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Thames Water Utilities Ltd

Final Drought Plan 2022: Strategic Environmental Report -Environmental Report

Report for Thames Water

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Non-Technical Summary

Background and Purpose of the SEA

Water companies in England and Wales are required to prepare and maintain statutory Drought Plans under the Water Industry Act 1991, as amended by the Water Act 2003 and in accordance with the Drought Plan Regulations 2005, the Drought Plan Direction 2020, and Environment Agency guidelines. The purpose of Thames Water's Final Drought Plan (DP) 2022 is to demonstrate what actions will be taken to protect public water supplies during a drought and how they intend to minimise any resulting environmental impacts.

This Strategic Environmental Assessment (SEA) has been undertaken on Thames Water's Final DP 2022. The DP provides a comprehensive statement of the actions Thames Water will consider implementing during drought conditions to safeguard essential water supplies to customers and minimise environmental impact. It is consistent with Thames Water's Water Resources Management Plan (WRMP), the objective of which is to set the strategic plan for the delivery of water resources to balance supply and demand over a 25-year period.

DPs encompass a number of drought options that will only be implemented if and when required. Each drought is different in terms of its severity, season, location and duration and each combination of these factors may require a different response in terms of measures. In the context of drought planning, individual drought options are taken to constitute alternatives. Thames Water's Final DP comprises a total of 44 drought options (five demand-side options, nine supply side options and 30 drought permit/order options).

SEA of certain plans and programmes is a statutory requirement under Directive 2001/42/EC, as transposed into UK law by the Environmental Assessment of Plans and Programmes Regulations 2004. The purpose of SEA is to provide high level and strategic protection of the environment by incorporating environmental considerations into the preparation of plans and policy. The nature of Thames Water's Final DP means that SEA is not a mandatory requirement in this case. However, the company has undertaken SEA to assist in the identification of the likely significant environmental effects of its drought options and to determine how any adverse impacts might be avoided or mitigated.

The SEA provides information on the relative environmental performance of alternatives, and is intended to make the decision-making process more transparent. The SEA can, therefore, be used to support the timing, prioritisation and implementation of drought options within the DP.

Thames Water has also undertaken a Habitats Regulations Assessment (HRA) of its Final DP, which has been carried out in parallel with the SEA and is reported separately in the HRA Screening Report. The HRA screening process identifies whether each drought option in the DP (either alone, in combination or with other plans or projects) is likely to have significant effects on the integrity of European designated sites, i.e. sites of international conservation importance. The findings of both the SEA and HRA have fed into the revision of the DP in an iterative process.

Consultation Process

An SEA Scoping Report was issued in July 2020, and provided an opportunity for the statutory consultees to provide views on the proposed scope and level of detail of this SEA Environmental Report. Issues raised by consultees have been considered in preparing this report.

In addition, a seven-week period of public consultation on Thames Water's draft DP and its accompanying documents, including this SEA Environmental Report, occurred between 7 June 2021 and 30 July 2021. Comments were received through this consultation process and any changes made to the DP (and accompanying documents, including the SEA) by Thames Water are detailed in the Statement of Response which was published on 20 September 2021. These comments, together with comments raised through additional specific SEA-focussed meetings held with the regulators over the course of the Drought Plan 2022 development, have also been taken into consideration in preparing this SEA.



The findings of the SEA are presented within this Environmental Report, which accompanies Thames Water's submission of the Final DP to Defra.

When the DP is implemented during an actual drought event, Thames Water will monitor its effects on the environment, helping to ensure that the potential impacts identified in the SEA are considered in practice.

Assessment Methodology

The assessment has been 'objectives-led'. SEA objectives have been derived from environmental objectives established in law, policy or other plans and programmes, and from a review of the baseline information. The SEA objectives have been categorised under the following topic areas: biodiversity, flora and fauna; population and human health; material assets and resource use; water; soil, geology and land use; air and climate; archaeology and cultural heritage; and landscape and visual amenity; and inter-relationships.

The overall findings of the SEA describe the extent to which objectives for each topic are met by each of the drought options. It should be noted that detailed Environmental Assessment Reports (EARs) have been produced for the supply side drought permit options and these were used to inform the SEA for these options.

The outputs of the assessment are a completed appraisal framework table for each drought option, and a colour coded summary matrix (ranging from major beneficial impacts to major adverse impacts) which provides a comparative assessment of the residual environmental effects of implementing each drought option (i.e. those impacts remaining after the implementation of mitigation measures).

A cumulative, or in-combination, assessment has also been undertaken which has involved examining the likely significant effects of each of the drought options in combination with each other and in combination with the implementation of other relevant plans and programmes.

The area under consideration for the SEA reflects the spatial scope of the Drought Plan, which necessarily extends beyond the boundaries of the Thames Water supply area (**Figure NTS1**) to include the whole of the Thames River basin (reflecting the natural catchment area for Thames Water's existing water supplies).

Findings of the Assessments

Demand side options

Overall, demand side measures serve to reduce pressure on water resources within each water resource zone by reducing customer demand for water, and therefore reducing the abstraction at source. This will in turn contribute to reducing the amount of energy needed for water abstraction, treatment and distribution. Demand side measures typically provide moderate beneficial effects such as protecting and enhancing health and well-being through maintaining water supplies for essential use, and promoting efficient and sustainable use of water. While customers may be asked to use less water during implementation of demand side measures, the measures will help to ensure that some water is available to support population health throughout drought situations. Adverse impacts have been identified with respect to some businesses (e.g., landscaping, horticulture, recreation and tourism) where restrictions of water use are involved, particularly for ordinary or emergency drought orders.

Supply side options

Most of the nine supply side options in Thames Water's DP are groundwater sources which require little, if any, construction works to operate. Overall, these options are expected to have minor to major beneficial impacts associated with benefits to security of public water supply. The North London Artificial Recharge Scheme, Thames Gateway Water Treatment Works and West Berkshire Groundwater Scheme have the greatest beneficial effects, as they would deliver large volumes of water during drought events.

The Thames Gateway Water Treatment Works, reduction in lowest residual flow on the Lower Thames Control Diagram at Teddington Weir from 300MI/d to 200MI/d and West Berkshire Groundwater



Scheme options have some moderate adverse effects. This is due to waste streams and air emissions from the Thames Gateway Water Treatment Works, deterioration in water quality in the River Thames, and reductions in freshwater flows into the Lower Thames and Upper Tideway, and associated water quality and biodiversity effects, due to reducing lowest residual flows at Teddington Weir. In addition, the West Berkshire Groundwater Scheme may have moderate adverse effects on other abstractors.







Drought permit/order options

Many of the drought permit/order options involve extensions of existing licences and do not involve any construction works. Reductions in groundwater and surface water levels also have the potential for adverse impacts on the SEA topics of Biodiversity, Population and Human Health, Archaeology and Cultural Heritage, and Landscape and Visual Amenity. Beneficial effects are also identified for some options mainly associated with the maintenance of water supplies. The assessment showed that for Water Resource Zones (WRZs) with a number of drought options available, some options would be considered more sustainable than others within the same WRZ. Therefore, in the event of a drought, the findings of the SEA can be reviewed and can contribute towards an informed assessment of the options proposed for implementation at that time. They will contribute to how Thames Water will use them in accordance with the DP.

Cumulative Impacts

The cumulative impacts assessment identified the potential for adverse impacts if two or more drought options were to be implemented at the same time, either intra- or inter-water resource zone. For the majority of combinations, impacts are considered unlikely, but in some cases, impacts have been identified where, for example, both options draw on the same water resource (e.g. same groundwater catchment or same river). Due to the uncertainty of timing of implementation of drought options, a strategic assessment of each drought option against all other drought options has been undertaken. In the event of a drought, the findings of the SEA can be reviewed and a more detailed cumulative assessment will be undertaken of the specific options proposed for implementation at that time, based on the findings of the specific environmental assessments.

Assessment of Thames Water's Final DP with other plans and programmes, including Environment Agency National Drought Plan, other water company DPs and WRMPs, identified potential cumulative impacts. For example, potential cumulative impacts have been identified between the Waddon option and the SES Drought Plan. Effects will be reviewed and re-assessed as necessary in an evolving drought situation, in order to enable a better understanding of potential impacts associated with simultaneous operation of drought permits.

Mitigation and Monitoring

As part of the environmental assessment of each drought option, for those receptors with a potential moderate or major impact from implementation of the associated drought permit, site specific monitoring has been recommended, together with triggers to inform practical implementation of mitigation measures. These are described in the EARs and Environmental Monitoring Plans (EMPs).

Consideration of mitigation measures has been an integral part of the SEA process. The SEA appraisals have been based on residual impacts, i.e. those impacts likely to remain after the implementation of reasonable mitigation. Suitable and practicable mitigation measures will be implemented at appropriate times to minimise impacts, as documented in the relevant EAR and EMP.

During implementation of one or more drought options, appropriate monitoring will be undertaken to track any potential adverse environmental effects. Additional mitigation measures will be put in place if monitoring indicates that further management of adverse impacts is required. Prior to implementation of any DP activities, Thames Water will review the specific requirements for environmental monitoring in consultation with the Environment Agency and Natural England.



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1 Introduction

1.1 Background and Purpose of Report

Thames Water Utilities Limited (Thames Water) has prepared its Statutory Drought Plan (DP) 2022 and has undertaken Strategic Environmental Assessment (SEA) of its DP. A Habitats Regulations Assessment (HRA) screening has been undertaken in parallel.

SEA is a statutory requirement for plans or programmes which could have significant environmental implications, and helps to identify where there are potential impacts and how any negative impacts might be mitigated. More information about SEA, and the rationale for applying it to the DP, is provided in Section 1.2 below.

This Environmental Report has been subject to consultation - see **Section 1.9 Consultation** for further details.

The Environmental Report presents the baseline information that sets the context for the assessment (**Section 3**) and provides details of the methods employed in undertaking the assessment (**Section 4**). The potential impacts of the various DP options are outlined in **Section 5**, with the impacts of the combinations of options included in the Final DP set out in **Section 6**. Information regarding mitigation and monitoring is provided in **Section 7**.

The SEA Environmental Report accompanies Thames Water's submission of their Final DP to Defra.

1.2 Application of SEA to Drought Planning

1.2.1 Overview of Strategic Environmental Assessment

SEA became a statutory requirement following the adoption of Directive 2001/42/EC (the SEA Directive) on the assessment of effects of certain plans and programmes on the environment. The Directive was transposed into UK legislation by The Environmental Assessment of Plans and Programmes Regulations 2004 (referred to as the SEA Regulations)¹.

The objectives of SEA are set out in Article 1 of the SEA Directive as follows:

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

The SEA Directive requires preparation of an Environmental Report in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and geographical scope of the plan or programme, are identified, described and evaluated.

It should be noted, however, that as stated in the Office of the Deputy Prime Minister (ODPM) SEA Guidelines² "It is not the purpose of the SEA to decide the alternative to be chosen for the plan or programme. This is the role of the decision-makers who have to make choices on the plan or programme to be adopted. The SEA simply provides information on the relative environmental performance of alternatives, and can make the decision-making process more transparent." The SEA can, therefore, be used to support the timing and implementation of actions within the plan, although this needs to be set in the context of applying SEA to drought planning, as described in Section 1.2.2 below.



¹ The Environmental Assessment of Plans and Programmes Regulations 2004 (Statutory Instrument 2004 No. 1633) apply to any plan or programme which relates solely or in part to England.

² Office of the Deputy Prime Minister (2005) A Practical Guide to the Strategic Environmental Assessment Directive.

The range of issues to be included in an SEA is set out in the regulations, and includes biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage, and landscape.

SEA is usually focused mainly on environmental impacts. However, it is current best practice within the water industry to examine the broader social effects of water resource management planning, in addition to the environmental effects. As such, the full range of environmental and social effects which are likely to arise from implementation of Thames Water's Final DP 2022 are considered.

As identified above, the Government has produced SEA guidance which sets out the stages of the SEA process³. This, together with guidance for undertaking SEA of DPs, which has been produced on behalf of United Kingdom Water Industry Research (UKWIR)⁴, has been used to inform the methodology for the SEA. These documents remain the recommended best practice guidance for preparation of SEAs of DPs.

A revised DP Guideline was published by the Environment Agency in 2015⁵ and included recommendations for SEA of DPs. An updated draft guideline was consulted on in 2019 and the final updated guidance was published in December 2020⁶. This informs Thames Water's DP 2022 and preparation of the SEA.

1.2.2 Applying Strategic Environmental Assessment to Drought Planning

The water industry has experience in undertaking and delivering SEAs for the most recent WRMPs. These SEAs assess a wide range of possible water resource options and alternative programmes of options to inform the delivery of a predictable and precise output – a WRMP that defines a preferred programme of water resource options.

DPs are different. They encompass a group of measures that will only be implemented if and when required because of the unpredictable occurrence of a drought event, and thus the actual impact of the plan over its life is subject to very significant uncertainties. There may or may not be a drought during the period of the plan, and each drought is different in terms of severity, season, location, duration and influence of other abstractors within the catchment. Each combination of these factors may require a bespoke reaction in terms of measures.

It is impossible to predict in advance which and how many of the measures will be required, and in which order of priority, to respond to each particular drought event. Therefore, SEA of DPs cannot provide a certain prediction of an overall environmental effect of adopting the plan, as its implementation is uncertain. However, for some resource zones with fewer drought options, it may be easier to predict which measures would be implemented in a drought scenario or it may be known that certain combinations would always be deployed simultaneously. The Environmental Report discusses these where relevant.

Instead of attempting to assess a number of potential scenarios, the SEA of Thames Water's Final DP includes a cumulative effects assessment in order to ensure that options are not mutually exclusive, or that combinations would not cause significant adverse impacts.

The SEA of Thames Water's DP is also focussed on the reactive and transient nature of the event when a DP is operational, while maintaining the strategic approach of an SEA. For this, it is important to consider the relationship between the WRMP and the DP. The Environmental Report, baseline review and establishment of the SEA framework attempt to separate the key issues and assessment approaches relevant to the DP from those more applicable to the WRMP. The assessment of individual



³ Office of the Deputy Prime Minister (2005). A Practical Guide to the Strategic Environmental Assessment Directive.

⁴ UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (21/WR/02/15). Prepared by Ricardo.

⁵ Environment Agency (2015) Drought plans: environmental assessment and monitoring, July 2015. Available at https://www.gov.uk/guidance/drought-plans-environmental-assessment-and-monitoring#carry-out-an-environmental-assessment. Accessed 29 July 2020.

⁶ Environment Agency (2020) Water Company Drought Plan guideline, December 2020 (Version 1.2)

options (Stage B of the SEA process) concentrates on effects resulting from the implementation of drought management actions rather than the 'natural' impacts of drought.

1.2.3 Requirement for SEA and HRA of Thames Water's Drought Plan

A SEA screening process was undertaken on Thames Water's Drought Plan following the ODPM SEA 2005 Guidelines⁷. This concluded that an SEA would be useful in informing the Drought Plan and the options contained within.

The SEA Scoping Report which was subsequently consulted on in July 2020 (see **Section 1.9**) contained a description of the route through screening. The conclusion was that SEA is required taking into account a precautionary approach and uncertainties associated with whether it sets a framework for future development consent and an unknown outcome of the Habitats Regulations Assessment screening (HRA) screening at that time.

A HRA has since been undertaken in accordance the requirements of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, and the outcome of the HRA screening is presented in a separate report.

An important judgment in the Court of Justice of the European Union (CJEU) in April 2018⁸ ruled that Article 6(3) of the Habitats Directive must be interpreted as meaning that mitigation measures should be assessed within the framework of an Appropriate Assessment and that it is not permissible to take account of mitigation measures at the screening stage. Considering this judgement, the implications have been taken into account as part of the HRA screening process which supports this SEA and the Final DP 2022.

Undertaking SEA of the DP helps guide Thames Water's decision making both in preparation of the DP and during DP operation. Because every drought is different in terms of severity, location, duration and hence impact, the output of the SEA and HRA for each option help to guide option selection specific to the characteristics of any potential drought. The SEA and HRA also include cumulative or incombination assessments to ensure that options are not mutually exclusive, or that combinations of options, either within the DP or with other plans and programmes, would not cause significant adverse impacts. This therefore informs decision making at DP development stage and ensures important strategic decisions are made early on in the process.

1.3 Thames Water's Supply System and Drought Planning

1.3.1 Introduction

Thames Water supplies around 2.6 billion litres of water per day to around ten million people and some 215,000⁹ businesses¹⁰. In a dry year, Thames Water supplies around 2,100Ml/d to its London Water Resource Zone (WRZ), and around 780Ml/d to the remaining WRZs at peak times. Some 80% of Thames Water's water supply is derived from surface water abstraction (largely from the upper and lower Thames and the River Lee) and the remainder is derived from groundwater abstraction. However, as for most of South East England, during periods of prolonged low rainfall leading to a serious drought, water supply is largely sustained by groundwater abstraction, groundwater derived baseflow within rivers and available water stored in reservoirs.

Thames Water sets out how it will maintain planned levels of service in its Water Resources Management Plan (WRMP). The latest WRMP was published in 2020 (as Final WRMP 2019) and sets out a "twin-track" approach of demand management measures together with timely development of new water sources to ensure a positive supply/demand balance during prolonged dry weather. The



⁷ Office of the Deputy Prime Minister (2005) A Practical Guide to the Strategic Environmental Assessment Directive.

⁸ Court of Justice of the European Union Case C-323/17: People over Wind & Sweetman v Coillte Teoranta

⁹ Thames Water Utilities Limited (2019) Final Water Resources Management Plan 2019

¹⁰ In April 2017 a competitive retail market for water services for business customers was introduced. This means that business customers can choose which retailer they buy their water and wastewater services from. The retailer provides billing, customer service and efficiency advice to the business customer, while Thames Water, as a wholesale water provider, still has an obligation to supply the water and sewerage services and manage the infrastructure.

WRMP2019 sets out the actions Thames Water will take to maintain its customer levels of service for water supply reliability, in particular planning for a Temporary Use Ban (one in every ten years) and/or a non-essential use ban (once in every 20 years, on average) on selected water uses to only be implemented and planning with the objective that rota cuts or standpipes one in every 100 years on average. The Thames Water Drought Plan complements the WRMP (published 2020) and is focused on the actions that Thames Water will take during drought conditions when there are increased risks of temporary water use restrictions being required along with implementing temporary measures to augment water supply availability in order to maintain essential water supplies to all customers. Thames Water's Final WRMP 2019 was approved by the Secretary of State in March 2020. Where available, Thames Water WRMP24 proposals will be considered in the SEA of the Thames Water DP (in combination and cumulative assessment).

For water resource and drought planning purposes, the Thames Water water supply area is divided into six water resources zones (WRZs) reflecting the different characteristics of the supply areas and associated risks associated with meeting demand within the Thames Water area (see **Figure 1.1**). The largest of these zones is the London WRZ, which covers the Greater London area, followed by Swindon and Oxfordshire (SWOX). The water resources for both of these zones are largely based on abstraction from the River Thames, with the abstracted water stored in reservoirs. The other zones to the west of London are Kennet Valley (including Reading and Newbury); Henley; Slough/Wycombe/Aylesbury (SWA) and Guildford. These latter four zones are largely reliant on groundwater abstraction although there are significant abstractions directly from local rivers, notably the River Kennet in Reading and the River Wey near Guildford. The Thames Water DP describes these WRZs from a drought perspective in the following sections.

1.3.2 London and SWOX Water Resource Zones

The water resources for London and SWOX WRZs are derived from a combination of river abstraction, raw water reservoir storage and groundwater sources. For both zones, the critical element in the system is the level of reservoir storage, which in turn is dependent upon river flow and during drought this is primarily made up of the baseflow from the catchment's major aquifers and treated effluent discharges.

Through the Environment Agency's Restoring Sustainable Abstraction (RSA) programme and requirements of European Directives, Thames Water has made sustainability reductions in the SWOX and London WRZs. There are small number of RSA investigations in the Thames Water supply area, most of which meet the WFD 'no deterioration' requirement.

1.3.3 Kennet Valley and Guildford Water Resource Zones

Although groundwater provides a major contribution in these zones, the critical drought elements are the surface water sources on the River Kennet and River Wey for Kennet Valley and Guildford zones, respectively. Consequently, the protocol for these zones consists of a trigger mechanism for implementing drought measures based on river flows receding to critical low levels.

Through the Environment Agency's RSA programme and requirements of European Directives, Thames Water has made sustainability reductions in the Kennet Valley and Guildford WRZs. Thames Water will continue to investigate any requirements for potential sustainability reductions in the supply area.

1.3.4 SWA and Henley Water Resource Zones

These two zones are entirely supplied by groundwater sources, which historically have remained robust during drought. That is to say, the critical point at which source outputs decline below their deployable output has never been reached. The approach in these zones, therefore, is to track groundwater levels in key regional observation boreholes as well as the linked performance of selected groundwater sources in relation to their deployable output. Stonor Manor observation borehole has been chosen for tracking groundwater levels in the Chilterns and forms the basis for defining drought management guide levels for both the SWA and Henley zones.



Through the Environment Agency's RSA programme and requirements of European Directives, Thames Water has made sustainability reductions in the SWA WRZ. Thames Water will continue to investigate any requirement for potential sustainability reductions in the supply area.

1.3.5 Area under construction for the SEA

The area under consideration for the SEA reflects the spatial scope of the DP which necessarily extends beyond the boundaries of the Thames Water supply area (**Error! Reference source not found.**) to include the whole of the Thames river basin (reflecting the natural catchment area for Thames Water's existing water supplies).







1.4 Thames Water Drought Planning Process

1.4.1 Overview and timetable

Water companies in England and Wales are required to prepare and maintain Statutory DPs under Sections 39B and 39C of the Water Industry Act 1991, as amended by the Water Act 2003 and in accordance with the DP Regulations 2005 and the DP Direction 2020.

The Water Industry Act 1991 defines a DP as 'a plan for how the water undertaker will continue, during a period of drought, to discharge its duties to supply adequate quantities of wholesome water, with as little recourse as reasonably possible to drought orders or drought permits'.

On 1 October 2010, Section 76 of the Water Industry Act 1991 was amended by the commencement of Section 36 of the Flood and Water Management Act 2010. The Water Use (Temporary Bans) Order 2010 also commenced on 1 October 2010 and provides definitions and clarifications on these activities.

The DP Direction 2020 states that all water company draft DPs should be sent to the Secretary of State prior to consultation before 1 April 2021. Water companies must then publish their DP as directed by Defra. A revised (final) DP must be published at least every 5 years from the date the previous DP was published.

Thames Water's current Final DP 2017 covers the period 2017-2022. Thames Water has updated its DP and published as Final DP 2022. The period encompassed by the Final DP 2022 will be 2022 - 2027. The next revision of the DP would be published in 2027.

1.4.2 Review of Existing Abstraction Licences

Permission to abstract water, granted through licences issued by the Environment Agency and held and operated by Thames Water, was subject to a 'Review of Consents' in accordance with Regulation 63 of the Conservation of Habitats and Species Regulations 2010 (as amended) (referred to as the Habitats Regulations). It should be noted that these Habitats Regulations have now been superseded by the Conservation of Habitats and Species Regulations 2017, as amended. This Review of Consents was undertaken by the Environment Agency and included screening to determine likely significant effects (LSEs) on Habitats sites and Appropriate Assessment if LSEs were identified, to either affirm an abstraction licence or recommend action to amend the licence conditions. As described in the HRA, the Habitats sites were initially screened to identify all sites with water dependent habitat within Thames Water's supply area. Those sites that contained water dependent habitat were then reviewed to assess whether Thames Water abstractions were located within the same groundwater or surface water catchment and therefore, could have potential to affect the hydrogeological or hydrological regime of the sites. Any sites that were in the same catchment as a Thames Water licensed abstraction source were assessed in more detail to determine whether the abstraction would be likely to have a significant effect. The Environment Agency looked in more detail at the sensitivities of the Habitats site to water supply, and at the local hydrology. In addition, the Environment Agency was also able to use drawdown calculations to conclude that the impact would be insignificant. This was to ensure that the integrity of Habitats sites was not at risk from the impacts of abstraction. Information provided by the outcomes of the Review of Consents (released to Thames Water on 29 August 2008) was used to support the HRA screening of Thames Water's DP 2017¹¹. This identified that none of the drought options included in the 2017 Final DP required an "Appropriate Assessment" for a Habitats Directive Habitats site.

It is acknowledged that this Review of Consents was concluded over a decade ago and, as the competent authority of the final DP 2022, Thames Water are required to consider the validity of the conclusions in light of more recent data or evidence, changes in Habitats site condition, and the impacts of climate change. Natural England requires that any abstraction which is not within the terms of the existing licence (including timings or duration of the abstraction) should be screened and assessed accordingly within the HRA.



¹¹ Thames Water Utilities Limited (2018) Habitats Regulations Assessment of Thames Water's Revised Draft Drought Plan Screening Report (Final). Prepared by Cascade Consulting.

As part of the update to the DP, Thames Water have reviewed the conclusions of screening assessments in light of current evidence, including any changes to Habitats site condition, where the HRA previously relied on Environment Agency's Review Of Consents. This is documented in the HRA of Thames Water's DP 2022 and has been undertaken in parallel with the SEA.

Only those drought options which are relevant to the period encompassed by the DP 2022 (2022 to 2027) are considered in the SEA and HRA process. To this end, environmental effects of the DP options are considered within the context of the current licence operating conditions. Potential new sources (which Thames Water may bring online in the future), new drought options, or revisions to existing options which are only envisaged to become operational post 2027 have, therefore, been excluded from the SEA and HRA screening process. The same approach has also been taken with respect to cumulative plans, projects and programmes, in that only those that are likely to be effective in the period to 2027 will be considered in the SEA.

1.4.3 Thames Water's Drought Options

In the 2017 Final DP, Thames Water identified four triggers that act as decision-points for implementing drought management actions and options. The triggers correspond to Thames Water's four customer Levels of Service for water supply reliability which set out the maximum frequency of imposing different types of water use restrictions on customers during drought conditions. These Levels of Service, together with the maintenance of a supply-demand balance in each WRZ, form the guiding principles of the Thames Water water supply strategy, as set out in the WRMP and DP.

Drought management actions may be applied either company wide, by WRZ or to target a specific geographic area depending on the nature of the drought event prevailing at that time. The Final DP 2022 contains a range of potential drought management options available to Thames Water, for example bringing reserve water sources into use, implementation of drought permits/orders and temporary use bans. As specified in the Drought Plan Guidance¹² individual drought permits/orders are valid for up to six months. However, a more severe drought may require implementation of options beyond six months. Thames Water provided a methodology for assessing the environmental impacts of severe droughts and a high-level summary of the environmental impacts of Thames Water's drought actions in droughts worse than record ('severe droughts') whilst preparing the latest WRMP and DP¹³. The assessment undertaken to inform the severe drought methodology and the high-level summary will be referred to, but not updated, for DP 2022.

There are two broad categories of drought options: demand side options and supply side options. These are described below.

Demand side options

Demand side options are designed to reduce the demand for water and the options available to Thames Water are consistent across all resource zones (see **Table 1.1**). Demand side options have been included in both the SEA and HRA screening. **Table 1.1** sets out the demand-side options that have been considered and the corresponding level of service: it should be noted that the planned measures in the Thames Water Drought Plan and WRMP 2019 are designed to ensure that the Level 4 Emergency Drought Order option show in the table will not be required in a repeat of the worst drought on record for the Thames catchment.

Table 1.1Demand side options (all water resource zones)

Measure*	Description of Measure	Company Level of Service
Media /water efficiency campaign	Wide-scale media activity and advertising to encourage voluntary reduction in water usage	1

¹² Environment Agency (2020) Water Company Drought Plan guideline, December 2020 (Version 1.2)



¹³ Thames Water Utilities Limited (2018) Environmental Assessment of Severe Droughts – Summary Report. Prepared by Ricardo Energy & Environment. August 2018

Measure*	Description of Measure	Company Level of Service
Leakage reduction	Increased leakage activity / Network pressure management	Not applicable
Temporary use ban	Temporary use ban	2
Drought Order to ban Non-Essential Use	Application to Defra to grant Non Essential Use Bans, as part of DD11 Ordinary Drought Order application	3
Emergency Drought Order	Application to Defra to grant an Emergency Drought Order to authorise water supply via temporary rota cuts or standpipes	4

*The above measures include a sub-set of Thames Water's baseline demand management (leakage reduction, metering and water efficiency) in the WRMP. During the course of a drought, leakage reduction and water efficiency can, to some extent, be enhanced.

Supply side options

Thames Water categorise the full range of supply side measures into the following:

- Optimisation of existing sources
- Strategic drought water resource schemes
- Bulk supplies
- Drought permits / orders
- Recommissioning of disused sources
- In extremis / 'More before Level 4' measures

In extremis supply side management actions, also referred to as 'more before level 4' actions, may be considered during a drought to mitigate the need for Level 4 measures such as rota-cuts in an emergency situation. Thames Water is currently completing further consideration of such options to provide supply benefits to reduce the risk of reaching Level 4. At present these options are not well defined and therefore it is not possible to undertake an SEA of these actions. Further work to define the feasibility and scope of these options is ongoing.

Supply side measures are measures available to Thames Water to introduce during the course of a drought to increase the amount of water available for supply. Supply side drought options that do not require drought permits/orders are listed in **Table 1.2**.

Table 1.2 Supply side drought options

Option	Description	Trigger Level			
London Water Reso	London Water Resource Zone				
North London Artificial Recharge Scheme	The scheme is licensed for 275Ml/d peak and 150Ml/d average.	Drought Event Level 1			
Thames Gateway Water Treatment Works (TGWTW)	There is an Operating Agreement governing use of the scheme. The TGWTW would take between 4-6 weeks to ramp up to full output. The scheme is maintained in a state of readiness at the beginning of the year and so it does not need to be increased to full output from zero output.	Drought Event Level 1 and naturalised Teddington flows below 3000MI/d for 10 days			



Chingford Artificial Recharge Scheme (CHARS)	16MI/d average, 16MI/d peak - CHARS is a water treatment works (WTW) using a number of the NLARS boreholes. It is not restricted to use under the NLARS Operating Agreement but can be used under any conditions, although its use is primarily to meet peak demands and drought demands.	Drought Event Level 1 and naturalised Teddington flows below 3000MI/d for 10 days
Reduction in lowest residual flow on the Lower Thames Control Diagram at Teddington Weir from 300MI/d to 200MI/d	100MI/d - increased abstraction from the River Thames, reducing residual flow over Teddington Weir.	Agreed between the Environment Agency and Thames Water during potentially severe drought.
Earlier reduction in residual flow at Teddington Weir on the Lower Thames Control Diagram	The gain in abstraction capability would be equal to the difference in reduction agreed at each stage on the Lower Thames Control Diagram, for the period when that flow band is operable.	Agreed between the Environment Agency and Thames Water during potentially severe drought.
East London Resource Development (ELRED)	ELRED comprises a number of groundwater abstraction locations along the route of the Channel Tunnel Rail Link which can be used to meet demand for water in London as well as contributing to the management of groundwater level rises. The licence held allows for abstraction of 18 Ml/d average and 20.57Ml/d peak.	Drought Event Level 1 and naturalised Teddington flows below 3000MI/d for 10 days
Stratford Box	Stratford Box is a groundwater source in East London which is run at low level of baseload output in order to keep groundwater levels suppressed to protect Stratford International Station. The option available during a drought is to increase the output from 5MI/d to 8 MI/d in aggregate with Edmeston Close.	Drought Event Level 1 and naturalised Teddington flows below 3000MI/d for 10 days
Old Ford	Old Ford is a groundwater source in East London which abstracts from the Chalk aquifer. The licence allows for the abstraction of 4.5 Ml/d average, 4.5Ml/d peak to meet peak demands and demand during drought conditions.	Drought Event Level 1 and naturalised Teddington flows below 3000MI/d for 10 days
West Berkshire Groundwater Scheme (WBGWS)	Untreated groundwater is discharged into the Kennet and Pang tributaries of the River Thame to increase the flow to London reservoir abstraction points. A benefit of some 123 Ml/d reducing to 66 Ml/d in a prolonged drought is provided by the scheme.	Level 2 on the Lower Thames Control Diagram

Supply Side Drought Permit / Order Options

Drought permits and orders are drought management actions that, if granted, can allow more flexibility to manage water resources and the effects of drought on public water supply and the environment.



Guidance has been prepared by Defra¹⁴: which highlights the main differences between drought permits and orders and the associated application processes. One of the key differences is that drought permits are granted by the Environment Agency, with drought orders being granted by the Secretary of State. Potential drought permit/order sites are identified in **Table 1.3**.

Water Source	Potential Drought Permits/Orders			
London Water Resource Zone				
Sundridge 1	0 - 6.64 MI/d - relax the annual average licence rate so that for the 6 months of the drought order, 8MI/d could be abstracted each day (1,470MI over 6 months).			
Sundridge 2	10.64MI/d -relax the annual average licence rate and increase the peak licence rate so that for the 6 months of the drought order, 12MI/d could be abstracted each day (sequential to Sundridge 1).			
Lower Thames	100 - 200MI/d – depending on agreement with the Environment Agency and water availability.			
Crayford	2.8MI/d - increase in abstraction beyond existing licence limit.			
Horton Kirby (Aquifer Storage & Recovery)	2.4MI/d - the option would be to bring forward the Aquifer Storage and Recovery (ASR) scheme which abstracts from the Greensand aquifer.			
Eynstord	5MI/d - increase in peak rate of abstraction to 11.6MI/d and relaxation of annual licence limit to allow 6 months of abstraction at peak daily rate (equating to 2,505.8MI/y).			
Wansunt	6.0MI/d - increase in abstraction beyond existing licence limit.			
Increase in M2 annual licence	Increase the annual maximum abstraction permitted under the M2 licence by up to 5%. Abstractions would still be restricted when flows are medium to low (as per normal operations).			
Waddon	0 - 7Ml/d - increase in abstraction beyond existing licence limit (average rate per year of 7.6Ml/d).			
Swindon Oxford Water Re	esource Zone			
Baunton 1	6.3MI/d - re-establish abstraction from existing boreholes (revoked through sustainability reductions).			
Baunton 2	17MI/d – an additional abstraction of up to 10.7MI/d above the additional 6.3MI/d from Baunton 1.			
Latton	5MI/d increase in average licence limit.			
Meysey Hampton	11.37Ml/d - additional abstraction from the Great Oolite boreholes when preceding flow (mean 5 days before) in the River Coln at Bibury is less than 68 Ml/d (i.e. as per the terms of the revoked 'summer' licence).			
Farmoor	10 - 30MI/d - additional abstraction direct from the river in addition to that allowed by the existing licence.			
Axford 1	Option would be to increase from the constrained level of 6 MI/d peak and average to unconstrained abstraction of 13.1MI/d peak and average. i.e. to go from 6 to 13.1MI/d a gain of 7.1MI/d.			
Axford 2	Option would be to increase from 13.1 MI/d to 20 MI/d peak and average i.e. an increase of 6.9 MI/d.			
Bibury	Up to 5MI/d - Increase abstraction at the current boreholes by up to 5MI/d. The arrangement for river flow augmentation would continue.			
Gatehampton	3.5MI/d - continuation of abstraction from boreholes beyond licence conditions.			
Ogbourne emergency boreholes	Abstract 4 MI/d from existing boreholes located 1 km away from the boreholes used in Thames Water's now revoked licence			
Oxford Canal - Banbury	5 -10MI/d - abstraction from Oxford Canal with the permission of the Canal and River Trust and transfer to Grimsbury Reservoir for storage and supply.			
Childrey Warren	4.5IVII/d - resume historical abstraction to previous licence limit.			
Ogbourne	Abstract 3.5 MI/d from the Ogbourne boreholes used in the now revoked licence.			
Kennet Water Resource Z	one			

Table 1.3 Supply side drought permit/order options



¹⁴ Environment Agency (2021) Drought permits and drought orders: Supplementary guidance from the Environment Agency and Department of Environment, Food and Rural Affairs, March 2021.

Water Source	Potential Drought Permits/Orders	
Fobney Emergency Boreholes	12 – 30MI/d - bringing emergency abstraction licence online with Output limited by groundwater resource available	
Pangbourne	7MI/d – removes flow constraint and allows the full amount of the Pangbourne licence to be abstracted.	
Playhatch	2.8 - 4.1Ml/d - increase in peak abstraction of existing licence from 8.2Ml/d to 12.3Ml/d.	
Fobney Direct	Variable, up to 20MI/d – manipulation of the Arrowhead control structure at extreme low flows (<173MI/d gauged at Theale) to allow abstraction from River Kennet at expense of flows to Holy Brook.	
Guildford Water Resource Zone		
Albury	6.8MI/d - extension of abstraction when flow constraints on the Law Brook is in force.	
Shalford	5MI/d - extension of existing surface water abstraction from the River Wey.	
SWA Water Resource Zone		
Pann Mill	Increase from revised licence of 9.5 Ml/d up to old deployable output of 16.8 Ml/d (i.e. an option providing 7.3 Ml/d)	
Henley Water Resource Zone		
Harpsden / Sheeplands	6MI/d – aggregate abstraction from multiple sources.	

Supporting Information

Drought options included in the SEA and HRA screening have been documented by Thames Water in the Final DP 2022.

It is noted that some drought options may have different environmental effects depending on the season of implementation (for example a summer vs a winter drought). As drought measures can theoretically be required and implemented at any time of year, overall impacts have been assessed where possible on a worst-case basis.

Environmental assessment studies of Thames Water's drought permit / order sites have been carried out and information from these studies will be used to inform the SEA and HRA.

1.5 Drought Permit/ Order Environmental Studies

Environmental Assessment Reports (EARs) have been prepared for the drought permits / order sites identified in **Table 1.3**, to support Thames Water's DP.

The aim of these studies was to produce environmental reports that have been agreed with the Environment Agency and Natural England such that in the event of a drought, they are readily available for updating based on the prevailing drought situation at that time. The environmental studies consider all potentially affected habitats and species including, but not limited to, Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar features as well as any Site of Special Scientific Interest (SSSI) or species/habitats of principal importance for the conservation of biodiversity in England (identified in the Natural Environment and Rural Communities (NERC) Act 2006 Section 41).

The reports also include Environmental Monitoring Plan (EMP) recommendations for each drought permit/order site. These environmental studies, undertaken outside of an actual drought event, are intended to be used as the basis for the EAR to be prepared in support of a specific drought permit/ order application, should the need arise.

Information from these assessments has been used to inform the SEA and HRA.

Local Wildlife Sites (LWS) are also being considered within the EARs. A screening exercise is being undertaken which aims to identify those LWS which are considered to be susceptible to Drought



Permit/Order impacts. The approach is described further in the Technical Briefing Note¹⁵ which accompanies the Environmental Assessment Methodology, and which has been agreed in consultation with the Environment Agency. The screening exercise is on-going and will be shared with the Environment Agency to obtain agreement on the findings of this to ensure that the relevant LWSs are taken forward for further consideration and assessment if required. The findings will be used to inform future updates of the SEA, if relevant.

1.6 Relationship to other plans and programmes

The only significant linkage between the DP and other plans or programmes is with the Thames Water Water Resources Management Plan (WRMP).

The DP and the WRMP have distinct, separate, but linked purposes. The DP is a short term, day to day plan for managing Thames Water's actions during a drought. The DP covers the monitoring and measurements of water resource variables to determine the onset of drought, the triggers for undertaking actions during a drought, the communications that would be undertaken in a drought, the demand and supply side actions undertaken in a drought, and the management structure put in place during a drought. The DP also sets out how droughts of differing severity would be managed, and the impact they would have on the provision of water supply. The DP is revised every four to five years and is based on the existing assets available to Thames Water. It does not provide the framework for development of new water supply options.

In contrast, the WRMP sets out the plans for meeting water resources needs over at least 25 years, but also includes consideration of requirements up to 80 years into the future. It also takes into account factors such as growth, climate change and loss of resources to protect the environment. The WRMP is the plan for future investment in demand management programmes and new water resource options and so sets the framework for development. The WRMP is also revised every five years to update the plans for future demand management and resource requirements.

The key links between the two plans are that the DP sets the tactical response to drought episodes, using the water resource assets that are specified in the WRMP as the base resource available at the time the plan is produced and for the following four to five years. The Drought Plan sets out in detail the methods used to implement the measures that are assumed to be available in the WRMP (e.g. temporary restrictions on the use of water) and it is therefore critical that the DP and WRMP are consistent in the assumptions made relating to what resources are available and what measures are implemented at what stages in a drought. The DP also addresses the challenge that would be faced in the event of droughts of greater severity than have been experienced in the historic record, and so indicates the situations in which pressure on resources would be greatest. This is used to inform the WRMP, outlining where measures are needed to improve the resilience to potentially more severe droughts in the future. The DP can be updated before five years have elapsed if necessary (see Section 1.4.1) for example, if there was a material change and a new resource development came on line.

It is important to note a key distinction between the assumptions in the DP and WRMP in respect of drought permit options. The WRMP does not specifically include the utilisation of drought permit options in its assessment of the supply demand balance. Drought permit options are a key feature of the DP and are included to provide greater resilience to severe droughts. Drought permit options do not feature in the WRMP because they have the potential to cause adverse impact on the environment, and so are not options that should be relied upon for routine use. The application of drought permits is, however, considered in sensitivity testing of potential investment portfolios in the WRMP to examine their robustness and likely environmental impacts.



¹⁵ Ricardo (2021) Environmental Assessment Reports: Local Wildlife Sites Technical Briefing Note, Version 4. Report for Thames Water. 23 April 2021.

1.7 Stages of SEA Process

Table 1.4 is an extract from the UKWIR 2021 Environmental Assessment Guidance¹⁶, which has been adapted from the Government's SEA guidance, the Practical Guide¹⁷ that sets out the main stages of the SEA process and the purpose of each task within the process. Specific guidance on the application of the SEA process to Drought Plans, including best practice, is provided in the UKWIR 2021 publication.



¹⁶ UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (21/WR/02/15). Prepared by Ricardo.

¹⁷ Office of the Deputy Prime Minister (2005). A Practical Guide to the Strategic Environmental Assessment Directive.

Table 1.4SEA Stages and Tasks

Stages in the SEA Process				
SEA Stages and Tasks Purpose				
Task A1. Identifying other relevant plans, programmes and environmental protection objectives	To establish how the plan is affected by outside factors, to suggest ideas for how any constraints can be addressed, and to help identify SEA objectives. It can also establish where there are existing SEAs which may be able to inform the SEA of the WRMP/DP.			
Task A2. Collecting baseline information	To provide an evidence base for environmental problems, prediction of effects, and monitoring; to help in the development of SEA objectives			
Task A3. Identifying environmental problems	To help focus the SEA and streamline the subsequent stages, including baseline information analysis, setting of the SEA objectives, prediction of effects and monitoring.			
Task A4. Developing SEA Objectives	"To provide a means by which the environmental performance of the plan and alternatives can be assessed" (ODPM wording).			
	Alternatively, this can be interpreted as developing the assessment framework if an objectives-led ¹⁸ approach is not being used.			
Task A5. Consulting on the scope of the SEA	To ensure the SEA covers the likely significant environmental effects of the plan or programme.			
	There is a statutory minimum period of 5 weeks for the SEA statutory bodies to respond to a SEA Scoping Report consultation.			
Stage B: Developing and refining alternatives and ass	sessing effects			
Task B1. Testing the plan or programme objectives against SEA objectives	To identify potential synergies or inconsistencies between the objectives of the plan and the SEA			
	objectives and help in developing alternatives.			
Task B2. Developing strategic alternatives	objectives and help in developing alternatives. To develop and refine strategic alternatives			
Task B2. Developing strategic alternatives Task B3. Predicting the effects of the plan or programme, including alternatives	objectives and help in developing alternatives. To develop and refine strategic alternatives To predict the significant environmental effects of the plan and its alternatives			
Task B2. Developing strategic alternativesTask B3. Predicting the effects of the plan or programme, including alternativesTask B4. Evaluating the effects of the plan or programme, including alternatives	 objectives and help in developing alternatives. To develop and refine strategic alternatives To predict the significant environmental effects of the plan and its alternatives To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme 			
 Task B2. Developing strategic alternatives Task B3. Predicting the effects of the plan or programme, including alternatives Task B4. Evaluating the effects of the plan or programme, including alternatives Task B5. Mitigating adverse effects 	 objectives and help in developing alternatives. To develop and refine strategic alternatives To predict the significant environmental effects of the plan and its alternatives To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme To ensure that adverse effects are identified and potential mitigation measures are considered. 			
 Task B2. Developing strategic alternatives Task B3. Predicting the effects of the plan or programme, including alternatives Task B4. Evaluating the effects of the plan or programme, including alternatives Task B5. Mitigating adverse effects Task B6. Proposing measures to monitor the environmental effects of plan or programme implementation 	 objectives and help in developing alternatives. To develop and refine strategic alternatives To predict the significant environmental effects of the plan and its alternatives To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme To ensure that adverse effects are identified and potential mitigation measures are considered. To detail the means by which the environmental performance of the plan can be assessed. 			
 Task B2. Developing strategic alternatives Task B3. Predicting the effects of the plan or programme, including alternatives Task B4. Evaluating the effects of the plan or programme, including alternatives Task B5. Mitigating adverse effects Task B6. Proposing measures to monitor the environmental effects of plan or programme implementation Stage C: Preparing the Environmental Report 	 botheon the objectives of the plan and the objectives and help in developing alternatives. To develop and refine strategic alternatives To predict the significant environmental effects of the plan and its alternatives To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme To ensure that adverse effects are identified and potential mitigation measures are considered. To detail the means by which the environmental performance of the plan can be assessed. 			
 Task B2. Developing strategic alternatives Task B3. Predicting the effects of the plan or programme, including alternatives Task B4. Evaluating the effects of the plan or programme, including alternatives Task B5. Mitigating adverse effects Task B6. Proposing measures to monitor the environmental effects of plan or programme implementation Stage C: Preparing the Environmental Report Task C1. Preparing the environmental report 	 botheon the objectives of the plan and the objectives and help in developing alternatives. To develop and refine strategic alternatives To predict the significant environmental effects of the plan and its alternatives To evaluate the predicted effects of the plan or programme and its alternatives and assist in the refinement of the plan or programme To ensure that adverse effects are identified and potential mitigation measures are considered. To detail the means by which the environmental performance of the plan can be assessed. To present the predicted environmental effects of the plan, including alternatives, in a form suitable for public consultation and use by decision-makers. 			

¹⁸ The objectives-led approach in SEA of WRMPs and DPs has become standard practice, but is not a regulatory requirement and there are other approaches to deliver SEA compliance, the 2013 Scottish Government SEA Guidance provides different assessment methods and explains their advantages and disadvantages.



Stages in the SEA Process			
SEA Stages and Tasks	Purpose		
Task D1. Consulting the public and consultation bodies on the draft plan or programme and the Environmental Report	To give the public and the consultation bodies an opportunity to express their opinions on the findings of the Environmental Report and to use it as a reference point in commenting on the plan or programme.		
	To gather more information through the opinions and concerns of the public		
Task D2. Assessing significant changes	To ensure that the environmental implications of any significant changes to the draft plan at this stage are assessed and taken into account		
Task D3. Making decisions and providing information	To provide information on how the Environmental Report and consultees opinions were taken into account in deciding the final form of the plan to be adopted (via the SEA Post Adoption Statement)		
Stage E: Monitoring the significant effects of the plan or programme on the environment			
Task E1. Developing aims and methods for monitoring	To track the environmental effects of the plan to show whether they are as predicted; to help identify adverse effects		
Task E2. Responding to adverse effects	To prepare for appropriate responses where adverse effects are identified.		

1.8 Structure of Environmental Report

This SEA Environmental Report presents the findings of Tasks B1 to C1 set out in **Table 1.4** and provides the consultation bodies with an opportunity to express their opinions on the findings of the assessment.

This **Section (Section 1)** of the report describes the overall purpose and process of the SEA and background to Thames Water's water supply system and drought planning process. It also gives details of consultation on the SEA. The remainder of the report is structured as follows:

Section 2 – Policy Context, provides a review of other policies, plans and programmes which influence the DP.

Section 3 – Environmental Baseline Review, sets out the key environmental issues Thames Water has considered in the SEA, drawing on information on the current state of the environment within Thames Water's water supply area.

Section 4 – Methodology, provides details of the methods employed in undertaking the assessment including the cumulative effects assessment methodology.

Section 5 – Assessment of Drought Options, presents the potential impacts of the various DP options against the SEA framework.

Section 6 – Cumulative Effects Assessment, discusses the potential in-combination impacts of drought options (intra-zone and inter-zone), demand management options and other plans and projects in the region.

