliable water supplies, biodiversity, freshwater fisheries, maintaining health and wellbeing, as well as minimising resource use. 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 given that these will be implemented in a drought situation when the environment is naturally under stress.

While there may be some construction activities associated with leakage management and 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.

#### Supply-side Options

Level 3b supply-side measures (more before 4) have the potential to result in cumulative beneficial effects with respect to water availability when enacted alongside demand side options. However, trades and transfers with third part abstractors, including the use of several disused abstraction sites, have the potential to increase pressure on groundwater resources, groundwater dependent terrestrial ecology and other hydrologically linked waterbodies.

Minimum Residual Flow (MRF) controls in the River Eden during both the May and winter drought permits should act to prevent potential adverse cumulative effects on the waterbody. MRF has, in the past, provided benefit in allowing SES Water to abstract during the permit period, whilst not being to the detriment of environmental receptors.

Environmental Appraisal Reports for the Hackbridge, Kenley and Purley and Outwood Lane groundwater abstraction drought permits each identify the River Wandle as being within their respective study areas.

In respect of hydrogeology, the Chalk is classified as a Principal Aquifer and for much of the SES Water supply area, including that of the Outwood Lane, Kenley and Purley areas, the aquifer is unconfined. As the Chalk dips north, (closer to the Hackbridge Drought Permit site) the aquifer becomes confined by the generally lower permeability lithologies of the Thanet Formation, Lambeth Group and London Clay Formation. As each of the three groundwater drought permit locations abstract from the Principal Aquifer, the potential for adverse cumulative effects on this groundwater resource cannot be ruled out. Additional abstraction from the aquifer is anticipated to lower groundwater levels and potentially reduce subsequent discharges at springs. Subsequent adverse cumulative effects on hydrologically linked surface waters, specifically the River Wandle, as well as other groundwater dependent terrestrial ecology and recreational surface waters such as the Waddon Ponds cannot therefore be ruled out.

While the extent and significance of such effects is currently not accurately quantified, improved tools to enable better quantification of the effects are in development and include updating and refining the Environment Agency's London Basin numerical groundwater model. Drought permits at Hackbridge, Kenley and Purley and Outwood Lane as well as the option to 'Change use of existing licences / internal transfers' (which include the operation of peak resources at Hackbridge, Goat Bridge Goat Bridge and Cliftons Lane) have the potential to ultimately reduce discharge/baseflow contributions to the River Wandle and Waddon Ponds. This has the potential to result in adverse cumulative effects on SEA Objectives including the water environment, delivering resilient and reliable water supplies, biodiversity, freshwater fisheries, maintaining health and wellbeing, as well as minimising resource use.

## 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 Drought Plan. In relation to other infrastructure and development projects it is considered that while these are 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 Drought Plan and have a cumulative effect on the environment (beneficial or adverse). However, no significant cumulative effects are identified. It is also the case that such issues are a key element for future planning through the iterations of Water Resource Management Plans (WRMP). At present, a regional WRMP is being developed which will examine such issues across the South-East region and help to inform the development of company level plans.

## 6. Monitoring

Under the SEA Regulations, there is a requirement to monitor significant environmental effects. The purpose of this is to identify any unforeseen effects as they arise and therefore allow these to be addressed at that time, but also to build up a body of evidence to help inform development of future versions of the Plan. For the most part, a comprehensive monitoring programme (including maps of monitoring locations) has been set out in the Drought Plan and the Environmental Assessment Reports that have been developed to help inform of the development of the Drought Plan.

The SEA also identified monitoring, for those effects which were not identified in the Environmental Assessment Reports. For the most part, rather than being proscriptive at this stage, the requirements for monitoring will be further developed during the drought period in light of prevailing conditions and intensity of drought, through discussions with relevant authorities, or with affected parties.

## 7. Summary and Conclusions

SES Water is a water-only supply company supplying an area of 834 km<sup>2</sup> within Surrey, West Kent, and also the London Boroughs of Sutton, Croydon and Merton. SES Water supplies, on average, 160 million litres of water per day (Ml/d) in the area, however, during the summer period this can increase to above 200 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 SES Water Draft Drought Plan identifies a balance of measures, including restrictions on customers' use of water appropriate to the seriousness of the drought, to ensure that essential supplies are maintained in all but the most severe events. Actions within the Drought Plan range from demand reduction measures through to emergency drought orders and Drought Permits which permit the abstraction of additional water from surface and groundwater resources.

Due to the Drought Plan containing drought permit options related to groundwater abstractions and the potential for these to have significant effect on the environment, a SEA has been undertaken under the Environmental Assessment of Plans and Programmes Regulations 2004. This SEA identifies the likely environmental effects (both beneficial and adverse) of implementing the Drought Plan.

In respect of Drought actions to raise customer awareness, implement Temporary water use restrictions (TUBs) and Non-essential use bans (NEUBs) no likely significant beneficial or adverse effects have been identified.

No significant adverse effects have been identified in respect of the Leakage management and operational usage option which seeks, among other measures, to increase resources on leakage detection, reduce leak repair times, increase awareness and restrict flushing and reservoir cleaning activities however significant beneficial effects have been identified. Reduced leakage is associated with more efficient use and reduced operational carbon emissions which have consequential beneficial effects on carbon emissions, water quality and resources and resilient water supplies.