Section 7 – Mitigation and Monitoring, discusses measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the DP and monitoring to track the environmental effects to show whether they are as predicted, to help identify any adverse impacts and trigger deployment of mitigation measures.

Appendix A - Statutory Consultee Responses to the Scoping Report, documents all the responses to the scoping consultation along with Thames Water's responses

Appendix B – Review of Policy, Plans and Programmes, provides a full list of the policies, plans and programmes reviewed and how they may influence the DP.



Appendix C – Environmental Baseline Review, provides the full baseline review of the current state of the environment within Thames Water's water supply area, which was used to form the key environmental issues set out in Section 3.

Appendix D – Assessment Tables, provides the full SEA for each drought option.

Appendix E – Quality Assurance - provides a checklist of requirements from the ODPM guidance.

1.9 Consultation

1.9.1 Overview

Two opportunities are available for consultation bodies to be formally involved during the SEA process: during the scoping process; and at the environmental reporting stage. These are discussed below.

Following publication of the Final DP, Thames Water will prepare a SEA Post-Adoption Statement setting out how the SEA and any views expressed by the consultation bodies or the public have influenced the DP.

1.9.2 Consultation on the Scoping Report

Consultation bodies were invited to express their views on the Scoping Report and the scope of the SEA proposed in accordance with SEA Regulation 12(5).

The Scoping Report was issued on 13 July 2020 to the Environment Agency, Historic England and Natural England. The consultation period ran until 14 August 2020. The Statutory consultees were invited to comment on the report and the proposed scope of the SEA. The issues raised and responses to comments are presented in **Appendix A**.

1.9.3 Consultation on the Environmental Report

This Environmental Report of the Drought Plan 2022 has been produced in accordance with the approach agreed by Thames Water and taking into consideration the responses received from consultation bodies in response to the Scoping consultation. It provides assessments of the likely significant effects of the drought options considered and selected by Thames Water.

The Draft Drought Plan 2022 and the SEA Environmental Report were issued to Defra on 30 March 2021. Thames Water received approval to consult on the draft Plan on 10 May 2021 and subsequently published the draft Drought Plan 2022 for public consultation on 7 June 2021 for a seven week period up to and including 30 July 2021.

The statutory consultation bodies (Environment Agency, Natural England and Historic England), as well as the public, were invited to express their views on the Environmental Report and were able to it as a reference point in expressing their views on Thames Water's Draft Drought Plan 2022.

A Statement of Response was prepared and issued on 20 September 2021, which explains the changes Thames Water will make to the Final Drought Plan (and accompanying documents, including the SEA) as a result of the consultation. **Appendix F** sets out the consultation responses and the section of this SEA where the comments are addressed.

In addition, comments that were received through the specific consultation meetings / periods held over the course of the Drought Plan 2022 development, listed in **Table 1.5**, have also been taken into consideration in preparing this SEA.

Date	Regulator/stakeholder	Туре	Aim of meeting/correspond
23/07/2020	Environment Agency (Area)	Teleconference	Discussion of the
07/08/2020	Natural England	Teleconference	Environmental Assessment Methodology Document; SEA and HRA approaches.

Table 1.5 Stakeholder/regulatory engagement for DP2022



Thames Water Drought Plan 2022.- SEA Environmental Report Ref: ED13714 | Report for submission | Issue number 5 | 17/08/2022

Date	Regulator/stakeholder	Туре	Aim of meeting/correspond
13/07/2020 – 14/08/2020	Environment Agency, Natural England and Historic England	Formal 5-week consultation period	SEA Scoping Consultation comments to be provided to Thames Water.
25/11/2020	Environment Agency	Teleconference	Draft EAR assessment outcomes; and update on SEA and HRA.
07/06/2021 – 30/07/ 2021	Public and regulators	Formal 7-week consultation period	To obtain feedback on the draft DP 2022 and its accompanying documents including the HRA, SEA and EARs.
24/08/21	Environment Agency and Natural England	Teleconference	Discussion of the general progress with the Draft DP 2022, and feedback on the HRA, SEA and EARs.
02/09/21	Environment Agency	Teleconference	Discussion of the general progress with the Draft DP 2022, and revisions to the EARs.

Further consultation will also be undertaken, as required, at the time of any future applications for drought permits / orders.

Following publication of the Final Drought Plan 2022, Thames Water will also publish a 'Post-Adoption' Statement setting out how the SEA, and any views expressed by the consultation bodies or public, influenced the Final Drought Plan 2022.

When the Drought Plan is implemented during an actual drought event, Thames Water will monitor its effects on the environment, helping to ensure that the potential impacts identified in the SEA are considered in practice.

1.10 Quality Assurance

ODPM Guidance on SEA contains a Quality Assurance checklist to help ensure that the requirements of the SEA Directive are met. The checklist is reproduced in **Appendix E**, **Table E1**, indicating where this Environmental Report meets each requirement.



2 Policy Context

2.1 Introduction

Annex 1 of the SEA Directive (Directive 2001/42/EC) requires the following specific baseline information to be included within the Environmental Report to identify the environmental characteristics of areas likely to be significantly affected by the DP:

- "an outline of the...relationship with other plans and programmes"
- "the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme"
- "the environmental characteristics of areas likely to be significantly affected"
- "any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC (the 'Birds Directive') and 92/43/EEC (the 'Habitats Directive')
- "the environmental protection objectives, established at international, (European) Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation".

In accordance with the SEA Directive, a summary of the key policy messages from the review of relevant policies, plans and programmes is presented in Section 2.2 (full review is presented in **Appendix B**. A summary of environmental baseline key issues is presented in Section 3 (full environmental baseline is presented in **Appendix C**).

2.2 Review of Policies, Plans and Programmes

2.2.1 Introduction

One of the first steps in undertaking SEA is to identify other relevant policies, plans, programmes and environmental protection objectives. The review of these other plans sets out to establish how YWSL's DP might be affected by other plans, to identify other environmental protection objectives which the DP should consider and to help to identify the objectives for the SEA.

Potentially relevant plans and programmes were identified at the international, national, regional and local level. If the plan or programme does not have a significant effect on achieving the objectives of the DP or the DP does not have a significant effect on achieving the objectives of the other plan or programme, it was not included.

The full list of international, national, regional and local policies, plans, programmes and strategies reviewed and the key messages, targets and how they relate to SEA topics and SEA objectives are provided in **Appendix B** and listed in **Table 2.1**.



Table 2.1 Key policy messages derived from the review of Plans, Policies and Programmes

SEA Topic	Key Messages	Policies	
Biodiversity, flora and fauna	Conservation and enhancement of the natural environment and of biodiversity, particularly internationally and nationally designated sites, whilst taking into account future climate change.	International: European Commission, The EU Biodiversity Strategy to 2020 (2011) European Commission, Birds Directive (2009/147/EC) European Commission, Marine Strategy Framework Directive (2008/56/EC) European Commission, Fresh Water Fish Directive (2006/44/EC) European Commission, Directive on Animal health requirements for aquaculture animals and products thereof, and on the prevention and control of certain diseases in aquatic animals (2006/88/EC)	
	Promote a catchment-wide approach to water management to ensure better protection of biodiversity.	 (2006/88/EC) European Commission The Water Framework Directive (2000/60/EC) European Commission, Habitats Directive (1992/43/EEC) Ramsar Convention The Convention on Wetlands of International Importance (1971) The Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983) The Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979) United Nations (1992) Convention on Biological Diversity (CBD) National: 	
	To achieve favourable condition for priority habitats and species, including UK NERC habitats and species.	Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 Defra (2020) Enabling a Natural Capital Approach (ENCA) Defra (2015) The government's response to the Natural Capital Committee's third State of Natural Capital report Defra (2015) The Great Britain Invasive Non-native Species Strategy Defra (2011) Water for Life - Water White Paper Defra (2011) The Natural Choice: Securing the value of nature. The Natural Environment White Paper	



SEA Topic	Key Messages	Policies
	Avoidance of activities, directly or in-combination, likely to cause irreversible damage to nature conservation and natural heritage.	 Defra (2011) Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services Defra (2010) Delivering a Healthy Natural Environment. Ecosystem Approach Action Plan (updated) Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network Defra (2011) UK National Ecosystem Assessment and Defra (2014) UK National Ecosystems Assessment Follow on, Synthesis of Key Findings Defra (2015) The Great Britain Invasive Non-native Species Strategy Defra (2008), England Biodiversity Strategy –climate change adaptation principles Defra (2007) Conserving Biodiversity in a Changing Climate, Guidance of Building Capacity to Adapt Environment Agency (2020) Meeting our Future Water Needs: a National Framework for Water Resources Environment Agency (2018) Creating a better place: Our ambition to 2020 Environment Agency (undated) Hydroecology: Integration for modern regulation Environment Agency CAMS (various) HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment Marine and Coastal Access Act 2009 MHCLG (2012) National Policy Planning Framework Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework 2019 Natural Environment and Rural Communities Act 2006
	Support well-functioning ecosystems and essential physical and biological processes, respect environmental limits and capacities, and maintain/enhance coherent ecological networks, including provision for fish passage and connectivity for migratory/mobile species.	
	Strengthen the connections between people and nature and realise the value of biodiversity.	



SEA Topic	Key Messages	Policies
	Protection, conservation and enhancement of natural capital. Ecosystem services from natural capital contributes to the economy and therefore should be protected and, where possible, enhanced.	Salmon and Freshwater Fisheries Act 1975 The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 The Eels Regulations 2009 (as amended) The Countryside and Rights of Way (CROW) Act 2000 Wildlife and Countryside Act 1981 (as amended) Water Resources Act 1991 (Amendment) Regulations 2009 SI3104 Regional/Local: AONB Management Plans (various)
	To seek opportunities for biodiversity net gain from infrastructure development.	National Park Authorities Management Plans (various)Biodiversity Action Plans (various)The Countryside and Rights of Way (CROW) Act 2000Environment Agency CAMS (various)Environment Agency (2004) Thames Salmon Action Plan (SAP)Environment Agency, Thames Eel Management Plan.Environment Agency and Defra, (2015) Thames River Basin District River Basin ManagementLondon Biodiversity Partnership (2009) London Biodiversity Action Plan
	Avoidance of activities likely to increase the risk of spread of Invasive Non-Native Species (INNS).	Local Planning Authority (various) Land Use Plans Local Wildlife Trusts (various) Local Catchment Partnership Plans (various) Mayor of London (2018) London Environment Strategy Mayor of London, Cross River Partnership and Natural England (2016) Green Capital: Green Infrastructure for a future city Natural England National Character Area (NCA) Profiles Oxfordshire Local Enterprise Partnership (OxLEP) Various Strategies, including Environment Strategy OxCam Local Natural Capital Plan
Population and human health	Water resources play an important role in supporting the health and recreational needs of local communities. Effective water resource management can create opportunities for regeneration, tourism and the wider economy.	International: European Commission, Drinking Water Directive (1998/83/EC) European Commission, Ambient Air Quality Directive (2008/50/EC) European Commission, Floods Directive (2007/60/EC) European Commission, The Bathing Waters Directives (76/160/EEC & 2006/7/EC)



SEA Topic	Key Messages	Policies
	The issue of water supply is becoming a development constraint in some areas, which is recognised as an issue in the National Planning Policy Framework.	United Nations Economic Commission for Europe (1998) Aarhus Convention - Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters The Environment Noise Directive (Directive 2002/49/EC)
	To ensure all communities have a clean, safe and attractive environment in which people can take pride.	The Countryside and Rights of Way (CROW) Act, 2000 Defra (2011) Water for Life -Water White Paper Defra (2011) The Natural Choice: securing the value of nature. The Natural Environment White Paper
	To ensure secure, safe, reliable, sustainable and affordable supplies of water are provided.	 Paper Defra (2007) The Air Quality Strategy for England, Scotland and Wales Defra (2005) Securing the Future; Delivering UK Sustainable Development Strategy Defra (2004) Rural Strategy Defra, Environment Agency, Natural England, Forestry Commission England (2016) Creating great place for living Department of Energy and Climate Change (2011) Planning our electric future: a White Paper secure, affordable and low carbon electricity
	Increase awareness around the value and health benefits of water and encourage its sustainable use.	Environment Agency (2020) EA2025 creating a better place Environment Agency (2020) Meeting our Future Water Needs: a National Framework for Water Resources Environment Agency (2018) Creating a better place: Our ambition to 2020 HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment HM Government (2016) National Infrastructure Delivery Plan 2016-2021 HM Government (2014) National Infrastructure Delivery Plan 2016-2021 HM Government (2015) Fixing the Foundations: creating a more prosperous nation. MHCLG (2019) National Planning Policy Framework 2019 The Natural Environment and Rural Communities (NERC) Act (2006) Regional/Local: Local Catchment Partnership Plans (various) Mayor of London (2018) Zero carbon London: A 1.5°C compatible plan Mayor of London (2015) London Infrastructure Plan 2050 Mayor of London (2018) London Environment Strategy



SEA Topic	Key Messages	Policies
		Mayor of London (2017) The London Plan Public Rights of Way Improvement Plans (ROWIPs) Thames Water Utilities Ltd (2020), Our Business Plan 2020-2025 Oxfordshire Local Enterprise Partnership (OxLEP) Various Strategies, including Environment Strategy OxCam Local Natural Capital Plan
Material assets and resource use	Promote sustainable production and consumption whilst seeking to reduce the amount of waste generated by using materials, energy and water more efficiently	International: European Commission (1999) Landfill of Waste Directive (99/31/EC) United Nations (2002) Commitments arising from the World Summit on Sustainable Developmed Johannesburg National: Department of Energy and Climate Change (2011) National Policy Statements for Energy Infrastructure Defra (2011) Government Review of Waste Policy in England 2011 Defra (2011), Water for Life, Water White Paper, November 2011
	Consider issues of water demand, water supply and water quality in the natural environment and ensure a sustainable use of water resources	
	Contribute to a resource efficient, green and competitive low carbon economy.	Defra (2008) Future Water: the Government's water strategy for England Department for Business, Energy and Climate Change (2007) Energy White Paper: Meeting the Energy Challenge (Updated version expected Spring 2020) Environment Agency (2020) Meeting our Future Water Needs: a National Framework for Water Resources
	Maintain a reliable public water supply and ensure there is enough water for human uses, as well as providing an improved water environment	Environment Agency (2013), Managing Water Abstraction Environment Agency (2010) Water Resources Action Plan for England and Wales Environment Agency (2009) Water Resources Strategy for England and Wales
	Accelerating the transition to sustainable forms of energy and achieving regional renewable energy deployment targets	Environment Act 1995 HM Government (2016) National Infrastructure Delivery Plan 2016-2021 HM Treasury (2015) Fixing the Foundations: creating a more prosperous nation. HM Treasury Infrastructure UK (2014) National Infrastructure Plan
	Minimise the production of waste, ensure waste management is in line with the 'waste hierarchy', and eliminate waste sent to landfill.	HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment HM Government (2016) National Infrastructure Delivery Plan 2016-2021 HM Treasury Infrastructure UK (2014) National Infrastructure Plan



SEA Topic	Key Messages	Policies
		HM Treasury (2015) Fixing the Foundations: creating a more prosperous nation. HM Government, The Natural Choice: Securing the Value of Nature (2011). MHCLG (2019) National Planning Policy Framework 2019 Natural Environment White Paper, June 2011 Natural Resources Wales, Drought Plan The Water Act, 2003 Regional/Local: Mayor of London (2017) The London Plan Mayor of London (2018) Zero carbon London: A 1.5°C compatible plan Mayor of London (2018) London Environment Strategy National Park Authorities Management Plans Water Company (various) Drought Plans adjacent to supply area Thames Water, Final Water Resources Management Plan 2019 Oxfordshire Local Enterprise Partnership (OxLEP) Various Strategies, including Environment Strategy
Water	Promote sustainable water resource management, including a reduction in water consumption	International: European Commission, The Groundwater Directive (2006/118/EC) European Commission, Drinking Water Directive (1998/83/EC) European Commission, Floods Directive (2007/60/EC)
	Maintain and improve water quality (surface waters, groundwater and bathing waters)	European Commission, Urban Waste Water Treatment Directive (2000/80/EC)) European Commission Environmental Liability Directive (2004/35/EC) European Commission Revised Bathing Water Quality Directive (76/160/EEC) European Commission Nitrates Directive (91/676/EEC) National:
	Expanding the scope of water protection to all waters, surface waters and groundwater	Defra (2014), River Basin Planning Guidance Defra (2012), National Policy Statement for Waste Water Defra (2012)The UK Climate Change Risk Assessment 2012 Evidence Report Defra (2011) Water for Life - Water White Paper



SEA Topic	Key Messages	Policies
	Improve the quality of the water environment and the ecology which it supports, and continue to provide high levels of drinking water qualityDefra (2011) The Natural Choice: Securing the value of nature. T Paper Defra (2009) The Groundwater Regulations 2009 Defra (2008) Future Water: the Government's water strategy for E Defra (2005) Making Space for Water	Defra (2011) The Natural Choice: Securing the value of nature. The Natural Environment White Paper Defra (2009) The Groundwater Regulations 2009 Defra (2008) Future Water: the Government's water strategy for England Defra (2005) Making Space for Water
	Ensure appropriate management of abstractions and protect flow and level variability across the full range of regimes from low to high conditions	Environment Agency, Ofwat, Natural Resources Wales (2020) Water Resources Planning Guideline, Draft for consultation Environment Agency (2020) EA2025 creating a better place Environment Agency (2020) Meeting our Future Water Needs: a National Framework for Water Resources
	Prevent deterioration of WFD waterbody status	Environment Agency (2017) Drought response: our framework for England Environment Agency (2013) Managing Water Abstraction Environment Agency (2011) National Flood and Coastal Risk Management Strategy for England Environment Agency (2010) Water Resources Action Plan for England and Wales Environment Agency (2009) Water Resources Strategy for England and Wales Environment Agency CAMS (various)
Balance the abstraction of water for supply with the other functions and services the water environment performs or provides. Balance the abstraction of water for supply with the other functions and services the water environment performs or provides. Environment Agency (1999) Restoring Sustainat Environment Agency and other lead authorities S Environment Agency, Drought response: our frai Flood and Water Management Act (2010)	Environment Agency Catchment Flood Management Plans Environment Agency (1999) Restoring Sustainable Abstraction Programme Strategy Process Environment Agency and other lead authorities Shoreline Management Plans Environment Agency, Drought response: our framework for England (2015) Flood and Water Management Act (2010)	
	Steer new development to areas with the lowest probability of flooding and manage any residual flood risk, taking account of the impacts of climate change.	 HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment MHCLG (2019) National Planning Policy Framework 2019 The Water Act (2003) The Water Environment (WFD) (England and Wales) Regulations 2003 Water Industry Act 1991 was amended by the commencement of Section 36 of the Flood and
	Promote measures to enable and sustain long term improvements in water efficiency.	Water Management Act 2010 Water Resources Act 1991 (Amendment) (England and Wales) Regulations 2009 SI3104 The Water Resources Management Plan Regulations 2007 Water UK (2016) Water Resources Planning Framework (2015-2065)


SEA Topic	Key Messages	Policies
	Ensure a sustainable balance between the supply and demand for water.	 WWF-UK (2017) Water for Wildlife: Tackling Drought and Unsustainable Abstraction UKTAG WFD Guidance Documents (various dates) Defra (2020) Drought Plan Direction 2020 (England) Defra and Environment Agency (2019) How to write and Publish a Drought Plan, Consultation draft DEFRA (2016) Guiding principles for water resources planning for water companies operating
	Encourage more efficient use of water and promote awareness of water sustainability.	 Wholly or mainly in England The State of the Environment: Water Resources 2018 Regional/Local: Environment Agency (2020) Water Industry National Environment Programme (WINEP), National Full data set: Thames Region Environment Agency (2019) Catchment Abstraction Management Strategies (CAMS) (various) Environment Agency (2019) Catchment Abstraction Management Plans Environment Agency (2016) Thames River Basin District Flood Risk Management Plan 2015-2021 Environment Agency (2016) Thames River Basin District Flood Risk Management Plan 2015-2021 Environment Agency (2011) Water Resources Strategy – A Regional Action Plan for Thames Region. Environment Agency (2009) Thames: Catchment Flood Management Plan Environment Agency (2001) Flood Plan Mayor of London (2011) Securing London's Water Future, The Mayor's Water Strategy OxCam Local Natural Capital Plan Thames Water Utilities Ltd (2020), Our Business Plan 2020-2025



SEA Topic	Key Messages	Policies			
		River Restoration and Water Level Management Plans and Programmes			
Soil, geology and land use	Maintain the quality and diversity of geology and soils, which can be lost or damaged by insensitive development Ensure that soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development.	International: Council of Europe (2003) European Soils Charter European Commission Environmental Liability Directive (2004/35/EC) European Commission (2006) Thematic Strategy for Soil Protection European Commission (1999) Landfill of Waste Directive (99/31/EC) National: The Countryside and Rights of Way (CROW) Act 2000 Defra (2009) Safeguarding our Soils – A Strategy for England Defra (2009) Construction code of practice for the sustainable use of soils on construction sites Defra (2004) The First Soil Action Plan for England Defra (2004) Rural Strategy 2004			
	Promote catchment-wide approach to land management by relevant stakeholders, in order to benefit natural resources, reduce pollution and develop resilience to climate change.	Defra (2002) The Strategy for Sustainable Farming and Food – facing the future Environment Agency (2007) Soil a precious resource: Strategy for protecting, managing and restoring soil MHCLG (2018) National Planning Policy Framework 2018 Natural England (2011) UK Geodiversity Action Plan Wildlife and Countryside Act 1981 (as amended) Regional/local:			
	Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions.	AONB Management Plans (various) National Park Authorities Management Plans (various) Mayor of London (2017) The London Plan Mayor of London, Cross River Partnership and Natural England (2016) Green Capital: Green Infrastructure for a future city			
	Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.	Mayor of London (2015) London Infrastructure Plan 2050 Natural England - National Character Area (NCA) profiles Local Geodiversity Action Plans (LGAPs)			



SEA Topic	Key Messages	Policies
		Local Planning Authority (various) Local Plans/Local Development Plans
Air and climate	Reduce greenhouse gas emissions. Targets include: bring UK's greenhouse gas emissions to net zero by 2050 and cut London's CO2 emissions by 60% by 2030.	International: The Paris Agreement (2016), The Cancun Agreement (2011) & Kyoto Agreement (1997) European Commission (2008) Ambient Air Quality Directive (2008/50/EC) European Commission (2009) Promotion of the use of energy from renewable sources Directive (2009/28/EC)
	Reduce the effects of air pollution on ecosystems.	European Commission (2005) Thematic Strategy on Air Pollution National: Defra (2013) The National Adaptation Programme: Making the country resilient to a changing
	Improve overall air quality	climate Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report DECC (2011) Planning our electric future: a White Paper for secure, affordable and low carbon electricity DECC (2011) National Policy Statements for Energy Infrastructure
	Minimise energy consumption, support the use of sustainable/renewable energy and improve resilience to climate change.	DECC (2007) Energy White Paper: Meeting the Energy Challenge (New Energy White Paper expected Spring 2020) Department of Trade and Industry (2003), Energy White Paper. Our Energy Future: Creating a Low Carbon Economy Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report
	Sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas.	Defra (2008), England Biodiversity Strategy –climate change adaptation principles Defra (2008) Future Water: the Government's water strategy for England Defra (2007) The Air Quality Strategy for England, Scotland and Wales Defra (2007) Conserving Biodiversity in a Changing Climate: Guidance on Building Capacity to Adapt English Heritage, now known as Historic England (2008) Climate Change and the Historic
	Build in adaption to climate change to future planning and consider the level of urgency of associated risks of climate change impacts accordingly.	Environment Historic England (2019) Heritage Counts 2019: There's No Place Like Old Holmes: Re-Use and Recycle to Reduce Carbon



SEA Topic	Key Messages	Policies
	Need for adaptive measures to respond to likely climate change impacts on water supply and demand.	HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment HM Government (2016) National Infrastructure Delivery Plan 2016-2021 MHCLG (2018) National Planning Policy Framework 2018 Natural England National Character Area (NCA) Profiles The Climate Change Act 2008 The Energy Act 2013 UKCIP (2018) UK Climate Projections UKCP18 (2018) Regional/Local: Mayor of London (2018) Zero carbon London: A 1.5°C compatible plan Mayor of London (2018) London Environment Strategy UKCIP (2018) UK Climate Projections UKCP18 (2018)
Archaeology and cultural heritage	Built development in the vicinity of historic buildings could have implications for the setting and/or built fabric	International: Granada Convention (1985) Convention for the Protection of the Architectural Heritage of Europe Valletta Convention (1992) Convention on the Protection of Archaeological Heritage of Europe
	Ensure active management of the Region's environmental and cultural assets.	 (revised) The World Heritage Convention (UNESCO) 1972 – a global instrument for the protection of cultural and natural heritage. European Commission (2007), Floods Directive (2007/60/EC)
	Ensure effects resulting from changes to water level (surface or sub-surface) on all water dependent historical and cultural assets are avoided.	National: Ancient Monuments and Archaeological Areas Act 1979 Department for Culture, Media and Sport (2001) The Historic Environment – A Force for the Future Defra (2011) The Natural Choice: securing the value of nature, The Natural Environment White Paper
	Promote the conservation and enhancement of the historic environment, including the promotion of heritage and landscape as central to the culture of the region and conserve and enhance distinctive characteristics of landscape and settlements.	Defra (2011) UK National Ecosystem Assessment Defra (2004) The First Soil Action Plan for England Historic England (2019) Heritage Counts 2019: There's No Place Like Old Holmes: Re-Use and Recycle to Reduce Carbon HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment
	Conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their	MHCLG (2018) National Planning Policy Framework 2018 English Heritage, (now known as Historic England) (2008), Climate Change and the Historic Environment English Heritage (2016),



SEA Topic	Key Messages	Policies	
	contribution to the quality of life of this and future generations.	English Heritage, now known as Historic England (2016) Heritage at Risk Historic England (2015) Historic Environment Good Practice Advice in Planning Note 3 Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment Planning (Listed Buildings and Conservation Areas) Act 1990	
	for paleo-environmental deposits.	AONB Management Units (various) AONB Management Plans Historic England (2019) Heritage at Risk Register	
Landscape and visual amenity	Protection and enhancement of urban and rural landscapes (including designated landscapes, landscape character and the countryside).	International: Council of Europe (2006) European Landscape Convention Council of Europe (2000) European Landscape Convention (Florence Convention) The Marine Coastal Act (2009)	
	Abstraction and low river flows could negatively affect landscape and visual amenity.	ational: ne Countryside and Rights of Way (CRoW) Act (2000) storic England (2015) Historic Environment Good Practice Advice in Planning Note 3 M Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment	
	Enhance the value of the countryside by protecting the natural environment for this and future generations	MHCLG (2018) National Planning Policy Framework 2018 Defra (2011) The Natural Choice: Securing the value of nature. The Natural Environment White Paper Defra (2010) Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network	
	Take account of the different roles and character of different areas, promoting the vitality of main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it.	 Wildlife and Countryside Act 1981 (as amended) Regional/Local: AONB Management Units (various) AONB Management Plans Mayor of London (2017) The London Plan Mayor of London, Cross River Partnership and Natural England (2016) Green Capital: Green 	
	Ensure good access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders. This includes protecting National trails and Public Rights of Way.	 Infrastructure for a future city Mayor of London (2018) London Environment Strategy National Park (various) National Park Management Plans Thames Landscape Strategy (2012) Our Guidance Document: The Thames Landscape Strategy Review 2012 	



3 Environmental Baseline Review

3.1 Introduction

A fundamental component of the SEA process is to identify the current baseline conditions and how these might evolve. An awareness of existing conditions ensures that the impacts of the DP can be identified, mitigated and monitored.

The SEA Directive (Directive 2001/42/EC) requires that the evolution of baseline conditions of the plan area (that would take place with or without implementation of the plan) is determined. This is useful when identifying impact significance, particularly with regards to baseline conditions that may already be improving or worsening and the rate of such change.

Full environmental baseline data is presented in Appendix C and have been drawn from a variety of sources, including a number of the plans and programmes reviewed as part of the SEA process given in Table 2.1. This environmental baseline review also summarises the likely future trends for the environmental issues being considered (where information is available). The key issues arising from the review of baseline conditions are summarised in Section 3.4.

3.2 Limitations of the data and assumptions made

The Thames Water supply area is large and covers a number of regions, which makes establishing a baseline at the sub-regional level challenging. There are also challenges around extrapolating information from data collated at differing spatial resolutions. Spatial data have been obtained for most of the SEA topics, and the baseline is presented graphically as mapped information where appropriate. In some instances, reporting cycles mean that available information is dated.

3.3 Overview

The Thames Water supply area is approximately 12,900 km² in area. Approximately two-thirds of the catchment is permeable, consisting of chalk, middle Jurassic limestones and river gravels, and is thus subject to direct recharge from rainfall. The Thames river basin extends from north Oxfordshire southwards to Surrey and from Gloucester in the west to the Thames Estuary and parts of Kent in the east. The Thames river basin is conventionally divided into four zones: the tidal, lower, middle and upper Thames. The upper Thames flows through a predominantly rural landscape and does not pass through any major towns. The middle Thames, from its confluence with the River Windrush near Eynsham to Hurley, is also predominantly rural as well as passing through some urban centres such as Oxford and Reading. The lower Thames, between Hurley and Teddington, becomes increasingly urbanised as it heads towards London where it becomes tidal.

The Thames Valley and London normally receive less than 650mm of rainfall per year¹⁹. Average yearly rainfall is greater in the west than the east of the region. According to the previous River Basin Management Plan (RBMP)²⁰ the Thames River Basin District is one of the driest in the UK, and is classified as 'water stressed'. The River Thames is an important water source for Thames Water and other water companies for supplying drinking water to the Thames Valley and providing two-thirds of London's drinking water. Water demand in the region is high relative to other parts of the country. Groundwater, particularly the chalk aquifer, is also an important source providing around 40% of public water supplies. Current assessments show that groundwater sources are fully utilised over most of the Thames River Basin District.

The Thames Water supply area spans four NUTS (nomenclature of territorial units for statistics)²¹ regions; the South East, London, East and South West. The baseline information has been presented



¹⁹ Met Office (2016) Accessed at <u>https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/weather/learn-</u> about/uk-past-events/regional-climates/southern-england_-climate---met-office.pdf ²⁰ Environment Agency (2009) River Basin Management Plan., Thames River Basin District (updated 2015).

²¹ In England, the region is the highest tier of sub-national division used by central Government. They are defined as first level NUTS regions ("NUTS 1 regions") within the European Union. Regional Government offices were abolished in 2011.

at local, regional and national levels where possible for comparative reasons and to aid the assessment during Stage B of the SEA:

Local: The baseline within the Thames Water supply area or within a specific WRZ. These data are usually sourced directly from Thames Water. Spatial analysis also allows the presentation of data that lie within the Thames Water supply area or scheme source area. In some circumstances London is discussed separately from the rest of the supply area due to its characteristics and importance as the capital.

Regional: The baseline in the counties or regions that the Thames Water supply region and scheme source areas cover. The Thames Region RBMP is a valuable source of information that includes the Thames Water supply region as well as the remainder of the Thames catchment. The RBMPs are updated every six years and this review and update is currently underway. The Environment Agency expect to consult on the draft RBMPs to start in 2021.

National: The baseline for the UK, England or in some cases the agglomerated baseline for the four regions that the Thames Water supply region intersects.

The baseline has been reviewed for each of the SEA topics, and is presented in full in **Appendix B**. Key issues identified from the baseline are presented in **Section 3.4**.

3.4 Key Issues

3.4.1 Biodiversity, Fauna and Flora Key Issues

The key sustainability issues arising from the baseline assessment for biodiversity are:

- The need to protect or enhance biodiversity, ecological functions and biodiversity connectivity within Thames Water's supply and source areas, particularly protected sites designated for nature conservation.
- The need to avoid activities likely to cause irreversible damage to natural heritage.
- The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors.
- The need to control the spread of Invasive Non-Native Species (INNS)
- The need to recognise the importance of allowing wildlife to adapt to climate change.
- The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.

3.4.2 Population and Human Health Key Issues

The key sustainability issues arising from the baseline assessment for population and human health are:

- The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas.
- The need to ensure public awareness of drought conditions and importance of maintaining resilient, reliable public water supplies without the need for emergency drought measures.
- The need to ensure water quantity and quality in rivers is maintained for a range of uses including tourism, recreation, navigation and other use such as agriculture.
- The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities for local residents and tourists, including opportunities for access to, protecting and enhancing recreation resources, green infrastructure and the natural and historic environment.
- The need to accommodate an increasing population.



• Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and wellbeing and the economy.

3.4.3 Material Assets and Resource Use Key Issues

The key sustainability issues arising from the baseline assessment for Material Assets and Resource Use are:

- The need to minimise the consumption of resources, including water and energy
- The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill.
- The need to continue to reduce leakage from the water supply system to help reduce demand for water.
- Daily consumption of water is higher than the national average in the area and consequently there is a continued need to encourage more efficient water use.

3.4.4 Water Key Issues

The key issues arising from the baseline assessment for water are:

- The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives and ensure no deterioration where improvement is not feasible.
- The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives and ensure no deterioration.
- The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change impacts on surface waters and groundwaters.
- The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply.
- The need to ensure that people understand the value of water.



3.4.5 Soil, Geology and Landscape Key Issues

The key sustainability issues arising from the baseline assessment for soil, geology and land use are:

- The need to protect and enhance geological features of importance (including geological SSSIs) and maintain and enhance soil function and health.
- The need to manage the land more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources).
- The need to make use of previously developed land (brownfield land) and to reduce the prevalence of derelict land in the region.

3.4.6 Air and Climate Key Issues

The key sustainability issue arising from the baseline assessment for air and climate is:

- The need to reduce air pollutant and greenhouse emissions and limit air emissions to comply with air quality standards.
- The need to mitigate against climate change through the reduction of greenhouse gas emissions in order to contribute to risk reduction over the long term.
- The need to adapt to the impacts of climate change for example through, sustainable water resource management, water use efficiencies, specific aspects of natural ecosystems (e.g. connectivity) as well as accommodating potential opportunities afforded by climate change.

3.4.7 Archaeology and Cultural Heritage Key Issues

The key sustainability issue arising from the baseline assessment for archaeology and cultural heritage is:

• The need to conserve sites of archaeological importance and cultural heritage interest, particularly those which are sensitive to the water environment.

3.4.8 Landscape and Visual Amenity Key Issues

The key sustainability issue arising from the baseline assessment for landscape and visual amenity is:

- The need to protect and improve the natural beauty of the region's AONBs, National Parks and other areas of natural beauty.
- The need to protect and improve the character of landscapes and townscapes.

3.4.9 Inter-relationships

There are inter-relationships between the SEA topics and all objectives assessed during the SEA process. These include impacts of changes to water flows and quality on biodiversity, the economy, recreation, tourism, navigation, cultural heritage and landscape. Inter-relationships that result in changes to individual effects are considered by evaluation of synergistic effects throughout the assessment.

The key sustainability issue arising is:

• The need to consider the inter-relationships between topics.



4 Methodology

4.1 Introduction

This section describes the methodology that has been used to undertake the SEA of the drought options in Thames Water's Final DP.

What the SEA Regulations require:

According to Regulation 12:

(2) The report shall identify, describe and evaluate the likely significant effects on the environment of –

(a) implementing the plan or programme; and,

(b) reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme

According to Schedule 2, The Environmental Report should include:

- 6. The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects and secondary, cumulative and synergistic effects.
- 8. An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information.

4.2 Assessment Methodology and SEA Framework

This section outlines the assessments that have been carried out in the SEA to identify the environmental effects of the drought options listed in Thames Water's Drought Plan.

The environmental assessments of the drought options are 'objectives-led'. Establishing assessment objectives is a recognised way of considering the environmental effects of a plan and comparing the effects of alternatives. SEA objectives are often derived from environmental objectives established in law, policy or other plans and programmes, or from a review of baseline information and environmental problems (based on the SEA topics listed in Section 3.4).

An assessment framework of objectives has been developed based on:

- The current state of the environment in the Thames Water water supply area (see Section 3.3).
- The key environmental issues identified (see Section 3.4).
- The key policy messages and environmental protection objectives identified in the review of policies, and other plans and programmes (see Section 2). It is important that the assessment takes these objectives into account as this will help it to highlight any area where the DP will help or hinder the achievement of the objectives of other plans (e.g. at local, national and international level see review of Plans, Policies and Programmes in Section 2.2).

Final SEA objectives are set out in **Table 4.1**. alongside the key messages identified from the review of policies, plans and programmes and the key issues from the review of baseline information. The following sections describe how Thames Water used these SEA objectives in the assessment of the environmental effects of the drought options. These SEA objectives are intended to reflect changes that contribute to sustainability. By assessing each drought option against the objectives, it is more apparent where drought options might have a negative impact, and where options could be developed to reduce potential impacts.



As well as the overall SEA objectives, a number of key questions have been developed for each SEA topic. These key questions prompt the assessment and ensure it considers all the relevant aspects. The assessment of each option required the following information, some of which was available from the DP:

- Details of each potential drought management measure;
- Likelihood and predicted frequency of deployment of the measure;
- Construction (where applicable) and operational/implementation details;
- Relevant information contained in Environmental Assessment Reports (EARs) relating to drought permit options;
- Benefits to the water supply-demand position in a drought (taking uncertainty into account); and
- Key elements of the baseline environment, such as location of designated sites, priority habitats and species, landscape areas or heritage assets, recreational facilities and other environmental features.



Table 4.1 SEA Objectives and Assessment Approach

SEA Topic	Policies, Plans and Programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
Biodiversity, flora and fauna	Conservation and enhancement of the natural environment and of biodiversity, particularly internationally and nationally designated sites, whilst taking into account future climate change. Promote a catchment-wide approach to water management to ensure better protection of biodiversity. To achieve favourable condition for priority habitats and species, including UK NERC habitats and species. Avoidance of activities, directly or in- combination, likely to cause irreversible damage to nature conservation and natural heritage. Support well-functioning ecosystems and essential physical and biological processes, respect environmental limits and capacities, and maintain/enhance coherent ecological networks, including provision for fish passage and connectivity for migratory/mobile species. Strengthen the connections between people and nature and realise the value of biodiversity.	The need to protect or enhance biodiversity, ecological functions and biodiversity connectivity within Thames Water's supply and source areas, particularly protected sites designated for nature conservation. The need to avoid activities likely to cause irreversible damage to natural heritage. The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors. The need to recognise the importance of allowing wildlife to adapt to climate change. The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of ecosystem services. The need to control the spread of Invasive Non-Native Species (INNS)	 1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy. 1.2 To avoid introducing or spreading INNS. 	 Will it protect the most important sites for nature conservation? Will it protect and enhance aquatic, transitional and terrestrial species and habitats? Will it contribute to the sustainable management of natural habitats and ecosystems, i.e. within their limits and capacities taking into account climate change adaptability? Will it affect WFD compliance e.g. good ecological potential/status? Will it ensure maintenance or support provision of fish passage with respect to migratory fish? Will it protect or enhance natural capital and ecosystem services? Will it maintain or enhance access to areas of natural heritage interest? Will it limit, reduce or increase the risk of spread



SEA Topic	Policies, Plans and Programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	 and therefore should be protected and, where possible, enhanced. To seek opportunities for biodiversity net gain from infrastructure development. Avoidance of activities likely to increase the risk of spread of Invasive Non-Native Species (INNS). 			of Invasive Non-Native Species (INNS)?
Population and human health	 Water resources play an important role in supporting the health and recreational needs of local communities. Effective water resource management can create opportunities for regeneration, tourism and the wider economy. The issue of water supply is becoming a development constraint in some areas, which is recognised as an issue in the National Planning Policy Framework. To ensure all communities have a clean, safe and attractive environment in which people can take pride. To ensure secure, safe, reliable, sustainable and affordable supplies of water are provided. Increase awareness around the value and health benefits of water and encourage its sustainable use. 	The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas. The need to ensure public awareness of drought conditions and importance of maintaining security of supply without the need for emergency drought measures. The need to ensure water quantity and quality in rivers is maintained for a range of uses including tourism, recreation, navigation and other use such as agriculture. The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities for local residents and tourists, including opportunities for access to,	 2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being). 2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way). 2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water. 	 Will it help to ensure access to a secure and affordable supply of drinking water? Will it help to protect or improve drinking water quality? Will it raise awareness of the importance and value of the water environment for health and well-being? Will it protect or enhance opportunities for recreation and tourist activities, including navigation? Will it help to promote healthy communities and protect from risks to health and wellbeing? Will it assist in ensuring provision of essential infrastructure services to



SEA Topic	Policies, Plans and Programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
		protecting and enhancing recreation resources, green infrastructure and the natural and historic environment. The need to accommodate an increasing population. Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and well- being and the economy.		support a sustainable economy?
Material assets and resource use	 Promote sustainable management of natural resources, sustainable production and consumption whilst seeking to reduce the amount of waste generated by using materials, energy and water more efficiently. Consider issues of water demand, water supply and water quality in the natural environment and ensure a sustainable use of water resources. Contribute to a resource efficient, green and competitive low carbon economy. Maintain a reliable public water supply and ensure there is enough water for human uses, as well as providing an improved water environment. 	The need to minimise the consumption of resources, including water and energy. The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill. The need to continue to reduce leakage from the water supply system to help reduce demand for water. Daily consumption of water resources is higher than the national average in the area and there is a need to encourage more efficient use.	 3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill. 3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained. 	 Will it help to minimise the demand for resources (including water)? Will it minimise the use of energy and promote energy efficiency? Will it make use of existing infrastructure? Will it help to encourage sustainable design or use of sustainable materials (e.g. supplied from local resources)? Will it reduce the amount of waste generated and increase the proportion sent to reuse or recycling?



SEA Topic	Policies, Plans and Programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	Minimise the production of waste, ensure waste management is in line with the 'waste hierarchy', and eliminate waste sent to landfill. Promote the sustainable management of natural resources.			Will it enable efficient water resource management and ensure maintenance of water supplies?
Water	 Promote sustainable water resource management, including a reduction in water consumption. Maintain and improve water quality (surface waters, groundwater and bathing waters). Expanding the scope of water protection to all waters, surface waters and groundwater. Improve the quality of the water environment and the ecology which it supports, and continue to provide high levels of drinking water quality. Ensure appropriate management of abstractions and protect flow and level variability across the full range of regimes from low to high conditions. Prevent deterioration of WFD waterbody status. 	The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives and ensure no deterioration where improvement is not feasible. The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives and ensure no deterioration. The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change impacts on surface waters and groundwaters. The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply.	 4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation. 4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status. 4.3 To ensure appropriate and sustainable management of abstractions (or compensation flow) to maintain water supplies whilst protecting ecosystem functions that rely on water resources. 4.4 To promote measures to enable and sustain long term improvement in water efficiency. 	 Will it minimise risks of adverse effects on water quality? Will it affect WFD compliance (supporting elements to Good Ecological Potential/Status, including hydromorphology)? Will it affect bathing water compliance? Will it affect bathing water compliance? Will it affect WFD compliance for groundwater bodies (Good Quantitative and Chemical Status) Will it help to minimise risks associated with unsustainable abstraction of ground and surface waters?



SEA Topic	Policies, Plans and Programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	 Balance the abstraction of water for supply with the other functions and services the water environment performs or provides. Steer new development to areas with the lowest probability of flooding and manage any residual flood risk, taking account of the impacts of climate change. Promote measures to enable and sustain long term improvements in water efficiency. Ensure a sustainable balance between the supply and demand for water. Encourage more efficient use of water and promote awareness of water sustainability. 	The need to ensure that people understand the value of water.		 Will it abstract from a water resource with resource availability (with reference to CAMS status and WFD considerations)? Will it affect WFD compliance e.g. Good Environmental Status? Will it affect river basin management plans? Will it affect river basin management plans? Will it alter the flow or level regime or residence time of surface waters or groundwaters? Will it enable flexible control over the level of abstraction at short notice in response to changing environmental conditions? Will it enable a sustainable use of water resources that balances demand for water with environmental protection? Will it encourage efficient water use? Will it contribute towards improving the awareness of water sustainability and its true value?



SEA Topic	Policies, Plans and Programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
Soil, geology and land use	Maintain the quality and diversity of geology and soils, which can be lost or damaged by insensitive development. Ensure that soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development. Promote catchment-wide approach to land management by relevant stakeholders, in order to benefit natural resources, reduce pollution and develop resilience to climate change. Promote mixed use developments, and encourage multiple benefits from the use of land in urban and rural areas, recognising that some open land can perform many functions. Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value.	The need to protect geological features of importance (including geological SSSIs) and maintain and enhance soil function and health. The need to manage the land more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources). The need to make use of previously developed land (brownfield land) and to reduce the prevalence of derelict land in the region.	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	 Will it avoid damage to and protect geologically important sites? Will it protect and enhance the quality of soils? Will it ensure efficient use of land (e.g. make use of previously developed land)? Will it contribute towards a catchment-wide approach to land management?
Air and climate	Reduce greenhouse gas emissions. Targets include: bring UK's greenhouse gas emissions to net zero by 2050 and cut London's CO2 emissions by 60% by 2030.	The need to reduce air pollutant and greenhouse emissions and limit air emissions to comply with air quality standards. The need to mitigate against climate change through the	6.1 To maintain and improve air quality6.2 To reduce greenhouse gas emissions6.3 To consider the need for	 Will it reduce or minimise air pollutant and greenhouse gas emissions? Will it increase emissions to air in an areas sensitive to



SEA Topic	Policies, Plans and Programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	 Reduce the effects of air pollution on ecosystems. Improve overall air quality Minimise energy consumption, support the use of sustainable/renewable energy and improve resilience to climate change. Sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Build in adaption to climate change to future planning and consider the level of urgency of associated risks of climate change impacts accordingly. Need for adaptive measures to respond to likely climate change impacts on water supply and demand. 	reduction in greenhouse gas emissions in order to contribute to risk reduction over the long term. The need to adapt to the impacts of climate change for example through, sustainable water resource management, specific aspects of natural ecosystems (e.g. connectivity) as well as accommodating potential opportunities afforded by climate change.	adaptive measures for climate change	 emissions (e.g. in proximity to an AQMA or to sensitive habitat or more deprived area)? Will it result in an increase in greenhouse gas emissions over and above that that would be produced to supply an equivalent quantity of water in non-drought conditions? Will it reduce vulnerability to risks associated with climate change effects (e.g. reduce the adverse effects of droughts and floods)? Will it improve resilience/adaptability to likely effects of climate change, e.g. by increasing water storage capacity, or transferring water from areas with surplus?
Archaeology and cultural heritage	Built development in the vicinity of historic buildings could have implications for the setting and/or built fabric. Ensure active management of the Region's environmental and cultural assets.	The need to conserve or enhance sites of archaeological importance and cultural heritage interest, particularly those which are sensitive to the water environment.	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	 Will it avoid damage to and protect the historic environment, heritage assets and their settings, places and spaces that



SEA Topic	Policies, Plans and Programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	Ensure effects resulting from changes to water level (surface or sub-surface) on all water dependent historical and cultural assets are avoided. Promote the conservation and enhancement of the historic environment, including the promotion of heritage and landscape as central to the culture of the region and conserve and enhance distinctive characteristics of landscape and settlements. Conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations. Consider effects on important wetland areas with potential for paleo-environmental deposits.			 enhance local distinctiveness? Will it maintain and enhance the historic environment, including palaeo-environmental deposits? Will the hydrological setting of water-dependent assets be altered, such as important wetland areas with potential for paleo- environmental deposits? Will it improve access, value, understanding or enjoyment of heritage assets and culturally/historically important assets in the region?
Landscape and visual amenity	Protection and enhancement of urban and rural landscapes (including designated landscapes, landscape character and the countryside). Abstraction and low river flows could negatively affect landscape and visual amenity. Enhance the value of the countryside by protecting the natural environment for this and future generations	The need to protect and improve the natural beauty of the region's AONBs and other areas of natural beauty.	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	 Will it avoid adverse effects and enhance designated landscapes? Will it help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness?



SEA Topic	Policies, Plans and Programmes Key Messages	Baseline Key Issues	SEA Objectives	Indicator Questions
	Take account of the different roles and character of different areas, promoting the vitality of main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it. Ensure good access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders. This includes protecting National trails and Public Rights of Way.			Will it improve access to valued areas of landscape character?



4.3 Primary Assessment

The appraisal framework set out in **Table 4.2** has been used to assess each of the drought options against the SEA objectives. The appraisal framework was applied to test the performance of the drought options against the SEA objectives. This assessment supported development of Thames Water's DP 2022, and will inform the selection of options should a drought result in the DP becoming operational.