Additional demand restrictions are not anticipated to result in significant beneficial effects. Significant adverse effects have however been identified in respect of Landscape, population and human health as well as built assets and infrastructure. During operation, the option is anticipated to have temporary, local effects on visual amenity on private and public gardens, parks and other green space owing to restrictions on watering. There are a range of potential adverse effects on population and human health owing to the additional demand restrictions. Dust pollution, risk of fires in allotment gardens and the removal of exemptions associated with TUBs and NEUBs have the potential to adversely impact on the wider population and vulnerable groups.

Emergency Drought Orders which include phased pressure reduction, rota cuts and standpipes are not anticipated to result in significant beneficial effects across any of the SEA Objectives. In relation to carbon emissions, it is anticipated that transport to standpipes to collect water would lead to increased carbon emissions. Other significant adverse effects are anticipated as the Emergency Drought Order may exacerbate soil quality issues during prolonged dry periods. There could also be significant adverse effects to landscape, townscape and visual amenity. This includes open green space, parks and gardens where restrictions include cleaning and watering which has the potential to result in deterioration of these assets.

Risk to human health may be increased owing to the reduction in access to water. The requirement to collect water at standpipes may disproportionately impact on vulnerable groups i.e those with certain disabilities, medical conditions or similar, blue badge holders or customers who are registered on the SES Water Priority Services list due to a lack of mobility. Waste associated with the alternative arrangements that may be sought, such as bottled water provision and increase in private transport to collect water is anticipated to result in adverse impacts on waste production. While temporary, the option is likely to impact 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.

In respect of supply side options each of the Drought Permits are associated with likely significant beneficial effects in respect of Objectives 1, 4, 11 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 in respect of increasing resilience to climate change and reduce flood risk. They will also help ensure reliability and resilience of supply and reduce the need for more resource intensive external transfers and abstractions during the period for which they are operational.

Significant adverse effects for each of the Drought Permits have been identified in respect of 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 water quality and resources. Watercourses in the area have unfavourable WFD statuses and the permit may create an interference drawdown with SES Water and Thames Water groundwater sources.

Changes in Use of existing licences / internal transfers includes transfers from Bough Beech WTW, use of peak resources, conjunctive use/transfer schemes and planned outages. While no significant adverse effects have been identified, significant beneficial effects have been reported against the majority (nine of 13) objectives and these centre around benefits associated with greater interconnectivity and flexibility within the network which has a range of beneficial effects including a capacity to alleviate pressures on other resources which might result in over abstraction.

Level 3B Supply-side measures (More before 4) include trades and transfers with third party abstractors and the use of non-potable supplies. The use of several disused abstractions sites is included, affording supply to farmers and other customers that are able to collect and use these supplies in times where their own abstraction points have dried up. Significant beneficial effects have been identified in relation to the options capacity to increase resilience to climate change. The measures identified in this option are a response to prolonged dry weather events which are anticipated to be exacerbated by climate change. By providing the mechanism to implement these options (through inclusion in the Drought Plan) the option will increase resilience to climate change. Trades and transfers with third party abstractors and the use of non-potable supplies is anticipated to result in a significant increase in operational carbon emissions. There is also

significant potential for adverse effects on the water environment owing to increased pressure placed on potentially unreliable resources through abstraction. This is anticipated to have consequent effects on water dependant habitat and species and on freshwater fisheries. New and additional abstractions may also have significant adverse effect on soils (quality and functionality) and the transport (pumping or via road using tankers) is associated with significant air and noise impacts. The use of previously abandoned or disused abstraction sites may pose an increased risk to human health where used inappropriately and its abstraction and transfer is associated with increased resource and waste production.

While some moderate adverse effects are identified through the SEA, no adverse effects are anticipated to be permanent in nature. Mitigation (embedded and additional) is included to alleviate effects of the Drought Plan where feasible.

Options 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, reducing carbon, air and noise emissions, the water environment, delivering resilient and reliable water supplies, biodiversity, freshwater fisheries, maintaining health and wellbeing, as well as minimising resource use. 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 given that these will be implemented in a drought situation when the environment is naturally under stress. In respect of the Drought Permits, the potential for adverse cumulative effects on this resource remains a potential issue for SEA Objectives relating to the water environment, delivering resilient and reliable water supplies, biodiversity, freshwater fisheries, maintaining health and wellbeing, as well as minimising resource use. While significance of effect is uncertain, drawdown is anticipated to lower groundwater levels and subsequent discharges at springs. The ongoing modelling investigations in the London basin alongside other assessment should act to improve understanding with respect to the significance of subsequent adverse cumulative effects on hydrologically linked surface waters, specifically the River Wandle, as well as other groundwater dependant terrestrial ecology and recreational surface waters such as the Waddon Ponds. It should be noted however that drought monitoring plans which comprise pre-drought, in-drought and post-drought (recovery) stages monitoring and assessment are included in the Plan. This, in addition to annual updates to the EARs, will ensure that adverse effects can be readily identified and mitigated should they arise.



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