In the context of drought planning, individual drought options are taken to constitute alternatives. Thames Water's DP comprises a total of 44 drought options (five demand-side options, nine supplyside options and 30 drought permit/order options). Each of these 'alternatives' (individual drought options) were therefore assessed using the appraisal framework set out in **Table 4.2**. The assessment therefore provides information on the relative environmental performance of alternatives, and is intended to make the decision-making process more transparent. The SEA can, therefore, be used to support the timing, prioritisation and implementation of drought options within the DP.

The appraisal framework (Table 4.2) is structured as follows:

- The first and second columns set out the SEA topics and objectives.
- The <u>third</u> column provides a brief commentary and evaluation of the impact of the drought option on the objectives for each topic, with reference to the key questions proposed in Table 3.2. This brief commentary assumes the implementation of best practice in implementing the option, therefore the effects are referred to as residual and are largely temporary. Potential mitigation measures for any identified adverse effects arising from each option are identified within the appraisal framework.
- The fourth column identifies the magnitude of the effect on a scale of low, medium and high.
- The value/sensitivity of the receptor(s) is identified in the <u>fifth</u> column on a scale of low, medium and high.
- The scale of the effect, which might relate to either geographical scale or the size of the population affected, is identified in the <u>sixth</u> column on a scale of small, medium to large.
- The impact evaluation includes consideration of the nature of the impact, certainty of effect, duration
 and permanence (seventh, eighth and ninth columns of Table 4.2) in compliance with criteria for
 determining the likely significance of effects specified in the SEA Directive Article 3(5) and Annex
 II, and the SEA Regulations Part 2, Regulation 9(2a) and Schedule 1. With respect to duration of
 temporary effects, short-term impacts are defined as those that last for up to six months, medium
 term impacts are those that extend for six months to two years whilst longer term temporary impacts
 are assessed as those that extend to two to five years. A 'significant long term' temporary impact
 category is used for those temporary effects that continue beyond five years in duration.
- The residual adverse and beneficial effects (after application of best practice approaches and any
 appropriate mitigation measures) are identified in the <u>tenth</u> and <u>eleventh</u> columns respectively.
 These were identified separately so as to avoid mixing adverse and beneficial effects. The
 commentary in column nine, combined with the magnitude (column seven) and value / sensitivity
 (column eight) informs the residual adverse or beneficial effects.

Where qualitative and/or quantitative information is available for an option (e.g. as identified by an EAR etc.), this was used to inform the assessment.

As described in Section 1.5, EARs have been produced for the supply side drought permit options and these were used to inform the SEA for these options. The EARs define the significance of effects on identified sensitive features based on fragility of the receptors and the likely magnitude of impact experienced. The assessment of effects on water quality described in the EARs took into consideration the requirements of the WFD. Important information held within the EARs is borne out in the commentary of the assessment table if relevant, and the level of significance largely guided the SEA level of significance for the objectives that are informed by the EARs (see **Table 4.1** above).



Objectives or key questions that are not supported by information presented in the EARs are evaluated using spatial analysis, professional judgement and appropriate guidelines.

Equally, where detailed environmental and socio-economic assessments of non-drought permit/order options were carried out (e.g. in relation to water use restrictions), these were also used to inform the SEA.



Table 4.2SEA appraisal framework

Торіс	SEA objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (Low/ Medium/ High)	Value/ sensitivity of receptor (Low/ Medium/ High)	Scale of effect: geographical &/or population affected (Small/ Medium/ Large)	Certainty of effect (Low/ Medium/ High)	Duration of effect (short/ medium /long term)	Permanence of effect (permanent/ temporary)	Residual Adverse Effect (likely to remain after reasonable mitigation)	Residual Beneficial Effect (likely to remain after reasonable mitigation)
Biodiversity, fauna and flora	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.									
	1.2 To avoid introducing or spreading INNS.									
ulation and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).2.2 To protect and enhance the water environment for other users									
Pop	ncluding recreation, tourism, navigation, as well as terrestrial									



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Торіс	SEA objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (Low/ Medium/ High)	Value/ sensitivity of receptor (Low/ Medium/ High)	Scale of effect: geographical &/or population affected (Small/ Medium/ Large)	Certainty of effect (Low/ Medium/ High)	Duration of effect (short/ medium /long term)	Permanence of effect (permanent/ temporary)	Residual Adverse Effect (likely to remain after reasonable mitigation)	Residual Beneficial Effect (likely to remain after reasonable mitigation)
	recreational resources (including National Trails and Public Rights of Way).									
	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.									
and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.									
Material assets	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.									
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this									



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Topic	SEA objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (Low/ Medium/ High)	Value/ sensitivity of receptor (Low/ Medium/ High)	Scale of effect: geographical &/or population affected (Small/ Medium/ Large)	Certainty of effect (Low/ Medium/ High)	Duration of effect (short/ medium /long term)	Permanence of effect (permanent/ temporary)	Residual Adverse Effect (likely to remain after reasonable mitigation)	Residual Beneficial Effect (likely to remain after reasonable mitigation)
	impacts on habitats and/or navigation.									
	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.									
	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.									
	4.4 To promote measures to enable and sustain long term improvement in water efficiency.									
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.									
Air and Climate	6.1 To maintain and improve air quality.									



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Торіс	SEA objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (Low/ Medium/ High)	Value/ sensitivity of receptor (Low/ Medium/ High)	Scale of effect: geographical &/or population affected (Small/ Medium/ Large)	Certainty of effect (Low/ Medium/ High)	Duration of effect (short/ medium /long term)	Permanence of effect (permanent/ temporary)	Residual Adverse Effect (likely to remain after reasonable mitigation)	Residual Beneficial Effect (likely to remain after reasonable mitigation)
	6.2 To reduce greenhouse gas emissions.									
	6.3 To consider the need for adaptive measures for climate change.									
Archaeology and cultural heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.									
Landscape and visual amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.									



The SEA appraisal framework was used to capture the assessment for each drought option. The results of the option assessments are provided in **Section 5**.

Varying levels of uncertainty are inherent within the assessment process. Through the application of expert judgement, the uncertainty was minimised. The level of uncertainty of the option assessment for each SEA objective was included in the appraisal framework. Where there was significant uncertainty which precluded an effects assessment category being assigned for a particular drought plan option and SEA objective, an "uncertain" residual effects assessment label was applied to that specific SEA objective.

For each SEA objective, a residual effects assessment was determined against a significance matrix (**Figure 4.1**) which took into account the value/sensitivity of the receptor (e.g. air quality, river water quality, landscape value) and the magnitude of the assessed effect. This significance matrix comprised effects from 'major beneficial' to 'major adverse'. For the box signifying low magnitude and high receptor value/sensitivity, this could result in a greater than 'moderate' effects being assigned dependent on the sensitivity/value of the receptor. This colour coding was used to complete the columns for residual effects in the appraisal framework.

The resulting significance of effects is used in the prioritisation of options. Also, where major adverse effects are predicted, broad measures envisaged to prevent, reduce and as fully as possible offset these effects on the environment (as a result of implementing the DP) are outlined where relevant/appropriate.

Figure 4.1	Significance matrix used to assess effects of each drought option on each SEA
objective	

Significance	of Effect	Value/sensitivity of receptor										
5		High	Medium	Low								
Effect	High	Major Beneficial Major Adverse	Major Beneficial Major Adverse	Moderate Beneficial Moderate Adverse								
magnitude (includes scale of effect)	Medium	Major Beneficial Major Adverse	Moderate Beneficial Moderate Adverse	Minor Beneficial Minor Adverse								
	Low		Minor Beneficial Adverse	Negligible								



= Significance of effect dependent on value/sensitivity of receptor and magnitude

The definitions for 'significance' ratings as identified in the table above are provided below:

Major - effects represent key factors in the decision-making process. They are generally associated with sites and features of international / national (e.g. SPAs, SACs, Ramsar, SSSI) or regional importance (e.g. National Trails, Biodiversity Action Plan (BAP) habitats/species). If adverse, such resources/features are generally those which cannot be replaced or relocated.

Moderate - effects are likely to be important considerations at a regional or district scale. If adverse, they are likely to be of potential concern.



Minor - effects are not likely to be decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.

Negligible - effects which are not perceptible, being within normal bounds of variation or the margin of forecasting error.

For the **'high' effect magnitude** (top row), a major effect significance is assigned for both high and medium value receptors to reflect the magnitude of the effect.

For the **'low' effect magnitude and 'high' value receptor** (bottom left box), the significance of effect could be minor, moderate or major dependent on the precise nature of the impact or benefit.

The appraisal framework for each option includes a summary comprising an overview of the adverse and beneficial effects. The assessment matrices are provided in **Appendix D**.

An appraisal framework table including the summary (example provided in **Table 4.3**) has been completed for each drought option (as identified in Section 1.4.2) and presented in full in **Appendix D**. The summary of the assessment is presented in **Section 5** as a colour-coded visual evaluation (VE) matrix. The VE matrix summarises the likely significance of impacts (which are discussed in full in the completed appraisal framework tables in Appendix D).

Option	[name of option]										
Summary commentary of scheme adverse effects	[summary]										
SEA objectives adverse effects summary											
Summary commentary of scheme beneficial effects	[summary]										
SEA objectives beneficial effects summary											

Table 4.3 Example SEA Appraisal Framework Summary

4.3.1 Secondary, cumulative and synergistic environmental effects

Schedule 2(6) of the SEA Regulations requires the assessment of "The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects...." From here on in "cumulative effects" is taken to include secondary and synergistic effects.

Because the combination of options that would be deployed in any one drought cannot be predetermined (see Section 1) a dedicated cumulative effects assessment in order to ensure that options are not mutually exclusive, or that combinations would not cause significant adverse impacts will be undertaken. This will involve examining the likely significant effects of each of the drought options individually, in combination with each other (both inter- and intra- water resource zone), and in combination with the implementation of other plans and programmes. In assessing these effects, consideration will be given to other factors which may affect the receiving environment in the short, medium and long term.

The following cumulative assessments are proposed in the SEA (see Section 6):



- 1. Within Thames Water's entire water supply area, assessment of cumulative impacts of each demand management option that could potentially be implemented at the same time. Note that demand management options are consistent across the whole of Thames Water's region, and it is proposed that the assessment takes into account the implementation of each option across the whole of Thames Water's supply region. However, there may be instances when demand management measures are implemented in part of a supply area rather than the whole region. Demand management measures serve to reduce pressure on water resources and will have a positive influence on both supply side and drought permit/order options within each water resource zone (by reducing the demand for water). Therefore, demand management measures will not be assessed in detail against each supply side option, other than to acknowledge that they will have a net positive effect by reducing pressure on water resources unless the assessment identifies an effect that could have in-combination effects with a supply-side option.
- 2. Within and between each of Thames Water's WRZs, assessment of cumulative impacts of those supply side options, including drought permit / order options that could potentially be implemented at the same time (intra-zone and inter-zone). Mutually exclusive options (e.g. those that draw the same resource or use the same site) will also be identified.
- 3. Assessment of cumulative impacts of the Thames Water DP with the Thames Water WRMP (Final WRMP19), other water company DPs and WRMPs, River Basin Management Plans (RBMPs) and Environment Agency's National DP (and any other drought plans prepared by other bodies, such as the Canal & River Trust). The potential for a neighbouring company implementing options under its DP simultaneously will be considered. Neighbouring water companies will be included as consultees to the DP and associated SEA Environmental Report in order to identify any trans-boundary issues.
- 4. Assessment of potential cumulative impacts of the **Thames Water DP with any other identified relevant programmes, plans and projects** that may be in place / implemented during the period of the DP (i.e. up to 2027), for example the Thames Tideway scheme.

Thames Water will communicate with neighbouring companies regarding the schemes in their respective plans. Potential effects with other plans will be identified, particularly in the context of spatial and temporal proximity. This is especially important in identifying potential water resources impacts, although licence changes would always be subject to further investigation by the companies themselves and the Environment Agency. Potential cumulative effects with wider plans will also be assessed. If effects are identified they can be ameliorated with early stage mitigation and associated monitoring.

DPs comprise a basket of measures, the implementation of which are dependent on the particular drought conditions experienced and are subject to temporal, spatial and other factors. The exact timing of implementation of drought options will not be known until a drought is experienced.

One of the limitations of the cumulative or in-combination assessment of Thames Water's DP is that whilst an environmental appraisal of each drought option can be undertaken, the lack of predictability of which options will be implemented in any particular drought event means that it may be impossible to provide an accurate cumulative assessment of the impacts of the plan for a possible future drought event.

Cumulative assessments of drought options with each other will be undertaken assuming as a worst case that the operation of two or more options could occur simultaneously. Spatial proximity and therefore potential impacts on a common receptor is the primary consideration (e.g. the same designated area or reach of river).

Due to the uncertainty of timing of implementation of drought options, prior to applying for specific drought permits/orders, Thames water will assess each drought option with every other drought option,



with the intention that in the event of a drought, the findings of the SEA be reviewed and a cumulative assessment made of the options proposed for implementation at that time, based on the findings of the one-on-one assessments to be undertaken.

4.3.2 Limitations of the Study

SEA is a high-level assessment aimed at highlighting potential environmental concerns. The environmental data used in this assessment is based on that which is readily available from existing sources, e.g. statutory organisations, and environmental assessments of drought permit/order options already undertaken by Thames Water. No primary research or survey work has been carried out specifically to inform the SEA and therefore it is possible that at the individual option level, there may be additional environmental issues that could have an influence on a drought option.

Limitations of the cumulative, or in-combination assessment of Thames Water's Final DP should also be noted as discussed in Section 4.3.1, as implementation of drought options are dependent on the particular drought conditions experienced meaning that it may be impossible to provide an accurate cumulative assessment of the impacts of the plan for a possible future drought event.

It should be noted that the EARs which have been prepared for the drought permits / order sites to support Thames Water's DP (see Section 1.5) have been undertaken in accordance with the revised Environment Agency Drought Plan Guidance. This states that the level of detail included in the EAR should be based on the level of risk posed by the action that is being assessed (e.g. based on the scale of the impact, the expected frequency of use or the importance or sensitivity of the site). The required level of assessment has been undertaken to help inform any potential residual effects of each drought option. The assessment does not, however, address local wildlife sites. The level of risk of a local wildlife site being significantly affected by the implementation of a drought permit / order is considered to be low and the implications on local wildlife sites will be considered in more detail in the EARs at the time of a potential application for a drought permit / order. For the SEA, assessment is undertaken at the strategic level and it is, therefore, not practical to assess each local wildlife site.

Where particular limitations or outstanding issues are known, these are briefly described in the SEA appraisal tables for the relevant drought option concerned.



5 Assessment of Drought Options

5.1 Drought Options Under Consideration

Demand management schemes which have been assessed are common to all zones and are listed in **Table 1.1**. Supply side and drought permit/order drought options which have been assessed for each of the four WRZs are listed in **Table 1.2** and **Table 1.3**.

5.2 Assessment of Schemes Against SEA Objectives

Assessment of drought options has been carried out in accordance with the methodology described in Section 4. Appraisal framework assessment tables have been completed for each drought option, and are presented in full in **Appendix E**. A summary of the assessment is presented in this section as colour-coded VE matrices. For each drought option and each SEA topic and SEA objective listed in the left hand column of **Table 5.1**, the VE matrix summarises the likely significance of residual impacts. The colour coding represents a range from significant adverse impact in red through to significant beneficial impacts in dark green (**Table 5.1**).

Colour	Significance of Effect
Dark Green	Major Beneficial
Mid Green	Moderate Beneficial
Light Green	Minor Beneficial
Negligible	Negligible
Yellow	Minor Adverse
Orange	Moderate Adverse
Red	Major Adverse
NONE APPLICABLE	NOT APPLICABLE

Table 5.1 Visual evaluation matrix legend

5.3 Demand Side Options

A visual summary of SEA conclusions for each of the demand side options in Thames Water's Final DP is provided in **Table 5.2.** The completed appraisal tables for each of the drought options are provided in **Appendix D**.

Overall, demand side measures serve to reduce pressure on water resources within each WRZ by reducing customer demand for water, and therefore reducing abstraction at source or preserving storage in reservoirs. This will in turn contribute to reducing the amount of energy needed for water abstraction, treatment and distribution. Demand side measures typically provide moderate beneficial effects such as protecting and enhancing health and well-being through maintaining water supplies for essential use, and promoting efficient and sustainable use of water. Minor adverse effects on landscaping and horticulture businesses may be associated with temporary use bans, and impacts on businesses due to water use restrictions would increase in severity and spread to other sectors (e.g., recreation and tourism) should ordinary or emergency drought orders be implemented. Impacts from implementation of drought orders could also extend to archaeology and cultural heritage, due to the influence on the setting of cultural assets. Minor adverse effects may also be associated with emissions of air pollutants and greenhouse gas emissions from leakage reduction programme activities



Table 5.2	Visual evaluation matrix summary for demand side options

				1			1		s	ЕА Тор	oic		1	1			1		Commentary
		Biodiversity		Population and Human Health		Material Assets and Resource Use		Water			Soil, Geology and Land Use	Air and	d Climat	te	Archaeology and Cultural Heritage	Landscape			
Objective		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	
Media /water	Adverse																		No adverse impacts have been identified for this drougl option.
campaign	Denencial																		supply of water for customers/businesses. Reducing the d for water will also have beneficial effects on maintaining s water and groundwater levels/flows, sustainable manager abstractions and enabling long term improvements in efficiency. Reducing water demand will also help to impro- resilience of water supplies to drought.
Leakage reduction	Adverse																		Minor adverse effects identified are associated with emiss air (air pollutants and greenhouse gas emissions) as a re construction activities and vehicle movements. All other a effects identified are negligible.
	Beneficial																		Minor to moderate beneficial effects have been identifier respect to sustainable provision of water through water savin would have otherwise been lost to leakage after having abstracted at source. These effects are generally considered long term and permanent in nature.
Temporary use ban	Adverse																		No major adverse effects have been identified. A minor a effect has been identified in terms of promoting a susta economy due to the temporary use ban affecting some busi that rely on sprinklers/hosepipes in their line of work landscaping/horticulture).
	Beneficial																		Beneficial impacts include reducing the demand for water, re in securing the supply of water for customers/businesses. Re the demand for water will also have beneficial effe maintaining surface water and groundwater levels sustainable management of abstractions and enabling lor improvements in water efficiency. Reducing water demand w help to improve the resilience of water supplies to drought.
Drought Order to ban Non- Essential Use	Adverse																		No major adverse effects are predicted relating to implementation of the ordinary drought order. Adverse associated with restriction of water use and impacts on rec and tourism assets, and businesses/economy, may be min moderate respectively. They may also be minor adverse effi- heritage assets, such as visual impacts on parks and g and/or grounds of listed buildings. All adverse impacts identifi- short-term and temporary.
	Beneficial																		Beneficial effects include a reduction in the demand for wa associated efficient resource use, maintenance of flows/levels, maintenance of supply to consumers, and im the resilience of water supplies to drought.
Emergency Drought Order	Adverse																		Significant adverse effects are predicted relating to implementation of the emergency drought order, restricting use with impacts for recreation and tourism assets businesses/economy (population and human health. Other a effects include potential minor impacts on heritage asset visual impacts on parks and gardens and/or grounds of buildings).
	Beneficial																		Beneficial effects include a reduction in the demand for wa associated efficient resource use, maintenance of flows/levels and maintenance of supply to consumers



d for this drought plan
and for water, securing . Reducing the demand on maintaining surface ainable management of
mprovements in water lso help to improve the
ciated with emissions to nissions) as a result of nents. All other adverse
ve been identified with rough water savings that age after having been nerally considered to be
ntified. A minor adverse romoting a sustainable ecting some businesses eir line of work (e.g.,
nand for water, resulting s/businesses. Reducing beneficial effects on undwater levels/flows, and enabling long term g water demand will also plies to drought.
icted relating to the order. Adverse effects d impacts on recreation omy, may be minor and ninor adverse effects on on parks and gardens se impacts identified are
e demand for water and naintenance of water nsumers, and improving
icted relating to the order, restricting water tourism assets, and an health. Other adverse n heritage assets (e.g. nd/or grounds of listed
e demand for water and naintenance of water consumers

5.4 Supply Side Options

A visual summary of SEA conclusions for each of the supply side options is provided in **Table 5.3**. The completed appraisal tables for each of the drought options are provided in **Appendix D**.

Eight of the nine supply side options in Thames Water's DP are within the London WRZ. WBGWS abstracts water from the Kennet Valley WRZ to supply the London WRZ. All of these supply side options are actions within existing licensed limits.

The NLARS, TGWTW and WBGWS options have the greatest beneficial effects, as they would deliver large volumes of water during drought events. These options all provide major beneficial effects with respect to SEA objectives regarding protecting and enhancing health and well-being, enabling access to essential services, and improving resilience to droughts.

Adverse impacts associated with supply side options typically relate to additional energy requirements, emissions and materials used to maintain supply. Groundwater abstraction drought options, for example NLARS, CHARS, ELRED, Stratford Box and Old Ford, generally perform well against the SEA objectives when considering drought conditions, with typically only minor adverse effects identified due to increased energy requirements, emissions and materials used. There may be potential for effects on local groundwater levels and quality, however, it is assumed that the existing abstraction licences would not have been granted if these options resulted in unsustainable abstraction or the licences would have been identified on the Environment Agency's RSA programme.

WBGWS has potentially both beneficial and adverse effects, because during a drought (assessed here as short-term) it provides potential benefits against several SEA objectives due to positive impacts on flows in the River Kennet. However, over the long term, the drawdown of the groundwater levels for river augmentation has the potential for adverse impacts, and there could be a prolonged recovery period after WBGWS stops operating. The HRA Screening Report concluded that likely significant effects (LSEs) could not be ruled out on the River Lambourn SAC and the Kennet and Lambourn Floodplain SAC during operation of WBGWS and a Stage 2 Appropriate Assessment was, therefore, undertaken. On the basis that specific monitoring and mitigation measures are implemented during scheme operation (in consultation and agreement with Natural England and the Environment Agency), no adverse effects on the River Lambourn SAC and the Kennet and Lambourn Floodplain SAC are anticipated once the operational licence is in place, as water levels could be maintained more effectively during drought conditions. It should be noted that completion of the licence application is still required in order for the scheme to be implemented.

Thames Gateway Water Treatment Works, reduction in lowest residual flow on the Lower Thames Control Diagram at Teddington Weir from 300Ml/d to 200Ml/d and WBGWS options have some moderate adverse effects. The Thames Gateway Water Treatment Works is identified as causing moderate adverse impacts on material assets and resource use, and air and climate, due to its waste streams and emissions. The reduction in the lowest residual flow at Teddington Weir (300Ml/d to 200Ml/d) option has moderate adverse impacts on water and biodiversity, fauna and flora due to deterioration in water quality in the Lower Thames and Upper Tideway that is known to occur in certain conditions when flow over Teddington Weir falls below 400 Ml/d. In addition, the WBGWS may have moderate adverse effects on other abstractors.



Table 5.3Visual evaluation matrix summary for supply side options

				1			1		S	ЕА Тор	ic			1					Commentary
		Biodiversity		Popu Huma	Ilation and an Health		Material Assets and Resource Use		Water				Soil, Geology and Land Use	Air and	Air and Climate			Landscape	
Objective		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	
North London Artificial Recharge Scheme	Adverse Beneficial																		Adverse effects identified are associated w re-abstraction of stored water and its tree respect to emissions to air (air pollutants a the additional pumping and treatment requ Major beneficial effects are identified with quantity of water (at a rate of up to 190Ml/c resilience of water supplies to drought.
Thames Gateway Water Treatment Works (TGWTW)	Adverse																		The scale of water abstraction, treatmen required for implementation of this option emissions, moderate effects on resource c gas emissions. The treatment process impacts, due to discharge of brine from the from clarification and filtration units and R and temporary, assuming the plant was situations.
	Beneficial																		Use of the TGWTW would have major bene reliability in drought conditions through pro of which is not influenced by the effects of
Chingford Artificial Recharge	Adverse																		Minor adverse effects may occur due to air re-abstraction of stored water and its treatr with respect to greenhouse gas emission However, all adverse effects identified are
(CHARS)	Beneficial																		Moderate beneficial effects are identified v to 12MI/d), thus providing improvements in
Reduction in lowest residual flow on the Lower Thames Control Diagram at Teddinaton	Adverse																		If implemented, the drought option would h lowest reaches of the fluvial Thames, mai flows to the upper Thames Tideway will re on water quality in the fluvial Thames (redu phosphate dilution), which may exacerba with the potential for moderate adverse eff on a range of aquatic ecological receptor and fish. The adverse effects include the Moderate adverse effects may occur on na
Weir from 300MI/d to 200MI/d	Beneficial																		If implemented, the drought option would h and human health in terms of ensuring sup Major beneficial effects are also expecte supplies to drought.
Earlier reduction in residual flow at Teddington Weir on the Lower Thames Control Diagram	Adverse																		If implemented, the measure would result passed forward over Teddington Weir ea without implementation of the measure. Th what could occur under baseline conditions form of velocity reduction) in the fluvial Lo the reduction in freshwater flows to the u potential for minor adverse effects regard in the fluvial Thames (reduced dissolved dilution), which may exacerbate water qual effects are expected on a range of macroinvertebrates, macrophytes and fish and water quality impacts. Minor adverse extended periods of restrictions on lock use
	Beneficial																		If implemented, the measure would have ensuring supply of water to customers and expected through improved resilience of w



with energy use and materials required for the atment. Adverse effects are also likely with and greenhouse gas emissions) as a result of irements. h respect to sustainable provision of a large d) during periods of drought, and improving the nt including RO, and waste stream pumping on will have moderate adverse effects on air consumption, and minor effects on greenhouse would also have minor waste management e desalination plant and generation of sludges O membranes. Impacts should be short term only ramped up to full output in drought eficial effects regarding maintenance of supply ovision of up to 100MI/I supply, the availability drought. emissions associated with energy use for the ment. Negligible adverse impacts are possible ons, material use and groundwater quality. short term and temporary. vith respect to sustainable provision water (up the resilience of water supplies to drought. nave moderate adverse effects on flows in the inly in terms of velocity reduction. Freshwater duce. Moderate adverse effects are predicted uced dissolved oxygen saturation and reduced te water quality issues in the upper Tideway fects. Moderate adverse effects are expected rs, such as macroinvertebrates, macrophytes ose associated with fish, including migration. avigation. have a major beneficial effects for populations oply of water and other customers/businesses. ed in regard to improved resilience of water in minor adverse effects due to reduced flows arlier and for longer than would be the case herefore, all identified effects are extensions of s. In addition to the flow impacts (mainly in the ower Thames, minor adverse effects relate to upper Thames Tideway. As a result there is ing extended periods of water quality impacts oxygen saturation and reduced phosphate lity issues in the upper Tideway. Minor adverse aquatic ecological receptors, such as , as a result of the extended periods of flow effects may occur on navigation as a result of e than would have occurred without the option. ve a moderate beneficial effects regarding businesses. Minor beneficial effects are also ater supplies to drought.

			SEA Topic										Commentary						
		Biodiversity		Population and Human Health			Material Assets and Resource Use		Water				Soil, Geology and Land Use	Air and Climate			Archaeology and Cultural Heritage Landscape		
Objective		1.1 1.2		2.1 2.2 2.3		3.1 3.2		4.1 4.2 4.3 4.4			5.1	6.1	6.2	6.3	7.1	8.1			
East London Resource Developme nt (ELRED)	Adverse																		Negligible adverse effects identified are associated with energy use and materials required for the re-abstraction of stored water and its treatment. Adverse effects are also likely with respect to emissions to air (air pollutants and greenhouse gas emissions) as a result of the additional pumping and treatment requirements. There is also the potential for minor, temporary adverse effects on other abstractors, however, these effects are uncertain. All adverse effects are short to medium-term and temporary.
	Beneficial																		Moderate beneficial effects are identified with respect to sustainable provision of a moderate quantity of water (at a rate of up to 21MI/d) during periods of drought, and minor improvements in the resilience of water supplies to drought.
Stratford Box	Adverse																		Minor adverse, temporary effects identified are associated with emissions to air (air pollutants) as a result of the additional pumping and treatment requirements and proximity to sensitive receptors (AQMAs).
	Beneficial																		Moderate beneficial effects are identified with respect to sustainable provision of water (at a rate of up to 5MI/d) during periods of drought, and minor improvements in the resilience of water supplies to drought.
Old Ford	Adverse																		Minor adverse, temporary effects identified are associated with emissions to air (air pollutants) as a result of additional pumping and treatment requirements and proximity to sensitive receptors (AQMAs). There is also the potential for minor, temporary adverse effects on other abstractors, however, these effects are uncertain.
	Beneficial																		Moderate beneficial effects are identified with respect to maintaining public health and sustaining the economy, as are minor benefits due to improved resilience of water supplies to drought.
West Berkshire Groundwat er Scheme (WBGWS)	Adverse																		Minor adverse short-term effects associated with extensive pumping is likely to lead to suppressed groundwater levels in the months following the drought, which might cause a reduction in groundwater levels at some sites, and discharge of groundwater may cause impacts to river water quality. Moderate adverse effects associated with the potential to impact on other abstractors. Negligible adverse impacts are anticipated on biodiversity, flora and fauna, as it was considered in the HRA Screening Report (which also documents the findings of the Stage 2 Appropriate Assessment which was undertaken) that the drought option is unlikely to have a significant effect on the designated features of the Kennet and Lambourn Floodplain SAC and the River Lambourn SAC as water levels could be maintained more effectively during drought conditions with the reduction of an existing licence and a new sluice to maintain flows to the SAC. Minor adverse effects due to air emissions associated with additional abstraction and proximity to nature conservation sites. All adverse effects are temporary.
	Beneficial																		Moderate beneficial effects on population and human health are anticipated due to maintenance of water supplies for customers and economic activity. Maintaining flow in watercourses during a prolonged drought may have a minor beneficial effect, and may also avoid declines in water quality in affected resources.



5.5 Drought Permit/ Order Options

A visual summary of the findings of the SEA for each of the drought permit/order options in each WRZ is provided in **Table 5.4**. The completed appraisal tables for each of the drought options are provided in **Appendix D**.

5.5.1 London Water Resource Zone

The assessment of drought permit/order options in the London WRZ has highlighted the following options as having moderate to major environmental effects:

- Sundridge 1
- Sundridge 2
- Lower Thames
- Eynsford
- Waddon

The Lower Thames has the highest number of major adverse effects in this WRZ. It would have major adverse effects on flows in the lowest reaches of the fluvial Thames. Major adverse effects are predicted on water quality in the fluvial Thames (reduced dissolved oxygen saturation and reduced phosphate dilution) which may exacerbate water quality issues in the upper Tideway. For biodiversity, major adverse effects are predominantly associated with adverse effects to fish, including migration. Major adverse effects may occur on navigation.

Three options, (Sundridge 1, Sundridge 2 and Eynsford) could have major significant adverse impacts on water flows and water quality, including the potential to cause adverse effects on the reaches of the River Darent.

The assessments of impacts on the environment associated with the Sundridge drought permit are based on conservative assessments (worst case scenario) of the potential changes in the physical environment of the associated reaches of the River Darent. It should be noted that the AMP6 Low Flows Investigations of the Upper Darent concluded that there is no direct evidence to suggest that the abstraction at the current rates are reducing flows in the river during the periods when low flow stress occurs. Sundridge 1 (which is the conservative assessment) and Sundridge 2 would have moderate adverse effects on water quality in the River Darent. Sundridge 1 and 2 would have major adverse effects on biodiversity, predominantly associated with adverse effects to fish, including migration and major adverse effects on biodiversity associated with the potential spread of invasive species.

Eynsford would have major adverse effects on surface water flows and water quality in the River Darent, as the significant flow reduction may cause drying of the river. This would result in major adverse effects on biodiversity, predominantly associated with adverse impacts on fish with respect to habitat fragmentation and inhibiting migration. Moderate adverse effects on biodiversity with respect to potential spread of invasive species. Major adverse effects on population due to impacts on navigation and moderate adverse effects on angling.

Waddon would have a major adverse hydrological effect, as under a worst case scenario, Waddon ponds may dry up (for up to 3 months) when they would otherwise not have done so without a drought permit.

The assessment highlights options with lower impacts that could be selected in preference for this WRZ. These comprise, Crayford, Wansunt, the Horton Kirby ASR and Increase in M2 annual licence drought permits. However, these options provide less water than the Lower Thames drought permit.

The following options also have moderate to major beneficial effects including those associated with maintaining public water supplies during times of drought:

- Sundridge 1
- Sundridge 2
- Lower Thames
- Crayford


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- Horton Kirby ASR
- Wansunt
- Eynsford
- Increase in M2
- Waddon

Major beneficial effects are for Lower Thames for maintenance of water supplies and air and climate due to drought permits/orders being a key component of the final DP, the aim of which is to ensure resilience of water supplies to drought. The increase in M2 annual licence also has major beneficial effects for maintenance of supplies and water provisioning.

5.5.2 SWOX Water Resource Zones

The assessment of drought permit/order options in the SWOX WRZ has highlighted the following options as having moderate to major adverse significant environmental effects:

- Baunton 1
- Baunton 2
- Latton
- Meysey Hampton
- Farmoor
- Axford 1
- Axford 2
- Childrey Warren
- Ogbourne
- Ogbourne Emergency Boreholes

Of these, major adverse effects are identified for Baunton 1 and Baunton 2 for river flows; Farmoor for river flows and water quality; Axford 2 for river flows; Childrey Warren for river flows, water quality and biodiversity; Ogbourne 1 and Ogbourne EBH for biodiversity. Childrey Warren has the highest number of major adverse effects.

The assessment highlights options with lower impacts that could be selected in preference for this WRZ and these would normally be implemented first. These comprise Bibury, Gatehampton and Oxford Canal that would have negligible to minor adverse effects.

Moderate to major beneficial effects, including those associated with maintaining public water supplies during times of drought, are identified for:

- Baunton 1
- Baunton 2
- Latton
- Meysey Hampton
- Farmoor
- Axford 1
- Axford 2
- Bibury
- Gatehampton
- Ogbourne Emergency Boreholes
- Oxford Canal
- Childrey Warren
- Ogbourne

None of the options in this WRZ have major beneficial effects.



5.5.3 Kennet Valley Water Resource Zone

The assessment of drought permit/order options in the Kennet Valley WRZ has highlighted the following options as having moderate to major significant environmental effects:

- Fobney Emergency Boreholes
- Pangbourne
- Fobney Direct

Of these, major adverse effects are identified for Pangbourne on water with respect to river flows, water quality and other abstractions, and also for Population and Human Health in relation to effects on another abstraction; and Fobney Direct for hydrology. Pangbourne therefore has the highest number of major adverse effects for the WRZ.

The assessment highlights one option with lower impacts that could be selected in preference for this WRZ and this is Playhatch, although this option provides a smaller volume of water.

Moderate to major beneficial effects including those associated with maintaining public water supplies during times of drought, for:

- Fobney direct
- Fobney Emergency
- Pangbourne
- Playhatch

None of the options in this WRZ have major beneficial effects.

5.5.4 Guildford Water Resource Zone

There are two drought permit/order options in the Guildford WRZ (Albury and Shalford). There are moderate and minor adverse effects associated with Albury. Moderate effects are associated with biodiversity and hydrology and water quality. However, Shalford has only negligible adverse effects.

Both options have minor to moderate beneficial effects.

5.5.5 SWA and Henley Water Resource Zones

There are two drought permit/order options in the SWA and Henley WRZ. Pann Mill has major and moderate adverse effects. Major adverse for hydrology and moderate for water quality and biodiversity. Harpsden/Sheeplands has negligible adverse effects.

All three options have minor to moderate beneficial effects.



Table 5.4Visual evaluation matrix summary for drought permit/ order options

-		1																	
									<u> </u>	EA Iop	DIC		1						Commentary
		Biodiv	versity	Popu Huma	lation a an Healf	nd h	Materia Assets Resour	l and ce Use	Water	r			oil, Geology nd Land Use	Air and	I Climat	e	rchaeology nd Cultural leritage	andscape	
Objective		4.4	4.2	24	2.2	2.2	24	2.2	4.4	4.2	4.2	4.4	a v v	6.4	6.2	6.2	T a A		
Objective		1.1	1.2	Z.1	2.2	2.3	J.I	J.Z	4.1	4.2	4.3	4.4	J.I	0.1	0.2	0.3	7.1	0.1	
London R	esource 2	Lone		-		_				-									
Sundridge 1	Adverse																		The hydrological impacts in the EAR are however, the high sensitivity of the waterbo- predicted due to reductions of flows, velou of the River Darent is considered to be m and therefore the overall risk is moderate abstraction at Sevenoaks Wildfowl Resem- place, a moderate adverse short-term imp anticipated on the Sevenoaks Gravel Pits impacts on breeding birds, and potential m which support Cordulia aenea. The signifi identified as moderate for brown trout and on fragmentation of habitats, with reduc adverse impacts on WFD status are likely fish. Overall impacts on biodiversity are sensitivity of ecological receptors, however as mitigation can reduce the magnitude of may occur on landscape values, as a sign a visual impact on the landscape setting o Trail, which may be noticeable by walkers The assessments of impacts on the environ- permit are based on conservative assess changes in the physical environment of the should be noted that the AMP6 Low Flows that there is no direct evidence to suggest
	Beneficial																		Beneficial effects associated with the main
Sundridge 2	Adverse																		The hydrological impacts in the EAR are however, the high sensitivity of the waterbor predicted due to reductions of flows, veloc of the River Darent is considered to be m and therefore the overall risk is moderate abstraction at Sevenoaks Wildfowl Reserve place, a moderate adverse short-term imp anticipated on the Sevenoaks Gravel Pits impacts on breeding birds, and potential re which support Cordulia aenea. The signifi identified as moderate for brown trout and on fragmentation of habitats, with reduc adverse impacts on WFD status are likely fish. Overall impacts on biodiversity are sensitivity of ecological receptors, however as mitigation can reduce the magnitude of may occur on landscape values, as a sign a visual impact on the landscape setting of Trail, which may be noticeable by walkers. The assessments of impacts on the enviro permit are based on conservative assess changes in the physical environment of th should be noted that the AMP6 Low Flows that there is no direct evidence to sugges reducing flows in the river during the perior



moderate in Reach 1 and minor in Reach 2. ody results in major adverse short-term effects ocities and levels in the River Darent. Reach 1 medium sensitivity to changes in water quality adverse. The feasibility of the surface water ve may being limited with the drought order in pact. Moderate adverse short-term effects are SSSI due to reduction in lake levels, potential reduction in suitability or distribution of habitats icance of impacts on NERC fish species were d eels with a minor impact for sea trout based ced river flows inhibiting migration. Moderate / based on the impact of the drought option on assessed as major adverse due to the high er, the residual effect is assessed as moderate of impacts. Minor adverse short-term effects nificant reduction in river or lake level will have of the area and the Darent Valley Path National

onment associated with the Sundridge drought sments (worst case scenario) of the potential the associated reaches of the River Darent. It is Investigations of the Upper Darent concluded st that the abstraction at the current rates are ods when low flow stress occurs.

ntenance of essential public water supplies and lrought.

moderate in Reach 1 and minor in Reach 2, ody results in major adverse short-term effects cities and levels in the River Darent. Reach 1 medium sensitivity to changes in water quality adverse. The feasibility of the surface water ve may being limited with the drought order in pact. Moderate adverse short-term effects are SSSI due to reduction in lake levels, potential eduction in suitability or distribution of habitats icance of impacts on NERC fish species were d eels with a minor impact for sea trout based ced river flows inhibiting migration. Moderate / based on the impact of the drought option on assessed as major adverse due to the high er, the residual effect is assessed as moderate of impacts. Minor adverse short-term effects nificant reduction in river or lake level will have of the area and the Darent Valley Path National

onment associated with the Sundridge drought sments (worst case scenario) of the potential the associated reaches of the River Darent. It is Investigations of the Upper Darent concluded st that the abstraction at the current rates are bods when low flow stress occurs.

							1		S	ЕА Тор	oic			1					Commentary
		Biodiv	versity	Popu Huma	lation a an Healt	nd :h	Materia Assets Resour	al and ce Use	Water				oil, Geology Ind Land Use	Air and	l Climat	e	rrchaeology Ind Cultural Ieritage	andscape	
Objective		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	
	Beneficial												•			0.0			Beneficial effects associated with the ma during times of drought, and improved res
Lower Thames	Adverse																		If implemented, the drought permit would lowest reaches of the fluvial Thames, ma flows to the upper Thames Tideway will r are predicted on water quality in the fluvial and reduced phosphate dilution) which ma Tideway with the potential for major adve expected on a range of aquatic ecolog macrophytes, fish and algae. The major with adverse effects to fish, including m respect to Langham Pond SSSI, Dumse adverse effects may occur on navigatio levels, restrictions on lock use, and small m Tideway would result in major adverse effects Tideway and the fluvial River Thames.
	Beneficial																		If implemented, the drought permit would and human health in terms of ensuring su Major beneficial effects are also expect supplies to drought.
Crayford	Adverse																		Hydrological impacts on two reaches of th as no reduction in the surface (fresh) wate Cray are expected as a result of increased drought plan option are also largely ne associated air emissions due to increase within an AQMA.
	Beneficial																		Moderate beneficial impacts are expected population and other customers/business associated with improved resilience of wa
Horton Kirby	Adverse																		Negligible adverse hydrological effects an continuity with the chalk or river and the abstracted being injected into the aquifer. within the existing site, and as such, it is no construction. Minor adverse short-term air increase emissions associated with abstra option is located less than 1km from the M
	Beneficial																		Beneficial effects comprise maintenance of drought.
Eynsford	Adverse																		Major adverse short-term effects are pred of it could dry up as a result of drought opti short-term adverse effects to water qual NERC fish species brown trout and Europ reduced river flows inhibiting migration. N anticipated based on the impact of the macroinvertebrates. Moderate adverse eff species (Australian swamp stonecrop, possible. Major adverse short-term effects lake or river levels restricting the size of anglers are predicted as well as minor ac the landscape setting of the area and the river level will have, which may be noticear
	Beneficial																		If implemented, the drought permit w populations and human health in term



aintenance of essential public water supplies silience to the drought effects. d have major adverse effects on flows in the ainly in terms of velocity reduction. Freshwater educe, potentially completely. Adverse effects Thames (reduced dissolved oxygen saturation ay exacerbate water quality issues in the upper rse effects. Minor to major adverse effects are gical receptors, such as macroinvertebrates, adverse effects are predominantly associated nigration. Adverse effects also identified with y Meadow SSSI and Syon Park SSSI. Major on. The combination of maintenance of water estrictions regarding navigability in the Thames fects on boats that are navigating between the have a major beneficial effect for populations pply of water and other customers/businesses. ed in regard to improved resilience of water he River Cray are considered to be negligible, er contribution to the tidal reaches of the lower abstraction. Other effects associated with the gligible, excluding a minor, short-term effect ed energy use, given the area of influence is with regard to ensuring supply of water to local es. There is also likely to be beneficial impacts ter supplies to drought. re predicted as the aquifer is confined with no option is non-consumptive with water to be The construction phase is restricted to the area ot anticipated that any impacts associated with quality effects are possible, as the option will action and treatment of water and the drought M20 AQMA. of essential public water supplies during times licted on one reach of the River Darent as part ion implementation. This would result in major, lity. Major short-term effects are possible on pean eel due to fragmentation of habitats and Moderate adverse impacts on WFD status are e drought option on fish, macrophytes and fects associated with the spread of the invasive parrots feather and floating pennywort) are are anticipated on navigation due to reduced boats able to use river. Moderate effects on dverse short-term visual impact may occur on Darent Valley Path National Trail reduction in able by walkers. vould have moderate beneficial effects for ns of ensuring supply of water and other

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		Biodiv	versity	Popu Huma	lation a an Healt	nd th	Materia Assets Resour	and and ce Use	Water	r			oil, Geology nd Land Use	Air and	d Climat	e	rchaeology nd Cultural eritage	andscape	
Objective		11	12	21	22	22	21	2.2	4.1	42	12	4.4	<u>0 10</u>	61	62	63	<u>₹</u> ā <u>Ť</u> 71	<u>ت</u> ۵۱	
Objective		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	4.4	5.1	0.1	0.2	0.3	7.1	0.1	customers/businesses Minor beneficial et
																			resilience of water supplies to drought.
Wansunt	Adverse																		Hydrological impacts on Reach 1 of the negligible, and effects on Reach 2 are a (fresh) water contribution to the tidal reach increased abstraction. Other effects ass largely negligible, excluding a minor, sho increased energy use, given the area of in Moderate beneficial impacts are expected
																			population and other customers/businesse
M2 Licence	Adverse																		Adverse effects identified are limited to emissions of air pollutants and greenho pumping and treatment requirements.
																			water and air and climate. These relate large quantity of water (at a rate of 91MI/d) achieves this by enabling recovery of stor summer drought. This will help ensure th calendar year rather than being restricted there is a drought period following on i restricted when flows are medium to low benefits are achieved with no adverse abstractors.
Waddon	Adverse Beneficial																		Under a worst-case scenario, Waddon Po would otherwise not have without a droug levels/flows). With reduction in through-flow water temperature and reduction in diss effects are also identified with respect to where the drought permit would extend t month. These hydrological affects could with respect to biodiversity, including ma fish species), moderate adverse effects communities. Appropriate mitigation may minor adverse effects on the Wilderness Valley Wetland LNRs are anticipated. Mi on the landscape values associated with feature in the London Borough of Croydon and character of the Wandle trail which is Moderate beneficial effects are expected There are also likely to be minor beneficia of water supplies to drought
SWOX Po		200																	of water supplies to drought.
Bounton 1	Adverse																		Major adverse hydrological effects on th
Baunton 1	Beneficial																		adverse, short-term effects on the middle moderate adverse effect on a reach of the is associated with a delayed recovery of g reach effect associated with reduced flow associated with groundwater drawdown adverse, short-term effects on NERC fish the nationally designated site North Mea support the macrophyte community at the management practice at the site). Beneficial effects associated with the drou water supplies during times of drought





result in major adverse, medium-term effects ajor adverse impacts on European eel (NERC s to brown trout and barbel and overall fish reduce the magnitude of effect. Moderate to Island, Spencer Road Wetlands, and Wandle inor, temporary adverse effects were identified n Waddon Ponds, which form a local amenity n and an essential part of the landscape setting s valued by walkers.

d due to provision of additional water supply. al impacts associated with improved resilience

he upper reach of the River Churn, moderate e and lower reaches of the River Churn and a River Coln. The upper and middle reach effect groundwater contributing to flow, with the lower of from upstream. In the River Coln, impact are n manifesting as flow reductions. Moderate, n species are possible, as are minor effects on adow SSSI as offtakes from the River Churn he site (uncertainty surrounds the water level

ught option include maintaining essential public

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		Biodiv	versity	Popu Huma	lation a an Healt	nd h	Materia Assets Resour	l and ce Use	Wate	r			oil, Geology nd Land Use	Air and	d Climat	e	rchaeology nd Cultural eritage	andscape	
Objective		11	12	21	22	23	31	32	41	42	43	44	<u>ທ</u> ສ	61	62	63	<u>र त्य म</u> 71	81	
Baunton 2	Adverse	1.1	1.2	2.1	2.2	2.3	5.1	3.2	9.1	4.2	4.0	7.7	5.1	0.1	0.2	0.5	7.1	0.1	Major adverse, short-term effects are prec Churn, one reach of the River Frome and o in two reaches (both reaches in River Cr Brook and a negligible impact on the assessment of major adverse, short term term effects on NERC fish species are p designated site North Meadow SSSI as macrophyte community at the site (uncer practice at the site). Negligible, adverse, occur as the drought option is located in o drying of the reaches in natural drought implementation will have significant impac
	Beneficial																		Beneficial effects associated with the drou water supplies during times of drought.
Latton	Adverse																		Moderate to minor adverse, short-term e remain dryer for longer as result of the d adverse effects to water quality, due to increased SRP concentration. Minor adv some other groundwater abstractions in th short-term effects on NERC fish specie anticipated due to reduction in abundance designated site or deterioration in habitat
	Beneficial																		Beneficial effects include those associa supplies during times of drought.
Meysey Hampton	Adverse																		Moderate adverse, short-term effects are remain dryer for longer as result of the d moderate short-term effects to water qual be affected by lower river flow. Moderat species are predicted, comprising increas as a result of delay in recovery of flows, r as a result of changes in water quality, and effects on the local designated site Dowr resilient to the impacts of desiccation as r waterbodies often ceases in dry summers
	Beneficial																		drought.
Farmoor	Adverse																		Moderate adverse, short term effects v including moderate adverse effects regar of short-term deterioration to the fish con adverse, short term effects to recreation effects to navigation and angling. Majo identified, including major reductions in ve mainstem of the River Thames and discharges) pose a risk to water quality in distributaries (this includes risks associa scheme).
Axford 1	Beneficial Adverse																		Moderate beneficial effects are expected of minor effects are associated with improve Moderate adverse, short term reductions a reduction in levels and velocities durin weather conditions there would be a subsi is unlikely to prevent recovery occurring March). Moderate adverse, short-term effect flora and fauna. Impacts regarding Rive



dicted on three reaches (one reach of the River one reach of the River Coln), a moderate impact hurn) a minor impact in one reach of Ampney Cirencester Watercourses. With an overall n effects identified. Moderate, adverse, shortossible, as are minor effects on the nationally offtakes from the River Churn support the rtainty surrounds the water level management short-term landscape and visual effects may Cotswolds AONB. However due to the natural conditions, it is unlikely that drought permit ts on the local distinctiveness of the landscape. th the Baunton 1 option. ught option include maintaining essential public effects are predicted on the river as they may drought option. This would result in moderate to reduced dissolved oxygen saturation and verse, short-term impacts on the feasibility of he study area are possible. Moderate adverse, es and on the Down Ampney Pits KWS are ce or distribution of species supported by the quality, causing a decline in ecological status ated with maintaining essential public water predicted on four reaches of river as they may lrought option. This would result in temporary, lity as dissolved oxygen saturation levels may te adverse, short-term effects on NERC fish sed stress and predation on species in refuges reduction in species abundance or distribution I impacts on spawning potential. Minor adverse n Ampney Pits KWS may occur, however it is movement of water from the aquifer to surface essential public water supplies during times of with respect to Biodiversity, flora and fauna

with respect to Biodiversity, flora and fauna rding INNS, fish community and moderate risk mponent of two WFD waterbodies. Moderate hal use of the River Thames due to potential or adverse, short term effects to water were elocity and high risk to water quality in both the distributaries. Discharge pressures (STW n both the mainstem of the River Thames and lated with the back pumping element of the

due to provision of additional water supply, and ed resilience of water supplies to drought.

in flows in the River Kennet would manifest as ng drought permit implementation. Under dry sequent delay in groundwater recovery, but this g during the hydrological winter (October to ects are anticipated with respect to biodiversity, er Kennet SSSI conservation objectives are

				I			T		S	ЕА Тор	ic								Commentary
		Biodiv	versity	Popul Huma	lation a an Healt	nd th	Materia Assets Resour	l and ce Use	Water	r			soil, Geology Ind Land Use	Air and	l Climat	e	Vrchaeology Ind Cultural Heritage	andscape	
Objective		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	
	Beneficial																		considered moderate during drought perm of groundwater recovery. Negligible ac Lambourn SAC. The macroinvertebrate (Marlborough to Hungerford) water body (from May to December and minor risk from or prevention of achieving GES with droug impacts on sea trout and brown trout (NEI December with drought permit implement macrophyte species as a result of moderat are anticipated, where there is also a mod Beneficial impacts include ensuring sup customers/businesses. There are also like
																			vulperability to drought
Axford 2	Adverse																		Major adverse, short term effects are exp River Kennet in Reach 1 and 2 with a mode adverse effect in Reach 4. Impacts would i during drought permit implementation. Uf subsequent delay in groundwater recove occurring during the hydrological winter (term effects are anticipated with respe regarding River Kennet SSSI Conservatio drought permit implementation and mino Negligible adverse effects predicted f macroinvertebrate and fish component of t water body (GB106039023172) would be minor risk from January to March of short GES with drought permit implementation. brown trout (NERC Act Section 41 Speci permit implementation.
	Beneficial																		Moderate beneficial effects are expected of
																			also minor beneficial effects associated wild
Bibury	Adverse Beneficial																		Potential adverse effects identified relate and associated minor impacts on NERC s reaches, and location within AONB. There related to construction. All impacts identified Beneficial impacts have been identified prin population and other customers/businesse associated with improving the resilience of
Gatehampt	Adverse																		There are negligible hydrological impacts
on	Beneficial																		implementation. No impacts on biodivers abstractors are expected. There may be associated with additional abstraction an adverse effects identified are short-term a Moderate beneficial impacts are expected population and other customers/businesse associated with improving the resilience o
Ogborune Emergency Borehole	Adverse																		Major adverse, short-term effects are ant fauna. Moderate impacts on the designate nationally important River Kennet SSSI r Impacts on fish may occur due to an exter reduction in flows in the River Kennet. Cl potential for moderate adverse, short-tern Kennet water body is considered at mod status for macroinvertebrates and fish. A n recreation relates is possible due to impa short-term effects to water are likely as the



nit implementation and minor during the period dverse effects predicted for the Kennet and and fish component of the Middle Kennet (GB106039023172) would be at moderate risk m January to March of short-term deterioration ght permit implementation. Potential moderate RC Act Section 41 Species) between May and entation. Minor adverse effects on invasive te water quality impacts on SRP concentrations derate adverse effect to surface water quality. pply of water to local population and other kely to be beneficial effects through reducing pected in relation to a reduction in flows in the erate adverse effect in Reach 3 and a negligible manifest as a reduction in levels and velocities nder dry weather conditions, there would be a very, but this is unlikely to prevent recovery (October to March). Moderate adverse, shortect to biodiversity, flora and fauna. Impacts on Objectives are considered moderate during or during the period of groundwater recovery. for the Kennet and Lambourn SAC. The the Middle Kennet (Marlborough to Hungerford) at moderate risk from May to December and t-term deterioration or prevention of achieving Potential moderate impacts on sea trout and ies) between May and December with drought due to provision of additional water supply, and ith improving the resilience of water supplies to to a minor reduction in flow in the River Coln, species, WFD status, the geomorphology of the may also be minor adverse temporary effects ied will be short-term and temporary. imarily through ensuring supply of water to local es. There are also likely to be beneficial impacts of water supplies to drought. associated with Gatehampton drought permit sity, geomorphology, water quality and other minor adverse effects due to emissions to air nd proximity to nature conservation sites. All and temporary. with regard to ensuring supply of water to local es. There are also likely to be beneficial impacts of water supplies to drought. ticipated with respect to biodiversity, flora and ed features and conservation objectives for the result in Major adverse impact to biodiversity. ension in duration of River Og being dry, and a hanges in flow in the River Kennet also have rm effects on macroinvertebrates. The Middle derate risk of short-term deterioration of WFD minor adverse, short-term effect on angling and acts on fish communities. Moderate adverse, e abstraction will cause the River Og to remain

				1			1		5	SEA Top	oic			1			I		Commentary
		Biodiv	versity	Popu Huma	lation a an Healt	nd th	Materia Assets Resour	l and ce Use	Wate	r			oil, Geology nd Land Use	Air and	d Climat	e	rchaeology nd Cultural eritage	andscape	
Objective		11	12	21	22	23	31	32	41	42	43	44	<u>ഗ്ര</u> 51	61	62	63	<u> 7 1</u>	<u>ت</u> 81	
Objective			1.2	2.1	LiL	2.5	5.1	5.2	4.1	7.2	4.0		5.1	0.1	0.2	0.0	7.1	0.1	dry for longer. Flow changes in the River H a high risk to water quality associated v reduced dilution in the River Kennet during
	Beneficial																		Moderate beneficial effects are expected Minor beneficial effects are associated wit drought.
Oxford Canal	Adverse																		Small changes to flow and velocity in Rea the hydrological impact of the drought p impacts on geomorphology, water quality term effects on public health and air quality and additional abstraction may occur, and proximity to the Cherwell District Council A
	Beneficial																		Moderate beneficial effects are expected Minor beneficial effects are associated wit drought.
Childrey Warren	Adverse																		Major, short-term, temporary effects o comprising a 100% decrease in flow on water quality effects. This is likely to contri- biodiversity, flora and fauna (in particular e short-term adverse effects anticipated inclu- of invasive species (Canadian pondweed (with regards to SRP), and geomorpholo drought action). There will also be minor, s existing trails and footpaths, and minor in due to abstraction and treatment of additio air emissions are expected to accompany
	Beneficial																		Beneficial effects include ensuring wate customers/businesses. There are also li improving the resilience of water supplies
Ogbourne 1	Adverse																		Major adverse, short-term effects are ant fauna due to the moderate impacts on th River Kennet SSSI, a nationally important in flow in the River Kennet have potentia macroinvertebrates. Moderate impacts or duration of River Og being dry, and a re Kennet water body is considered at mod status for macroinvertebrates and fish. Min recreation are possible due to impacts or term effects to water are likely as the abs for longer. Flow changes in the River Ker high risk to water quality associated with th
	Beneficial																		Moderate beneficial effects are expected Minor beneficial effects are associated wit drought.
Kennet R	esource Z	one																	
Fobney Emergency Borehole	Adverse																		Eight abstraction boreholes are located of emergency use in case of contamination failure of pumps, power supplies, pipelines The licence permits emergency abstraction for 30 consecutive days and requires the days as they were used before abstraction under normal licensed conditions, durin comprises 12-30 Ml/d. It is anticipated that likely be 25 Ml/d. The boreholes abstract fr phase associated with this drought permit.



Kennet are considered minor, however there is with the Marlborough STW discharge due to g drought permit implementation.

d due to provision of additional water supply. th improving the resilience of water supplies to

ach 1 of the Oxford Canal will occur, however permit is considered to be minor overall. No y and other abstractors are expected. Shorty due to emissions associated with construction these are considered to be minor overall given AQMA.

d due to provision of additional water supply. th improving the resilience of water supplies to

on water levels and flows are anticipated, Reach 1 of Letcombe Brook and associated ibute to major short-term, temporary effects on effects on NERC species - brown trout). Other ude changes to the distribution and abundance and least duckweed), declines in water quality ogical changes (shallower banks affected by short-term drying-up of Letcombe Brook along ncreases in energy use and waste generation ional water. Negligible, short-term increases in v increases in energy use.

er supply to the local population and other ikely to be beneficial effects associated with to drought.

ticipated with respect to biodiversity, flora and ne designated features (riverine habitat) of the site which is intersected by Reach 2. Changes al for moderate adverse, short-term effects on n fish may also occur due to an extension in eduction in flows in the River Kennet. Middle derate risk of short-term deterioration of WFD inor adverse, short-term effects on angling and n fish communities. Moderate adverse, shortstraction will cause the River Og to remain dry nnet are considered minor, however there is a ne Marlborough STW discharge due to reduced at permit implementation.

d due to provision of additional water supply. th improving the resilience of water supplies to

on the grounds of Fobney WTW, licenced for a of the River Kennet at the Fobney intake or s, or other apparatus associated with the WTW. on of 30MI/d for 10 consecutive days or 10MI/d e boreholes to be rested for at least as many a can resume. The boreholes may not be used, ing times of drought. Proposed abstraction at the maximum yield during a drought will most rom the Chalk aquifer. There is no construction

				1					S	ЕА Тор	oic								Commentary
		Biodiv	versity	Popu Huma	lation a an Healt	ind th	Materia Assets Resour	al and ce Use	Water	r			Soil, Geology and Land Use	Air and	d Climat	e	Archaeology and Cultural Heritade	andscape	
Objective		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	
	Beneficial																		Moderate beneficial effects include ensurir customers/businesses, and minor benefit water supplies to drought.
Pangbourn e	Adverse																		Negligible hydrological effects are anticip the confluence with River Thames. Howe major to negligible are anticipated on Sull are predicted due to extension of the pe effects on water quality in Sulham Brook a saturation and reduced dilution of Pangbo sensitivity for WFD status. Short-term n Sulham Brook are also possible. Modera Brook are possible, associated with reduc Minor, short-term impacts on the Sulhan NERC fish species (brown trout and Europ species (bullhead and brook lamprey) are
	Beneficial																		Moderate beneficial impacts are expected population and other customers/business effect associated with improving the resilie
Playhatch	Adverse																		Overall, adverse effects associated with t temporary. There would be minor adverse to the abstraction of an additional 4MI/d. R as they are associated with negligible hyd additional abstraction.
	Beneficial																		There would be moderate beneficial effect Also, minor beneficial effects due to improv
Fobney Direct	Adverse																		If implemented, the drought permit would h between the Arrowhead control structure Impacts will manifest as a reduction in low in velocities, levels and wetted widths. Th SRP during the drought permit implemen affected through reductions in loss of m affecting macroinvertebrates, macrophytes part of the landscape and visual amenity v river levels may adversely impact the visi who visit the park. However, all adverse e and not expected to extend beyond six mo
	Beneficial																		If implemented the drought permit would here River Kennet from the Arrowhead cont would be increased by 20 Ml/d for the du Moderate beneficial impacts associated w and other customers/businesses. Minor be of water supplies to drought. An increase in to alleviate the impacts of natural drought the habitats of the River Kennet.
Guildford	Resource	e Zone																	
Albury	Adverse																		Moderate adverse effects on water concentrations, and moderate adverse h reaches of Law Brook. Moderate adverse anticipated, as are minor moderate adverse macroinvertebrates. There would be minor and minor adverse effects associated wi geomorphological changes are also exp Reach 2 (Law Brook from Ford Cress Ber are predominantly short-term and tempore



ng supply of water to local population and other ts associated with improving the resilience of

bated on the River Pang from the Blue Pool to ever, temporary adverse impacts ranging from ham Brook. Major adverse hydrological effects eriod Sulham Brook would be dry, and major are also expected due to low dissolved oxygen burne STW discharges. Sulham Brook has high major impacts on one other abstraction from ate impacts on the geomorphology of Sulham ced flows in areas where bank slope is shallow. m and Tidmarsh Woods and Meadows SSSI, pean eel) and notable county and regional level e possible.

I with regard to ensuring supply of water to local es. There is also likely to be a minor beneficial ence of water supplies to drought.

this drought option are minor to negligible and se effects associated with emissions to air due Remaining adverse effects would be negligible, drological effects and the use of energy for the

ts associated with provision of water supplies. wing the resilience of water supplies to drought. have a major hydrological impact on Holy Brook re and its confluence with the River Kennet. west flows of up to 40%, along with reductions here would be a moderate water quality risk for natation. Habitat availability would be negatively harginal habitats in localised areas, adversely and phytobenthos, and fish. Holy Brook forms value of Southcote Linear Park and impacts on sual amenity of the park for walkers and those effects identified are short-term and temporary, onths.

have a minor beneficial hydrological impact on trol structure to the Fobney WTW intake. Flows uration that the drought permit is implemented. vith ensuring supply of water to local population enefits associated with improving the resilience in flow at a time of natural drought will also help to on macrophytes, fish, mammals and birds in

quality may occur due to elevated SRP hydrological effects are expected on the two se effects on NERC species (brown trout) are se effects due to a potential increase in invasive r impacts on angling at ponds along Law Brook, vith air and greenhouse gas emissions. Minor pected. Adverse effects are largely limited to eds to confluence with River Tillingbourne) and arv.

				-			-		S	ЕА Тор	ic		_	-			-		Commentary
		Biodiv	versity	Popul Huma	lation a In Healt	nd th	Materia Assets Resour	al and rce Use	Water	r			Soil, Geology and Land Use	Air and	d Climat	e	Archaeology and Cultural Heritade	Landscape	
Objective		1.1	1.2	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	4.4	5.1	6.1	6.2	6.3	7.1	8.1	
	Beneficial																		Moderate beneficial effects are expected Minor beneficial effects associated with i drought.
Shalford	Adverse																		Flow reductions associated with implement upstream of the River Tillingbourne will be proportionally less with flow contribution Guildford STW. Negligible adverse hydro geomorphology, water guality and other at
	Beneficial																		Moderate beneficial impacts are expected local population and other customers/bu beneficial impacts associated with improvi
SWA Res	ource Zon	e																	
Pann Mill	Adverse																		Major adverse effects have been identified Wye Reach 2 with moderate adverse effect being at its lowest level during drought pern to the impacts of this low flow on biodive areas affecting Brown Trout), and water qu 3). Minor adverse impacts have also been species (low flows and loss of habitat), and of reaches). However, all adverse effects not expected to extend beyond six months
	Beneficial																		Beneficial impacts include ensuring sup customers/businesses. There is also like improving the resilience of water supplies
Henley Re	esource Z	one																	
Harpsden / Sheeplands	Adverse Beneficial																		Negligible adverse effects are predicted f proposed. Beneficial effects include maintained of endrought. There is also likely to be bene resilience of water supplies to drought.



d due to provision of additional water supply. improving the resilience of water supplies to entation of the drought permit on the River Wey be negligible. Downstream impacts would be ns coming from the River Tillingbourne and rological impacts were identified, impacts on abstractors are also expected to be negligible. ed with respect to ensuring supply of water to pusinesses. There is also likely to be minor ving the resilience of water supplies to drought.

ed in relation to a reduction in flow in the River ects identified for Reach 3 with flow in the river rmit operation. Moderate adverse effects relate rersity (including loss of habitat and spawning uality (with risks for SRP in Reach 2 and Reach en identified in relation to non-native invasive nd geomorphology (effects in shallow sections s identified are short-term and temporary, and

pply of water to local population and other ely to be beneficial impacts associated with to drought.

for this drought option and no construction is

essential public water supplies during times of eficial impacts associated with improving the

5.6 Habitats Regulations Assessment Screening Report of Drought Plan Summary

Thames Water has undertaken the first stage in the HRA process, Screening, on its DP options list. It has been carried out in parallel with the SEA and is reported separately in the HRA Screening Report. The screening stage establishes whether any schemes have the potential for a Likely Significant Effect (LSE) on the integrity of a European designated site. No LSEs on European designated sites are anticipated for the majority of the drought options in Thames Water's Final DP 2022, either alone or in combination with other drought options. The exception was for the West Berkshire Groundwater Scheme (WBGWS) supply-side drought option where HRA screening identified LSEs due to the uncertainties regarding the potential effects on the River Lambourn SAC and the Kennet and Lambourn SAC. This drought option was, therefore, subject to a Stage 2 Appropriate Assessment, where the objectives were to establish if the option could meet the requirements of the HRA integrity test, with the consideration of appropriate mitigation measures. The Stage 2 Appropriate Assessment concluded that on the basis of agreeing the appropriate monitoring and mitigation measures during the scheme operation with Natural England and the Environment Agency, no adverse effects on the River Lambourn SAC and the Kennet and Lambourn Floodplain SAC are anticipated. It should be noted that completion of the licence application is still required in order for the scheme to be implemented.

5.7 Summary

In general, the demand side options were found to have beneficial impacts on SEA objectives for population and human health and material assets and resource use. Minor adverse impacts have been identified with respect to other users where restrictions of water use are involved and also for cultural heritage and emissions.

The assessment has found that supply side options would have adverse impacts associated with supply side options typically relate to additional energy requirements, emissions and materials used to maintain supply. The NLARS, TGWTW and WBGWS options have the greatest beneficial effects, as they would deliver large volumes of water during drought events. These options all provide major beneficial effects with respect to SEA objectives regarding protecting and enhancing health and well-being, enabling access to essential services, and improving resilience to the threats of climate change.

Impacts on SEA objectives for drought permit/order options were mainly associated with impacts on groundwater levels and the subsequent effects on surface waters and their ecology. Reductions in groundwater levels and surface water levels also have the potential for adverse impacts on archaeology and cultural heritage and on landscape and visual amenity. The assessment showed that for WRZs with a number of drought options to select from, a distinction can be made between options that would be considered more sustainable than the others within the same WRZ and this is used to inform the order in which they would be implemented.



6 Cumulative Assessment

6.1 Introduction

The cumulative assessments presented in this section have been carried out in line with the methodology described in Section 4.

6.2 Demand Side Options

6.2.1 Cumulative effects of demand management options

The matrix in **Figure 6.1** illustrates potential incompatibility and cumulative impacts between demand management schemes.

Figure 6.1 Cumulative impacts matrix, demand management measures

Leakage reduction				
Temporary use ban				
Drought order to ban non-essential use				
Emergency drought order				
Demand Management Options	Media / water efficiency campaign	Leakage reduction	Temporary use ban	Drought order to ban non-essential use

Legend:

No cumulative effects identified or beneficial cumulative effects anticipated
Adverse impacts anticipated
Options are sequential
Uncertain – Insufficient information available to undertake assessment

It is acknowledged that the demand management options "Drought Order to ban Essential Use" and "Emergency Drought Order" are sequential. The "Drought Order to ban Essential Use" will remain in place while the "Emergency Drought Order" is operational but it is the worst-case scenario for demand management and effects between the two options are not additive. No cumulative impacts between demand side options have been identified.

6.2.2 Cumulative effects with supply side and drought permit/ order options

Demand management measures serve to reduce pressure on water resources and will have a positive influence on both supply side and drought permit/order options by reducing customer demand for water, and therefore reducing the abstraction at source.



6.3 Cumulative Effects Between Supply Side and Drought Permit/ Order Options

This section considers the cumulative effects associated with implementation of all drought options across the Thames Water operational area. Cumulative effects of each supply side and drought permit/order drought option with each other supply side and drought permit/order drought option have been assessed and are summarised in the matrix presented in **Figure 6.2**.

The legend used is as follows:

Key

Mutually exclusive schemes, i.e. use the same site or the same resource
Potential adverse construction impacts if constructed simultaneously
Potential cumulative impacts in operation
No cumulative impacts

Figure 6.2 provides a framework as a basis for capturing cumulative effects that could arise from simultaneous deployment of two or more drought option groups.

The assessments have been informed by the EARs and mapping of locations of drought options, surface water and groundwater catchments.

Due to the uncertainty of the timing/implementation of the various supply side drought options, the cumulative impacts of drought options across multiple areas have not been assessed in detail. In practice, in the event of a drought and possible application of drought permits/orders, the findings of the environmental assessment reports (EARs) would be reviewed and a cumulative assessment made of the precise options proposed for implementation at that time.



Figure 6.2 Cumulative impacts matrix, supply-side options





There are three pairs of mutually exclusive schemes – schemes that use the same site or the same resource. The second schemes use the same resource, but an increased output compared with the first and therefore there is no potential for cumulative effects. These are:

- Sundridge 1 and Sundridge 2
- Baunton 1 and Baunton 2
- Axford 1 and Axford 2

The potential cumulative impacts in the operation of options have been identified on **Figure 6.2** and are discussed below. For the other options not discussed below, no cumulative impacts have been identified with other options.

6.3.1 Latton with Meysey Hampton

The Latton and Meysey Hampton drought permit options individually affect the same five watercourses: Ampney Brook, Poulton Stream, Marston Meysey Brook, Blackford Barn Stream and a short reach of the River Thames (from the confluence with Ampney Brook until its confluence with the River Ray). Potential cumulative impacts are as follows:

- The cumulative impact of the Latton and Meysey Hampton reaches would not extend beyond that described for the Meysey Hampton drought permit.
- Cumulatively, the magnitude of the impacts would be the same as for Meysey Hampton, i.e. there would be a **moderate** impact on Ampney Brook (from source to the confluence with the River Thames), Poulton Stream (from source to the confluence with Ampney Brook), Marston Meysey Brook (from source to the confluence with the River Thames) and Blackford Barn Stream (from source to the confluence with Marston Meysey Brook).
- The timing of the impacts would be limited to hydrological winter (October to March) when there
 would be a delay in groundwater recovery meaning a delay in groundwater contributing to flow
 in the watercourses. Assessment of the delay in recovery concluded that his cumulative delay
 could be as much as 71 days (more than the impacts associated with the individual drought
 permits) but long enough to increase the magnitude of the impact based on the intermittently
 flowing watercourse methodology (see the Methodology²²). The actual duration of impact would
 be dependent on the prevailing meteorological characteristics during the typical period of
 groundwater recovery, but would occur within the same hydrological winter.
- Cumulatively, there would remain minor impacts on flows within the River Thames reach. Overall, the cumulative impacts of the drought permit would not reduce flow in the river below levels that it would have been experienced earlier in the year.
- The cumulative impact of the Latton and Meysey Hampton reaches on water quality is not considered likely to increase from that assessed for the drought permits in isolation.
- The cumulative risk from flow pressures with both the Latton and Meysey Hampton drought permits in place is hence considered to be **low**, and there is no additional risk to the operation of these abstractions from having both drought permits in place.
- The cumulative risk from water quality pressures with both the Latton and Meysey Hampton drought permits in place is therefore assessed as **medium**.
- The cumulative impacts on the identified environmental features when operating Latton and Meysey Hampton drought permits simultaneously are summarised in the EAR and include **moderate** adverse impacts on fish (as an ecological community) and Brown/Sea Trout and Lamprey sp., **minor** effects on Down Ampney Pits KWS, macroinvertebrates, diatoms, bullhead, and ecological significant receptors.



²² Ricardo Energy & Environment (2020) Thames Water Drought Plan 2022. Environmental Assessment Methodology. Report for Thames Water Utilities Ltd. September 2020

6.3.2 Axford 1 with Ogbourne 1

- The Axford 1 abstraction lies in close proximity to the Ogbourne 1 abstraction. The Axford 1 and Ogbourne 1 drought permit options individually affect the same watercourse, the River Kennet. The Ogbourne 1 drought permit option also affects the River Og. Individually both drought permits also impact on Cumulative Reach 1 whilst Axford 1 also individually impacts Cumulative Reach 2. As a result of the simultaneous operation of both drought permits the impacted reaches will extend those described for the Axford 1 and Ogbourne 1 drought permits individually. These are Cumulative Reach 3 and 4. Potential cumulative impacts are as follows:
- The impact on both Cumulative Reach 1 and 2 will manifest themselves as a reduction in flow, although this not anticipated to significantly increased cumulatively when compared to the drought permits operating individually. Although there will be a reduction of flow, this is not expected to be beyond that experienced in the normal range of hydrological variation.
- Hydrological impacts on Cumulative Reach 3 are considered to be minor and any reduction of flow is not anticipated to be beyond the normal range of hydrological variation and impacts on flow will reverse following cessation of the drought permits. A negligible impact on Cumulative Reach 4 is predicted.
- Cumulative geomorphological impacts have been assessed as moderate in Reach 1 as a result of reduced discharge causing weir structures to influence sediment dynamics. Minor geomorphological impacts are concluded for Reaches 2 and 3 and impacts in Reach 4 are considered negligible in Reach 4. Impacts to wetted width are considered minor in the upper reaches only.
- Cumulative impacts on water quality in the River Kennet have been assessed as minor (Cumulative Reach 2) associated with occasional spikes in SRP concentrations, although these do not seem to be related to flow conditions, they could still pose a risk.
- In the context of the **minor** hydrological impact expected within Cumulative Reach 3, the risk of water quality deterioration linked to total ammonia, SRP and dissolved oxygen is **low**.

The risk to water quality from flow and discharge pressures with both drought permits in place is considered to be **medium** risk.

Impacts to environmental features range from **negligible** to **moderate**. The extended delay to the recovery of the Cumulative Reaches 1 and 2 is not considered likely to alter the impact magnitude or significance of impact identified for the environmental features when operating the drought permits individually. Two additional reaches, (Cumulative Reaches 3 and 4) on the River Kennet will also be impacted when the drought permits are operating simultaneously. These reaches extend from the River Kennet confluence with the River Dun to Newbury. Impacts of the drought permits operations on Cumulative Reach 3 will be **minor** reducing to **negligible** by the end of Cumulative Reach 4 in Newbury.

6.3.3 Ogbourne 1 and Ogbourne Emergency Boreholes

The Ogbourne EBH abstraction lies approximately 1km away from the Ogbourne 1 abstraction. Both drought permit options affect the same watercourses (the River Og and River Kennet), therefore individually and cumulatively have the same hydrological impacted reaches (i.e., Cumulative Reaches 1 and 2). Potential cumulative impacts are as follows:

- Groundwater modelling indicates that with the implementation of the both drought permits, the Rive Og will be dry for an additional 51 days. This corresponds to a **moderate** impact on Cumulative Reach 1.
- Flow reductions in the River Kennet equate to less than 10% of the total flow in the River Kennet which corresponds to a negligible hydrological impact. More significant flow reductions in the River Kennet would occur within the hydrological winter that follows the period of drought permit implementation, while groundwater recovery takes place. Nevertheless, the drought permit will result in lower flows during the early winter than would otherwise occur. Thus, it is concluded that the hydrological impact of the drought permit on this Cumulative Reach 2 is **minor**.



- However, hydrological impacts and associated impacts to the physical environment (i.e., water quality and geomorphology) are categorised as the same level of significance as described for Ogbourne EBH drought permit Reaches 1 and 2. Therefore, cumulative impacts are similar to those identified for the Ogbourne 1 and Ogbourne EBH drought permits individually. Reach 1 (River Og) has a medium risk to water quality associated with SRP concentrations only, however, Reach 2 (River Kennet) has a low risk to water quality associated with total ammonia, dissolved oxygen and SRP.
- The cumulative impacts on the identified environmental features when operating the drought permits simultaneously are similar to the impacts identified for the Ogbourne EBH drought permit when operated individually. This includes a moderate impact on the River Kennet SSSI due to a reduction in abundance or distribution of species supported by the designated site, from October to March only. Therefore, the range of precautionary monitoring and mitigation measures identified for receptors with a potential impact identified as being of moderate significance/risk (ecological features) or magnitude (other features) are also the same as those described in the Ogbourne EBH EAR.

6.3.4 Ogbourne 1, Ogbourne Emergency Boreholes, Axford 1 and Axford 2 with the West Berkshire Groundwater Scheme

Before either of the two Axford drought permits and two Ogbourne drought permits are implemented, the WBGWS will already be operating in the nearby Lambourn catchment. It is not anticipated that the implementation of any of these drought permits will have any cumulative impacts with the WBGWS due to the distance between the catchments and abstraction boreholes. Furthermore, the WBGWS is not considered to significantly impact upon flow in the River Kennet. A Restoring Sustainable Abstraction Investigation²³ used groundwater modelling to assess the impact of the Ogbourne (1) abstraction on flow in River Aldbourne. The model compared two scenarios when the abstraction at Ogbourne (1) was zero and another when abstraction was at 4.4MI/d. The results suggested that drawdown in the Aldbourne catchment was very limited, between 0 and 30 cm which equated to a 0.1Ml/d reduction of flow in the River Aldbourne itself. It is noted that impacts of the abstraction at Ogbourne 1 were modelled on the 1976 drought conditions, therefore does not include the full abstraction from WBGWS. The Axford abstractions and associated drawdown is not anticipated to impact on flow in the River Aldbourne given that the hydrogeological zone of impact extends for approximately 1.5km downstream of the start of Cumulative Reach 1 to Axford Farm and not as far as the Aldbourne. Thus, it is not considered that the WBGWS, Axford drought permits and Ogbourne drought permits will have any cumulative impacts on the River Kennet or River Aldbourne.

6.3.5 Axford 2 with Ogbourne 1 and Ogbourne Emergency Borehole

The Axford 2 abstraction lies in close proximity to the Ogbourne 1 and Ogbourne EBH abstractions. The Axford 2 and Ogbourne 1 and EBH drought permits individually affect the same watercourse, the River Kennet. Potential cumulative impacts are as follows:

- Simultaneous implementation of the Axford 2, Ogbourne 1 and Ogbourne EBH drought permits would cause **major** reductions in flow for Cumulative Reaches 1 and 2, **moderate** flow reductions in Cumulative Reach 3, and **negligible** hydrological impacts in Cumulative Reach 4. However, recovery as a result of all three drought permits operating is not anticipated to be significantly different cumulatively.
- Cumulative geomorphology impacts are assessed as **moderate** in Cumulative Reaches 1 and 2, **minor** in Cumulative Reach 3 and **negligible** in Cumulative Reach 4.
- The risk of water quality deterioration linked to SRP is **medium** in Cumulative Reaches 1 to 3, and risks associated with deterioration in dissolved oxygen concentrations is **low** for these reaches. In addition, the risk of water quality deterioration linked to total ammonia is **low** in Cumulative Reach 1.



²³ River Og Sustainability Reduction Investigation Groundwater Modelling Analysis, March 2009, Atkins

- There are no significant risks to river flows in the impacted reaches from other groundwater abstractions (other than from the Thames Water abstractions themselves) or surface water abstractions. The cumulative risk from flow pressures with the Axford 2, Ogbourne 1 and Ogbourne EBH drought permits in place is hence considered to be **low**.
- As the cumulative hydrological and physical environment impacts are categorised as the same level of significance as described for the Axford (2) drought permit, the outcome of the environmental features assessments specified for the Axford (2) drought permit is applied to the cumulative scenario.

6.3.6 Baunton 2 with Latton, Meysey Hampton and Bibury

The Baunton (2) drought permit option affects the following five watercourses: River Churn, Cirencester Watercourses, River Frome, Ampney Brook and the River Coln. The Latton and Meysey Hampton drought permit options also affect the Ampney Brook, and the Meysey Hampton and Bibury drought permit options affect the River Coln.

The cumulative impact of the Baunton (2) drought permit with Latton and/or Meysey Hampton and/or Bibury reaches would not extend the reaches beyond that described for the Baunton (2) drought permit. The results of the modelling using the Cotswolds Groundwater Model also shows that the cumulative effects of the implementation of the Baunton (2) drought permit with any (or all) of the drought permits listed above will be similar to the effects of the Baunton (2) drought permit implemented alone. Please see the Baunton (2) Environmental Assessment Report for further details of what these effects entail.

6.3.7 Fobney Direct with Fobney Emergency Borehole

The Fobney Direct abstraction lies in close proximity to the Fobney Emergency Borehole (EBH) abstraction. The Fobney Direct and Fobney EBH drought permit options individually affect the same watercourses namely the River Kennet and Holy Brook. An additional reach will be impacted from the confluence of the Holy Brook and the River Kennet when compared to the hydrological impact associated with the Fobney Direct drought permit individually. This reach was however, included in the EAR for the Fobney EBH drought permit. Potential cumulative impacts are as follows:

- Operation of both drought permits will result in a 57% reduction in flow in Cumulative Reach 1, corresponding to a **major** impact. Impacts in Cumulative Reach 2 are **beneficial** due to an increase in flow in this reach. A **minor** hydrological impact is concluded for Cumulative Reach 3.
- The Chalk aquifer the Fobney EBH drought permit abstracts from has a short recovery period and tests have found that groundwater levels recover within 10 days at the end of pumping. It is therefore considered that the cumulative impacts of both drought permits will not extend beyond the 6 months of implementation.
- Cumulatively, operation of the Fobney Direct and EBH drought permits could exert a high risk to water quality in Cumulative Reach 1 as a result of flow reductions. Medium risks to water quality without the drought permit being implemented already exist in this reach (Holy Brook) due to occasional spikes in SRP concentrations. For Cumulative Reach 2 the risk of water quality deterioration with both drought permits operating is assessed as medium risk. The risk to Cumulative Reach 3 is assessed as being medium. No water quality risks associated with decreases in dissolved oxygen saturations or increases in total ammonia concentrations are expected to arise during the joint operation of both permits.
- The cumulative impacts on the identified environmental features when operating Fobney Direct and Fobney EBH drought permits simultaneously are similar to the impacts identified for Reach 1 of the Fobney Direct drought permit when operated individually. This includes a range of moderate to minor impacts to the environmental features in Cumulative Reach 1. Elsewhere, there are negligible impacts.



6.3.8 Farmoor and Gatehampton

The Farmoor drought permit, independently of the Gatehampton drought permit, would have a **minor** impact on the River Thames in the vicinity of the Gatehampton abstraction. The minor impacted reach extends from Sandford Lock (around 30km upstream of the Gatehampton abstraction) until Caversham Lock (around 30km downstream of the Gatehampton abstraction). The Farmoor drought permit is associated with a 21% reduction in the summer Q_{99} and 14.4% reduction in the summer Q_{95} (at the top of the minor reach). The cumulative reduction in flow, at Sandford Lock, as a result of both the Gatehampton and Farmoor drought permits would be a 22.7% reduction in the summer Q_{99} and a 15.7% reduction in the summer Q_{95} (noting that these would be reduced due to flow accretion by the point the river passes close to the Gatehampton abstraction). The cumulative impact corresponds to a **minor** impact which is the same magnitude as for the Farmoor drought permit when considered on its own. Hence the cumulative impacts, for both schemes, would be the same as those considered for the Farmoor drought permit on its own.

6.3.9 Sundridge 1 with Sundridge 2

When implementing the Sundridge (2) drought permit the Sundridge (1) drought permit will already be operating. Under the normal operating licence at Sundridge, recent actual rates suggest that approximately 4MI/d is abstracted between April to September. The Sundridge (1) drought permit would increase this abstraction to 8MI/d and the Sundridge (2) drought permit would increase this to 12MI/d.

6.3.10 Sundridge 1 with Eynsford

The two drought permits do not abstract from the same aquifer; however, they do independently cause a reduction of flow in the River Darent. Therefore, the cumulatively impacted reaches only start at Eynsford as this is the first point of impact for both the Sundridge and Eynsford drought permits.

- Simultaneous implementation of the drought permits would result in **moderate** hydrological impacts in Cumulative Reach 1 and Cumulative Reach 2 but recovery in the river is not anticipated to be significantly different to when the Eynsford drought permit is operating individually. When operating together, there is potential for a **major** reduction in flow in Cumulative Reach 3.
- Cumulative geomorphology impacts are assessed as **minor** for both Cumulative Reach 1 and 2 and **moderate** for Cumulative Reach 3. The risk of water quality deterioration linked to all determinants is **major** in Cumulative Reach 3, due to potential drying of the River Darent, while the risk of water quality deterioration in Cumulative Reaches 1 and 2 were assessed as **negligible**.
- The cumulative impact of environmental features associated with the simultaneous implementation of these two drought permits are similar to the impacts identified for the Eynsford drought permit, i.e. **major** impacts on biodiversity and **major** risk to WFD deterioration.

6.3.11 Sundridge 2 with Eynsford

The two drought permits do not abstract from the same aquifer; however, they do independently cause a reduction of flow in the River Darent. Therefore, the cumulatively impacted reaches start at Eynsford as this is the first point of impact for both the Sundridge and Eynsford drought permits.

- Within Cumulative Reach 1, the hydrological impacts and associated impacts to the physical environment (water quality and geomorphology) are categorised as the same level of significance as described for Eynsford drought permit Reaches 1 and 2, i.e. **moderate**.
- The outcome of the environmental features' assessments specified for Reach 1 and 2 of the Eynsford drought permit is applicable for Cumulative Reach 1, i.e. **moderate** impacts on biodiversity and **moderate** risk to WFD deterioration.
- Within Cumulative Reach 2, the hydrological impacts are considered to be **major**. The associated impacts to the physical environment (water quality and geomorphology) are categorised as the same level of significance as described for Eynsford drought permit Reach 3.



• The impacts associated with the cumulative implementation of the Eynsford and Sundridge 2 drought permits are the same as those discussed for the operation of the Eynsford drought permit, i.e. **major** impacts on biodiversity and **major** risk to WFD deterioration.

6.3.12 Crayford with Wansunt

Downstream of the River Shuttle confluence to Vitbe Sluice, groundwater levels would already be below the stream bed, cumulative effects of abstracting an additional 2.8MI/d from Crayford borehole, in addition to the 6.0MI/d already considered from Wansunt Borehole would constitute a negligible impact on flows in the River Cray during the duration of the drought permits. Groundwater recovery is typically rapid and differences in stream flows with the drought permit in place compared to without would be minimal.

An AMP6 investigation²⁴ into the impact of the Bexley abstraction on the Lower Cray concluded that there is evidence that the Bexley abstraction currently impacts on groundwater levels in the Cray catchment and stream flows in the River Cray. Additional data is now available to use within the assessment for these reaches, however, the hydrological assessments have not been updated within the respective EARs for this iteration of the Drought Plan. Therefore, the cumulative assessment between the Crayford and Wansunt drought permits remains **uncertain** and a more detailed assessment will be undertaken at the time of drought permit application.

6.4 Habitats Regulations Assessment Screening Report of Drought Plan Summary of Cumulative Assessment

Thames Water has undertaken the first stage in the HRA process, Screening, on its DP options list, and a further Stage 2 Appropriate Assessment on one of its drought options, as summarised in Section 5.6. It has been carried out in parallel with the SEA and is reported separately in the HRA Screening Report. The screening stage establishes whether any schemes have the potential for a Likely Significant Effect (LSE) on the integrity of a European designated site. No in-combination effects of Thames Water's Final DP 2022 with its WRMP19, the Environment Agency's DPs, the Thames and Severn River Basin Management Plan 2015, other water company WRMPs and DPs, and other major infrastructure projects have been identified and no LSE are anticipated.

6.5 Cumulative Effects with Existing Relevant Programmes, Plans, Policies and Projects

6.5.1 Other Water Company Drought Plans

Assessment of the potential for cumulative impacts of supply side and drought permit/order options listed in neighbouring water companies' drought plans has been undertaken.

It should be noted that DPs for other companies/organisations are subject to review from the Environment Agency and Defra on the same timescales as Thames Water's DP revision. Thames Water has previously held discussions with neighbouring water companies in order to identify any drought options which may have the potential to cause in-combination effects, where necessary further discussions and, if necessary, more assessment work will be used to further improve understanding of potential in-combination effects. The information used to carry out these assessments is considered to be the most up to date information available at time of writing, but the assessments should be reviewed at the time of drought option implementation to ensure that no changes to the neighbouring water company drought options has been made in the intervening period, and that the assessment, therefore remains valid.

The assessments have been informed by the most recent information available on the neighbouring water company DPs. Where possible, the SEAs and the details presented in the drought option details



²⁴ Atkins (2018) AMP6 Low Flows Investigations: Lower Cray, Integrated Impact Assessment. Report for Thames Water Utilities Ltd. October 2018

tables often presented in the appendices of the respective water company DP have been taken into consideration, together with information gathered through Thames Water's ongoing consultation with other neighbouring water companies.

The following neighbouring watering company DPs were considered:

- Anglian Water (2022)
- Severn Trent (2022)
- Southern Water (2022)
- Wessex Water (2021)
- Bristol Water (2022)
- Essex and Suffolk Water (2022)
- South East Water (mid Kent) (2022)
- SES (2021)
- Affinity Water (2022)

6.5.1.1 Anglian Water

No cumulative impacts between drought options in Thames Water's Drought Plan (2022) with Anglian Water's Drought Plan (2019) have been identified.

6.5.1.2 Severn Trent

No cumulative effects between drought management measures in the Thames Water DP (2022) and Severn Trent Water DP (2019) have been identified. The cross-border supplies between Severn Trent Water and Thames Water are minor in terms of drought planning.

6.5.1.3 Southern Water

No cumulative impacts between drought options in Thames Water's Drought Plan (2022) with Southern Water's Drought Plan (2019) have been identified.

6.5.1.4 Wessex Water

No cumulative impacts between drought options in Thames Water's Drought Plan (2022) with Wessex Water's Drought Plan (2018) have been identified.

6.5.1.5 Bristol Water

No cumulative impacts between drought options in Thames Water's Drought Plan (2022) with Bristol Water's Drought Plan (2018) have been identified.

6.5.1.6 Essex and Suffolk Water

Essex and Suffolk Water (ESW) obtain 16% of water supplied in their Essex water resource zone from Thames Water via a raw water bulk transfer from the Lee Valley reservoirs. This would be reduced in drought conditions depending on the respective demand management measures implemented by each company. ESW's Draft DP (2022) includes an option that would increase the Chigwell bulk transfers from Thames Water by agreement. The ESW Drought Plan assumes that Thames Water's own resource situation would be robust and that the spatial distribution of drought impact would not cover Thames Water's supply area although this would not be the case in all drought situations. The agreement states that during an "unusual drought" Thames Water shall supply to ESW such quantities as shall represent "fair apportionment" of the water available and will therefore be dependent on Thames Water's own resource situation, the nature and spatial distribution of the drought, and demand in the Chigwell area. Therefore, the drought action would only be realistic in the event that a drought affecting ESW does not materially affect Thames Water, therefore, no cumulative impacts between drought options in Thames Water's DP (2022) with Essex and Suffolk Water Drought Plan (2022) have been identified.

6.5.1.7 South East Water (Mid Kent)

No cumulative impacts between drought options in Thames Water's Drought Plan 2022 with South East Drought Plan (2019) have been identified. At the time of writing South East Water had no drought options confirmed.



6.5.1.8 SES Water

SES have not included any temporary bulk transfers from other water companies, or third parties, in their Draft Drought Plan 2021 and no permanent bulk transfers will be in operation for the lifetime of this iteration of the Drought Plan.

Cumulative impacts have been identified between the Waddon DP option and drought options in the SES Water Drought Plan. The SES Water Drought Plan (2021) includes a potential drought permit/order option which involves an increase in abstraction from three groups of groundwater abstraction sites (Hackbridge/Goatbridge group, Woodmansterne group and Kenley group). Given the proximity of these boreholes to the Waddon boreholes, there is the potential for cumulative effects, such as exacerbating the reduction in groundwater levels and associated effects, if the SES Water drought permits were to be implemented at the same time as the Waddon drought permit. In 2017, Thames Water conducted a study together with SES Water²⁵ to understand the impact their individual groundwater abstractions were having on the Wandle Catchment. Borehole monitoring was carried out to assess how the different groundwater abstractions impact on levels in the Chalk aquifer when they are at their fully licensed rates. Results of the monitoring suggested that when operating the Waddon abstraction at its peak fully licensed abstraction of 15.5MI/d (equivalent to the drought permit) groundwater drawdown of a depth of 0.1m would be experienced in the immediate vicinity of the abstraction. North of the abstraction, drawdown response varied with some boreholes not responding to the increased abstraction and others drawn down by 0.03-0.1m. There was no response to the increased abstraction south of Waddon in any of the boreholes. An assessment²⁶ of the cumulative impacts of operating these two drought permits simultaneously has identified that together, the drought permits will exert a moderate impact on the River Wandle from Waddon Ponds to Beddington STW effluent ditch. The impact of the drought permits will be mitigated by the 90MI/d discharge coming from the Beddington STW, therefore, the impacted reach ends here. The hands-off- flow associated with the Hackbridge and Carshalton Arm augmentation scheme will also ensure that the River Wandle has enough flow in that section of the river to ensure that effluent discharge continues to flow downstream and does not back up the River Wandle. In an evolving drought situation, further discussions with SES Water will be required in order to understand the likelihood of the drought permits being operated at the same time. Alternative drought options may need to be reviewed in order to determine the appropriate approach according to the prevailing drought conditions.

The potential for cumulative impacts with other water company drought plans must be reviewed at the time of any potential future Waddon drought permit application, as they may have been revised in the interim.

6.5.1.9 Affinity Water

Affinity Water Drought Plan (2022) notes that there are currently four bulk import connections with Thames Water in their central region. It is Thames Water's responsibility to maintain minimum flows in the River Thames at Teddington and Affinity do not link their drought actions to surface water conditions. No cumulative impacts between drought options in Thames Water's Drought Plan (2022) with Affinity Water's Drought Plan (2022) have been identified at this stage. Affinity Water are currently consulting on their Scoping Report for the SEA on WRMP24. This will also form the scoping stage for the SEA of their Drought Plan as it includes drought permit options. Affinity Water will undertake a full SEA on their drought permit options following this consultation phase. Cumulative impacts will be reviewed following publication of this.

6.5.2 Water Resource Management Plans

Assessment of the potential for cumulative effects with Thames Water's WRMP and neighbouring water companies' WRMPs has been undertaken.



²⁵ Mott Macdonald, Thames Water and SES Water (2017) River Wandle Low Flow Investigation

²⁶ Environmental Assessment of Waddon Drought Permit, Thame Water Utilities Ltd, 2017

It should be noted that all WRMPs are subject to review every five years. The information used to carry out these assessment is considered to be the most up to date information publicly available at time of writing (Periodic Review 2019 (PR19) WRMPs). Where possible, this is also informed through on-going discussions that Thames Water are holding with neighbouring water companies in order to identify any water resource options which may have the potential to cause cumulative impacts with their drought options. The assessments should be reviewed at the time of drought option implementation to ensure that no changes to the WRMPs has been made in the intervening period, and that the assessment, therefore remains valid. For example, the PR24 WRMPs will be developed and issued during the period of Thames Water's DP.

The assessments have been informed by each Water Companies' WRMP and where possible SEAs.

The following WRMPs were considered:

- Thames Water (2020)
- Anglian Water (2019)
- Severn Trent (2019)
- Southern Water (2019)
- Wessex Water (2019)
- Bristol Water (2019)
- Essex and Suffolk Water (2019)
- South East Water (mid Kent) (2019)
- SES Water (2019)
- Affinity Water (2020)

All of Thames Water's neighbouring companies WRMPs include significant demand management components which will complement the Demand Side measures of Thames Water's DP. Improved water efficiency and leakage reduction across the country will give beneficial cumulative impacts in terms of lower energy use and carbon emissions from reduced pumping and treatment. These measures will also reduce the need to abstract new water resources, thereby ensuring ecological water requirements are maintained.

6.5.2.1 Thames Water

The DP demand side measures complement the demand management schemes included in the WRMP. While their implementation may exacerbate some of the potential adverse impacts of the demand management measures, for example in relation to vehicle movements their implementation in combination with demand management measures included in the WRMP should cause a beneficial cumulative impact on water resources (with indirect beneficial effects on environmental receptors such as biodiversity) because of improved water efficiency and less wasted water.

In terms of geographic location, possible interactions with options included in Thames Water's Final WRMP19 as either operational or under construction in the timeframe of Thames Water's DP (to 2027) were identified as:

- an ASR option at Horton Kirby, due to become operational in 2022, is considered to be mutually exclusive with the DP. After the WRMP option becomes operational, the option would no longer be considered as a drought management option for the DP. Therefore, there are no cumulative effects identified. a groundwater removal of constraints option at Southfleet/Greenhithe in the River Darent catchment is due to commence construction in 2021 and would become operational during the period covered by this DP. There is potential for cumulative effects between this WRMP option and groundwater options which potentially affect surface water flows in the River Darent (Sundridge, Eynsford, Wansunt and Crayford). It has not been confirmed whether the Southfleet and Greenhithe option will be delivered inAMP7 or AMP8 yet, but it is possible that it will be delivered in AMP7 and so would be available prior to 2025. We will keep the EA informed of progress with the scheme development and will provide confirmation as soon as the option development timescale is firmed up.
- No cumulative effects are anticipated to arise from the ASR South East London (Addington) scheme in the WRMP19 and Waddon groundwater drought permit.



6.5.2.2 Anglian Water (2019)

With particular focus on the Ruthamford South, South Essex and Central Essex WRZs which border Thames Water's region, there are no likely potential cumulative effects with Anglian Water's WRMP.

6.5.2.3 Severn Trent (2019)

There are no Thames Water DP options in close enough proximity to Severn Trent Waters region to result in any construction related cumulative effects. There is no hydrological link between the options in Thames Waters DP and Severn Trent's WRMP19. No cumulative effects are, therefore, likely to occur with Thames Water's DP.

6.5.2.4 Southern Water (2019)

Focussing on areas which boarder the Thames Water region it has been identified that there are no Thames Water DP options in close enough proximity to result in any cumulative effects.

6.5.2.5 Wessex Water (2019)

Wessex Water has no projected deficit and as such the WRMP19 proposes no supply options. No cumulative effects are therefore likely to occur with Thames Water's DP.

6.5.2.6 Bristol Water (2019)

There are no Thames Water DP options in close enough proximity to the Bristol Water region to result in any construction related cumulative effects and there is no part of the Thames region in hydrological connectivity with the Bristol Water region. No cumulative effects are therefore likely to occur with Thames Water's DP.

6.5.2.7 Essex and Suffolk Water (2019)

The Essex and Suffolk Water WRMP includes no supply options, as all of the WRZs are projected to be in surplus over the plan period. No cumulative effects are, therefore, likely to occur with Thames Water's DP.

6.5.2.8 South East Water (mid Kent) (2019)

There are no Thames Water DP options in close enough proximity to the South East Water's WRMP19 options. No cumulative effects are considered likely to occur with Thames Water's DP.

6.5.2.9 SES Water (2019)

The SES Water WRMP 2019 included constrained option R26 – Secombe Centre UV, which is in proximity and identified as having potential to cause increased drawdown of groundwater, potentially reducing springflow. However, the SEA of the SES Water WRMP states that the Environment Agency believes that increased abstraction at this source would be at the expense of northward flow to the confined Chalk rather than base flow in the Rivers Hogsmill or Wandle and that the effect on surface water is negligible. This option was not included in the final preferred plan therefore no cumulative impacts with Thames Water's DP 2022 have been identified.

6.5.2.10 Affinity Water (2019)

No cumulative impacts were identified between the Affinity Water WRMP19 and the Thames Water DP.

6.5.3 Environment Agency Drought Plans

The potential for cumulative effects of Thames Water's DP 2022 with the Environment Agency's National Drought Action Plan²⁷ has been assessed. Relevant area DP's will be reviewed for the final Drought Plan.

Part of the Environment Agency's role is to reduce the impact of drought on the natural environment by taking specific actions. The Environment Agency can apply for environmental drought orders if the environment is suffering serious damage because of abstraction during a drought. The plan says that



²⁷ EA (2015). Drought response: our framework for England. June 2015.

the Environment Agency would work with stakeholders including water companies to identify where and when it would be necessary and its potential effects on any essential public supplies or infrastructure.

Environment Agency environmental drought order actions have the potential to have in-combination impacts with Thames Water's DP 2022. The Environment Agency can apply to the Secretary of State for environmental drought orders if the environment is suffering serious damage as the result of abstraction during a drought. Nevertheless, liaison is required with the Environment Agency to permit the operation of the DP schemes, and the Environment Agency also monitor the actions taken to ensure these are in accordance with any drought permits/orders.

Given that the Environment Agency drought actions will have a positive effect on river flows and lake levels and, therefore, the natural environment and ecology, there will be **no cumulative impacts** between it and the Thames Water drought plan options. However, due to the uncertainties of potential locations, this should be considered further at the time of any potential application for drought permits/orders by Thames Water or the Environment Agency.

6.5.4 Thames River Basin Management Plan

Assessment of the potential for cumulative impacts of supply side and drought permit/order options with drought options listed in the River Basin Management Plans has been undertaken.

The information used to carry out these assessments is considered to be the most up to date information available at the time of writing, but the assessments should be reviewed at the time of drought option implementation to ensure that no changes to the River Basin Management Plans have been made in the intervening period, and that the assessment, therefore, remains valid.

The Thames RBMP describes the planned steps to implement the measures required to achieve the environmental objectives of the Water Framework Directive (WFD). It provides the framework for protecting and enhancing the water environment. The SEA²⁸ of the Thames RBMP determined that the plan was likely to have significant positive effects on the environment, particularly in respect of biodiversity, water, population and human health and that any local negative effects would expect to be mitigated during implementation. Therefore, there will be **no cumulative impacts** between the Thames RBMP and the Thames Water drought plan options.

The RBMPs, including the objectives and the measures they contain, are reviewed and updated every six years. The last updates were published in 2015, therefore, it is expected the Environment Agency will publish updated RBMPs in 2021, these should be considered for the next DP.

6.5.5 Canal & River Trust Water Resources Strategy 2015–2020

The Canal & River Trust Water Resources Strategy²⁹ sets out the vision for how they intend to manage water resources across its network through to 2050. It contains their planned actions over the next five years relating to the canal network. A number of the hydrological units overlap with Thames Water's DP including the Kennet and Avon Canal, Lower Lee/Lee Navigation and South Oxford Canal.

However, the main actions for the strategy are to undertake a range of modelling scenarios for the hydrological units in order of preference. Specific restoration projects or other canal developments are not detailed, however Strategic Action 4 states that appropriate water resource assessments will be undertaken aiming for "no net impact on long term water resource levels of service."

No cumulative impacts between the Canal and River Trust Water Resources Strategy and drought options in Thames Water's Drought Plan 2022 have been identified.

At the time of writing the Canal & River Trust had not published their drought plans.



²⁸ Environment Agency (2016) The River basin management plan for the Thames River Basin District Strategic Environmental Assessment: Statement of Particulars Updated December 2015. https://www.gov.uk/government/publications/thames-riverbasin-district-river-basin-management-plan

²⁹ Canal and Rivers Trust (2015) Putting the water into waterways: Water Resources Strategy 2015-2020.

6.5.6 Cumulative effects with any identified relevant projects

There are a number of infrastructure priorities identified in regional and local planning documents in addition to national programmes. These include the improvement of existing infrastructure by extension, redevelopment or increasing existing capacity. With regard to other projects that may result in a cumulative effect with the Thames Water Final DP, those considered to be **relevant at the strategic level** comprise large scale high profile infrastructure schemes and particularly those that may affect water flows or groundwater levels, these projects comprise:

- River Thames Scheme (reducing flood risk from Datchet to Teddington)
- Oxford Flood Alleviation Scheme
- Abingdon Flood Alleviation Scheme
- Thames Tideway Tunnel Project
- Crossrail 1 and 2
- Northern Line Extension
- High Speed Two Rail Network (HS2): Construction of Phase 1 of the HS2 network from Euston station to Birmingham.

6.5.6.1 The River Thames Scheme (reducing flood risk from Datchet to Teddington)

The River Thames Scheme (reducing flood risk from Datchet to Teddington³⁰) is a proposed programme of projects and investment that aims to reduce flood risk in communities near Heathrow. The scheme consists of a range of measures, including extensive engineering work to construct new flood channel, improvements to three existing weirs on the River Thames, improved flood incident response plans, creation of new habitat, increasing community flood awareness and providing community resilience measures.

Weir modifications will reduce water levels between Walton Bridge and Teddington. The earliest the work is likely to start is 2023 and it will not be operational for some time after that. As the DP will be operational until 2027, it is likely the scheme will be under construction, and possibly operational, at the same time as the drought options in the DP. There is potential for cumulative impacts between the DP and the scheme during the construction phase such as temporary disturbance to people, landscapes and wildlife. Capital works for the scheme were originally supposed to be completed by 2027, however, construction is behind schedule therefore it is unlikely the scheme will become operational during the period this DP encompasses. Therefore, no cumulative impacts have been identified with the operation of this scheme.

6.5.6.2 Oxford Flood Alleviation Scheme

The Environment Agency is working in partnership on a major new scheme to reduce flood risk in Oxford. The scheme will cost around £150 million and is one of the biggest flood schemes in the country. It will create a new stream with wetland wildlife corridor, running through the existing floodplain to the west of Oxford. The scheme will be approximately 5km long and is designed to reduce flood risk around the River Thames through diverting flood water across the undeveloped flood plain away from properties. The same amount of water that enters the scheme will return to the River Thames at Kennington.

In 2019, Oxfordshire County Council found that a railway bridge needed to be replaced that floodwater would need to pass underneath as part of the scheme. This presented an opportunity to design and build the bridge and the scheme together to reduce disruption and ensure the best use of public money. This requires changes to the planning and purchase order applications that were made in 2018. As the plans for the scheme are yet to be finalised, a cumulative impact assessment cannot be conducted at this time.



³⁰ Environment Agency (2019) The River Thames Scheme: reducing Flood Risk from Datchet to Teddington. https://www.gov.uk/government/publications/river-thames-scheme-reducing-flood-risk-from-datchet-to-teddington/riverthames-scheme-reducing-flood-risk-from-datchet-to-teddington Accessed 1 March 2021

6.5.6.3 Abingdon Flood Alleviation Scheme

Appraisal and design of flood alleviation projects in Abingdon are underway. Construction of early projects, including a flood wall, was undertaken in 2017. Work is continuing to progress a number of design options including a flood storage area, property level products and natural flood management measures. The scheme will allow more floodwater to pass down the River Ock and into the River Thames and may also include an upstream storage project on the River Ock.

No cumulative impacts are envisaged with the Thames Water DP, as the Abingdon Flood Alleviation Scheme would influence flows in the River Thames during flood events, whereas the Thames Water drought options would be active during periods of drought.

6.5.6.4 Thames Tideway Tunnel Project

The Thames Tideway Tunnel comprises a 25km-long sewer beneath the River Thames. It will capture sewage that would otherwise overflow into the river, transfer it to the Beckton works for treatment and return the clean water to the environment. Construction is due to be completed in 2023 and should become operational by 2025.

Volume 3 of the Environmental Statement³¹ reports on the project wide effects. For surface water significant beneficial effects are identified for water quality in the Thames Upper and Middle (no significant adverse effects on surface water). For groundwater, moderate adverse effects are predicted for construction associated with dewatering on the lower aquifer, two licenced abstractions (28/39/39/0141 Mantilla Ltd and TH/39/0042/023 Thames Water) and mobilisation of poor quality groundwater in the lower aquifer and major adverse effects on one licenced abstraction (TH/039/0039/066 Global Grange Ltd). Cumulative effects of the Thames Tideway with Crossrail and the Northern Line Extension are addressed in the Thames Tideway Environmental Statement Volume 3 with respect to groundwater. There is expected to be an overlap of dewatering activities for Crossrail and Thames Tideway and groundwater levels in the lower aquifer are considered unlikely to have fully recovered following Crossrail construction. No drought options are located within the same WFD groundwater body as the Crossrail dewatering, therefore, **no cumulative impacts** are predicted.

The only construction activities considered to impact upon surface water quality was dredging and piling which may lead to water quality effects as a result of sediment mobilisation. Mitigation proposed involves not dredging from June to August and using techniques that limit the dispersal of intertidal sediments. The Thames Tideway Tunnel will likely become operational during the drought plan and the majority of effects have been identified as beneficial. The only drought option on the Tidal Thames is the Thames Gateway Water Treatment Works (TGWTW), which is a desalination plant and it is predicted to have negligible impact on water quality and flow and therefore there is no potential for cumulative adverse impacts during construction or operation, however, there may be cumulative beneficial impacts during operation.

6.5.6.5 Crossrail

Crossrail 1 is a 73 mile railway line under development in London and neighbouring counties of Berkshire, Buckinghamshire and Essex. The main construction phase is now complete and intensive operational testing of the central section is due to start in Spring 2021 before initiating passenger service in 2022³². This predates the operational span of the DP therefore no cumulative impacts are predicted.

Crossrail 2 is a proposed rail route in South East England and there is currently no detailed information about construction impacts for the scheme³³. Plans to build Crossrail 2 have been shelved for the time being, therefore, the Crossrail 2 project will have **no cumulative impacts** with this DP.



³¹ Thames Water Utilities Ltd (2013) Thames Tideway Tunnel Environmental Statement Volume 3: Project-wide effects assessment

³² Crossrail (2021) <u>https://www.crossrail.co.uk/news/articles/crossrail-project-update</u> (accessed 15 March 2021)

³³ Crossrail 2 2018 http://crossrail2.co.uk(accessed 22/08/2018)

6.5.6.6 High Speed Two Rail Network (HS2): Construction of Phase 1 of the HS2 network from Euston station to Birmingham.

High Speed Two is a major rail infrastructure project planned to link London with Birmingham (Phase 1) and subsequently Leeds and Manchester (Phase 2). Construction of Phase 1 of the project commenced in 2017, with an estimated completion date of 2025. This construction phase of HS2 coincides with the five year operation period of the DP.

Potential cumulative assessment of the HS2 construction Phase 1 will be reviewed at the time of any potential drought option implementation.



7 Mitigation and Monitoring

7.1 Overview

Key stages of the SEA process comprise Task B5: *Mitigating adverse effects*, Task B6: *Proposing measures to monitor the environmental effects of plan or programme implementation* and Stage E: *Monitoring the significant effects of the plan or programme on the environment* (see Section 1.7, Table 1.4). The Sections 7.2 and 7.3 below describe how these tasks have been addressed and how Thames Water intend to ensure that mitigation measures are implemented for any adverse effects that are identified and the means by which the environmental performance of the DP can be assessed.

To put this into context, a summary of Drought Plan monitoring and mitigation guidance provided by the Environment Agency is provided below.

7.1.1 Environmental Monitoring and Mitigation Guidance

Guidance on environmental monitoring, the objectives and content of the Environmental Monitoring Plan (EMP) and mitigation, is given in Sections 4 and 5 of the Environment Agency's "Environmental assessment for water company drought planning supplementary guidance"³⁴.

The guidance states that an EMP should include details of the monitoring required and states this should include:

Baseline monitoring – collection and maintenance of baseline monitoring datasets help to understand the nature of the environment under 'normal' circumstances, along with establishing the sensitivity of the environment to changes in flow and any especially sensitive features of interest. Baseline monitoring is also essential in enabling understanding of the actual environment impact of supply side drought management actions. It allows comparison between the environment under 'normal' conditions against observed environmental datasets during and after a drought.

Onset and In-drought monitoring - to help assess the immediate environmental impacts of drought action during a drought along with informing choices and implementation of mitigation measures. This can be split between pre-permit application (**Onset**) and post-permit implementation (**In-drought**) stages.

Post-drought (recovery) monitoring - to help assess any longer term environmental impacts of, or recovery from, the implementation of drought actions.

It may be possible to **mitigate** or reduce adverse effects on the environment. The guidance states a drought plan should, therefore, identify:

- pre-drought mitigation actions: actions you will implement before or whilst the drought is developing to reduce the likely environmental impact of your proposed actions
- in-drought mitigation actions: actions you will implement during a drought to minimise the environmental impact of your proposed actions
- post drought mitigation actions: actions you will implement following a drought to reduce any environmental impacts that may occur as a result of the actions you implement

The DPG also indicates that a drought plan should provide evidence that the mitigation measures that are proposed will be effective for the features that could be at risk from a drought option. The EMP should show how this will be monitored. The drought plan should also include details of any additional permits or approvals needed to carry out the mitigation measures.

In some cases, mitigation actions may be necessary to prevent derogation of other abstractions (for example, by providing alternative supplies).



³⁴ Environment Agency (2020) Environmental assessment for water company drought planning supplementary guidance, Version 1.0, Reference LIT 55303, July 2020.

7.2 Mitigation

Consideration of mitigation measures has been an integral part of the SEA process. The methodology for the assessment of the drought options is provided in **Section 4**. The SEA appraisals have been based on residual impacts, i.e. those impacts likely to remain after the implementation of reasonable mitigation. Certain assumptions have been made regarding this:

- Where suitable mitigation measures are known and identified (e.g. as informed through EARs, where available, or Thames Water's drought management action forms in the Drought Plan (see Appendix M, these have been taken into account, such that the resultant residual impact has been determined.
- In line with recommendations made in the UKWIR SEA Guidance³⁵ the SEA appraisals have assumed the implementation of reasonable mitigation, such as the use of good construction practice. This is particularly applicable to unused supply-side options which are currently noncommissioned and which do not operate as 'business as usual' and would require recommissioning in the event of use as a drought option.
- No mitigation is proposed for abstraction licences which are issued by the Environment Agency based on an assessment of the potential impacts on the environment. These licences already contain flow constraints at low flows or conditions associated with an operating agreement. This is applicable to all supply-side options which are actions within existing abstraction licence limits which have been subject to the Environment Agency's Review of Consents process.

As part of the environmental assessment of each drought option, for those receptors with a potential moderate or major impact from implementation of the associated drought permit, site specific monitoring has been recommended, together with triggers to inform practical implementation of mitigation measures. These are described in Thames Water's drought permit / order EARs and EMPs. The range of mitigation measures that are possible for the features identified fall into three general activities:

- 1) Measures to reduce impacts at source, by reducing the hydrological or water quality impact.
- 2) Measures to modify environmental conditions in the river, by conducting actions within the watercourse to reduce the pressure at sensitive locations; and
- 3) Management of sensitive ecological species and communities, through direct action to mitigate impact by movement or management of the receptor/feature itself.

Mitigation measures identified in the EARs are feature, location, species and community specific. They will be informed by walkover surveys of all significantly impacted reaches before and during the implementation of the drought measure. This will enable a targeted approach to mitigation based on monitoring. If post-drought measure monitoring identifies impacts associated with implementing the permit, consideration will be given to compensatory measures, such as restocking of fish.

Examples of monitoring and mitigation that would be conducted during implementation of drought measures and following the drought period are presented in Table 7.1. Note that these are examples only and have been provided to indicate the type of mitigation considered when assessing residual impacts during the SEA process. Actual EMPs would be site and event-specific, and finalised at the time of implementation.

It should be noted that Thames Water are currently developing a programme of potential mitigation measures for the drought permit options in advance of drought. This programme is being developed with the DP to start implementing measures over the coming AMPs. For example, Thames Water are currently working on a project to identify potential options to improve environmental resilience of the rivers to improve their robustness in times of Drought. This project is reviewing all potentially impacted reaches identified in the EARs and assessing what river restoration options might improve the environmental resilience in the area should there be a drought and / or a need to implement Drought



³⁵ UKWIR (2021) Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans (21/WR/02/15). Prepared by Ricardo.

Permits. This work is ongoing and will feed into PR24 and therefore the results will not be available to include in the plan until the next round of updates to the Drought Plan.



Table 7.1 Example monitoring and mitigation measures included in site-specific EARs and EMPs

	Baseline conditions	On-set of environmental drought	During Drought Permit implementation		Post Drought Permit
Potential impact	Key locations	Monitoring and trigger setting	Trigger and monitoring to inform mitigation action	Mitigation actions	Monitoring and post-drought mitigation (where applicable)
Habitat degradation		Surveillance walkover survey, including site photographs.	Surveillance walkover including site photographs.		Surveillance walkover survey, including site photographs.
as a result of decreased river velocity. This impact would manifest as elevated SRP which can alter the	 The macrophyte community is well understood as a result of: LEAFPACS2 macrophyte surveys. Local knowledge of the site provided by Natural England 	LEAFPACS2 Macrophyte survey at established sites.	LEAFPACS2 Macrophyte survey at established sites.	If existing macrophyte community has significantly deteriorated, consider reseeding/replanting where possible to promote recovery. Replanting of macrophyte community composition to be	LEAFPACS2 macrophyte surveys at established sites for two years following drought permit implementation.
macrophyte community composition.	 Walkover surveys to further assess the level of connectivity 	Macrophyte surveys can be carried out during June-September. If drought occurs outside this period, only surveillance walkover surveys can be undertaken	Macrophyte surveys can be carried out during June-September. If drought occurs outside this period, only surveillance walkover surveys can be undertaken	informed by pre-drought community and on return to baseline SRP concentrations	Macrophyte surveys can be carried out during June-September. If monitoring is required outside this period, only surveillance walkover surveys can be undertaken
Habitat degradation as a result of decreased river velocity, or level and	To establish a baseline, monitoring should incorporate:	Surveillance walkover of mestotrophic standing waters and investigate if connectivity with source is lost during environmental drought.	Surveillance walkover of mestotrophic standing waters and investigate if connectivity with source is lost during drought permit implementation, if not already lost during environmental drought.	Specific mitigation for the mesotrophic standing water habitats in area of	In year following drought permit implementation, carry out appropriate monitoring (Boat/Wader) of mesotrophic
velocity due to lower flows in the distributaries	 Walkover to further assess the level of connectivity between the mesotrophic pools in area of influence. 	Carry out appropriate monitoring (Boat/Wader) of mesotrophic standing water habitat using Common Standards Methodology criteria for assessing habitat condition.	Carry out appropriate monitoring (Boat/Wader) of mesotrophic habitat using Common Standards Methodology criteria for assessing habitat condition.	influence is not considered feasible.	Methodology criteria for assessing habitat condition.
Reduction in macroinvertebrate habitat quality or species diversity as a result of sedimentation	Location of suitable habitat and their susceptibility to drying up is known as a result of:	Walkover of key sections known to be susceptible to lower flows. Assessment of sediment cover.	Continue walkovers, and measure dissolved oxygen, conductivity and temperature in the field using calibrated handheld equipment.	Mitigating the impact of the drought	In year following drought targeted sweep sampling of silty habitat and submerged macrophytes in established monitoring sites
Reduction in extent and quality of in- stream and marginal habitats in some distributaries	Species presence is known as a result of: - Data from routine EA monitoring sites	Measure dissolved oxygen, conductivity and temperature in the field using calibrated handheld equipment.	Further assessment of sediment cover. No in stream monitoring is advised during drought permit implementation to prevent	permit on macroinvertebrate species through direct intervention is not feasible. In extreme circumstances habitat improvements post drought can aid in natural recolonization of macroinvertebrates.	Laboratory sorted to identify presence macroinvertebrates.
Reduction in abundance or distribution as a result of reduced water quality.	for invertebrates The Environmental Report	No in stream monitoring is advised during environmental drought to prevent further harm to the invertebrate community through kick/ sweep sampling.	further harm to the invertebrate community through kick/ sweep sampling.		handheld equipment. Post drought assessment of the in stream sediment cover.
Reduction in extent or quality of important habitats for fish community, including potential exposure of marginal and bed	 Spawning habitats are understood as a result of: RHS+ walkover survey Environment Agency Rare and Protected Species database Data from EA fish monitoring sites Local knowledge from Environment 	Walkover of key locations recording the number of redds potentially affected if survey is undertaken at right time of year. Record extent of exposed marginal spawning and bed substrates. Photographs should be taken during each walkover	Additional walkovers if situation is expected to deteriorate in stream sections known to contain spawning habitats.	Considering eggs require high quality flowing water for development, these cannot be removed and expected to survive.	Post-drought and year 3 fish population surveys at Environment Agency monitoring sites (corresponding with a control and impact site/s) to determine any changes in population dynamics both temporally and spatially, including fish ageing (scale) analysis.
substrates (spawning, nursery and cover habitats) in distributaries that	Agency fisheries and ecology teams Liaise with local Environment Agency fisheries and ecology teams to determine	As an alternative use historic redd count data to provide an approximation.		The focus would therefore be on protecting the adult population (see actions below).	Undertake River Habitat Surveys (RHS) to focussed on locations of bank poaching, surface water outfall input and also downstream of weirs where flows are likely



	Baseline conditions	On-set of environmental drought During Drought Permit implementation			Р
Potential impact	Key locations	Monitoring and trigger setting	Trigger and monitoring to inform mitigation action	Mitigation actions	N (\
are not level controlled	key spawning habitat locations.	Appropriate trigger values would be set for level and flow for spawning habitats based on local circumstances, timing, seasonality and expert opinion.			to s d ir
Fragmentation of fish community habitats and increased significance of obstacles	 Fish populations are well understood as a result of: RHS+ walkover survey Environment Agency Rare and Protected Species database Data from EA fish monitoring sites Local knowledge from Environment Agency fisheries and ecology teams 	Walkover of key sections known to be susceptible to lower flows. Known areas of dry habitats are typically avoided during the walkover, but recorded where observed to confirm and/or confirm existing knowledge	Additional walkovers, if situation is expected to deteriorate in stream sections known to contain high fish densities.	Migration is inhibited by the increased significance of obstacles. Mitigating this impact can incorporate physically moving migrating fish upstream or downstream of barriers depending on species and natural migration behaviour. This should not be considered if movement increases the risk of fish mortality.	lr p le
Increased mortality (density dependent) within the fish community as a result of increased predation and competition	 Fish populations are well understood as a result of: RHS+ walkover survey Environment Agency Rare and Protected Species database Data from EA fish monitoring sites Local knowledge from Environment Agency fisheries and ecology teams 	Approximation of the number of each fish species (e.g. 10s, 100s) in each ponded reach, where safe and practical to do so. Measure dissolved oxygen, conductivity and temperature in the field using calibrated handheld equipment. Appropriate trigger values would be set for level and flow based on local circumstances, timing, seasonality and expert opinion.	Additional walkovers, if situation is expected to deteriorate in stream sections known to contain high fish densities.	Deployment of aeration equipment in key reaches that have standing or slow flowing water with low oxygen levels. Consider provision of bird scarers to deter piscivorous birds at significant locations. Bird scarers would only be used where it is possible for birds to safely move to alternative habitats. Operation of key flow control structures to maintain water levels in key reaches. In extreme cases, consider capture/rescue surveys for fish at significant locations. It is noted these will need sufficiently sized aerated holding tanks as it is unlikely that they can be moved to elsewhere in the catchment.	lr p s
Impacts on fish community growth and/or alteration to feeding and migration	 Fish populations are well understood as a result of: RHS+ walkover survey Environment Agency Rare and Protected Species database Data from EA fish monitoring sites (including analysis of growth rates for each species using fish scales) Local knowledge from Environment Agency fisheries and ecology teams 	The hydrological impact could also adversely affect the growth and development of rheophilic species, with feeding regimes and movement patterns associated with species development potentially altered as a result of the reduction in flows and water levels. Monitoring this potential impact should involve post drought monitoring of the fish population to ascertain the relative health of year classes which are influenced by this impact. As such no monitoring is advised during drought	Monitoring this potential impact should involve post drought monitoring of the fish population to ascertain the relative health of year classes which are influenced by this impact. As such no monitoring is advised during drought as this may cause further stress.	Mitigating the impact of changes to feeding regimes and movement patterns is not feasible during drought permit implementation.	P s ir p s a N o o m p ir
Reduction in abundance and distribution of flow fish sensitive species.	 Brown trout and bullhead populations are well understood as a result of: RHS+ walkover survey Environment Agency Rare and Protected Species database Data from EA fish monitoring sites Local knowledge from Environment Agency fisheries and ecology teams 	Surveillance walkover of key sections with fish populations which are known to be susceptible to hydrological impacts (as informed by RHS+ surveys and local knowledge from EA).	Surveillance walkover of key sections with fish populations which are known to be susceptible to hydrological impacts (as informed by RHS+ surveys and local knowledge from EA).	In extreme cases, following consultation with the Environment Agency restocking of flow sensitive fish species can be considered if recovery needs to be facilitated	S fi s ir k d



Post Drought Permit Monitoring and post-drought mitigation where applicable) to be particularly low in order to provide a suitable comparison to make a conclusion on deterioration or otherwise within the mpacted reaches. n the year following a drought undertake a post-drought fish survey to substantiate the evel of impact. n the year following a drought undertake a post-drought fish surveys at EA monitoring sites to substantiate the level of impact. Post-drought and year 3 fish population surveys at Environment Agency monitoring sites (corresponding with a control and mpact site/s) to determine any changes in population dynamics both temporally and spatially, including fish ageing (scale) analysis. Mitigating this pressure should concentrate on post drought monitoring to determine overall health of fish population and inform measures to facilitate the recovery of the fish population post drought permit mplementation. Surveillance walkover of key sections with

surveillance walkover of key sections with ish populations which are known to be susceptible to hydrological impacts (as nformed by RHS+ surveys and local knowledge from EA) in the year following the drought.

Potential impact	Baseline conditions	On-set of environmental drought	During Drought Permit implementation		Post Drought Permit
	Key locations	Monitoring and trigger setting	Trigger and monitoring to inform mitigation action	Mitigation actions	Monitoring and post- (where applicable)
					Post drought, electric f also be carried out at e monitoring sites which populations of sensitiv assist with determining successfully migrated impacted reaches from tributaries.
					More than one survey
Entrainment of fish individuals during back-pumping operation.	This impact will be isolated to locations where back pumping is in operation.	As back pumping will only be in operation during drought permit implementation, monitoring during environmental drought is not required.	On initiation of back pumping operation, periodic monitoring of the pumps should be carried out to ensure fish screens and deterrents are successful in preventing fish entrainment. Frequency of monitoring should be determined locally depending on duration of the back pumps are in operation.	The pumps would be appropriately screened to protect against fish entrainment using "fish friendly" pumps if available or, standard pumps supplemented with an appropriate screen and fish deterrent devices compliant with the Environment Agency Best Practice Guide.	Monitoring for this important post-operation.
Reduction in abundance or distribution of fish species as a result of reduced water quality.	 Water quality is well understood as a result of water quality monitoring undertaken by the EA. In addition, key water quality locations (e.g. near STW outfalls) have been identified. Fish populations are well understood as a result of: Data from EA fish monitoring sites Local knowledge from Environment Agency fisheries and ecology teams Undertake River Habitat Surveys (RHS) focussed on locations of bank poaching, surface water outfall input and also downstream of weirs where flows are likely to be particularly low in order to provide a suitable comparison to make a conclusion on deterioration or otherwise within the impacted reaches. 	Surveillance walkover of key sections with known water quality pressures and sections known to be susceptible to lower flows. Measure dissolved oxygen, conductivity and temperature in the field using calibrated handheld equipment. Appropriate trigger values would be set for key water quality determinants (e.g. dissolved oxygen), level and flow based on local circumstances, timing, seasonality and expert opinion. Known areas of dry habitats are typically avoided during the walkover, but recorded where observed to confirm and/or confirm existing knowledge.	Surveillance walkover of key sections with known water quality pressures and sections known to be susceptible to lower flows. Measure dissolved oxygen, conductivity and temperature in the field using calibrated handheld equipment. Deployment of automated water quality equipment that continuously monitors for dissolved oxygen.	Deployment of aeration equipment in key reaches that have standing or slow flowing water with low oxygen levels. Where point sources (STW) can affect water quality, consider improving treatment efficiency and/or dosing with hydrogen peroxide in line with Environment Agency Guidance to (further) reduce biochemical oxygen demand.	Post-drought and year surveys if needed at E monitoring sites (corre control and impact site changes in population temporally and spatiall ageing (scale) analysis Walkover of key spawn recording the number affected, undertaken d spawning period. Reco marginal habitats, spay composition of the bed estimates of overlaying Undertake River Habit focussed on locations surface water outfall in downstream of weirs w to be particularly low in suitable comparison to deterioration or otherw impacted reaches.
Increased proliferation of blue green algal blooms.	Key locations of blue green algal bloom can be established upon liaising with EA.	Monthly walkover of key locations previously established. Visual assessment of algal blooms. Samples to be collected from algal blooms which are suspected to contain blue green algae. Samples to be analysed following EA guidance on assessing blue green algae blooms. On confirmation of a blue green algae bloom EA are to be notified.	Monthly walkover of key locations previously established for visual assessment of algal blooms. Samples to be collected from algal blooms which are suspected to contain blue green algae. Samples to be analysed following EA guidance on assessing blue green algae blooms. On confirmation of a blue green algae bloom EA are to be notified.	Mitigation of blue-green algal blooms should centre around reporting all blooms to the EA to ensure that appropriate action can be taken to inform the public. If major risk identified, consider treatment of algal bloom.	Upon cessation of the baseline conditions wil Thames. As such no fu be required post-droug



Ionitoring and post-drought mitigation where applicable) Post drought, electric fishing surveys should

also be carried out at established fish monitoring sites which have known oopulations of sensitive species. This will assist with determining whether these have successfully migrated back to previously mpacted reaches from non-impacted ributaries.

Nore than one survey may be required

Ionitoring for this impact is not required ost-operation.

Post-drought and year 3 fish population surveys if needed at Environment Agency nonitoring sites (corresponding with a control and impact site/s) to determine any hanges in population dynamics both emporally and spatially, including fish ageing (scale) analysis.

Valkover of key spawning locations ecording the number of redds potentially ffected, undertaken during the winter pawning period. Record extent of exposed marginal habitats, spawning habitats, composition of the bed substrate and estimates of overlaying silt cover.

Indertake River Habitat Surveys (RHS) to ocussed on locations of bank poaching, surface water outfall input and also downstream of weirs where flows are likely be particularly low in order to provide a uitable comparison to make a conclusion on deterioration or otherwise within the mpacted reaches.

Jpon cessation of the drought permit, aseline conditions will return in the River hames. As such no further monitoring will e required post-drought.

Potential impact	Baseline conditions	On-set of environmental drought	During Drought Permit implementation		Ро
	Key locations	Monitoring and trigger setting	Trigger and monitoring to inform mitigation action	Mitigation actions	Mc (w
Increased distribution of invasive non-native species (INNS)	Locations of INNS species to be ascertained upon liaising with local EA biodiversity and ecology teams.	Further monitoring of INNS using previously detailed survey techniques, at locations established during investigatory surveys. This includes the mapping of localities where INNS were observed and photographs	Further monitoring of INNS using previously detailed survey techniques, at locations established during investigatory surveys	All INNS surveys should be carried out in compliance with biosecurity guidance	Fu det est
	surveys and methods are to be informed by EA knowledge around key locations (including back pumping operations and known any known obstacles to INNS spread)				Mc fol at



ost Drought Permit

onitoring and post-drought mitigation /here applicable)

urther monitoring of INNS using previously etailed survey techniques, at locations stablished during investigatory surveys.

II INNS records to be provided to the EA

onitoring should commence in the year llowing the drought and should continue for least two years

7.3 Monitoring

Monitoring is required to track the environmental effects to show whether they are as predicted, to help identify any adverse impacts and trigger deployment of mitigation measures.

DPs encompass a basket of measures that will only be implemented if and when required because of the unpredictable occurrence of a drought event, and thus the actual impact of the plan over its life is subject to very significant uncertainties.

Thames Water's DP includes a range of possible measures to allow Thames Water to respond to a particular drought in the most appropriate way. It is impossible to predict in advance which and how many of the measures will be required, and in which order of priority, to respond to each particular drought event. Correspondingly, it is therefore difficult to prescribe monitoring for the effects of the DP as a whole, and more appropriate to consider monitoring for drought options with significant environmental effects should these options be implemented during an actual drought.

As described in Section 1.5, EARs have been prepared. The EARs include detailed Environmental Monitoring Plans (EMPs) in support of the DP and in compliance with the requirements of Section 6 (Environmental Assessment, Monitoring and Mitigation) of the DPG. The DPG requires the environmental assessment and EMPs to be updated regularly. The monitoring requirements will be assessed in more detail through this process. As described in the DP 2022, in the event of a drought requiring the implementation of drought option(s), Thames Water will review the requirement for environmental monitoring in consultation with the Environment Agency and Natural England.

As part of the environmental assessment of each drought option, for those receptors with a potential **moderate** or **major** impact from implementation of the associated drought permit, site specific monitoring has been recommended, together with triggers to inform practical implementation of mitigation measures. These are described in the EARs and EMPs. Monitoring would occur at the following three stages:

- 1) At the on-set of environmental drought.
- 2) During implementation of the drought permit/order.
- 3) After the drought.

Control sites are important for a consistent approach to monitoring. Control sites would be identified during implementation of the permit on systems experiencing environmental drought. Possible options could include reaches upstream of those impacted, or other watercourses within Thames Water's drought permit/order options where the watercourses are comparable and not subject to a drought permit application.


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Appendices



Appendix A

Statutory Consultee Responses to the Scoping Report



A. Statutory Consultee Responses to the Scoping Report

This Appendix sets out the consultation responses received from the statutory consultation on the Scoping Report. The consultation period was held between 13 July 2020 to 14 August 2020. The table below sets out Thames Water's response to the comments received together with particular sections where the comments have been addressed during drafting of the Environmental Report and accompanying Appendices.

No.	Consultee	Comment	Response	Where addressed in Drought Plan Environmental Report
1	Historic England	 Historic England is a statutory consultation body in relation to the SEA Directive in regard to any matters affecting the historic environment. We are content that the scoping report for Thames Water's drought plan adequately covers the issues that may arise in respect of the potential effects of proposed development sites on heritage assets. Historic England has prepared generic guidance with regards to our involvement in the various stages of the local plan process which you may find helpful in preparing the Sustainability Appraisal. This is available to download here: https://historicengland.org.uk/images-books/publications/sustainability-appraisaland-strategic-environmental-assessment-advice-note-8/. This opinion is based on the information provided by you and for the avoidance of doubt does not affect our obligation to advise you on, and potentially object to any specific development proposal which may subsequently arise from this or later versions of the plan which is the subject to consultation, and which may, despite the SEA, have adverse effects on the historic environment 	Noted	No action
2	Environment Agency	It would be good to understand if SEA can help in determining order of actions to limit impacts. It may be beneficial to include a section on this to highlight the relationship between the environmental assessments, drought operations and whether the SEA in-combination assessment would inform the categorisation.	It is impossible to predict in advance which and how many of the drought measures will be required and in which order of priority, to respond to each particular drought event. The SEA of DPs cannot provide a certain prediction of an overall environmental effect of adopting the plan, as its implementation is uncertain. However, the resulting significance of effects is used to inform the prioritisation of options. Thames Water have taken the predicted impact into account in deciding the provisional order of priority of implementing the permits.	Section 1.2.2 and Section 4.3
3	Environment Agency	We welcome the consideration of WRMP24 proposals within the assessment (in-combination and cumulative). It would also be good to understand how the drought plan will be updated following publication of WRMP24.	The assessment is based on the most up to date information at the time. WRMP24 proposals will not be available for Draft DP. Assessments will be reviewed at the time of drought option implementation to review if changes to WRMPs have been made during the intervening period and that the assessment is updated accordingly and remains valid. Thames Water will include any relevant updates arising from WRMP24 in their draft DP27.	No action
4	Environment Agency	Page 3, para 3 - "Stonor Park OBH has been chosen for tracking groundwater levels in the Chilterns" For our WSR we are using data from Stonor Estate OBH which was drilled in 2015 to replace Stonor Park due to some GWL data issues. We are still dual monitoring both sites. Thames Water should consider switching to the new site.	Thames Water will liaise with the Environment Agency to determine when to switch to the new OBH.	No action
5	Environment Agency	Does this include both surface water catchments and groundwater catchments?	Yes.	No action
6	Environment Agency	Please note that the Drought Plan Directions and environmental assessment guidance have been published and are available on Defra Huddle website.	Noted, updated references have to these have been included in the Environmental Report,	Various sections
7	Environment Agency	We'd recommend considering the EA's National Framework. Although long-term, it does cover some part of the drought plan period.	National framework has been considered and included in the Environmental Report.	Appendix B and Section 2.2
8	Environment Agency	We'd recommend also considering the draft Water Resources Planning Guidelines that are currently out for consultation.	Reference to this has been made in the Environmental Report.	Appendix B and Section 2.2
9	Environment Agency	"Environment Agency CAMS (various)" these are now referred to as Abstraction Licensing Strategies.	This has been amended.	Various sections
10	Environment Agency	There is a reference to the EA's Creating a better place document which ends this year and has been updated to EA2025. This should be considered.	Environmental Report now references most recent update.	Appendix B and Section 2.2
11	Environment Agency	RBMPs are going to be updated for cycle 3 and it will be good to reference these as there may be some changes.	Noted, reference has been updated.	Various sections
12	Environment Agency	There are also going to be new Flood Risk Management plans as well.	Noted, reference has been updated.	Various sections



13	Environment Agency	Annex A needs to include a reference to Local Catchment Partnership Plans.	This has been amended.	Appendix B and Section 2.2
14	Environment Agency	Should OxCam be considered?	Relevant plans and/or publications from OxCam have been reviewed and included in baseline review where appropriate. Thames Water will also review for the WRMP.	Appendix B and Section 2.2
15	Environment Agency	Biodiversity flora and fauna key messages. Recommend the inclusion of a message around improving the resilience of habitats to climate change. This has a direct impact on the development of mitigations measures and provides context around other statements such as protecting corridors. In regard to refine documents, the Lawton principles would be a useful reference.	Reference to climate change is made in the first key message. Thames Water are reviewing the opportunities for implementing measures to address the resilience of sensitive sites that could be affected by their options. They will be taking this into account in delivering river restoration in AMP7 for the River Darent.	No action
16	Environment Agency	Biodiversity etc. recommend reference to activities should include "directly or in-combination". Consideration of in combination impacts need to be considered throughout the process, the amended wording would make this explicit.	Key message will be updated in Environmental Report as follows: "Avoidance of activities, directly or in-combination, likely to cause irreversible damage to nature conservation and natural heritage".	Section 2.2
17	Environment Agency	Recommend the paragraph on well-functioning ecosystems include reference to essential physical and biological processes. It is important that geomorphological processes are recognised as an essential component of ecological function, it is especially important in this context with for instance the importance of flushing flows to maintain spawning habitat.	Will be updated in Environmental Report as follows: "Support well-functioning ecosystems and essential physical and biological processes, respect environmental limits and capacities, and maintain/enhance coherent ecological networks, including provision for fish passage and connectivity for migratory/mobile species".	Section 2.2
18	Environment Agency	Key policy messages derived from the review of Plans, Policies and Programmes Recommend adding Groundwater Directive (GWD) 2006/118/EC to the table under the international policies	Noted, reference to Groundwater Directive included in policy context review.	Appendix B and Section 2.2
19	Environment Agency	Notes that limitations for data are that some may be dated. Would be useful to understand when updates are due or how they may be considered.	Baseline data for the SEA will be reviewed and, where possible, updated at each iteration of the Drought Plan which will be every 5 years or sooner if there is a material change to the Drought Plan.	No action
20	Environment Agency	"The Thames river basin is conventionally divided into four zones: the tidal, lower, middle and upper Thames" - no lower Thames is subsequently mentioned. The middle Thames appears to extend to the tideway.	Noted, description of Thames river basin has been updated.	Section 3.3
21	Environment Agency	Within the paragraph reporting on protected sites, would recommend that reference is also made to species of principle importance. Chalk streams are considered to be an important and vulnerable resource and should be referenced throughout the sections on biodiversity	There is a paragraph on species and habitats of principle importance in the biodiversity, flora and fauna baseline (Appendix C, C1) which also includes reference to chalk streams. Thames Water is working with WRSE to determine the level of Environmental Ambition measures required in the future. This applies particularly to chalk streams and Thames Water is seeking to cease all abstraction that adversely affects vulnerable chalk streams.	Appendix C, Section C.1.2
22	Environment Agency	"Daily consumption of water is higher than the national average in the area and consequently there is a continued need to encourage more efficient water use" – should there be some recognition of zonal differences?	See Sections 1.2.7, 1.4.2 and 3.1 of the Scoping Report. This level of detail is not typically required for an SEA of a plan. The purpose of the baseline review is to form the objectives for strategic, not detailed, environmental assessment. The SEA can, therefore, be used to support the timing, prioritisation and implementation of actions within the plan.	No action
23	Environment Agency	This should also consider the need to ensure no deterioration for WFD. For some water bodies, improvement may not be possible so preventing deterioration is important.	Noted, key issues updated to include no deterioration. Thames Water is undertaking a number of 'No deterioration' investigations in AMP7.	Section 3.4.4
24	Environment Agency	"The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives." The need to improve quality of groundwater resources should be added to this point.	Improvement may not always be possible. Key issues updated to include no deterioration.	Section 3.4.4
25	Environment Agency	P19: "The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives". Seems to cover this in general as long as chemistry objective is not "lost" by reference only to those chemical elements contributing to the ecological classification. The priority hazardous and priority substances are important and could potentially be more problematic than the "ecological" chemistry elements.	The SEA is objectives-led and the objectives have been derived from law, policies and other plans and programmes as well as a review of the environmental baseline information. The SEA is not a detailed assessment. EARs contain detailed assessment and include priority substances and the outcomes of which have been used to inform the SEA.	No action
26	Environment Agency	P26: Under "Water section" – the comments "Will it minimise risks of adverse effects on water quality?"; "Will it affect WFD compliance (supporting elements to Good Ecological Potential/Status, including hydromorphology)?"; "Will it affect bathing?" tends to suggest that the true chemistry elements (ie those used for the chemical classification- which should also NOT Deteriorate) appear to have been overlooked in the WFD compliance comment- since it's not just about Ecological Potential- where only some of the "chemical" elements are contributory factors to the ecological classification. PAHs like benzo-g,h,i- perylene may require specific consideration as they are probably at levels higher than are generally recognised by the 2015 classification (which does not flag them as failing- though the same concentrations recorded as passing in 2015 would now be regarded as failing (so the likelihood is the tideway fails currently).	The SEA is objectives-led and the objectives have been derived from law, policies and other plans and programmes as well as a review of the environmental baseline information. The SEA is not a detailed assessment. EARs contain detailed assessment and include priority substances and the outcomes have been used to inform the SEA. An indicator question has been added to the Environmental Report to make specific reference to quantitative and chemical status of GW bodies.	Table 4.1



		Ultimately it will need to be demonstrated that the proposals remain WFD compliant for water quality (all elements) to be acceptable.		
		It is worth specifically mentioning the Quantitative and Chemical Status of groundwater bodies "Will it affect WFD compliance for groundwater bodies e.g. Good Quantitative and Chemical Status?" could be added among the Indicator Questions		
27	Environment Agency	Indicator questions: recommend "will it protect essential physical and natural processes, to maintain ecological integrity?"	Indicator question has been added based on recommendation.	Table 4.1
28	Environment Agency	Water topic' section and the final column titled 'indicator question'. Bullet points include: 'Will it affect WFD compliance (supporting elements to Good Ecological Potential/Status, including hydromorphology)?' And 'Will it affect WFD compliance e.g. Good Environmental Status?'. How will you use the WFD Hydrological Regime or Flow Compliance to prevent deterioration of WFD waterbody status?	We utilise the findings of the EARs to inform SEA assessments. Noting SEA is a strategic review and is objectives-led. Indicator questions have been used to derive objectives. Detailed assessment is documented in the EARs.	No action
29	Environment Agency	Will there be some consideration on the impact of existing groundwater water quality problems on the yield of drought sources? Table 3.2 doesn't seem to have an objective that this naturally sits in, although note that this would be considered through the RBMP for example which includes groundwater Safeguard Zone Action Plans for abstractions affected by deteriorating water quality, plus AMP7 PR19 Schemes.	The aim of the SEA is to determine the likely significant effects on the environment as a result of implementing a plan or programme. It is not a detailed assessment. These are covered by the EARs which have been used to inform the SEA.	No action
30	Environment Agency	Section 1.1 recommend reference to species and habitats of principle importance. Within the definition of significance, it would be useful to have clarity on what criteria is used to define regional/national importance.	Protected habitats and species cover reference to species and habitats of principle importance. Examples added to text to clarify the criteria for regional/national importance.	Section 4.3
31	Environment Agency	'Water' topic - how are you going to use the WFD Hydrological Regime/Flow Compliance within the context or to inform point '4.1 To avoid adverse impact on surface and groundwater levels etc'	We utilise the findings of the EARs to inform SEA assessments. Noting SEA is a strategic review and is objectives-led. Indicator questions have been used to derive objectives. Detailed assessment is documented in the EARs.	No action
32	Environment Agency	Example of a SEA Appraisal Framework Table to be Completed for Each Drought Option Could you please add "to avoid adversely affecting water body status" to the Objective 4.1	This is covered through objective 4.2.	No action
33	Environment Agency	Point 3 This may be implied, but this should include any DPs from other water companies that fall within the Thames Water supply area as well as those cross boundary.	This is covered within 'other water companies DPs and WRMPs'.	Section 6.5
34	Environment Agency	Point 4 "during the period of the DP (i.e. up to 2023)" Assume this needs to be corrected	Noted, this has been updated to 2027.	Section 4.3.1
35	Environment Agency	Point 4 Note River Thames Scheme as one of these projects that is likely to be impacted.	Assessment complete, see 6.5.6.1 of Environmental Report for the outcome.	Section 6.5.6.1
36	Environment Agency	Cumulative assessments - "assuming as a worst case that the operation of the two options could occur simultaneously" will only two be considered cumulatively?	Text updated to reference "two or more".	Section 4.3.1
37	Environment Agency	Page 42 Could an outcome of a significant cumulative effect also be prevention of two options being implemented simultaneously (rather than solely finding an alternative option)?	Thames Water would only implement two options simultaneously if the drought severity warranted it. Mitigation through the identification of potential alternatives would be considered where possible.	Refer to Section 4.2, 4.3 and 1.2.2 and Appendix E
38	Environment Agency	Water Framework Directive - "The SEA should seek to promote the protection and enhancement of all water resources." – it should also consider no deterioration. It may also be worth referencing clauses 4.6 & 4.7	No deterioration will be added in Environmental Report.	Appendix B
39	Environment Agency	The influences cited under INNS are similarly vague.	Updated influences in Appendix A.	Appendix B
40	Environment Agency	"Sutton & East Surrey Water" is now "SES Water".	Reference updated in Environmental Report.	Appendix B and Section 2.2
41	Environment Agency	Recommend adding Groundwater Directive (GWD) 2006/118/EC to the table under the international policies	Noted, reference to Groundwater Directive included in policy context review.	Appendix B and Section 2.2
42	Environment Agency	B2.2 - Human Health. By 2022 this may need updating with COVID?	Current COVID-related data are unlikely to provide any meaningful insight to current baseline, however, impacts from COVID have been referenced in the future environmental baseline section.	No action
43	Environment Agency	B3.1 - Water Use - 2016/17 is quoted. I have 2018/19 (England is 143) and TW should now have 2019/20.	B.3 updated with revised figures	Appendix C3.1



44	Environment Agency	B4.1 "Approximately 80% of Thames Water's supplies are derived from surface water abstraction" - inconsistent with the figure in section 1.2.1, which was 85%.	85% figure is an average of last 3 years. Both figures updated based on most recent Drought Plan (80%).	Appendix C4.1
45	Environment Agency	Reference to CAMS rather than Abstraction Licensing Strategies	Now refer to CAMS as Abstraction Licensing Strategies in Environmental Report.	Various sections
46	Environment Agency	 Biodiversity, Flora and Fauna (pages 78-84) This section acknowledges the importance of habitats of principal importance and references some of them, but does not list all those which may be more impacted by the DP options and nor are they mapped, albeit this would be difficult to show at the scale used for mapping designated sites. There is also no reference to Local Wildlife Sites (LWS), a subset of which will be hydrologically dependent and will be equally vulnerable (many will overlap with the habitats of principal importance). The SEA scoping report should make explicit reference to the fact that LWS and habitats of principal importance will be considered alongside other designated sites in the SEA process - they deserve a similar level of consideration. They should be considered for individual site EARs of course, as do designated sites, but are also relevant to the consideration of cumulative and synergistic impacts. A list of LWSs is being compiled for the EAR updates, and the data obtained for these sites should be considered in this assessment. 	See sections 1.2.7, 1.4.2 and 3.1 of the Scoping Report. The purpose of the baseline review is to form the objectives for strategic, not detailed, environmental assessment. The SEA can, therefore, be used to support the timing, prioritisation and implementation of actions within the plan. It is acknowledged and noted that LWS are important and reference will be made to them in the baseline environment section of the Environmental Report. However, a detailed review of them is not appropriate for the SEA and moreover, the objectives will not change as a result of including LWS. LWS are being reviewed within the individual drought option EARs. However, as agreed with the Environment Agency, this exercise is on-going and the finding of the assessments will not be incorporated into the current EARs which are submitted with the Draft Drought Plan. When this has been completed, the outputs will be used to inform the SEA.	Appendix C1.1
47	Environment Agency	Could this be reviewed and updated as necessary?	This will be reviewed and updated at the next iteration of the Drought Plan if new data is released.	No action
48	Environment Agency	Page 98 Note Days has recently been suspended by Sutton Courtenay gauge for CAMS etc.	Thames Water will use the gauge currently being used by the Environment Agency and will use Sutton Courtenay when the refurbishment is complete.	No action
49	Environment Agency	Should there be any consideration of pollution for the wastewater side of the business?	The purpose of the baseline review is to identify the current baseline conditions and take into account impacts on water quality in the EARs. This is described in B.4.	No action
50	Environment Agency	On the map showing the Thames Water area and Surface water features, detail of rivers is missing and quite high level.	The intention here was to provide an overview of the main rivers in the study area, due to the large geographic area that the SEA covers. Detailed assessment and review of surface and groundwater features is undertaken for each drought option and is documented in the EARs which are used to help inform the SEA.	No action
51	Environment Agency	P101 (actual page number) Information should be updated with most up to date information for WFD waterbody status, when these are released externally (planned for autumn 2020).	Baseline has been updated with 2019 Cycle 2 information.	Table C10 and C11
52	Environment Agency	Baseline (Water) "Groundwater quality issues include high nitrate levels in some aquifers. Implementation of drought plan options which increase the frequency and speed of groundwater abstractions (i.e. at a faster rate than groundwater source can be replenished) can potentially result in a negative impact on groundwater quality due to reduced dilution." The negative impact on surface water quality due to reduced dilution is equally important and should be addressed in the SEA and drought plan.	Agreed and it should be noted that detailed assessments of drought options are provided in the EARs which are used to inform SEA. Drought plan options are planned for only being implemented once every 20 years on average and so, should not have significant effect on groundwater quality issues.	No action
53	Environment Agency	Page 101 – Water Quality: "Water quality is classified according to several quality elements in line with the requirements of the Water Framework Directive (WFD)" The report gives figures for water bodies that are at good status, moderate status, poor status. The SEA does not indicate what this information will be used for or how this information will be used. What percentage of RNAGS for water bodies in the Thames River Basin District are associated with drought (link to abstraction and reduced dilution)?	See Sections 1.2.7, 1.4.2 and 3.1 of the Scoping Report. The purpose of the baseline review is to form the objectives for strategic, not detailed, environmental assessment. The SEA can, therefore, be used to support the timing, prioritisation and implementation of actions within the plan. The information on waterbody status is to give an indication of the baseline conditions for the area only. Text has been added to B.4.1 around RNAGS. Drought plan options are planned for only being implemented once every 20 years on average.	Section C.4.1 - Water Quality
54	Natural England	Generally Natural England consider that the scoping document has highlighted appropriate SEA objectives and proposed sensible baseline evidence gathering. However, we advise that there may be some gaps in both the proposed 'baseline key issues', 'SEA objectives' and 'indicator questions', these are summarised below by SEA Topic as presented within Table 3.1 of the Drought Plan Scoping document:	See Sections 1.2.7, 1.4.2 and 3.1 of the Scoping Report. It should be noted that SEA is a strategic review and is objectives-led, based on the current state of the environment, key environmental issues identified, policy messages and indicator questions. Detailed assessment is not an SEA requirement - this is undertaken for each drought option and is documented in the EARs which are used to help inform the SEA. The SEA can, therefore, be used to support the timing, prioritisation and implementation of actions within the plan. This response should be taken into consideration in subsequent comments and responses below made by Natural England.	No action
55	Natural England	We acknowledge that a comprehensive list of 'policies, plans and programme key messages' has been included in Table 3.1 for biodiversity. Having said this, TWUL should consider including the 25 Year Environment Plan and the Environment Bill to this list. While the Environment Bill progress has stalled it is likely that it will become relevant over the coming years, and TWUL should mention this. NB Natural England acknowledge that these are both referenced in Appendix B of the Drought Plan Scoping document and would suggest including this in the summary list as well.	The 25 Year Environment Plan has been included in Appendix B and in other areas of the report but will be added to this table for clarity. The Environment Bill (although not yet adopted) will be added for consideration.	Appendix B, Section 2.2 and Appendix C.1.2



56	Natural England	Objective 1.1 aims to "conserve and enhance biodiversity, including designated sites", and this is echoed in the indicator questions outlined in Table 3.1. Natural England would encourage TWUL to review aspects of your drought options and try to identify areas where habitat improvement works, prior to drought action, may help to provide resilience to increased stress from abstraction pressure. This should be incorporated into the baseline assessment.	See "General" comment and response (No. 54) above. SEA is a high level assessment of the Drought Plan. Detailed assessments have been undertaken in EARs, including any potential monitoring and mitigation measures. These have been used to inform the SEA. Thames Water is reviewing opportunities for implementing measures to mitigate the impacts of its drought options where possible e.g. through river restoration. This work is ongoing and Thames Water hope to include some measures in our plans for 2025-2030.	No action
57	Natural England	There seems to be some disparity between the SEA objectives and the baseline key issues and indicator questions. For example, climate change is mentioned in the baseline key issues – but this is not translated into the SEA objectives. Climate change poses a significant risk to the water environment and water resources. As such, TWUL may need to consider the exacerbation of water resource stresses from climate change and how this may influence the scale of risk from a particular drought option. Natural England has prepared a Climate Change Adaptation Manual to help partners to identify and support habitats and species to adapt to climate change. This document could be useful when assessing the scale of potential additional risk drought action could have.	See "General" comment and response (No. 54) above. The Drought Plan is in place for 2022- 2027 and the impacts of climate change are addressed through Thames Waters WRMP. Thames Water are working through their WRMP to improve their resilience to drought, so that they are less reliant on the use of drought permits in future and this increased resilience will take into account climate change impacts. Climate change is addressed in the following indicator question under biodiversity, flora and fauna: "Will it contribute to the sustainable management of natural habitats and ecosystems, i.e. within their limits and capacities taking into account climate change adaptability?" which informs the objectives.	No action
58	Natural England	We note that there is a separate climate change SEA topic area, and the above could equally be included within this topic area. Ultimately, TWUL must ensure that climate change risk to sensitive habitats is captured within the SEA baseline, particularly when considering protected sites.	See "General" comment and response (No. 54) above. The Drought Plan is in place for 2022- 2027 and the impacts of climate change are addressed through Thames Waters WRMP. Thames Water are working through their WRMP to improve their resilience to drought, so that they are less reliant on the use of drought permits in future and this increased resilience will take into account climate change impacts. Climate change is also considered in the "Air and Climate Topic" i.e. in addition to the biodiversity, flora and fauna topic.	No action
59	Natural England	We are broadly happy with the summary of the Environmental Baseline Review as outlined in Appendix B of the document. However, while the NERC Act Section 41 habitats and species are referred to and listed, which is excellent, it is not clear how these habitats and species will be addressed within the Drought Plan, especially if these habitats and species will be impacted by drought action.	See "General" comment and response (No. 54) above. The baseline information has been used to inform the SEA objectives which form the framework for assessment. The EARs provide more detailed assessment, including on NERC habitats and species, and the outcomes feed into the SEA.	No action
60	Natural England	Paragraph B.1.1 states the following "the duration of effects on sensitive features and reversibility post drought are important considerations". While this is very true, Natural England would add that there are particular and significant stressors already on aquatic environments in the South East, even out of drought, and therefore there may be a degree of action that TWUL could take on particular habitats prior to drought as well. If TWUL looks at this within their baseline assessment, they may be able to find areas within their Drought Plan area that could provide habitat improvement works to help build resilience and buffer habitats from exacerbated impacts as a result of both drought, and additional abstractions because of drought.	See "General" comment and response (No. 54) above. Thames Water is reviewing opportunities for implementing measures to mitigate the impacts of its drought options where possible e.g. through river restoration. This work is ongoing and we hope to include some measures in our plans for 2025-2030.	No action
61	Natural England	Natural England advise that water dependant SSSIs, European sites and Ramsar sites will need to be considered within this section of the SEA, where relevant, along with reviewing implications around WFD status. We mention this due to the fact that WFD is referenced within this section, so for consistency it would be sensible to also reference designated sites which may be influenced by the plan.	Designated sites are considered in the Biodiversity, Fauna and Flora SEA topic. Inherently, impacts on designated sites have been covered by existing objectives.	Section C.1
62	Natural England	Impacts from the Drought Plan should be considered in light of the Government's policy for the protection of the best and most versatile (BMV) agricultural land as set out in paragraph 170 of the NPPF. We also recommend that soils should be considered in the context of the sustainable use of land and the ecosystem services they provide as a natural resource, as also highlighted in paragraph 170 of the NPPF.	The key messages and indicator questions in Table 4.1 have been used to develop objectives for SEA topic on Soils, geology and land use.	No action
63	Natural England	While it may be unlikely that drought action will result in large infrastructure development, this should still be screened out and included within the SEA.	For each drought option, the SEA considers and addresses both construction and operational aspects for all SEA topics and objectives, so any infrastructure development associated with a drought option will be addressed.	No action
64	Natural England	Natural England reiterate the comments that we made in reference to climate change adaptation under 'Biodiversity, flora and fauna'.	See "General" comment and response (No. 54) above. The Drought Plan is in place for 2022- 2027 and the impacts of climate change are addressed through Thames Waters WRMP. Thames Water are working through their WRMP to improve their resilience to drought, so that they are less reliant on the use of drought permits in future and this increased resilience will take into account climate change impacts.	No action
			fauna: "Will it contribute to the sustainable management of natural habitats and ecosystems,	



			i.e. within their limits and capacities taking into account climate change adaptability?" which informs the objectives.	
65	Natural England	Section B.6 talks about climate change in more detail, but Natural England do not think this section fully captures the impacts that climate change could have on water resilience. For example, in paragraph B.6.2 is states that "Climate change is likely to have an impact on wildlife in the future by exacerbating existing pressures such as changes to the timing of seasonal activity, and water scarcity". This is slightly misleading as it implies that climate change is potentially a future issue. The reality is that we are seeing the effects of climate change now, and all sectors needs to acknowledge this and take action to not only reduce emissions, but to actively enhance our ecosystems to ensure that we are adapting to climate impacts both for wildlife and human populations. We advise that this is expanded on within the Drought Plan's SEA, especially given the risk that climate change puts on water resources and the need to balance sustainable water abstraction with environmental health.	See "General" comment and response (No. 54) above. The Drought Plan is in place for 2022-2027 and the impacts of climate change are addressed through our WRMP. We are working through our WRMP to improve our resilience to drought so that we are less reliant on the use of drought permits in future and this increased resilience will take into account climate change impacts. The climate change impact on water resilience has also been covered in the Water topic (see B4.3 and Table 3.1).	No action
66	Natural England	The following may be useful resources that TWUL could use in order help with climate change assessments: Committee on Climate Change Net Zero Report and the Met Office 2018 UK Climate Predictions (UKCP18)	Noted, these have been reviewed and included in the policy context and/or environmental baseline review where necessary and will be used in Thames Waters WRMP approach.	Various sections
67	Natural England	The SEA will need to undertake a Landscape and Visual Impact Assessment (LVIA) for any drought options which may result in significant infrastructure development in or in the setting of an Area of Outstanding Natural Beauty (AONB). This will only be necessary if there is any work that may be required as part of the Drought Plan that would influence an AONB.	It is not the purpose of the SEA to undertake LVIA. SEA draws on detailed information in the EARs. SEA does assess construction and operation impacts. No drought options will result in a significant infrastructure development.	No action
68	Natural England	Natural England has reviewed the proposed assessment framework as outlined in section 3.2 of the Drought Plan Scoping Document. We consider that the proposal seems appropriate and should ensure that all drought options are suitably reviewed against the SEA objectives outlined. The visual evaluation (VE) matrix as explained in paragraph 3.2.1.1 and the example provided in table 3.5 is very clear and Natural England consider that this will help summarise the results of the SEA very clearly per drought option. Natural England encourages the provision for monitoring, and would suggest the Drought Plan incorporates the monitoring stipulations that may be required for each designated site that is likely to be affected by drought action. It would also be advantageous to clarify here how the proposed monitoring programmes will distinguish the effects of natural drought from the additional pressures	Environmental Monitoring Plans for drought options are included in the relevant EARs (see Section 1.3 of the Scoping Report) and these have been used to inform the SEA. Mitigation and Monitoring of the Drought Plan is described in the Environmental Report.	Section 7
69	Natural England	Natural England broadly agree with the cumulative assessments proposed in section 3.2.2 of the Drought Plan scoping document. However, we would advise that the following should also be considered when reviewing the Drought Plan and the options therein: - We advise that point 4 (which explains that the Drought Plan will identify any relevant plans and projects that may be in place during the Drought Plan period) looks into Local Authority Plans and reviews how development over the plan period may change local water budgets. - While we acknowledge that the Drought Plan will not directly contribute to the creation of Nature Recovery Networks (NRNs), it is likely that Local Boroughs and Districts will start investing in this work over the coming years, and as such these plans will need to be considered in tandem with any drought action taken.	DPs comprise a basket of measures, the implementation of which are dependent on the particular drought conditions experienced and are subject to temporal, spatial and other factors. The exact timing of implementation of drought options will not be known until a drought is experienced. One of the limitations of the cumulative or in-combination assessment of Thames Water's Drought Plan is that whilst an environmental appraisal of each drought option can be undertaken, the lack of predictability of which options will be implemented in any particular drought event means that it may be impossible to provide an accurate cumulative assessment of the impacts of the plan for a possible future drought event. Local Authority (LA) plans have been reviewed in the policy context of the SEA. Specifically, for LA plans and local water budgets, this is covered in more detail in the WRMP. Regarding NRNs, it is recognised that consideration may need to be given to the potential impact that drought options may have on their integrity. However, it is considered that this is a drought action specific issue and that it would not be practical to undertake such a detailed assessment as part of the SEA. NRNs can be addressed in EARs if and when Thames Water receive any information.	No action
70	Natural England	 Schedule 4 of the Town & Country Planning (Environmental Impact Assessment) Regulations 2017, sets out the necessary information to assess impacts on the natural environment to be included in an SEA, specifically: A description of any potential development associated with the Plan (permanent or temporary) – including physical characteristics and the full land use requirements of the site during construction and operational phases. Expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from any operational aspects of the proposed Drought Plan. A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors. A description of the likely significant effects of the Drought Plan on the environment – this should cover direct effects but also any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects. Effects should relate to the use of natural resources and the 	Noted - these have been covered in the Environmental Report where appropriate.	Various sections



		 emissions from pollutants. This should also include a description of the forecasting methods to predict the likely effects on the environment. A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment. 		
71	Natural England	Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters.	Noted - features of nature conservation interest have been assessed through the objectives (e.g. 1.1). Further detailed assessment is undertaken in the EARs, along with any mitigation, and has been used to inform the assessments.	Various sections
72	Natural England	The SEA should thoroughly assess the potential for the Drought Plan to affect designated sites. European sites (e.g. designated Special Areas of Conservation and Special Protection Areas) fall within the scope of the Conservation of Habitats and Species Regulations 2017 (as amended). In addition paragraph 176 of the National Planning Policy Framework requires that potential Special Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites. Under Regulations 2017 (as amended) an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site.	The proximity of drought options to designated sites has been assessed in the SEA and further detailed assessment has been undertaken in the relevant EARs. HRA screening has also been undertaken in parallel with the SEA and the outcome of this is included in the Environmental Report. No likely significant effects on European designated sites are anticipated.	Section 5.6
73	Natural England	The Drought Plan has the potential to impact significantly on designated sites, and as such there will need to be sufficient detail included within the Drought Plan and all supplementary supporting data. • Further information on the SSSI and its special interest features can be found at www.magic.gov . The SEA should include a full assessment of the direct and indirect effects of the development on the features of special interest within SSSIs and should identify such mitigation measures as may be required in order to avoid, minimise or reduce any adverse significant effects. • European site conservation objectives are available on our internet site http://publications.naturalengland.org.uk/category/6490068894089216	The proximity of drought options to SSSI has been assessed in the SEA (in various sections and captured in SEA objective 1.1) and further detailed assessment has been undertaken in the relevant EARs.	Various sections
74	Natural England	The SEA should assess the impact of all relevant sections of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). Natural England does not hold comprehensive information regarding the locations of species protected by law, but advises on the procedures and legislation relevant to such species. Records of protected species should be sought from appropriate local biological record centres, nature conservation organisations, groups and individuals; and consideration should be given to the wider context of the site for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment. The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System. Any areas likely to be affected by the Drought Plan should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the SEA. In order to provide this information there may be a requirement for a survey at a particular time of year. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and where necessary, licensed, consultants. Natural England has adopted standing advice for protected species which includes links to guidance on survey and mitigation.	See "General" comment and response above (No. 54). This level of detail is not a requirement of the SEA for a Drought Plan. The EARs for each drought option include detailed assessments of these features where necessary and include any potential monitoring and mitigation measures. The outcome of these informs the SEA.	No action
75	Natural England	The SEA should thoroughly assess the impact of the proposals on habitats and/or species listed as 'Habitats and Species of Principal Importance' within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act 2006 places a general duty on all public authorities, including local planning authorities, to conserve and enhance biodiversity. Further information on this duty is available here https://www.gov.uk/guidance/biodiversity-duty-public-authority-duty-to-have-regard-to-conserving- biodiversity. Natural England advises that a habitat survey (equivalent to Phase 2) is carried out where relevant, in order to identify any important habitats present. In addition, ornithological, botanical and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The SEA should include details of: • Any historical data for the site affected by the proposal (e.g. from previous surveys); • Additional surveys carried out as part of this proposal; • The habitats and species present; • The status of these habitats and species (e.g. whether priority species or habitat); • The direct and indirect effects of the Drought Plan upon those habitats and species; • Full details of any mitigation or compensation that might be required. The Drought Plan should seek if possible to avoid adverse impact on sensitive areas for wildlife within the	See "General" comment and response above (No. 54). This level of detail is not a requirement of the SEA for a Drought Plan. The EARs for each drought option include detailed assessments of these features where necessary and include any potential monitoring and mitigation measures. The outcome of these informs the SEA.	No action



		site, and if possible provide opportunities for overall wildlife gain. The record centre for the relevant Local Authorities should be able to provide the relevant information on the location and type of priority habitat for the area under consideration.		
76	Natural England	Natural England does not hold local information on local sites, local landscape character and local or national biodiversity priority habitats and species. We recommend that you seek further information from the appropriate bodies (which may include the local records centre, the local wildlife trust, local geoconservation group or other recording society and a local landscape characterisation document).	See "General" comment and response above (No. 54). This level of detail is not required for SEA of the Drought Plan. The EARs for each drought option include detailed assessments of these features where necessary and the outcome of these informs the SEA.	No action
77	Natural England	Any development site within/adjacent to an AONB consideration should be given to the direct and indirect effects upon this designated landscape and in particular the effect upon its purpose for designation within the environmental impact assessment, as well as the content of the relevant management plan for these.	Noted - proximity of drought options to AONB has been considered and assessed through SEA objective 8.1. AONB management plans have been considered in the review of relevant plans, policies and programmes.	SEA Objective 8.1 Section 2 and Appendix B
78	Natural England	Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. The SEA should include assessments of visual effects on the surrounding area and landscape together with any physical effects of the development, such as changes in topography. The SEA should include a full assessment of the potential impacts of any development/disturbances on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed. Natural England supports the publication Guidelines for Landscape and Visual Impact Assessment, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2013 (3rd edition). The methodology set out is almost universally used for landscape and visual impact assessment. Any assessment should refer to the relevant National Character Areas which can be found on our website. Links for Landscape Character Assessment at a local level are also available on the same page.	Visual effects have been assessed through SEA objective 8.1 under Landscape and Visual Amenity SEA topic. Construction impacts associated with the DP are minor therefore LCA is not required. National Character areas have been referred to in the environmental baseline (Appendix C).	SEA Objective 8.1 Appendix C.8
79	Natural England	You should consider whether there is land in the area affected by the development which qualifies for conditional exemption from capital taxes on the grounds of outstanding scenic, scientific or historic interest. An up-to-date list may be obtained at www.hmrc.gov.uk/heritage/lbsearch.htm.	See "General" comment and response above (No. x). This level of detail is not a requirement of the SEA for a Drought Plan. The EARs for each drought option include detailed assessments of these features where necessary. The outcome of these informs the SEA. Only minor and temporary construction measures are needed at existing assets therefore, this is not considered to be a significant issue of relevance to the Drought Plan.	No action
80	Natural England	Natural England encourages any proposal to incorporate measures to help encourage people to access the countryside for quiet enjoyment. Measures such as reinstating existing footpaths together with the creation of new footpaths and bridleways are to be encouraged. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Relevant aspects of local authority green infrastructure strategies should be incorporated where appropriate.	Noted - none of the drought options have significant infrastructure requirements however, this has been addressed through SEA Objective 2.2.	See Section 4.2
81	Natural England	The SEA should consider potential impacts on access land, public open land, rights of way and coastal access routes in the vicinity of development (e.g. new pipes, blockages to pathways as a result of the Drought Plan). Consideration should also be given to the potential impacts on the adjacent/nearby National Trails. The National Trails website www.nationaltrail.co.uk provides information including contact details for the National Trail Officer. Appropriate mitigation measures should be incorporated for any adverse impacts. We also recommend reference to the relevant Right of Way Improvement Plans (ROWIP) to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced.	Noted - the location of the drought options in relation to PROWs and National Trails has been assessed under SEA objective 2.2.	See Section 4.2



Appendix B Review of Policy, Plans and Programmes



B.Review of Policy, Plans and Programmes

The findings of the review of policy, plans and programmes are set out in **Table B.1**. The purpose of the review and the key findings are set out in Section 2.2 of the Environmental Report. This table sets out the purpose and objectives of the policy, plans and programmes, their potential relationship with Thames Water's Drought Plan and the potential implications of the plan objectives for the objectives of the SEA.

Table B.1Summary of the Policy, Plans and Programmes reviewed and their link to the
Strategic Environmental Assessment

Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives		
International			
The Bern Convention (1979) The Convention on the Conservation o	f European Wildlife and Natural Habitats		
International convention which aims to ensure conservation of wild flora and fauna species and their habitats. Special attention is given to endangered and vulnerable species, including endangered and vulnerable migratory species specified in appendices.	The SEA should seek to promote the protection and enhancement of biodiversity.		
(92/43/EEC) and Birds Directive (79/409/EEC).			
The Bonn Convention (1983) The Convention on the Conservation of	of Migratory Species of Wild Animals		
Aims to conserve terrestrial, marine and avian migratory species by protecting endangered, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger such species. Enforced in European legislation through the Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC).	The implementation of the DP may influence biodiversity in the north west and as such the SEA should seek to maintain or enhance the quality of habitats and biodiversity.		
The Paris Agreement (2016), Cancun Agreement (2011) and Kyoto	Agreement (1997)		
The agreement represent key steps forward in capturing plans to reduce greenhouse gas emissions and to help developing nations protect themselves from climate impacts and build their own sustainable futures. It includes a shared vision to keep global temperature rise to below two degrees Celsius.	The SEA should consider the need for water companies to seek to promote a reduction in greenhouse gas emissions in carrying out its service activities.		
Granada Convention (1985) Convention for the Protection of the Architectural Heritage of Europe			
To reinforce and promote policies for the conservation and enhancement of Europe's heritage.	The SEA should take into account the need to conserve heritage.		
Valletta Convention (1992) Convention on the Protection of Archaeological Heritage of Europe (revised)			
The Valletta Convention is one of a series of Conventions for the protection of the cultural heritage produced by the Council of Europe over the last fifty years.	The SEA should take into account the need to conserve heritage.		
Council of Europe (2003) European Soils Charter			
Sets out common principles for protecting soils across the EU and will help.	The SEA should seek to ensure that the quality of the regions land, including soils, is protected or enhanced.		
Council of Europe (2006), European Landscape Convention			



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives			
European Landscape Convention (ELC) is the first international convention to focus specifically on landscape. Natural England implements the European Landscape Convention in England. The aims of the 2009/10 action are:	The implementation of the Drought Plan may influence landscape or the enjoyment of landscapes in the TWUL SEA study area and as such the SEA			
 Lead on improving the protection, planning and management of all England's landscapes 	enhance the quality of the regions landscapes and the potential enjoyment			
 Raise the quality, influence and effectiveness of policy and practical instruments 	of these landscapes.			
 Increase the engagement in and enjoyment of landscapes by the public 				
Collaborate with partners across the UK and Europe.				
European Commission (2001) Directive 2001/42/EC on the Assess Programmes on the Environment (SEA Directive)	sment of the Effects of Certain Plans and			
The SEA Directive provides the following requirements for consultation:	The Directive sets the basis for SEA as a whole and therefore indirectly covers all			
• Authorities which, because of their environmental responsibilities, are likely to be concerned by the effects of implementing the plan or programme, must be consulted on the scope and level of detail of the information to be included in the Environmental Report. These authorities are designated in the SEA Regulations as the Consultation Bodies (Consultation Authorities in Scotland).	objectives.			
• The public and the Consultation Bodies must be consulted on the draft plan or programme and the Environmental Report, and must be given an early and effective opportunity within appropriate time frames to express their opinions.				
• Other EU Member States must be consulted if the plan or programme is likely to have significant effects on the environment in their territories.				
• The Consultation Bodies must also be consulted on screening determinations on whether SEA is needed for plans or programmes under Article 3(5), i.e. those which may be excluded if they are not likely to have significant environmental effects.				
European Commission (2011), The EU Biodiversity Strategy to 2020)			
The strategy aims to halt the loss of biodiversity and ecosystem services in the EU and help stop global biodiversity loss by 2020. It reflects the commitments taken by the EU in 2010, within the international Convention on Biological Diversity.				
European Commission (2009), Birds Directive (2009/147/EC)				
The Directive provides a framework for the conservation and management of, and human interactions with, wild birds in Europe. It sets broad objectives for a wide range of activities, although the precise legal mechanisms for their achievement are at the discretion of each Member State (in the UK delivery is via several different statutes).				
European Commission (2009), Promotion of the use of energy from renewable sources Directive (2009/28/EC)				



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives	
This promotes the use of energy from renewable sources.	The SEA should take account of the need to seek to promote the use of renewable energy.	
European Commission (2008) Marine Strategy Framework Directive	(2008/56/EC)	
The Directive sets out a framework for an ecosystem-based approach to the management of human activities which supports the sustainable use of marine goods and services. The overarching goal of the Directive is to achieve 'Good Environmental Status' (GES) by 2020 across Europe's marine environment. Each member state is required to develop a marine strategy for their waters to protect and conserve the marine environment, prevent its deterioration, and, where possible, restore marine ecosystems in affected areas. The strategies must contain:	The DP may have some influence on the marine environment and the SEA should seek to protect and conserve this.	
An initial assessment of the current environmental status;		
A determination of what GES means for those waters;		
 Targets and indicators designed to show whether a Member State is achieving GES; 		
 A monitoring programme to measure progress towards GES; 		
 A programme of measures designed to achieve or maintain GES 		
The Directive also requires Marine Protected Areas (MPAs) to be established to support the achievement of GES.		
European Commission (2008) Ambient Air Quality Directive (2008/5	50/EC)	
The 2008 directive sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health such as particulate matter (PM10 and PM2.5) and nitrogen dioxide (NO2). There are also indirect effects as these pollutants can combine in the atmosphere and contribute to greenhouse gases which can be transported great distances by weather systems.	The implementation of the DP may have some influence on air quality, either directly or indirectly, through construction or operational activities. The SEA should take account of the need to ensure that the region's air quality is maintained or enhanced, and that emissions of air pollutants are kept to a minimum. seek to help meet regional air quality targets.	
European Commission (2007), Floods Directive (2007/60/EC)		
The Directive's aim is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity. The Directive shall be carried out in coordination with the Water Framework Directive, notably by flood risk management plans and river basin management plans being coordinated, and through coordination of the public participation procedures in the preparation of these plans.	The SEA should seek to ensure that flood risk in the region is not adversely affected by the implementation of the DP.	
European Commission (2006) The Groundwater Directive (2006/118/EC)		
This Directive establishes a regime which sets groundwater quality standards and introduces measures to prevent or limit inputs of pollutants into groundwater. It establishes quality criteria, taking into account local characteristics and allows for further improvements to be made based on monitoring data and new scientific knowledge. The directive represents a proportionate and scientifically sound response to the requirements of the Water Framework Directive (WFD) as it relates to assessments on chemical status of	The SEA should seek to protect and, where possible, improve the quality of groundwater sources in the Thames Water supply area.	



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives		
groundwater and the identification and reversal of significant and sustained upward trends in pollutant concentrations. Member States should establish standards at the most appropriate level and take into account local or regional conditions.			
European Commission (2006), Fresh Water Fish Directive (2006/44,	(EC)		
The Directive seeks to protect those fresh water bodies identified by Member States as waters suitable for sustaining fish populations. For those waters, it sets physical and chemical water quality objectives for salmonid waters and cyprinid waters. The Directive is designed to protect and improve the quality of rivers	The SEA should seek to promote the protection of river and lake water quality in order to maintain and develop suitable environments that will sustain fresh water fish populations.		
and lakes to encourage healthy fish populations.			
European Commission (2006), Animal health requirements for aqua on the prevention and control of certain diseases in aquatic animals	aculture animals and products thereof, and (2006/88/EC)		
The Directive establishes:	The implementation of the DP may		
Animal health requirements for the placing on the market, importation and transit of aquaculture animals and their products;	and as such the SEA should seek to maintain or enhance the guality of		
Minimum measures to prevent diseases in aquaculture animals;	habitats and biodiversity.		
Minimum measures to be taken in response to suspected or established cases of certain diseases in aquatic animals.			
European Commission (2006) Thematic Strategy for Soil Protection			
The Thematic Strategy for Soil Protection consists of a Communication from the Commission to the other European Institutions, a proposal for a framework Directive (a European law), and an Impact Assessment.	The SEA assessment framework should include soils.		
European Commission (2004), Environmental Liability Directive (200)4/35/EC)		
The Directive establishes a framework for environmental liability based on the "polluter pays" principle, with a view to preventing and remedying environmental damage.	The SEA should seek to ensure that the DP avoids causing direct or indirect damage to the aquatic environment or contamination of land that creates a significant risk to human health.		
European Commission (2000), The Water Framework Directive (200	00/60/EC)		
This Directive establishes a framework for the protection of inland surface waters, transitional waters, coastal water and groundwater. It also encourages the sustainable use of water resources.	The SEA should seek to promote the protection and enhancement of all water resources.		
Key objectives are general protection of the aquatic ecology, specific protection of unique and valuable habitats, protection of drinking water resources, and protection of bathing water.			
European Commission (1999) Landfill of Waste Directive (99/31/EC)			
The Directive aims at reducing the amount of waste landfilled; promoting recycling and recovery; establishing high standards of landfill practice across the EU, and preventing the shipping of waste from one Country to another.	The DP should take the effects on waste to landfill into account. The SEA assessment should consider the effects on water, soil, air, human		
The objective of the Directive is to prevent or reduce as far as possible negative effects on the environment (in particular on surface water, groundwater, soil, air and human health) from the	health and waste.		



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives	
landfilling of waste, by introducing stringent technical requirements for waste and landfills.		
European Commission (1998), Drinking Water Directive (1998/83/EC	C)	
The objective of the Drinking Water Directive is to protect the health of the consumers in the European Union and to make sure the water is clean and of good quality.	The SEA should seek to ensure that objectives address water quality in the region, particularly drinking water quality.	
To make sure drinking water everywhere in the EU is healthy, clean and tasty, the Drinking Water Directive sets standards for the most common substances (so-called parameters) that can be found in drinking water. A total of 48 microbiological and chemical parameters must be monitored and tested regularly.		
European Commission (1992), Habitats Directive (1992/43/EC)		
The aim of the Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance.	The impacts of the DP options on internationally designated sites and species must be considered as part of the SEA.	
European Commission (1991) The Nitrates Directive (91/676/EEC)		
The Nitrates Directive is designed to reduce water pollution caused by nitrate from agriculture. The directive requires Defra and the Welsh Assembly Government to identify surface or groundwaters that are, or could be, high in nitrate from agricultural sources.	The DP should be consistent with the aim to reduce water pollution caused by nitrate from agriculture. The SEA assessment framework should	
Once a water body is identified as being high in nitrate all land draining to that water is designated a Nitrate Vulnerable Zone. Within these zones, farmers must observe an action programme of measures which include restricting the timing and application of fertilisers and manure, and keeping accurate records.	include water quality.	
European Commission (1991), Urban Waste Water Treatment Directive (1991/271/EC)		
The Directive's objective is to protect the environment from the adverse effects of urban waste water discharges and discharges from certain industrial sectors and concerns the collection, treatment and discharge of domestic waste water, mixture of waste water and waste water from certain industrial sectors.	The SEA should seek to maintain, protect and improve water quality across the region.	
Council of Europe (2000) European Landscape Convention (Florence Convention)		
The European Landscape Convention is an international convention focusing specifically on landscape. The UK Government signed the European Landscape Convention in 2006 and it became binding from March 2007.	The SEA should take landscape quality into account and include water quality in the assessment framework.	
Ramsar Convention (1971) The Convention on Wetlands of Internat	ional Importance	
The Convention on Wetlands (Ramsar, Iran, 1971) (the "Ramsar Convention") is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the "wise use", or sustainable use, of all of the wetlands in their territories.	The impacts of the DP options on important wetland habitats must be considered as part of the SEA.	



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
United Nations (1992), Convention on Biological Diversity (CBD)	
The main objectives are:	The commitment to conserving biological
Conservation of biological diversity	diversity must be considered in any DP options and the SEA should seek to
Sustainable use of its components	promote the protection and enhancement
Fair and equitable sharing of benefits arising from genetic resources	of blodiversity.
United Nations Economic Commission for Europe (1998) Aarhus Information, Public Participation in Decision-making and Access to J	Convention - Convention on Access to Iustice in Environmental Matters
The Aarhus Convention grants the public rights regarding access to information, public participation and access to justice, in governmental decision-making processes on matters concerning the local, national and transboundary environment. It focuses on interactions between the public and public authorities.	The Convention is designed to improve the way ordinary people engage with government and decision-makers on environmental matters. It helps to ensure that environmental information is easy to are the defined end environmental
The Aarhus Convention has been ratified by the European	get hold of and easy to understand.
legislation, notably the Water Framework Directive (Directive 2000/60/EC).	The SEA should seek to provide easily understood information to the public on the environmental implications of the DP and its constituent options.
The Environment Noise Directive (Directive 2002/49/EC)	
The END aims to define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to the exposure to environmental noise. It also aims to provide the basis for developing EU measures to reduce noise emitted by major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and mobile machinery.	The SEA assessment framework should include for the protection against excessive noise.
United Nations (2002), Commitments arising from the World Johannesburg	Summit on Sustainable Development,
The World Summit on Sustainable Development proposed broad- scale principles which should underlie sustainable development and growth.	These commitments are the highest level definitions of sustainable development. The DP should be influenced strongly by
It included objectives such as:	take its aims into account.
Greater resource efficiency	
Work on waste and producer responsibility	The SEA should seek to promote the
New technology development	achievement of the sustainable development objectives outlined in this
Push on energy efficiency	plan.
Integrated water management plans needed	
Minimise significant adverse effects on human health and the environment from chemicals by 2020.	
The World Heritage Convention (UNESCO) 1972 – a global instrume heritage.	ent for the protection of cultural and natural



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
A global instrument for the protection of cultural and natural heritage. Signatories commit themselves to refraining from 'any deliberate measures which might damage, directly or indirectly, the cultural and natural heritage' of their World Heritage Sites. The city of Bath is the closest UNESCO designated site.	The Drought Plan and SEA should take account of the need to protect scheduled monuments and archaeological areas.
National	
Ancient Monuments and Archaeological Areas Act 1979	
This act addresses the protection of scheduled monuments including the control of works affecting scheduled monuments. It also addresses archaeological areas.	The DP and SEA should take account of the need to protect scheduled monuments and archaeological areas.
The Climate Change Act 2008	
This act sets carbon targets for 2050. Originally the target was for net carbon account for 2050 at least 80% lower than 1990 baseline., however, this was revised in 2019 to be at least 100% lower in line with the net zero ambition.	This target needs to be taken into account by the SEA.
Conservation of Habitats and Species Regulations 2017	
These regulations consolidate all the various amendments made to the Conservation (Natural Habitats) Regulations 1994 in England.	The DP must fully comply with the Regulations.
The regulations provide for the designation and protection of 'European sites', the protection of 'European species', and the adaptation of planning and other controls for the protection of European Sites. They are the principal means by which the Habitats Directive is transposed in England as such its main objective is to promote the maintenance of biodiversity.	The impacts of the DP options on biodiversity and protected species and sites must be considered as part of the SEA.
The Countryside and Rights of Way (CROW) Act, 2000	
The Act provides for increased public access to the countryside and strengthens protection for wildlife.	The DP may have an effect on public access to the countryside.
The main provisions of the Act are as follows:	
 Extends the public's ability to enjoy the countryside whilst also providing safeguards for landowners and occupiers 	The SEA should include objectives that take into account public access,
 Creates new statutory right of access to open country and registered common Land Use Consultants 	of relevant landscape designations.
Modernises Right of Way system	
Gives greater protection to SSSIs	
Provides better management arrangements for AONBs	
Strengthens wildlife enforcement legislation.	
Department of Energy and Climate Change (2011) National Policy S	tatements for Energy Infrastructure
The energy National Policy Statements (NPSs) set out national policy against which proposals for major energy projects will be assessed and decided on by the Infrastructure Planning Commission. The purpose of the NPSs is to develop a clear, long- term policy framework which facilitates investment in the necessary new infrastructure (by the private sector) and in energy efficiency. It highlights that the construction, operation and decommissioning of	The SEA should consider the cumulative effects of the DP and any major energy proposals which may affect the availability of water in the Thames Water supply area.



infrastructure can lead to increased demand for water, involve

Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives	
discharges to water and cause adverse ecological effects resulting from physical modifications to the water environment.		
Department of Energy and Climate Change (2011) Planning our affordable and low carbon electricity	electric future: a White Paper for secure,	
This white paper outlines a package of reforms so that by 2030 there will be a flexible, smart and responsive electricity system, powered by a range of low carbon sources of electricity. This includes engaging with consumers on energy use. Decarbonisation is important in meeting the 2050 targets.	The implementation of the DP may have an influence upon Thames Water total energy use. The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions. The SEA should also promote the use of renewable energy, where relevant.	
Department for Business, Energy and Climate Change (2007) Energy White Paper: Meeting the Energy Challenge		
Department for Business, Energy and Industrial Strategy (Due Sprin	g 2020) Energy White Paper	
Meeting the energy challenge', sets our international and domestic energy strategy, in the shape of four policy goals:	The implementation of the DP may have an influence upon Thames Water's total	
Aiming to cut CO2 emissions by some 60% by about 2050, with real progress by 2020	promote energy efficiency, as well as seeking to reduce the effects of climate	
Maintaining the reliability of energy supplies	change through greenhouse gas emissions The SEA should also	
Promoting competitive markets in the UK and beyond	promote the use of renewable energy,	
Ensuring every home is heated adequately and affordably.	where relevant.	
A new Energy White Paper is due to be published Spring 2020 and will roadmap the		
Defra, Environment Agency, Natural England, Forestry Commission living	England (2016) Creating a great place for	
In 2016 Defra produced a report that set out objects to great a great place for living, The objectives are related to the following topics:	The SEA must take into account impacts of the drought options (construction and	
 Environment – a cleaner, healthier environment, benefiting people and the economy; 	the population and human health and land use (which will impact on the food	
• Food and farming – a world-leading food and farming industry;	and farming and rural objectives).	
 Rural – a thriving rural economy, contributing to national prosperity and wellbeing; 		
 Protection – a nation better protected against floods, animal and plant diseases and other hazards, with strong response and recovery capabilities; 		
 Excellent Delivery – Excellent delivery, on time and to budget with outstanding value for money; 		
An outstanding organisation – an organisation striving to be the best, focused on outcomes and constantly challenging itself.		
Defra (2020) Enabling a Natural Capital Approach (ENCA)		
ENCA resources are a mixture of data, guidance and tools that enable individuals/organisations to understand natural capital and know how to take it into account. The aims of ENCA are to:	The SEA will help to inform future development by TWUL and therefore should consider the effect of the drought	



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives	
 Build capacity among users to assess and value the natural environment by providing comprehensive information and resources 	options on opportunities for natural capital.	
 Reduce search costs for analysts and decision makers Provide a platform to update tools and guidance as knowledge develops 		
• Identify new evidence and areas for development The guidance is a comprehensive document providing information and resources for Natural Capital, covering the natural capital framework, economic valuation of the environment, how project or policy appraisal can incorporate natural capital, natural capital accounting principles and methods, benefits and challenges and applying natural capital at a local level.		
Defra (2015) The government's response to the Natural Capital Com	mittee's third State of Natural Capital report	
This provides a number of recommendations such as:	Outputs from the SEA process will help to	
Agreement for the development of a 25 year plan for a healthy natural economy. This includes helping organisations understand the economic, social and cultural value the impact their actions have on it and how to use the knowledge for better decisions; identify most important and threatened environmental assets; protection of designated areas; address outstanding monitoring and data issues to enable better decisions about strategic investments in natural capital.	by Thames Water of Natural Capital Accounting (NCA) approaches to assessing environmental asset performance. Government (led by HM Treasury and Defra) is increasingly using NCA to support future environmental policy and decision-making, and there may be future expectations on water	
Assigning institutional responsibility for monitoring the state of natural capital.	companies to follow suit.	
Organisations that manage land and water assets should create a register of natural capital for which they are responsible.		
Defra (2015) The Great Britain Invasive Non-native Species Strategy	/	
The Strategy is intended to provide a strategic framework, updated from the 2008 framework, within which the actions of government departments, their related bodies and key stakeholders can be better co-ordinated. Its overall aim is to minimise the risks posed, and reduce the negative impacts caused, by invasive non-native species in Great Britain.	The implementation of the DP result in changes to the distribution of INNS and influence biodiversity in the south east and as such the SEA should seek to protect habitats and biodiversity from INNS.	
Defra (2014), River Basin Planning Guidance		
Aims to give guidance on practical implementation of the Water Framework Directive (WFD).	The Drought Plan should take into account the contents of this statutory guidance	
The river basin planning process involves setting environmental objectives for all groundwater and surface waters (including estuaries and coastal waters) within the river basin district, and devising programmes of measures to meet those objectives.	guidance	
Defra (2012) The UK Climate Change Risk Assessment 2012 Evider	nce Report	
Five themes are identified that form the priorities for adaptation in the UK.	The SEA should take into account the need for climate change adaptation.	
Defra (2012) National Policy Statement for Waste Water		
National Policy Statement (NPS) sets out Government policy for the provision of major waste water infrastructure. It will be used by the Infrastructure Planning Commission (IPC) to guide its decision making on development consent applications for waste water	The SEA should seek to ensure the DP considers any unforeseen NSIP proposals that come forward prior to	



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
developments that fall within the definition of Nationally Significant Infrastructure Project (NSIP) as defined in the Planning Act 2008.	adoption which may affect water resources in the Thames Water area.
Defra (2011) Biodiversity 2020: A Strategy for England's Wildlife and	Ecosystem Services
The objective for the next decade is: 'to halt overall biodiversity loss, support healthy well-functioning ecosystems and establish coherent ecological networks, with more and better places for nature for the benefit of wildlife and people.' Four action areas are: A more integrated large-scale approach to conservation on land and at sea Putting people at the heart of biodiversity policy	The SEA must consider impacts on biodiversity. The implementation of the DP may influence biodiversity in the area and as such the SEA should seek to maintain or enhance the quality of habitats and biodiversity, and take regards of priority species.
Reducing environmental pressures	
Improving our knowledge.	
Defra (2011) Government Review of Waste Policy in England 2011	I
The review is guided by the "waste hierarchy", EU obligations and targets on waste management, carbon impacts, environmental objectives and the costs and benefits of different policy options. The Governments vision include a move beyond the current throwaway society to a "zero waste economy" in which material resources are re-used, recycled or recovered wherever possible, and only disposed of as the option of very last resort.	The DP may involve options that involve the generation of waste (e.g. either through construction requirements or operation of supply side options). The SEA should seek to enhance recycling and minimise the amount of waste going to landfill.
Defra (2011) Water for Life - Water White Paper	
This sets out market reform in the water sector.	The DP should take into account the contents of this paper.
Defra (2011) The Natural Choice: securing the value of nature, The I	Natural Environment White Paper
Addresses the Government's approach to valuing economic and social benefits of a healthy natural environment while continuing to recognise nature's intrinsic value. It describes the vision of the Government for this to be the first generation to leave the natural environment of England in a better state than it inherited, requiring placing the value of nature at the heart of decision-making – in Government, local communities and businesses. Approaches to mainstream the value of nature across society include:	The DP supports the provisioning service of freshwater through ensuring security of supply during times of drought. The media campaigns that form part of the Demand side DP options may contribute towards increasing the awareness of the population to the value the provisioning services of water. Other related ecosystem services may include:
e creating a great according to which according arouth and the	Provisioning Services: Biodiversity
 creating a green economy, in which economic growth and the health of our natural resources sustain each other, and markets, business and Government better reflect the value of nature; strengthening the connections between people and nature to the benefit of both; and showing leadership in the European Union and internationally, to protect and enhance natural assets globally 	 Regulating Services: Water Regulation
	 Cultural services: Recreation and ecotourism Cultural services: Cultural heritage
	Cultural services: Aesthetic
	The SEA should ensure the DP effects the related provisioning services in the least damaging way through informing the DP formulation and selection of DP options during times of Drought.



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
Defra (2011) UK National Ecosystem Assessment	
Defra (2014) UK National Ecosystems Assessment Follow on, Synthesis of Key Findings	
Ecosystems services from natural capital contribute to the economic performance of the nation. Information and tools to enable decision makers to understand the wider value of ecosystems and their associated services.	For the purposes of the readership integrating an ecosystems services approach into the SEA is not being undertaken. However, it is realised that through the 'Objective-led' approach, many of the services relevant to the DP can be considered through the objectives and key questions for example:
	Provisioning Services: Freshwater
	Provisioning Services: Biodiversity
	Regulating Services: Water Regulation
	Cultural services: Recreation and ecotourism
	Cultural services: Cultural heritage values
	Cultural services: Aesthetic
	The SEA should ensure the DP effects the related provisioning services in the least damaging way through informing the DP formulation and selection of DP options during times of Drought.
	In the event of further guidance being issued on incorporating ESA into SEA, the anticipated approach is sufficiently flexible that it should be able to accommodate this (subject to timing).
Defra (2010) Making Space for Nature: A Review of England's Wildl	fe Sites and Ecological Network
This independent review of England's wildlife sites and the connections between them sets objectives and recommendations to help achieve a healthy natural environment that will allow our plants and animals to thrive.	The SEA should seek to maintain or enhance the quality of habitats and biodiversity.
Defra (2009) Safeguarding our soils – A Strategy for England	
The new Soil Strategy for England – Safeguarding our Soils – outlines the Government's approach to safeguarding our soils for the long term. It provides a clear vision to guide future policy development across a range of areas and sets out the practical steps that we need to take to prevent further degradation of our soils, enhance, restore and ensure their resilience, and improve our understanding of the threats to soil and best practice in responding to them.	The SEA should seek to ensure that the quality of the regions soils and their management is protected or enhanced.
The Governments vision is that: By 2030, all England's soils will be managed sustainably and degradation threats tackled successfully. This will improve the quality of England's soils and safeguard their ability to provide essential services for future generations.	
Defra (2009) Construction code of practice for the sustainable use o	f soils on construction sites
This Code of Practice was developed to assist anyone involved in construction to better protect and enhance the soil resources with	Some drought options may have associated construction.



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
which they work. The key messages include; consideration of sustainable drainage systems on site, preparation of Soil Resource Plan and to safeguard and utilise on-site soil resources where possible.	The SEA should seek to ensure that the quality of the regions soils and their management is protected or enhanced
Defra (2009) The Groundwater Regulations 2009	
The Groundwater Regulations are designed to implement a daughter directive to the European Water Framework Directive and prevent or limit the inputs of polluting substances into groundwater.	The SEA should include an objective relating to the effects of options on groundwater quality.
Defra (2008) Future Water: the Government's water strategy for Eng	land
This strategy is the high level Government document which outlines how the Government wants the water sector to look by 2030, considering issues of water demand, water supply, water quality in the natural environment, surface water drainage, river and coastal flooding, greenhouse gas emissions and charging.	The SEA should seek to ensure that the themes included in the strategy objectives are also reflected in the SEA objectives, particularly around water quality in the region, the quality of aquatic ecology, drinking water quality, resource
Improved the quality of our water environment and the ecology which it supports, and continued to provide high levels of drinking water quality from our taps	use, energy use and greenhouse gas emissions, and adaptation to climate change.
Sustainably managed risks from flooding and coastal erosion, with greater understanding and more effective management of surface water	
Ensured a sustainable use of water resources, and implemented fair, affordable and cost-reflective charges.	
Defra (2008) England Biodiversity Strategy –climate change adaptat	ion principles
Government strategy presenting five principles that are fundamental to conserving biodiversity during climate change. The precautionary principle underlies all the principles.	The SEA must consider the impacts on biodiversity whilst also taking into account the potential for future climate change.
Defra (2007) The Air Quality Strategy for England, Scotland and Wa	les
This strategy identifies air quality objectives and policy options to further improve air quality in the UK from into the long term. The options are intended to provide important benefits to quality of life and help protect the environment as well as the direct benefits to public health.	The implementation of the DP may have some influence on air quality, either directly or indirectly through construction or operation activities. The SEA should seek to ensure that the region's air quality is maintained or enhanced, and that emissions of air pollutants are kept to a minimum.
Defra (2007), Conserving Biodiversity in a Changing Climate: Guida	nce on Building Capacity to Adapt
The guiding principles described in this document summarise current thinking on how to reduce the impacts of climate change on biodiversity and how to adapt existing plans and projects in the light of climate change. The guidance is intended to inform implementation of the UK Biodiversity Action Plan, taking account of climate change is relevant to the fulfilment of many international agreements and obligations affecting the UK.	The SEA must consider the impacts on biodiversity whilst also taking into account the potential for future climate change.
Defra (2006) Shoreline Management Plan Guidance	



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives	
A shoreline management plan (SMP) is a coastal defence management tool. It is a large-scale assessment of the risks associated with coastal processes and helps to reduce these risks to people and the developed, historic and natural environment. This guidance document sets out Defra's strategy for managing flooding and coastal erosion.	The SEA should take into account the effects of the DP on areas with a SMP.	
Defra (2005) Making space for water: taking forward a new governr risk management in England	nent strategy for flood and coastal erosion	
The strategy outlines how to manage the risks from flooding and coastal erosion in the UK. The strategy aims to reduce the threat of flooding to people and their property, and to deliver the greatest environmental, social and economic benefit, consistent with the Government's sustainable development principles.	The SEA should seek to ensure that flood risk in the region is not adversely affected by the implementation of the DP.	
Defra (2005) Securing the Future: Delivering UK Sustainable Develo	pment Strategy	
The strategy for sustainable development aims to enable all people to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations. The strategy places a focus on protecting natural resources and enhancing the environment.	The SEA must seek to ensure that objectives relating to sustainable development, sustainable resource use and protecting the natural environment, are considered when assessing the potential impacts of the DP.	
Defra (2004) The First Soil Action Plan for England		
This plan is a comprehensive statement on the state of the UK's soils and how Government and other partners were working together to improve them. Ensure that England's soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development.	The SEA should seek to ensure that the quality of the region's land, including soils, is protected or enhanced.	
Defra (2004) Rural Strategy		
The strategy sets out rural and countryside policy, and draws upon from lessons learnt following the rural white paper. Objectives include supporting economic and social regeneration across rural England and enhance the value of the countryside and protect the natural environment for this and future generations.	The implementation of certain DP options may have an effect upon rural communities and the countryside. The SEA should also seek to ensure that the quality of the region's landscapes, natural resources and biodiversity are maintained or enhanced.	
Defra (2002) The Strategy for Sustainable Farming and Food – facing the future		
This strategy sets out how industry, Government and consumers could work together to secure a sustainable future for our farming and food industries. The strategy's objectives are to support the viability and diversity of rural and urban economies and communities, respect and operate within the biological limits of natural resources (especially soil, water and biodiversity) and achieve consistently high standards of environmental performance by reducing energy consumption, by minimising resource inputs, and use renewable energy wherever possible.	The implementation of the DP may have some indirect links with the food industry, through ensuring the availability of water for food based activities. The SEA should also seek to promote the most effective use of the region's natural resources, including soil, biodiversity and energy resources.	
Defra and Environment Agency (2019) How to Write and Publish a Drought Plan, Consultation draft.		



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
This draft sets out how to assess the environmental effects of actions to maintain supply and how to mitigate. An environmental assessment must include details of changes as a result of actions to:	The SEA must take into account the approach to environmental assessment and what needs to be done to mitigate or reduce adverse effects and provide componentian for offects that remain
Water flow or level regimes	following mitigation.
Water quality	
Ecology (sensitive features, habitats and species)	
Designated sites (habitats and species)	
Fish populations (in particular migratory fish)	
Additionally, an assessment must include effects on WFD status and consider effects on river basin management plans.	
Assessments should also take into account the Handbook for Scoping Projects: Environmental Assessment and the EcIA Guidelines.	
For SEAs of a DP, guidance should be followed in the DCLG (2005) Practical Guide to the Strategic Environmental Assessment Directive and UKWIR (2012) Strategic Environmental Assessment and Habitats Regulations Assessment: Water Resources Management Plans and DPs.	
Need to identify what needs to be done to mitigate or reduce adverse effects and provide compensation for effects that remain following mitigation. This includes the identification of pre-drought, in-drought and post drought mitigation actions.	
Environment Agency (2020) Meeting our Future Water Needs: a Nat	ional Framework for Water Resources
 The National Framework explores England's long-term water needs and sets out: The scale of the action needed to ensure resilient water supplies are available to meet the needs of all users in the future A greater level of ambition for restoring, protecting and improving the environment that is the source of all our supplies 	The implementation of the DP may have an impact on water resources. The SEA must be aligned with the future water resource needs as set out in the national framework. It must take into account the WRSE Regional Plan which aims to increase drought resilience.
It sets the framework for regional planning as individual water company WRMPs are unlikely to deliver the right strategic solutions alone. Thames Water sits in the WRSE regional group. One aspect of the Regional Plans is to reduce the use of drought measures that have an impact on the environment.	
Environment Agency, Ofwat, Natural Resources Wales (2020) Wate consultation	er Resources Planning Guideline, Draft for
The Water Resources Planning Guideline (WRPG) guides water companies on what to include in their WRMPs. WRMPs set out how water companies will provide a secure, sustainable supply of water to their customers and businesses over at least the next 25 years. The WRPG also includes 9 supplementary technical guidance notes.	The assumptions and methodologies must be consistent with the WRMP.
The DP compliments the WRMP and any DP actions and options should be justified in the WRMP.	
Environment Agency (2020) EA2025 creating a better place	



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives	
This plan translates the vision for the future into action. The plan aims to protect and enhance the environment as a whole and contribute to sustainable development and the UN Sustainable Development Goals. The plan sets out 3 long term goals:	The DP and SEA should take into account the objectives set out in the Agency's plan.	
 A nation resilient to climate change Healthy air, land and water Green growth and a sustainable future 		
These goals will drive everything today, tomorrow and to 2025.		
Environment Agency (2016), Drought plan guideline extra information company drought plans	tion: Environmental assessment for water	
This supplements the guidance provided on how to write and publish a drought plan. It provides guidance on how to develop an environmental assessment to support a Drought Plan.	The Drought Plan and SEA need to take account of the guidance provided by the Environment Agency	
It includes the need to consider whether an SEA is required for a drought plan.		
Defra (2020), Drought Plan Direction 2020 (England)		
Sets out the timescales for water companies to develop and consult on Drought Plans.	The Drought Plan and SEA will take account of the statutory requirements of this Direction.	
Defra (2016) Guiding principles for water resources planning for water companies operating wholly or mainly in England		
This identifies the key policy priorities to be addressed in WRMPs. This includes protecting and enhancing the environment and the promotion of efficient water use and reducing leakage.	The Drought Plan is closely aligned to the WRMP, and the SEA needs to take account of this guidance.	
Department for Culture, Media and Sport (2001) The Historic Enviro.	nment – A Force for the Future	
This strategy outlines the Governments policy regarding the historic environment. The strategy has key aims and objectives that demonstrate the contribution the historic environment makes to the country's economic and social well-being.	The implementation of the DP may have an influence on the heritage of the region, particular if options affect surface water levels. The SEA should seek to ensure any adverse effects on heritage assets are minimised or avoided.	
The Energy Act 2013		
This provides the legislative framework for delivering secure, affordable and low carbon energy. It includes provisions for decarbonisation,	The implementation of the DP may have an influence upon Thames Water's total energy use. The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions. The SEA should also promote the use of renewable energy, where relevant.	
Environment Act, 1995		
The Environment Act set up the EA to manage resources and protect the environment in England.	The SEA should seek to promote the protection and enhancement of all water resources without having negative effects on other aspects of the Environment.	



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives	
Environment Agency (2017) Drought response: our framework for En	ngland	
This framework describes how drought affects England and how the EA works closely with the government, water companies and others to manage the effects of drought on people, business and the environment. Specifically, the framework sets out:	The supply of water resources in the region may be affected by future drought, therefore this framework is linked closely with the DP.	
 How drought affects different parts of England Who is involved in managing drought and how we work together How the agency and others take action to manage drought How we monitor and measure the impacts of drought to advise senior management and government on the prospects and possible action How we report on drought and communicate with others 	The DP and SEA need to take account of the guidance provided by the Environment Agency.	
Environment Agency (2013), Managing Water Abstraction		
This sets out how the EA manages water resources in England.	The SEA should consider the range of impacts that changes to abstractions could have on the environment, including water bodies, biodiversity, and water users.	
Environment Agency (2011) National Flood and Coastal Risk Management Strategy for England		
This strategy provides the overarching framework for future action by all risk management authorities to tackle flooding and coastal erosion in England, building on existing approaches. Risk should be managed in a co-ordinated way within catchments and along the coast and balance the needs of communities, the economy and the environment. This strategy will form the framework within which communities have a greater role in local risk management decisions and sets out the Environment Agency's strategic overview role in flood and coastal erosion risk management (FCERM).	The SEA should consider how the DP may affect flood and coastal risk across the region.	
Environment Agency (2010), Water Resources Action Plan for Engla	and and Wales	
The strategy has four main aims:	The SEA should seek to ensure that	
Adaptation to and mitigation of climate change;	strategy objectives are also reflected in the SEA objectives particularly regarding	
A better water environment;	the sustainable management of water	
Sustainable planning and management of water resources;	environment.	
People valuing water and the water environment.		
Environment Agency (2009), Water Resources Strategy for England and Wales		
Launched on 30 March 2009, covering the actions that the Environment Agency believes need to be taken to ensure that there is enough water for people and wildlife in the face of future pressures. These include:	The SEA should seek to ensure that strategy objectives are also reflected in the SEA objectives, particularly around water resource use and availability in the region	
climate change	region.	
population growth		
diffuse pollution		
water for wildlife and wetlands		
Environment Agency (2007) Soil: A Precious Resource		



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
The soil strategy identifies the Environment Agency's priorities, sets out their role and says what action is to be taken to protect, manage and restore soil. Damaged soil structure can lead to flooding, water pollution and can affect the landscape and archaeological features. The strategy also outlines the part managing soils can play in mitigating climate change.	The DP should ensure the sustainable management of soil resources. SEA objectives should reflect and consider relevant priorities from the Soil: A Precious Resource publication.
Environment Agency (2004) Catchment Flood Management Plans: (Guidelines – Volume 1 Policy
These guidelines support the EA's strategy for flood risk management and work towards achieving the government's strategy for flood and coastal erosion flood risk management. The aims of Catchment Flood Management Planning is:	The DP links to this plan where it affects flood risk or land management, for example through changes in abstraction or water storage. The SEA should consider how the DP may affect flood risk
To promote sustainable flood risk management measures To reduce the sources of flooding and harm to people, and the	across the region.
natural, built and historic environment caused by floods	
• To support the delivery of the Government's and others' policies and targets, and the Environment Agency's environmental vision.	
Environment Agency (2018), Water Resources Planning Guideline:	Interim update
Technical guidelines published jointly by Defra, Environment Agency and Ofwat for the 2019 Water Resource Management Plans for England.	The SEA should seek to ensure that water supplies and resources are maintained or enhanced in line with the Water Resources Planning Guidelines.
Environment Agency (undated), WFD River Basin Characterisation Project: Technical Assessment Method - River abstraction and flow regulation	
This paper describes the method used to assess the likelihood of river water bodies achieving the relevant WFD objectives as a result of artificial influences on low river flows.	Implementation of the DP may impact river water quality. The SEA should seek to promote the protection and enhancement of biodiversity and river water quality across the region.
Environment Agency (undated) Hydroecology: Integration for moder	n regulation
This paper describes clear way forward in terms of hydroecology and a strategic direction to its development and application.	The DP and SEA should ensure relevant ecological considerations are integral to water resource evaluation and management decisions across the range of temporal and spatial scales.
English Heritage, now known as Historic England (2008) Climate Change and the Historic Environment	
Sets out the current thinking on the implications of climate change for the historic environment. It is intended both for the heritage sector and also for those involved in the wider scientific and technical aspects of climate change; in the development of strategies and plans relating to the impact of climate change; or in projects relating to risk assessment, adaptation and mitigation.	The SEA should seek to assess the implications of the DP in combination with climate change and the potential impacts on heritage and the historic environment.
Flood and Water Management Act, 2010 as amended	
The Flood and Water Management Act 2010 aims to provide better, more comprehensive management of flood risk for people, homes and businesses. It aims improve efficiency in the water industry, improve the affordability of water bills for certain groups and	The SEA should seek to ensure that flood risk in the region is not adversely affected by the implementation of the DP and that



Influences on the DP and the SEA objectives	
water supplies across the region are maintained.	
The SEA should seek to protect and enhance heritage and landscape.	
Historic England (2019) Heritage Counts 2019: There's No Place Like Old Homes: Re-Use and recycle to Reduce Carbon	
The SEA should consider the findings of this report and the effect building has on heritage assets and climate change.	
n Planning Note 3	
The SEA should take into account effects on settings of heritage assets.	
Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment	
The SEA should consider the potential effects of the DP on the historic environment, particularly designated assets and their settings, and to important wetland areas with potential for paleo-environmental deposits. Historic characterisation can supplement information about designations. Sustainability issues, objectives and indicators identified in this document should be taken into account in the SEA.	
e the Environment	
 The DP may influence the environmental benefits and pressures identified in the Environment Plan, such as: Clean air Clean and plentiful water Thriving plants and wildlife Reducing risks of harm from environmental hazards Using resources from nature more sustainably and efficiently Enhancing beauty, heritage and engagement with the natural environment mitigating and adapting to climate change minimising waste 	



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
 Using and managing land sustainably, which includes embedding an 'environmental net gain' principle for development (including housing and infrastructure) 	The SEA should ensure that the impacts of any drought options on the 25-year goals set out in the Environment Plan are fully considered, whilst taking into account environmental net gain and natural capital approach, which the government have identified as principle themes.
 Recovering nature and enhancing the beauty of landscapes 	
Connecting people with the environment to improve health and wellbeing	
 Increasing resource efficiency, and reducing pollution and waste 	
Securing clean, productive and biologically diverse seas and oceans	
Protecting and improving the global environment	
HM Government (2016) National Infrastructure Delivery Plan 2016-2	2021
This plan updates and replaces the previous National Infrastructure Plan and takes a targeted approach to infrastructure investment and delivery across different sectors over five years. These are all critical to support economic growth through the expansion of private sector businesses across all regions and industries, to enable competitiveness and to improve the quality of life of everyone in the UK. The plan recognises the pressure on future water and waste services from population growth and climate change.	The DP could result in the production of additional waste. The SEA should seek to reduce the production of waste and ensure it is treated in line with the widely adopted 'waste hierarchy' and not sent to landfill. The DP can contribute to the providing resilient water services.
HM Treasury (2015) Fixing the Foundations: creating a more prosperous nation.	
This document sets out a 15-point plan that the government will put into action to boost the UK's productivity growth, centred around two key pillars: encouraging long-term investment, and promoting a dynamic economy. It sets out the government's long term strategy for tackling the issues that matter most for productivity growth.	The DP should have regard to the points included in the plan
Marine and Coastal Access Act 2009	
The Marine and Coastal Access Act sets out a number of measures, including the establishment of Marine Conservation Zones (MCZs)	The DP should have regard to effects on coastal areas.
and Marine Spatial Plans. I	The SEA should take into account the effects of the measures of coastal environments where relevant.
Ministry of Housing, Communities and Local Government (2019) National Planning Policy Framework 2019	
The NPPF sets out the Government's planning policies for England. The revision to the NPPF published in February 2019 broadly continues the guidance set out in the 2012 NPPF, with more emphases on housing, design, efficient use of land and continued reference to an objective of achieving net gains. It constitutes	The DP and SEA should take account of the key components of the NPPF to ensure sustainable development and seek to promote biodiversity net gain.



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications. At the heart of the NPPF is a presumption in favour of sustainable development. However, the 'presumption in favour of sustainable development' is not applicable where any adverse impacts would significantly outweigh the benefits, when assessed against all policies in the NPPF or where specific policies indicate development should be restricted. This includes proposed developments that affect European designated sites, Green Belt or AONB land.	
It presents guidance under broad themes which include: Promoting healthy and safe communities; Meeting the challenge of climate change, flooding and coastal change; Conserving and enhancing the natural environment; and Conserving and enhancing the historic environment.	
Natural Environment and Rural Communities Act, 2006	
This Act makes provision about bodies concerned with the natural environment and rural communities in connection with wildlife, sites of special scientific interest, National Parks and the Broads. The Natural Environment and Rural Communities Act is designed to help achieve a rich and diverse natural environment and thriving rural communities.	The SEA should seek to maintain or enhance the quality of habitats and biodiversity. The impacts of the DP on any designated features, as highlighted in the Natural Environment and Rural Communities Act, should be addressed.
Planning (Listed Buildings and Conservation Areas) Act 1990	
This addresses listed buildings including prevention of deterioration and damage and preservation and enhancement of conservation areas.	The DP and SEA should take account of the need to protect listed buildings and conservation areas.
Salmon and Freshwater Fisheries Act, 1975	
The Act lays down the present basic legal framework within which salmon and freshwater fisheries in England are regulated. Proposals have been made to extend the legislation to apply to more fish species e.g. coarse fish, eel and lamprey species. These proposals are currently under review.	The Act Provides statutory requirements for maintaining fish passage. The SEA will cover fish passage as an element of at least one sustainability objective. The SEA should seek to address any potential
The Act covers legislation on fishing methods and related offences, obstructions to fish passage, salmon and freshwater fisheries administration and law enforcement. Proposed extensions to the legislation (under review) include the provision of fish passes and screening of water abstraction and discharge points for coarse fish, eel and lamprey species.	address fish passage.
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015	
These regulations amend the 2009 regulations and provide additional protection to habitats and species identified on Annexes 1 and 2 of the EC Habitats Directive (92/43/EEC), SSSIs and, in some cases, classified waterbodies from environmental damage where an operator has intended to cause damage or been negligent to the potential for damage.	The SEA should seek to ensure that the guidance provided by the regulations is considered when assessing the DP.



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives	
Applies to the most serious categories of environmental damage, including:		
 Contamination of land that results in a significant risk of adverse effects on human health 		
Adverse effects on surface water or groundwater consistent with a deterioration in the water's status		
• Adverse effects on the integrity of a Site of Special Scientific Interest (SSSI) or on the conservation status of species and habitats protected by EU legislation outside SSSIs.		
The Eels Regulations 2009		
Implement European Council Regulations 1100/2007 establishing measures for the recovery of the stock of European eel. The Regulations will help implement delivery Eel Management Plans. They address eel records and re-stocking, close season and reduction of fishing effort, passage of eels and entrainment.	The SEA should seek to should seek to maintain the quality of habitats and biodiversity, and take regard of protected species identified. This should include migratory fish species and their migratory	
The key objective is to ensure that at least 40% of the potential production of silver eels returns to the sea to spawn. This will be achieved by reducing exploitation of all life-stages of the eel and restoration of their habitats.		
UKTAG on the WFD e.g. Phase 3 Review of Environmental Standards		
UKTAG prepares technical guidance designed to facilitate consistent implementation of the WFD in the UK.	The SEA should seek to ensure that the guidance provided by the plan are	
This report identifies standards for certain chemicals known as specific pollutants, developments in assessments of risk to groundwater, non-native species, standards for flows in rivers, standards for levels in lakes, standards for acidity in rivers and standards in intermittent discharges.	considered when assessing the DP, especially with respect to objectives relating to ecology, water quality and water quantity. The SEA should also ensure the guidance in the plan is used in relation to other related regulations for example the Habitats Directive. The guidance could contribute to the formulation of any criteria for assessing significance of effects.	
UKCIP (2018) UK Climate Projections UKCP18		
The UKCP18 Projections provide a basis for studies of impacts and vulnerability and decisions on adaptation to climate change in the UK over the 21st century. Projections are given of changes to climate, and of changes in the marine and coastal environment; recent trends in observed climate are also discussed.	The DP indirectly takes account of UKCP18 projections through the WRMP process which takes account of climate change in its supply and demand projections. The SEA should also use UKCP18 projections in the broader assessment of climate change effects and any potential cumulative effects. For example, the ecological requirements of aquatic habitats that may be affected by the DP will also be influenced by climate change.	
The methodology gives a measure of the uncertainty in the range of possible outcomes; a major advance beyond previous national scenarios		
The Projections will allow planners and decision-makers to make adaptations to climate change. In order to do so they need as much good information as possible on how climate change will evolve. They are one part of a UK government programme of work to put in place a new statutory framework on, and provide practical support for, adaptation.		
The Water Act, 2003		



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
The Water Act 2003 is in three Parts, relating to water resources, regulation of the water industry and other provisions. The four broad aims of the Act are:	The implementation of the DP may have an effect through its role in maintaining supplies of water. The SEA should seek
The sustainable use of water resources	to promote sustainable use of water resources.
Strengthening the voice of consumers	
A measured increase in competition	
The promotion of water conservation.	
The Water Environment (WFD) Regulations, 2003	
These Regulations make provision for the purpose of implementing in river basin districts within England and Wales. The Water Framework Directive (2000/60/EC) of the European Parliament. The Regulations require a new strategic planning process to be established for the purposes of managing, protecting and improving the quality of water resources.	The SEA should seek to promote the protection and enhancement of all water resources. The SEA should seek to maintain, protect and improve water quality across the region and ensure efficient use of resources.
Water Resources Act, 1991 (Amendment) Regulations 2009 SI3104	
Amends Water Resources Act 1991 by extending the use of Water Protection Zones and Works Notices, in particular to deal with harm to aquatic ecosystems caused by the physical characteristics of a water course or lake, such as quantity, structure and substrate of river/lake bed. Aligns the Water Resources Act with the hydromorphological requirements of the WFD	The SEA should include objectives that cover hydromorphological aspects and seek to ensure that hydromorphological features within the plan are maintained or enhanced.
Natural England (2011) UK Geodiversity Action Plan	
 The UKGAP sets out of framework for geodiversity action across the UK. It provides a shared context and direction for the protection and enhancement of geodiversity through a common aim, themes, objectives and targets which link national, regional and local activities. The UKGAP consists of six broad themes: 1. Furthering our understanding of geodiversity 2. Influencing planning policy, legislation and development design 3. Gathering and maintaining information on our geodiversity 4. Conserving and managing our geodiversity 5. Inspiring people to value and care for our geodiversity 6. Sustaining resources for our geodiversity 	The DP should have regard to the aims and objectives of the UKGAP. The SEA framework should consider effects of options on geodiversity and outline enhancement and mitigation opportunities where these are identified.
Water Industry Act 1991 was amended by the commencement Management Act 2010	of Section 36 of the Flood and Water
This makes provision for general duties of water undertakers including those associated with water resources management plans and sets out supply duties.	The DP must take into account this legislation.
The Water Resources Management Plan Regulations 2007	
This provides the legislation for the preparation of water resources management plans.	The DP should take account of these requirements.
Water UK (2016) Water Resources Planning Framework (2015-2065	5)



Objectives identified in the Policy, Plan or Programme	Influences on the DP and the SEA objectives
Water UK worked with companies, regulators, academics and NGOs to create this long-term Water Resources Planning Framework. The report breaks new ground by deploying new modelling techniques and by looking 50 years ahead across the whole of England and Wales. This high level strategy and framework considers:	The DP should take into account the considerations of the strategy and framework.
 A sector-wide view of future resilience and options for improving that resilience; and 	
• An assessment of variation in levels of service and potential minimum levels of service for customers and the environment, accounting for costs and benefits at a national, regional and sub-regional level, which includes the wider social impacts of drought and drought resilience.	
Wildlife and Countryside Act, 1981	
The Act is the principle mechanism for providing legislative protection of wildlife in Great Britain. Species listed in Schedule 5 of the Act are protected from disturbance, injury, intentional destruction or sale. Other provisions outlaw certain methods of taking or killing listed species. This Act is brought up to date regularly to ensure the most endangered animals are on the schedule.	Some aspects of the DP may have effects on habitats and species in the Thames Water supply area and beyond. The SEA should seek to maintain or enhance the quality of habitats and biodiversity, and take regard of protected species and habitats.
The Act also improved protection for the most important wildlife habitats.	
WWF-UK (2017) Water for Wildlife: Tackling Drought and Unsustainable Abstraction	
This report from WWF-UK looks at the risk of unsustainable abstraction on rivers and the wildlife that is reliant on them. It urges the government to bring forward the Water Bill and include key areas such as:	The DP should take into the account the issues highlighted in the report by WWF-UK.
 Transposing the WFD in full and establishing mechanisms and sanctions to enforce its implementation and uphold its 2027 deadline after leaving the EU Introduction a new 'Restoring Sustainable Abstraction' scheme Ensure all licences and permits prevent future damaging abstraction Devise a national strategy to cut water waste and improve efficiency in homes and businesses whilst engaging the public on the value of water 	
Regional	
AONB Management Units (various) AONB Management Plans	
The following management plans for the five AONBs present in the Thames Water area contain objectives associated with conserving and enhancing the AONB:	The DP operation may have the potential to affect several of the objectives for managing the various AONBs in the Thames area.
 Chilterns AONB Management Plan 2019-2024 Cotwolds AONB Management Plan 2018-2023 Kent Downs AONB Management Plan North Wessex Downs AONB Management Plan 2019-24 Surrey Hills AONB Management Plan 2020-2025 	The SEA should consider the effects of options on landscapes, including designated landscapes.
Environment Agency (2011) Water Resources Strategy – A Regional Action Plan for Thames Region.	



Explains how the aims of the Environment Agency national strategy will be progressed by regional teams. Brings a sustainable approach to water management, taking into account regional challenges. This plan takes the aims and objectives of the strategy and identifies	The DP should be aligned to these objectives which should be reflected in the SEA objectives.
 regional actions that will enable: water to be abstracted, supplied and used efficiently; the water environment to be restored, protected and improved so that habitats and species can better adapt to climate change; supplies to be more resilient to the impact of climate change, including droughts and floods; water to be shared more effectively between abstractors; improved water efficiency in new and existing buildings; water to be valued, and for prices to act as an incentive for efficient use, while safeguarding vulnerable sectors of society; additional resources to be developed where and when they are needed in the context of a twin-track approach with demand management; sustainable, low-carbon solutions to be adopted; stronger integration of water resources management with land, energy, food and waste. 	
Environment Agency Area Drought Plans (various)	
Identifies the measures that will be taken by the Environment Agency to plan for and manage droughts.	The DP should take account of relevant measures contained in these plans and the SEA should consider any cumulative effects between the DP and the relevant Environment Agency plans
Environment Agency (2020) Water Industry National Environment Pr Thames Region	rogramme (WINEP), National Full data set:
The Water Industry National Environment Programme (WINEP) is the mechanism by which the Environment Agency sets out the measures that it would like water companies to implement to improve the water environment. The WINEP covers both water and wastewater services and the detail in the WINEP enables water companies to include specific measures in their business plans for submission to Ofwat so that the environmental improvements can be funded and delivered in the following Asset Planning Period (AMP). In relation to Water Resources Management Plan 2019, the WINEP sets out a series of investigations for Thames Water to carry out to assess the sustainability of some of its existing water sources and also provides an indication of potential changes to abstraction licence conditions to reduce the reliable supply of water to help protect the water environment (termed "sustainability reductions" in the Water Resources Management Plan 2019).	The DP should take this into account.
Environment Agency (2019) Abstraction Licensing Strategies (CAMS process) (various)	
 Sets out how much water is available for abstraction within the Thames area, taking into account the needs of the environment and existing abstractors. Includes: Arun and western streams Bristol Avon, Axe and North Somerset Streams Cherwell, Thame and Wye Colne 	The DP should be aligned to these objectives.



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 Kennet and Vale of White Horse Upper Lee Loddon London Medway Mole Roding, Beam and Ingrebourne Severn corridor Severn Vale Test and Itchen Thames Corridor Upper and Bedford Ouse Warwickshire Avon Wey 	
Environment Agency (2016) Thames River Basin District	Flood Risk Management Plan 2015-2021
 The objectives include: Reduce the risk of flooding to communities where pose Enhance recreation and general amenity across the rie Ensure development and redevelopment in areas flooding is appropriate, does not increase flood reduces risk wherever possible. Promote the use of sustainable drainage system development to help reduce pressure on existing networks. Protect and enhance biodiversity through flor management schemes. Restore naturally functioning river systems where pose Promote sustainable land use management to lan across the catchment to achieve reductions in flood reduces in the process of being updated for 2021 	The DP may have an effect on some of the flood risk management plan objectives. The SEA should include objectives that take into account the objectives where relevant. stems in drainage ood risk ssible. d owners isk.
Environment Agency and Defra (2015) Thames River Basin District River Basin Management Plan	
 Updated as 2009 plans superseded by 2015 plans. Reference is made to the environmental objectives of the groundwater; To achieve objectives and standards for protected and To achieve good status for all water bodies or, for modified water bodies and artificial water bodies or, for everse any significant and sustained upward pollutant concentrations in groundwater; The cessation of discharges, emissions and loses hazardous substances into surface waters; Progressively reduce the pollution of groundwater and or limit the entry of pollutants. Environmental objectives are set for each of the protect and water bodies in the river basin district. 	WFD are: aters and eas; or heavily es, good I status; trends in of priority d prevent ted areas expected d here.
Environment Agency (2004) Thames Salmon Action Plan	(SAP)


The Plan details a 5 year programme of work. Eight targets are identified. Which includes:	The DP may have the potential to impact on fish migration. The SEA will cover fish passage as an element of at least one
An average of 250 adult salmon returning to the river each year	sustainability objective.
Fish passes to be open throughout the fish migration period and operate at greater than 95% efficiency	
Historic England (2019), Heritage at Risk Registers (East of England	d, London & South East and South West)
The register is produced annually as part of Historic England's Heritage at Risk programme. It includes buildings or structures, places of worship, archaeological sites, battlefields, wrecks, parks and gardens, and conservation areas known to be at risk as a result of neglect, decay or inappropriate development	It is unlikely the DP will have an effect on the Heritage at Risk Register.
Thames Water Utilities Ltd (2020), Final Water Resources Manager	nent Plan 2019
See WRMP.	The DP will take into account the objectives of TWUL's WRMP.
Thames Water Utilities Ltd (2020), Our Business Plan 2020-2025	
Thames Water's statutory Business Plan to the water regulator, Ofwat.	The DP should take into account the objectives set out in the Business Plan.
Water Company (various) Drought Plans adjacent to supply area	
 This looks at the management of water resources to maintain service to customers during drought in the surrounding areas. The plans considered include for the following water companies; Affinity Water SES Water 	Assessment of the potential for cumulative impacts of supply side and drought permit/order options with drought options listed in neighbouring water companies' drought plans has been undertaken.
 South East Water Southern Water Anglian Water Severn Trent Water Wessex Water Bristol Water 	The assessments should be reviewed at the time of drought option implementation to ensure that no changes to the neighbouring water company drought option has been made in the intervening period, and that the assessment, therefore, remains valid.
Water Resources Management Plans from adjacent water companie	es la
These set out the plans to manage water resources by companies in adjacent areas, including:	The DP should not conflict with the other water company operations especially
Affinity Water	drought options that may be operated simultaneously.
SES Water	
South East Water	
Southern Water	
Anglian Water	
Severn Trent Water	
Wessex Water	
Bristol Water	



Water Resources South East (2020) Future water resource requirements for South East England			
This publication sets the scene in the South East region WRSE in preparation for the development of the first Regional Plan. This first step sets out to understand how much water is forecasted for the region through to 2100 to show a full range of potential issues the region could face.	The DP and SEA must take into account the work WRSE are doing to increase resilience to drought.		
Local			
Local Catchment Partnership Plans (various)			
There are 28 catchment partnerships covered by the Thames RBMP. These partnerships are guided by the Catchment Based Approach (CaBA) which is a community-led approach that engages people and groups from across society to help improve our precious water environment.	The DP and SEA must take into account the objectives of local catchment partnerships across the Thames region.		
Local catchment partnerships produce catchment plans which are working documents that set out a wide range of objectives to improve the rivers.			
River Restoration and Water Level Management Plans and Program	imes		
 There are a number of proposed river restoration projects in the Thames region such as: The River Restoration Centre (2009) The London Rivers Action Plan Environment Agency (2006) Bringing your rivers back to life: A strategy for restoring rivers in North London Land of the Fanns Landscape Partnership Scheme, River Restoration Programme South East Rivers Trust and Environment Agency, Restoration of the Emm Brook 	The DP may have an effect on River Restoration Plans and schemes for non- Natura 2000 sites. The SEA should include objectives that take into account the objectives of these sites where relevant.		
Defra (2010), Eel Management Plans for the United Kingdom: Tham	es		
These plans aim to achieve an escapement of silver eel to the spawning population that equals or exceeds a target set at 40 per cent of the potential biomass that would be produced under conditions with no anthropogenic disturbance due to fishing, water quality or barriers to migration.	The SEA should consider the potential impacts of the DP on eel populations and escapement targets.		
the eel population and fishery in the RBD, to assess whether the stock is meeting its 40 per cent escapement target, and to present management actions that will ensure the long-term viability of the eel population.			
Mayor of London (2017) The London Plan			
The London Plan is the statutory Spatial Development Strategy for Greater London prepared by the Mayor of London in accordance with the Greater London Authority Act 1999 (as amended). The legislation requires the London Plan to include the Mayor's general policies in respect of the development and use of land in Greater London and statements dealing with general spatial development aspects of other strategies. The overall strategic plan for London, setting out an integrated economic, environmental, transport and social framework for the development of London over the next 20–25 years. The plan brings together the geographic and locational aspects of the Mavor's other	The DP may have an effect on some aspects of the London Plan objectives (such as environmental issues, climate change, air quality and waste). The SEA should include objectives that take into account the objectives and vision of the London Plan (current adopted plan and draft New London Plan) where relevant.		



strategies – including those dealing with: transport, economic development, housing, culture a range of social issues such as children and young people, health inequalities and food a range of environmental issues such as climate change (adaptation and mitigation), air quality, noise and waste. The current London Plan (2016) is still the adopted Development Plan but the draft London Plan is a material consideration in planning decisions.	
Mayor of London (2018) Zero carbon London: A 1.5°C compatible pl	an
This plan sets out some of the most ambitious plans to tackle climate change in the world, making London a zero carbon city by 2050.	Any DP options in the London area should not impact the targets set out in the plan.
Mayor of London (2018) London Environment Strategy	
The first strategy for London of its kind aims to ensure London is greener, cleaner and ready for the future through bringing together approaches to every aspect of London's environment, including: Climate change and energy, Waste, Adapting to climate change, Green infrastructure, Air quality, and Noise	Options in the DP have potential to cause environmental impacts. The SEA assessment framework should consider the effects of the DP on the achievement of the strategy's key priorities.
Mayor of London, Cross River Partnership and Natural England (20 a future city	16) Green Capital: Green Infrastructure for
 This plan sets out the changes to policy, governance, valuation and funding need to ensure long-term investment in London's green infrastructure. Based on a Natural Capital Approach, the plan sets out five objectives for the future: 1. Promote healthy living: by increasing physical activity, reducing stress and removing pollutants 2. Strengthen resilient living: by keeping the city dry and cool and it's air clean 3. Encourage active living: by increasing levels of walking and cycling 4. Create living landscapes: by conserving the most special landscapes, habitats and species 5. Enhance living space: by providing a range of outdoor spcaes for cultural, civic, learning and community activities 	The SEA should ensure alignment with the natural capitals of the Green Infrastructure plan for London.
Mayor of London (2015) London Infrastructure Plan 2050	
he London Infrastructure Plan 2050 is the first ever attempt to identify, prioritise and cost London's future infrastructure to 2050, given London's growth. Following the release of an update report in early 2015, the plan is helping London work to improve the delivery of London's infrastructure and to make sure London receives the investment it needs to support housing, quality of life and economic growth.	The DP may have an effect on some aspects of the London Infrastructure Plan objectives. The SEA should include objectives that take into account the objectives and vision of the London Infrastructure Plan where relevant
Mayor of London (2011) Securing London's water future: The Mayor	's Water Strategy
Securing London's Water Future: the Mayor's Water Strategy is the first water strategy for London and provides a complete picture of London's water needs. The strategy calls for organisations involved in the city's water management to:	The DP may have an effect on water resources. The SEA should take the Mayor's water strategy into account.



 invest in a water management and sewerage infrastructure system that's fit for a world class city and will create jobs 	
 support and encourage Londoners to take practical actions to save water, save energy and save money off their utility bills 	
 realise the potential of London's sewerage as an energy resource to help reduce greenhouse gas emissions 	
• work in partnership with the Mayor, boroughs and communities to seek and develop opportunities to manage flood risk through enhancing London's green spaces	
At a time of decreasing supply and increasing demand for water we need to use the water we have more wisely. The strategy promotes increasing water efficiency and reducing water wastage to balance supply and demand for water, safeguard the environment and help tackle water affordability problems. It also sets out how the Mayor will help communities at risk of flooding to increase their resilience to flooding.	
Local Biodiversity Action Plans (various)	
Local biodiversity action plan objectives include those associated with maintaining and safeguarding the current extent of protected designations and recognised habitats and achieving favourable status for these areas.	The DP may have an effect on BAP objectives. The SEA should include objectives that take into account the objectives of the BAP where relevant (e.g. conservation designation status).
The Thames Water assessment area covers many Local BAPs.	
Local Planning Authority (various) Land Use Plans	
The Thames Water area covers a large number of Local Planning Authorities. The main objectives of the existing and emerging Land Use Plans in these areas are related to the sustainable development of the area.	SEA should seek to ensure the DP options should be consistent with the Land Use Plans of those local authorities that will be affected by the option.
Local Geodiversity Action Plans (LGAPs)	
Local Geodiversity Action Plans (LGAPs) set out actions to conserve, enhance and promote the geodiversity of a particular	DP options should take into account the aims of the LGAPs.
area. They aim to identify, conserve and enhance the best sites that represent the geological history of an area. They also aim to promote geological sites, provide a local geodiversity audit and influence local planning policy.	The SEA assessment should consider effects of options on geodiversity and outline enhancement and mitigation opportunities where these are identified.
Local Planning Authority (various) Local Plans/Local Development P	lans
The Thames Water assessment area includes a large number of Local Planning Authorities which will all have their own Local Plan /	The DP should take into account the Local Plans and emerging Local Plans.
areas.	The SEA assessment framework should consider the effects of the DP on the achievement of the Plans' visions and the effects of options on sustainable land use.
Local Wildlife Trust Strategies (various)	
There are a number of local Wildlife Trusts in the Thames Water area, including:	The DP should take into account the key objectives of Wildlife Strategies and
London Wildlife Trust	protect local wildlife.



 Herts and Middlesex Wildlife Trust Berks, Bucks and Oxon Wildlife Trust Surrey Wildlife Trust Kent Wildlife Trust 	The SEA assessment framework should consider the effects of options on biodiversity.
Natural England National Character Area (NCA) Profiles	
There are several NCAs within Thames Water's operating boundary. Each of these have individual objective relating to specific landscapes, habitats and species. Generalised objectives for each of these include: Conserve characteristic historic structures Protect the area's rich and diverse archaeology Protect the area's high levels of tranquillity Protect, manage and enhance the good rights of way network Manage and enhance existing habitats Encourage the maintenance of traditional land management practices Protect, and encourage sympathetic management Protect and manage geological features Plan for climate change mitigation and adaptation	The DP may have an effect on NCAs. The SEA should include objectives that take into account the objectives of the NCAs where relevant (e.g. manage and enhance existing habitats).
OxCam Local Natural Capital Plan	
The OxCam Arc LNCP project is a Defra-Group-led project to develop a LNCP to support he delivery of environmental protection and enhancement as part of the planned growth and investment within the Arc. The government is committed to LNCPs, with the aim to embed natural capital thinking into growth plans. A secondary aim of the project is to provide a scalable and replicable framework for LNCPs elsewhere.	The DP operation may have the potential to impact natural capital and the SEA should seek to protect and or enhance this.
Oxfordshire Local Enterprise Partnership (OxLEP) Various Strategie	s, including Environment Strategy
OxLEP was set up with the responsibility of championing and developing the Oxfordshire economy. The partnership has many programmes and strategies including; Local Industrial Strategy, Energy Strategy, Infrastructure Strategy and the Environmental Strategy. The Environment Strategy stresses the importance of protecting its natural capital, including the River Thames and its tributaries, when developing and growing the area.	The DP operation may have the potential to impact the environment. The SEA should include objectives to protect natural capital in line with the OxLEP Environment Strategy. The SEA will also take into account other strategies from OxLEP
Public Rights of Way Improvement Plans (ROWIPs)	
Objectives include those associated with each local authority's rights of way improvement plans.	The DP operation may have the potential to affect the objectives of the ROWIPs. The SEA will include objectives that take into account the objectives of the ROWIPs where relevant.



Appendix C Environmental Baseline Review



C.Environmental Baseline Review C.1 Biodiversity, Fauna and Flora

C.1.1 Baseline

Biodiversity comprises the variety of plants (flora) and animals (fauna) in an area, and their associated habitats. The importance of preserving biodiversity is recognised from an international to a local level. Biodiversity has importance in its own right, and has value in terms of quality of life and amenity.

The Thames Water supply area includes a variety of sites that are designated at a European, national or local level as important for biodiversity, flora and fauna (see Figure C.1), including:

- 5 Ramsar¹ Sites (South west London waterbodies, Lee Valley, Thursley & Ockley Bogs, Benfleet and Southend Marshes, and Thames Estuary & Marshes)
- 7 Special Protection Areas (SPA)² •
- 24 Special Areas of Conservation (SAC)³ •
- 455 Sites of Special Scientific Interest (SSSI)⁴ •
- 16 National Nature Reserves (NNR)⁵ •
- 272 Local Nature Reserves (LNR)⁶. •

Figure C.1 shows the location of these designated sites. Table C.1 presents details of the internationally designated sites including SPAs and SACs. There are no candidate SACs in the Thames catchment.



¹ Ramsar sites are wetlands of international importance designated under the Ramsar Convention.

² Special Protection Areas (SPAs) are strictly protected sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species. www.jncc.org.uk

³ Special Areas of Conservation (SACs) are strictly protected sites designated under the EC Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). <u>www.jncc.org.uk</u> ⁴ Natural England now has responsibility for identifying and protecting the SSSIs in England under the Wildlife and Countryside

Act 1981 (as amended by the Countryside and Rights of Way Act 2000).

⁵ NNRs are protected under Sections 16 to 29 of the National Parks and Access to the Countryside Act, 1949 and the Wildlife and Countryside Act, 1981.

⁶ LNRs – places with wildlife or geological features that are of special interest locally.



Legend Thames Water Supply Area Site of Special Scientific Interest Special Area of Conservation Special Protection Areas

Ancient Woodland Local Nature Reserve National

RAMSAR

Nature Reserve



 Thames Water Drought Plan 2022 SEA Environmental Report

 Figure Title:
 Designated Sites

 Figure Number:
 Date:

 Figure C1
 March 2021

 12.5
 0
 12.5
 25 km

 Note: All locations are approximate Contains Ordnance Survey Data © Crown copyright and database rights 2020

Table C.1 SPAs and SACs in Thames area

Name of Site and Type	Thames Water	Region(s)
	Water Resource Zone (where applicable)	
SPA		
Lee Valley (SPA) (Also Ramsar)	London	East of England
South West London Waterbodies (SPA)	London	South East and London
(Also Ramsar)	Slough/Wycombe/Aylesbury	
Thursley, Hankley & Frensham Commons (SPA), also SAC and SSSI	Guildford	South East and London
Thames Estuary & Marshes (also Ramsar)	London (partially)	
Wealden Heaths Phase II (SPA) (constituting Woolmer Forest, Bramshott and Ludshott Commons, Broxhead and Kingsley Commons and Devil's Punchbowl SSSI)	Guildford	South East and London
Thames Basin Heaths (SPA) (constituting Ash to Brookwood Heaths, Bourley and Long Valley, Bramshill, Broadmoor to Bagshot Woods and Heaths, Castley Bottom to Yately and Hawley Commons, Chobham Common (also NNR), Colony Bog and Bagshot Heaths, Eelmoor Marsh, Hazeley Heath, Horsell Common, Ockham and Wisely Common, Sandhurst to Owlsmoor Bogs and Heaths, Whitmoor Common)	London (partially)	South East and London
Benfleet and Southend Marshes (also Ramsar)		
SAC		
Kennet & Lambourn Floodplain (SAC)	Kennet Valley and SWOX	South East, London and South West
Windsor Forest & Great Park (SAC)	Slough/Wycombe/Aylesbury	South East and London
Hackpen Hill (SAC)	SWOX	South East and London
Oxford Meadows (SAC)	SWOX	South East and London
River Lambourn (SAC) Also SSSI	Kennet Valley	South East and London
Cothill Fen (SAC)	SWOX	South East and London
Chiltern Beechwoods (SAC)	Slough/Wycombe/Aylesbury and SWOX	South East, London and East of England
Hartslock Wood (SAC)	SWOX	South East and London
Little Wittenham (SAC)	SWOX	South East and London
Thursley, Ash Pirbright and Chobham SAC (constituting Thursley Hankley and Frensham Commons, Colony Bog and	Guildford	South East and London



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Name of Site and Type	Thames Water Water Resource Zone (where	Region(s)
Bagshot Heaths, Ash to Brookwood Heaths, Chobham Common SSSIs		
Burnham Beeches (SAC) (also SSSI)	Slough/Wycombe/Aylesbury	South East and London
Kennet Valley Alderwoods (SAC)	Kennet Valley	South East and London
Aston Rowant (SAC) (also SSSI)	SWOX and Slough/Wycombe/Aylesbury	South East and London
Wormley-Hoddesdonpark Woods (SAC)	London	East of England
Wimbledon Common (SAC) (also SSSI)	London	South East and London
Richmond Park (SAC)	London	South East and London
Epping Forest (SAC)	London	South East, London and East of England
North Meadow & Clattinger Farm (SAC) (also SSSI)	SWOX	South West
Pewsey Downs (SAC)	SWOX (outside zone – 1.5km)	South West
Cotswold Beechwoods (SAC)	SWOX	South West
Shortheath Common (SAC)	Guildford (outside zone – 17km)	South East
Mole Gap to Reigate Escarpment (SAC)	London/Guildford (outside zones – 5km)	South East
East Hampshire Hangers (SAC)	Guilford (outside zone – 5km)	South East
Woolmer Forest (SAC)	Guildford (outside zone – 10km)	South East

Note: all terrestrial SACs and SPAs are underpinned by SSSIs

A list of the SSSIs that have been considered in the SEA is provided in Table C.2 along with the outcome of any environmental assessment undertaken, where required. Information in relation to specific drought permit options was obtained from the respective EARs. Water dependent features were identified using the UK Technical Advisory Group on the Water Framework Directive Guidance on the Identification of Natura Protected Areas (final) March 20037. Following this, professional judgement, informed by relevant information on the ecological requirements for each habitat/species, identified the sensitivity of the feature to the changes resulting from the drought option. This was used as a basis to screen features in and out of needing further assessment. A description of the perceived sensitivity to each drought option and any uncertainty was identified in each EAR. This information was used to define the confidence of the sensitivity assessment.

Where features were considered to have a high or medium or uncertain sensitivity to drought management actions, the habitats/species were considered for further assessment. Internationally or nationally designated sites were also considered for detailed assessment where a low sensitivity was identified.

Further information on the approach to assessing SSSIs is available in the Environmental Assessment Methodology⁸



⁷ UK Technical Advisory Group (UKTAG) (2003). UK Technical Advisory Group on The Water Framework Directive. Guidance on the Identification of Natura Protected Areas [Final]. Published 30 March 2003. ⁸ Ricardo Energy & Environment (2020) Thames Water Drought Plan 2022. Environmental Assessment Methodology. Report

for Thames Water Utilities Ltd. September 2020

Table C.2 SSSIs in Thames Water SEA Study Area

SSSI Name	Drought Permit(s)	Screened In/Out in EARs	Result (taken from EARs)
Kennet Valley WRZ			
Sulham & Tidmarsh SSSI	Pangbourne	In	Negligible
Pamber Forest & Silchester SSSI	Fobney Emergency Boreholes	Out	
Ron Ward's Meadow with Tadley Pastures SSSI	Fobney Emergency Boreholes	Out	
Decoy Pit, Pools & Woods SSSI	Fobney Emergency Boreholes	Out	
West's Meadow, Aldermaston SSSI	Fobney Emergency Boreholes	Out	
Ashford Hill Woods & Meadows SSSI	Fobney Emergency Boreholes	Out	
Woolhampton Reed Bed SSSI	Fobney Emergency Boreholes	Out	
Old Copse, Beenham SSSI	Fobney Emergency Boreholes	Out	
Greenham & Crookham Commons SSSI	Fobney Emergency Boreholes	Out	
London WRZ	I	I	I
Sevenoaks Gravel Pits SSSI	Sundridge (1) Sundridge (2)	In	Moderate
Otford to Shoreham Downs SSSI	Sundridge (1), Sundridge (2)	Out	
Darenth Wood SSSI	Sundridge (2)	Out	
Farningham Wood SSSI (and LNR)	Sundridge (1), Sundridge (2), Eynsford	Out	
Farthing Downs & Happy Valley SSSI	Sundridge (1)	Out	
West Thurrock Lagoon & Marshes SSSI	Sundridge (2)		
Quarry Hangers SSSI	Sundridge (1)	Out	
Titsey Woods SSSI	Sundridge (1)	Out	
Woldingham & Oxted Downs SSSI	Sundridge (1)	Out	
Wraysbury and Hythe End Gravel Pits SSSI	Increase in M2 Annual Licence	Out	
Wansunt Pit SSSI	Crayford, Wansunt	Out	
SWA, Guildford and Henley WRZ			
Blackheath SSSI	Albury	Out	



Colyers Hanger SSSI	Albury	Out	
Wey Valley Meadows SSSI	Shalford	Out	
Harpsden Wood SSSI	Harpsden Sheeplands	Out	
Lodge Wood & Sandford Mill SSSI	Harpsden Sheeplands	Out	
Wykery Copse SSSI	Harpsden Sheeplands	Out	
SWOX WRZ		1	1
Chilton Foliat Meadow SSSI	Axford (1), Axford (2)	Out	
River Kennet SSSI	Axford (1), Axford (2), Ogbourne (1), Ogbourne EBH	In	Moderate
Kennet Valley Alderwoods SSSI	Axford (2)	Out	
	Latton	Out	
	Meysey Hampton	In	Negligible
Cotswold Water Park SSSI	Baunton (1)	In	Negligible
	Baunton (2)	In	Negligible
	Bibury	In	Negligible
	Latton	Out	
Wildmoorway Meadows SSSI	Baunton (1)	In	Negligible
	Baunton (2)	In	Negligible
North Meadow & Clattinger Farm SSSI	Latton	Out	
(and SAC & NNR)	Baunton (1), Baunton (2)	In	Negligible
	Meysey Hampton	Out	
North Meadow, Cricklade SSSI	Baunton (1), Baunton (2)	In	Minor (uncertain)
Barnsley Warren SSSI	Meysey Hampton	Out	
Acre Farm Meadow SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Chimney Meadows SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Clattinger Farm SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Cloatley Manor Farm Meadows SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	



Distillery Meadows SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Ducklington Mead SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Elmlea Meadows SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Emmet Hill Meadows SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Grafton Lock Meadow SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Haydon Meadow SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Juniper Hill, Edgeworth	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Langley's Lane Meadow	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Pike Corner	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Restrop Farm & Brockhurst Wood SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
Stoke Common Meadows SSSI	Meysey Hampton, Baunton (1), Baunton (2), Bibury	Out	
	Meysey Hampton	In	Negligible
Whelford Meadows SSSI	Baunton (1)	In	Negligible
	Baunton (2)	In	Negligible
	Bibury	In	Negligible
	Meysey Hampton	Out	
Winson Meadows SSSI	Baunton (1)	In	Negligible
	Baunton (2)	In	Negligible
	Bibury	In	Negligible
Alvescot Meadows SSSI	Baunton (1), Baunton (2)	Out	
Upper Waterhey Meadow SSSI	Baunton (1), Baunton (2), Bibury	Out	
Cassington Meadows SSSI	Farmoor	In	Negligible
Pixey & Yarnton Meads SSSI	Farmoor	In	Negligible



Wolvercote Meadows SSSI	Farmoor	In	Negligible
Port Meadow with Wolvercote Common & Green SSSI	Farmoor	In	Negligible
Wytham Wood SSSI	Farmoor	Out	
Wytham Ditches and Flushes SSSI	Farmoor	In	Negligible
Iffley Meadows SSSI	Farmoor	In	Negligible
Littlemore Railway Cutting SSSI	Farmoor	Out	
Culham Break SSSI	Farmoor	Out	
Hartslock Wood SSSI	Farmoor, Gatehampton	Out	
Little Wittenham SSSI	Farmoor	Out	
Holies Down SSSI	Farmoor, Gatehampton	Out	
Lardon Chase SSSI	Gatehampton	Out	
Hackpen, Warren and Gramp's Hill Downs SSSI	Childrey Warren	Out	

Marine Conservation Zones (MCZs) are designated to protect a range of nationally important marine wildlife, habitats, and geology and geomorphology. There are no drought sources in the SEA study area that have an impact on a MCZ. Swanscombe MCZ was designated in 2019, with its interest features being the tentacled lagoon worm *Alkmaria romijni*, however, this site falls outside of the zone of influence for the Lower Thames drought permit option. The Upper Thames Estuary is a recommended MCZ and is within the zone of influence of the Lower Thames drought permit however this has not been designated.

Species and habitats of principal importance for the conservation of biodiversity in England are identified in the Natural Environment and Rural Communities (NERC) Act 2006 Section 41. There are 18 habitats⁹ designated within the Natural Environmental and Rural Communities (NERC) Act within the Thames Corridor. These include rivers and streams (e.g. sensitive chalk rivers), reedbeds, fens and water meadows. Important water-related NERC species are listed in below.

- Otter
- Water vole
- Atlantic salmon
- European eel
- Sea/Brown trout
- River lamprey
- White clawed crayfish and
- Snakeshead Fritillary
- Loddon Lilly

- Fine-lined Pea Mussel
- Freshwater Pea Mussel
- Depressed River Mussel
- Greater Water Parsnip
- Club-tailed Dragonfly
- Tassel Stonewort
- Desmoulins Whorl Snail
- Snipe
- Lapwing



⁹ Species or habitats of principal importance for the conservation of biodiversity in England, identified in the Natural Environmental and Rural Communities (NERC) Act 2006 Section 41.

- Creeping Marshwort
- Narrow-leaved water-dropwort
- River water-dropwort

- Natterer's Bat
- Daubenton's Bat
- Pipistrelle Bat

Local Wildlife Sites (LWS) are areas of land that are especially important for their wildlife and are identified and selected locally using robust, scientifically-determined criteria and detailed ecological surveys. LWS data are generally held by local environment record centres. There are a large number of LWS in the SEA study area, many of which may be associated with water features. Over 900+ sites have been identified to date which are located in the vicinity of Thames Water's drought options as part of the screening exercise which is being undertaken to inform the DP detailed Environmental Assessment Reports (see Section 1.5 of the SEA Environmental Report).

Natural England has defined a series of 159 National Character Areas (NCAs) as a means to conserve nature in England¹⁰. These are areas of countryside identified by the unique combination of physical attributes, wildlife, land use and culture. National Character Areas (NCAs) that cover the River Thames basin are described in **Table C18** (under the Landscape and Visual Amenity topic).

Ancient woodlands in England and Wales are important habitats that should be protected. An ancient woodland is any wooded area that has contained woodland continuously since at least 1600 AD. They tend to be more ecologically diverse and of a higher nature conservation value than those developed recently, or where cover on the site has been intermittent. They often also have cultural importance. Areas of ancient woodland are shown on **Figure C.1**.

The WFD ecological status classification considers the condition of biological quality elements (e.g. aquatic invertebrates, plants and fish), the morphology of the habitat available in each water body (e.g. a defined stretch of river), and concentrations of supporting physico-chemical elements (e.g. oxygen or ammonia and concentrations of specific pollutants). See the 'Water' topic for details on water quality, and **Table B9** for the ecological condition of surface water bodies.

Water abstraction and associated infrastructure can sometimes result in adverse effects on waterrelated sites. Impacts on biodiversity may include the drying out of wetland habitats, lower water levels and slower flows in watercourse, deterioration in water quality, change in water temperature, or the transfer or proliferation of invasive species. The WFD Thames River Basin District River Basin Management Plan (RBMP) identifies barriers to fish passage as one of the major issues affecting the ecology of rivers in the Thames River Basin District, some of which are relate to abstraction impacts on migratory flow conditions and/or abstraction infrastructure (e.g. intakes or weirs).

Drought options have the potential to affect biodiversity, flora and fauna due to the operational abstraction of water during times of water stress or due to impacts of any construction works required. The sensitivity of environmental features that can be affected by implementing drought options is site specific. A drought is transient and the deployment of a drought option would only be for a limited period of time. Therefore, the duration of effects on sensitive features and reversibility post drought are important considerations.

C.1.1.1 Invasive Non-Native Species (INNS)

There has been a dramatic increase in the number of non-native species arriving into the UK over recent decades, as well as in the number of invasive species being established. There are



¹⁰ Natural England (2014) Natural Character Area Profiles. <u>https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles</u>

approximately 2000 non-native species established in Britain, with the majority of in the terrestrial environment and smaller numbers in marine and freshwater environments. The River Thames is particularly vulnerable to introductions of INNS due to the dense human population and high level of marine traffic and is now thought to be one of the most heavily invaded river systems in the world¹¹. Implementation of Thames Water's drought plan options are not expected to increase in the distribution of INNS. Non-native species cause significant adverse impacts, including out-competing native species and spreading disease. The UK Government 2015 strategy on invasive non-native species¹² builds on previous strategies to provide a framework for coordinated action to prevent spread and work to eradicate species across the UK. The distribution of INNS will be assessed in the SEA report and the spread of invasive species forms a key question with regards to biodiversity in Section 3.1.

C.1.2 Future Baseline

It is not expected that many additional sites will be designated under international or national legislation, with the focus therefore on achieving the conservation objectives set for each of these sites. A range of measures are included in the management plans for each site to contribute to these objectives and, assuming sufficient resources are in place, it is likely that the condition of these sites will improve over the next two or three decades to reach the objectives. These timescales recognise the time required for environmental changes to arise following positive interventions. A similar trend is likely for achievement of objectives associated with the NERC priority habitats.

The number of locally designated sites may increase slightly in response to growing community activities and the development of local environmental initiatives. An improving trend in condition of these sites is also anticipated with greater resources (particularly voluntary resources) devoted to their protection and enhancement.

Thames Water is working with WRSE to determine the level of Environmental Ambition measures required in the future. This applies particularly to chalk streams and Thames Water is seeking to cease all abstraction that adversely affects vulnerable chalk streams.

The Defra 25 Year Environment Plan¹³ includes a commitment to restore restoring 75% terrestrial and freshwater protected sites to favourable condition and to create or restore 500,000 hectares of wildliferich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits. The 25 Year Plan also proposed an adoption of 'Biodiversity Net Gain' approach to development, an approach introduced into national planning policy in 2019 and which will be mandated by the forthcoming Environment Bill.

The 25 year Plan also includes a commitment to support land management at landscape and catchment level and to support the adoption of long-term sustainable land management practices to significantly expand wildlife habitat and provide opportunities for species and ecosystem recovery.

Climate change is likely to have an impact on wildlife in the future by exacerbating existing pressures such as changes to the timing of seasonal activity, and water scarcity. It is acknowledged that there is a need to allow wildlife to adapt to the impacts of climate change. Climate may limit species' distributions indirectly though the impact of invasive species on native species along climatic



¹¹ Jackson, M. and Grey, J. (2012) Accelerating rates of freshwater invasions in the catchment of the River Thames. *Biological Invasions*, 2012.

¹² Defra (2015) The Great Britain invasive non-native species strategy

¹³ HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. Accessed at https://www.gov.uk/government/publications/25-year-environment-plan. Accessed 09 June 2020.

gradients¹⁴. It will affect the abundance and diversity of natural enemies, competitors and species that constitute resources, as well as a species' ability to compete for resources or resist natural enemies.

C.1.3 Key Issues

The key sustainability issues arising from the baseline assessment for biodiversity are:

- The need to protect or enhance biodiversity, ecological functions and biodiversity connectivity within TWUL's supply and source areas, particularly protected sites designated for nature conservation.
- The need to avoid activities likely to cause irreversible damage to natural heritage.
- The need to take opportunities to improve connectivity between fragmented habitats to create functioning habitat corridors.
- The need to control the spread of Invasive Non-Native Species (INNS)
- The need to recognise the importance of allowing wildlife to adapt to climate change.
- The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.



¹⁴ Pateman & Hodgson (2015) Biodiversity Climate change impacts report card technical paper. Available from: <u>http://www.nerc.ac.uk/research/partnerships/lwec/products/report-cards/biodiversity/papers/source06/</u>

C.2 Population and Human Health

C.2.1 Baseline

Population

The greater South East region is a densely populated part of the UK. London, as expected, is the most densely populated area with the most recent estimates at 5,701 people per square kilometre, compared to an average of 432 per square kilometre in England as a whole¹⁵. Households in England are projected to increase by 17% between 2016 and 2041, from 22.9 million to 26.9 million¹⁶.

Table C.3 describes the latest population statistics for the NUTS regions ¹⁷ covered by the River Thames basin. Data projections at the regional scale do not generally extend beyond 2030 whereas Thames Water is having to develop water demand forecasts out to 2100 for London WRZ and SWOX WRZ based on uncertain population and household projections. London was previously the fastest growing population in the 2016-based projections but has now dropped to fifth place out of all regions in England. However, it is expected to be the largest-growing region in absolute terms (increase of 434,000 people by mid-2028). The South West region is projected to be the fastest-growing region in percentage terms, out of those regions covered by the River Thames basin.

Region	Population 2018 (mid)	Population 2028 (mid)	% change
London	8.9	9.3	4.9%
South East	9.1	9.5	4.4%
South West	5.6	6.0	6.8%
East of England	6.2	6.5	5.0%
England	56.0	58.8	5.0%

Table C.3 Population¹⁸ statistics and projections (millions)

Considering the respective purposes of the WRMP and the DP, it is considered that the long term issues relating to population growth represent key issues for the strategic nature of the WRMP rather than the reactive operation of the DP. The awareness of the population in the region to drought conditions and the avoidance of emergency drought measures are considered key issues with respect to the DP and population.

However, the result of the UK's Referendum to leave the European Union (EU) may lead to greater short-term uncertainty regarding future population and housing growth.

Human Health and Deprivation

The DP has the potential to influence quality of life, including human health, well-being, amenity and community, through actions to maintain essential water supplies during drought conditions. There could

¹⁷ Nomenclature of Territorial Units for Statistics (NUTS) areas



¹⁵ ONS (2020) Estimates of the population for the UK, England and Wales, Scotland and Nothern Ireland. Mid-2019: April 2020 local authority distrct codes.

¹⁶ ONS (2018) Household Projections in England: 2016-based, September 2018.

¹⁸ ONS (2020) Subnational population projections for England: 2018-based. <u>https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationprojections/bulletins/subnationalpopulationprojectionsforengland/2018based</u>. Accessed 9 June 2020.

be beneficial (e.g. actions to provide additional supply of water will help safeguard public health) or adverse impacts (e.g. noise and disruption from temporary infrastructure required to pump water). The DP also sets out measures to ensure that essential water supplies can be maintained to all of Thames Water's customers, thereby protecting public health in drought conditions.

The UK is committed to delivering against the 17 Sustainable Development Goals (SDGs) as part of the United Nations 2030 Agenda for Sustainable Development. These include sustainability indicators related to health and deprivation and the UK published a Voluntary National Review in 2019¹⁹, reporting on the UK's progress to date on delivering the SDGs. In general, the health of the population is good in the regions the Thames Water supply area covers.

The Office of National Statistics compiled the 'Indices of Multiple Deprivation' in 2019²⁰, which score and rank local authorities and smaller 'Super Output Areas' according to their performance against seven distinct categories of deprivation. It can be seen that many of the least deprived areas in the country lie within the Thames Water supply area. However, the London WRZ includes many areas facing high levels of deprivation. There are also smaller pockets of deprivation beyond London which should not be overlooked, for example in Swindon and Reading. The SEA will consider whether any of the DP options will influence deprivation, either positively or negatively.

Recreation and Tourism

Drought options have the potential to affect areas with recreation value. Impacts may arise from operational phases resulting in effects on water levels beyond those that may result from the 'natural' drought alone. Any potential construction requirements or any drought options impacts may include indirect reductions in amenity through reduced access or loss of areas of amenity value. Temporary water use restrictions (voluntary and statutory) may also adversely affect some recreational activities.

Figure C.2 shows some of the areas that may be used for recreation within the Thames River Basin. This includes National Trails, Areas of Outstanding Natural Beauty (AONB) (see Landscape and Visual Amenity topic), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) (see Biodiversity, Flora and Fauna topic). Many of the recreational and cultural offerings are represented in other topic areas in the baseline. For example there are a number of water-related resources of recreation importance including canals (e.g. the Kennet & Avon and Oxford canals), reservoirs for sailing or fishing and river sections of particular importance with respect to navigation (e.g. the River Thames and the River Wey) and angling (e.g. River Kennet), and the Thames Path and Blue Ribbon Network in London. Angling is a popular pastime with just under 275,000 rod licences sold in 2017/18 in the South East region²¹.

Public areas of open space, National Parks (see Landscape and Visual Amenity topic), country parks²², Rights of Way, walking routes and cycle routes are also important with respect to recreation and tourism. Some, for example the Thames Path, form features of particular importance. The National Planning Policy Framework (NPPF)²³ states planning policies should protect and enhance public rights of way and access. All Local Authorities are required to prepare and publish Rights of Way Improvement

²⁰ MHCLG (2019) The English Indices of Deprivation 2019 (IoD2019)



¹⁹ HM Government (2019) Voluntary National Review of progress towards the Sustainable Development Goals. United Kingdom of Great Britain and Northern Ireland, June 2019

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/818212/UKVNR-webaccessible1.pdf (accessed 9 June 2020)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835115/IoD2019_Statistic al_Release.pdf (Accessed 9 June 2020)

²¹ Environment Agency (2019) Salmonid and Freshwater Fisheries Statistics for England and Wales, 2017

²² Area designated for people to visit and enjoy recreation in a countryside environment

²³ MHCLG (2019) National Planning Policy Framework, February 2019.

Plans (ROWIPs). These plans explain how improvements made by local authorities to the public rights of way network will provide a better experience for a range of users, including pedestrians, cyclists, horse riders, horse and carriage drivers, people with mobility problems, and people using motorised vehicles (e.g. motorbikes).

The NPPF defines green infrastructure as 'a network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities' (including rivers and ponds). Local planning authorities are required to plan positively for strategic networks of green infrastructure, and take account of the benefits of green infrastructure in reducing the risks posed by climate change. The majority of LAs have therefore developed Green Infrastructure Strategies or Studies addressing these issues. Green infrastructure will often play a large part in local recreational resources.

The Archaeology and Cultural Heritage topic identifies the importance of the Thames River Basin with respect to heritage assets, including 6 internationally-recognised World Heritage Sites and 2,228 Scheduled Monuments.

Tourism is the fifth largest industry in the UK and supports 2.6 million jobs in England (forming England's third largest employer), contributing £106billion to the economy²⁴. London represents one of the most visited cities in the world and 19 million tourists were reported to have visited London in 2019²⁵. With the potential to hold major international events (sporting and cultural), the additional non-domestic population can cause the number of people relying on water supply to swell relatively significantly, although this will be offset to some extent by the number of people on holiday or away from their homes. Many tourist attractions have some connection with the water environment. For example, various waterways were restored as a showcase project for the Olympics and now offer improved recreation value.



 ²⁴ Visit England (2018) England Tourism Factsheet – 2018. <u>https://www.visitbritain.org/sites/default/files/vb-corporate/england tourism factsheet 2018 - copy.pdf</u> (Accessed 9 June 2020)
 ²⁵ Visit England, Latest quarterly data: London – 2018. <u>https://www.visitbritain.org/latest-quarterly-data-area?area=100</u> (Accessed 9 June 2020)





Economy and Employment

The Greater South East region is a prosperous region of the UK and has relatively low rates of unemployment. The Greater South East as a whole has shown a greater level of resilience to the effects of the recession that followed the banking crisis in 2008 compared to other parts of the UK. This is evident in economic indicators such as house prices and un-employment rates. Compared to a UK average in 2019 of 3.8%, the rate in the South East was 3.3%, 3.3% in the East and 2.8% in the South West²⁶. The rate in London was considerably higher at 4.3% for the same period. However, all are considerably lower than in 2010.

The South East region is one of the most densely populated and urbanised parts of the UK, where business services make up a significant proportion of the economy; however, agriculture is also one of the more important industries outside of Greater London. Some businesses that rely on water supply have the potential to be affected by the DP through a Temporary Use Ban or a Drought Order to ban prescribed non-essential water uses. However, the DP also sets out measures to maintain essential water supplies to businesses during drought conditions to ensure most businesses can continue to operate without any disruption.

C.2.2 Future Baseline

Population is projected to grow by 21.5% in the Thames River Basin area (2016/17 to 2044/45) with the greatest growth forecast for the SWOX and Guildford WRZs. The demand for new housing in England is estimated to be as high as 340,00 new homes needed per year (over a 15 year period) as a result of the changing population as well as a large backlog of need (estimated to be around 4 million)²⁷. In a lack of housing supply ranking of local authorities, all of the top 20 were located in the London and South East regions²⁸. In the most recent WRMP, Thames Water forecast over 1.2 million new properties in their supply area by 2045.

In response to recent studies access to the recreational resources, green spaces and the historic environment will have greater importance in future planning²⁹. For example the National Ecosystem Assessment and the Marmot Review, Fair Society, Healthy Lives, demonstrate the positive impact that nature has on mental and physical health and as a result the Government intends to establish a Green Infrastructure³⁰ Partnership with civil society to support the development of green infrastructure in England. Improvements to the quality of the water environment and certain potential climate change impacts will present opportunities for an expanding tourist industry in the region³¹.

However, the result of the UK's referendum to leave the European Union (EU) and ongoing Covid-19 pandemic may lead to greater uncertainties regarding a range of population and health indicators such as; population and housing growth, health impacts, employment rates and the economy (including the impact on tourism).



²⁶ ONS (2020) Regional labour market statistics in the UK: Janurary 2020 (data from the period September to November 2019). ²⁷ Bramley, G. for Crisis (2018) Housing supply requiements across Great Britain: for low-income households and homeless people, December 2018 ²⁸ Residential Analysts (2018) A Housing Crisis? More like a series of local crises needing local solutions, October 2018.

²⁹ Defra (2011) The Natural Choice: securing the value of nature, The Natural Environment White Paper

³⁰ Green infrastructure is a term used to refer to the living network of green spaces, water and other environmental features in both urban and rural areas.

³¹ Defra (2012) The UK Climate Change Risk Assessment 2012 Evidence Report.

C.2.3 Key Issues

The key sustainability issues arising from the baseline assessment for population and human health are:

- The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas.
- The need to ensure public awareness of drought conditions and importance of maintaining resilient, reliable public water supplies without the need for emergency drought measures.
- The need to ensure water quantity and quality in rivers is maintained for a range of uses including tourism, recreation, navigation and other use such as agriculture.
- The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities for local residents and tourists, including opportunities for access to, protecting and enhancing recreation resources, green infrastructure and the natural and historic environment.
- The need to accommodate an increasing population.
- Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and wellbeing and the economy.



C.3 Material Assets

C.3.1 Baseline

Water Use

In 2018/19, Thames Water had 2,866 million litres of water per day (MI/d) available for supply, slightly higher than their WRMP14 forecast³². Leakage from the water distribution system for 2018/19 was reported as an annual average of 690 MI/d³³. This is above the Business Plan and WRMP14 performance commitment target of 606 MI/d by 2020. **Table C.4** shows the average per capita consumption (PCC) by WRZ and reflect "dry year" demand. PCC ranges between 145.7 and 160.5 I/h/d (litres per head, per day) with Henley WRZ exhibiting the greatest PCC in the Thames Water supply area. The national average water consumption in England is 143 litres/day³⁴ (2018/19). Thames Water has ongoing programmes to reduce leakage from its network and to encourage more efficient use of water by customers. Thames Water has bulk supply agreements in place to transfer raw water or treated water to neighbouring water companies (Essex and Suffolk Water and Affinity Water) and overall are a net exporter of water of approximately 100MI/d³⁵.

Average PCC (I/h/d)	2019/20 (Uplifted Actual)
London	146.23
SWOX	147.81
SWA	145.70
Kennet Valley	145.95
Guildford	153.31
Henley	160.51

Table C.4 Per Capita Consumption (Average) by WRZ

Resource Use and Waste

There is an ongoing need for society to reduce the amount of waste it generates, by using materials more efficiently, and improving the management of waste that is produced. In England, biodegradeable municipal waste³⁶ (BMW) to landfill figures have almost halved over the period 2010 to 2018 (10,339 thousand tonnes to 5,598 thousand tonnes) and household recycling rates have climbed to 44% (2018) from 11% (2000); meanwhile, waste generated by commercial and industrial activities rose by 1.1 million tonnes between 2017 and 2018³⁷. In line with the widely adopted 'waste hierarchy', best practice for waste management is to reduce, re-use, recycle and recover, and only then should disposal (or storage) in landfill be considered.

Data on waste arisings is collected in a range of categories. The activities of the water industry contribute to construction, demolition and excavation waste (CDEW), through construction of new



³² Thames Water (2019) Water Resources Management Plan 2014 (WRMP14), Annual Review 2018-19, June 2019.

³³ Thames Water (2019) Building a better future: Annual Report and Annual Performance Report 2018/19.

³⁴ Defra (2020) Water supply and demand management. Report by the Comptroller and Auditor General, June 2020.

³⁵ Thames Water (2020) Thames Water Final Water Resources Management Plan 2019

³⁶ The fraction of municipal waste that will decompose within a landfill site to produce methane, a potent greenhouse gas.

³⁷ Defra (2020) UK Statistics on Waste, Statistical Release, March 2020.

infrastructure. The water industry also contributes to several waste streams through the operation of facilities. Waste streams include commercial and industrial waste (C&I) (statistics include waste arisings from the power and utilities sector, which includes water supply and sewage removal), and also hazardous wastes. **Table C.5Table C.8** provide further baseline information regarding waste.

Drought options which require infrastructure may result in the use of raw materials and the production of waste. The operation of DP options may result in additional chemical use and the production of waste through water treatment. Raw water (rainwater, groundwater, water from surface water bodies) could be included in the water treatment, which requires more intense levels of treatment. In 2018/19, Thames Water reported that 100% of water treatment waste (sewage sludge) was put to beneficial use (e.g. energy generation, recycling as fertiliser to land, residuals used to create aggregate for construction) compared with 48% in 2006/07.



Table C.5 Authorities increase in recycling rate in 2018/19 compared to 2017/18³⁸

Waste Figures	England	Eastern	London	South East	South West
% of authorities with increase of 0.1 percentage point or more in recycling rate in 2018/19	46	42	57	49	63
% of authorities with increase of 1.0 percentage point or more in recycling rate in 2018/19	23	27	43	25	19

Table C.6 Waste generation split by responsible economic activity, England, 2014-16³⁹

Economic activity	2014 (million tonnes)	2016 (million tonnes)	% change
Commercial & Industrial (C&I)	30.7	32.1	4.7%
Construction, Demolition & Excavation (CDE) (includes dredging)	116.8	120.3	3.0%
Households	22.4	22.8	1.9%
Other	11.9	11.8	-1.3%
Total	181.8	187.0	2.8%

Selected Waste Indicators 2010-11 to 2018-19⁴⁰ Table C.7

Wests Indiaster	Eng	land	Eas	tern	Lon	don	Sout	n East	South	West
waste mulcator	10/11	18/19	10/11	18/19	10/11	18/19	10/11	18/19	10/11	18/19
Total Household Waste (inc. recycling) million tonnes	23.45	23.01	2.68	2.69	3.01	2.97	3.92	3.89	2.47	2.42
% of municipal waste sent to landfill (%)	43.3	10.8-	47.3	14.0	44.7	7.0	32.7	8.7	49.6	19.3
Household recycling rate (%)	41.5	43.5	48.9	48.5	32.4	33.4	41.3	47.2	46.6	50.1

Table C.8 Municipal waste and Biodegradable Municipal Waste (BMW) to landfill in England 2010-201841

England	Municipal waste to Landfill ('000 tonnes)	Of which BMW to Landfill ('000 tonnes)	BMW to Landfill as % of 1995 target baseline
2010	20,298	10,339	35.6%
2012	16,187	8,129	28.0%
2014	13,714	6,843	23.6%
2016	12,381	6,049	20.8%
2018	11,688	5,598	19.3%

³⁸ Defra (2019) Statistics on waste managed by local authorities in England in 2018/19, November 2019



 ³⁹ Defra (2020) UK Statistics on Waste, March 2020
 ⁴⁰ Defra (2019) Local Authority Collected Waste Management Statistics, November 2019

⁴¹ Defra (2020) UK Statistics on Waste, March 2020

Note: 1995 baseline for England 29,030,000 – EU target of no greater than 35% baseline by 2020.

C.3.2 Future Baseline

The Environment Agency recently published the national framework for water resources⁴² which included ambitious targets to reduce average per capita consumption (PCC) to 110 litres per person per day (I/p/d) by 2050. In its 2019 WRMP, Thames Water pledge to help customers use less water through the continued roll out smart water meters together with providing support and advice of efficient water use. The latest programme sets out to reduce average PCC to 135 I/p/d by 2024/25, 121 I/p/d by 2044/45 and 117 I/p/d by the end of the planning period 2099/00. Thames Water will reassess this programme in the next iteration of the WRMP to take account of the new target for PCC.

Water leakage targets from Thames Water include a reduction in leakage by 15% to ~100 Ml/d by 2025 (from 2020 target of 606 Ml/d) and to have halved leakage by 2050^{43} .

The Government's 25 year environment plan includes goals for increasing resource efficiency and minimising waste, including working towards the elimination of all avoidable waste by 2050, and all avoidable plastic waste by the end of 2042. The government has also developed a new national Resources and Waste strategy to look at the whole life-cycle of products in order to maximise the value of our resources during their lifetime. The Waste Strategy for England⁴⁴, published in 2018, sets out measures to help society move away from a 'take, make, use and throw' approach to resources and materials and instead waste less and reuse, recycle and repair more. Targets for waste include; 50% recycling rate for household waste by 2020, 75% recycling rate for packaging by 2030, 65% recycling rate for municipal solid waste by 2035 and municipal waste to landfill at 10% or less by 2035.

C.3.3 Key Issues

The key sustainability issues arising from the baseline assessment for Material Assets and Resource Use are:

- The need to minimise the consumption of resources, including water and energy
- The need to reduce the total amount of waste produced in the region, from all sources, and to reduce the proportion of this waste sent to landfill.
- The need to continue to reduce leakage from the water supply system to help reduce demand for water.
- Daily consumption of water is higher than the national average in the area and consequently there is a continued need to encourage more efficient water use.



⁴² Environment Agency (2020) Meeting our future water needs: a national framework for water resources, March 2020.

⁴³ Thames Water (2020) Water Resources Management Plan 2019.

⁴⁴ HM Government (2018) Our waste, our resources: a strategy for England

C.4 Water

C.4.1 Baseline

In the context of the WFD, the water environment includes rivers, lakes, estuaries, groundwater and coastal waters out to one nautical mile. The aquatic environment of the River Thames basin has been characterised as part of the UK Government's reporting obligations to the EU under the WFD and this provides the most appropriate baseline reference⁴⁵.

The WFD brings together the planning processes of a range of other European Directives. These Directives, listed in **Table C.9**, establish protected areas to manage water, nutrients, chemicals, economically significant species, and wildlife, and have been brought in line with the planning timescales of the WFD.

Directive	Protected area	Number of protected areas
Bathing Waters	Recreational waters	18
Birds	Natura 2000 sites (water dependent special protection areas)	5
Drinking Water	Drinking water protected areas	93
Shellfish Waters	Waters for the protection of economically significant aquatic species	2
Habitats	Natura 2000 sites (water dependent SACs	11
Nitrates – High nitrate in surface water	Nitrate Vulnerable Zones - 66	57% land area
Nitrates – High nitrate in groundwater	21 NVZs	23%
Nitrates – Eutrophication in lakes or reservoirs	1 NVZ	<1
Nitrates – Eutrophication in estuaries or coastal waters	0 NVZs	0
Urban Waste Water	Treatment Sensitive areas – eutrophication in rivers	9
Urban Waste Water	Treatment Sensitive areas – eutrophication in lakes / reservoirs	13

Table C.9 Other EU Directives and Water Framework Directive protected areas⁴⁶

Note: Figures for Birds, Drinking Water and Habitats Directives are from the River Thames River Basin District River Basin Management Plan (EA, 2009)

Surface Waters: Rivers and Canals

Thames Water's supply area (see **Figure 1.1**) lies almost entirely within the catchment of the River Thames and Thames Tideway. The River Thames rises to the west as springs from the limestone of the Cotswolds and flows eastwards to the sea downstream of London. WRZs within the Thames Valley



⁴⁵ Defra (2005) Water Framework Directive: Summary report of the characterisation, impacts and economics analyses required by Article 5, Thames River Basin District

⁴⁶ Environment Agency and Defra (2016) Thames River Basin District River Basin Management Plan

(SWOX, Kennet Valley, SWA and Henley) encompass the major River Thames tributaries: Rivers Cherwell, Kennet, Loddon, Thame and Windrush and the Kennet and Avon Canal. The London WRZ, centred on metropolitan London, includes the lower freshwater River Thames up to its tidal limit at Teddington weir as well as a number of smaller river systems that discharge to the inner Thames estuary (Thames Tideway). These include the River Lee and the River Darent. The Guildford WRZ is based on the upper River Wey.

Surface water features for the SEA study area are shown in Figure C.3.





Surface Waters: Lakes and Reservoirs

There are no significant natural lakes within River Thames catchment area. However, there are a series of off-line reservoirs for a variety of purposes and a significant number of flooded former gravel excavations, for example, in the River Lee valley and to the west of London. Grimsbury and Farmoor Reservoirs are within the SWOX WRZ. There are also the Lower Thames Reservoirs (in west London) and the Lee Valley Reservoirs (in north London), both within the London WRZ.

Groundwater

Approximately 80% of Thames Water's supplies are derived from surface water abstraction (largely from the upper, lower Thames and the lower Lee) and the remainder is derived from groundwater abstraction. However, as for most of south east England, during periods of prolonged low rainfall leading to a serious drought, water supply is largely sustained by the utilisation of reservoir storage, groundwater abstraction and baseflow within rivers, the latter being derived from the outflow of groundwater from the major aquifers within the catchment.

The Environment Agency considers that licensed groundwater abstraction is fully utilised over much of the Thames river basin. Both the quantity and quality of groundwater is extremely important in maintaining these resources. Groundwater is vulnerable to pollution from surface activities since aquifers underlie up to two-thirds of the land surface in this densely populated area. Groundwater quality issues include high nitrate levels in some aquifers. Implementation of drought plan options which increase the frequency and speed of groundwater abstractions (i.e. at a faster rate than groundwater source can be replenished) can potentially result in a negative impact on groundwater quality due to reduced dilution.

Under the WFD, there are two separate classifications for groundwater bodies: chemical status and quantitative status. A groundwater body will be classified as having poor quantitative status in the following circumstances: where low groundwater levels are responsible for an adverse impact on rivers and wetlands normally reliant on groundwater; where abstraction of groundwater has led to saline intrusion; where it is possible that the amount of groundwater abstracted will not be replaced each year by rainfall. For a groundwater body to be at good status overall, both chemical status and quantitative status must be good. In addition to assessing status, there is also a requirement to identify and report where the quality of groundwater is deteriorating as a result of pollution and which may lead to a future deterioration in status.

Source Protection Zones (SPZ) provide additional protection to safeguard drinking water quality. This is achieved through constraining the proximity of an activity that may impact upon drinking water abstraction. They are defined around large and public potable groundwater abstraction sites, and the groundwater travel time to an abstraction.

Estuaries

The Thames Tideway (or estuary) is one of the most ecologically diverse estuaries in England and Wales. The Thames River Basin District includes 11 estuarine ('transitional waters'). The Thames Tideway is classified as hypernutrified but there is little evidence of ecological damage as a result the high nutrient status. Natural turbidity resulting in a reduction of light penetration limits adverse impacts. The Thames Tideway does suffer from the impacts of discharges of storm sewage: this is being addressed through the current construction of Thames Tideway Scheme, which is designed to address a significant number of combined overflows.



Monitoring

Thames Water, other water companies and the Environment Agency monitor the ongoing water resources situation in all parts of the Thames catchment using a hydrometric network from which an accurate assessment of the ongoing water resources situation in all parts of the Thames catchment can be established and reliable forecasts undertaken. For Thames Water's supply area the essential data requirements are fulfilled by:

- Measurements of total reservoir storage in the London Reservoirs and Farmoor Reservoir.
- River flow at key locations related to abstractions to principal reservoirs key measurement points are the River Thames above Teddington Weir (limit of freshwater Thames) and the River Thames at Farmoor (see **Table C.9**).
- Levels of key groundwater sources/key aquifer monitoring boreholes.
- Demand for each water resource zone.

Key hydrological variables are monitored throughout the catchment such as river flows at a wide range of locations, groundwater levels, rainfall and soil moisture deficits (SMDs).

At the most downstream flow gauge on the River Thames, at Kingston in the London WRZ, long term average (median 1883-2015) flow is recorded as 3,516 Ml/d. This flow gauge is downstream of all abstractions made from the river, including those for potable supply, agriculture and industrial use; and downstream of all discharges including returns from wastewater treatment works and industrial cooling water returns. **Table C.10** indicates the main influences on river flows in the catchments upstream of the listed river flow gauge.

			Measu fl	red long ow (MI/d)	-term)
WRZ	Flow gauge	Influences on flow	Q10 (high flow)	Mean flow	Q95 (low flow)
SWOX	Thames at Days Weir (Lowest gauge on Thames in SWOX)	Runoff reduced by abstraction for public water supply and industrial/ agricultural abstraction; increased by effluent returns. River levels affected by lock movements and gates.	5,961	1,451	286
Kennet Valley	Kennet at Theale (Lowest gauge on Kennet)	A mainly pervious catchment (80% Chalk). High baseflow component but responsive contribution from the River Enbourne. Flows influenced by groundwater abstraction/recharge (West Berkshire Groundwater Scheme). Abstraction for industrial/agricultural purposes. Minor contribution to the Kennet & Avon Canal. Little net impact of abstractions and discharges.	1,512	698	328
Henley	Thames at Bray Weir (Downstream of Henley WRZ)	Baseflow sustained mainly from the Chalk and the Oolites. Reservoirs in catchment affect runoff. Regulation from surface water and/or ground water. Runoff reduced by abstraction for	10,972	1,651	1,318
London	Thames at Kingston (Lowest	public water supply and industrial/ agricultural uses; also influenced by groundwater	13,910	3,516	669

Table C.10 Measured long term water flows in selected parts of the River Thames catchment



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	gauge on freshwater Thames)	abstraction/recharge. Runoff increased by effluent returns.			
Guildford	Wey at Weybridge (Upstream of confluence with Thames (only gauge on lower Wey))	Largely permeable upper catchment (Chalk and Upper Greensand of the North Downs). No available information on flow influences.	1,175	440	204

High flow included is the Q10 flow statistic. River flow at the river flow gauge is equal to or greater than the listed flow for 10% of the time.

Average flow included is the median flow statistic, Q50. River flow at the river flow gauge is both greater than and less than the listed flow for 50% of the time.

Low flow included is the Q95 flow statistic. River flow at the river flow gauge is equal to or less than the listed flow for 5% of the time.

Abstraction Licensing Strategies (CAMS process)

The Environment Agency is responsible for managing water resources in England to ensure there is enough water for people, industry and agriculture as well as a healthy environment. Abstraction Licensing Strategies (ALS) set out how water resources will be managed within a catchment area. Each strategy provides information on:

- what resources are available (where and when)
- what conditions may apply to new licences
- whether time limited licences will be replaced with the same conditions
- what changes may need to be made to existing non-time limited licences

Additionally, the local impacts of any proposed abstraction are considered to ensure the rights of existing water users and the environment is protected. ALS areas are based on river catchment boundaries and overlap with Thames Water's supply area.

The results of the most recent ALSs, completed in 2019, have been mapped onto WFD Cycle 2 boundaries and are represented by different water resource availability colours showing the availability of water resource for further abstraction. **Figure C.4** shows the Environment Agency representation of resource availability based on the worst downstream water body at low flows (the flow percentile called Q95), focusing on the Thames River Basin District and Thames Water supply area. It is apparent from **Figure C.4** that little water is actually available and the status of most rivers is identified as 'water not available for licensing'.







Legend

Water Quality

Water quality is classified according to several quality elements in line with the requirements of the Water Framework Directive (WFD).

For surface waters, there are two separate status classifications for water bodies: ecological and chemical. For a water body to be in overall 'good' status both ecological and chemical status must be at least 'good'. Biological status classification considers the condition of biological quality elements, e.g. aquatic invertebrates, plants and fish, the morphology of the habitat available, concentrations of supporting physico-chemical elements e.g. oxygen or ammonia and concentrations of specific pollutants.

Of 498 surface water bodies within the Thames River Basin District, with regard to their ecological status or potential 3.8% were classified as 'bad', 23.3% as 'poor', 66.9% as 'moderate', 6.0% as 'good' and 0% as 'high'. All water bodies were classified 'fail' for their chemical status (see **Table C.11**). To attain 'good' chemical status, concentrations of priority substances must not exceed the relevant EQS (Environmental Quality Standard). The main issues preventing waters reaching good status include physical modifications and pollution from waste water, towns and cities and rural areas. There were a total of 81 counts of reasons for not achieving good status in water bodies attributed to changes to the natural flow and levels of water by the water industry.

No. of		Ecologi	Chemical Status				
bodies	Bad	Poor	Mod	Good	High	Fail	Good
498	19	116	333	30	0	498	0

Table C.11Ecological and chemical 2019 Cycle 2 classification for surface waters – Thames
River Basin District47

For groundwater there are two separate classifications for groundwater bodies: chemical status and quantitative status. Each must be reported in addition to the overall groundwater body status. For a groundwater body to be at good status overall both chemical status and quantitative status must be good. In addition to assessing status, there is also a requirement to identify and report where the quality of groundwater is deteriorating as a result of pollution and which may lead to a future deterioration in status. Out of 47 groundwater bodies in the Thames River Basin District, 30 are classified as good for quantitative status (63.8%) and 29 for chemical status (61.7%). These were 35% and 43% respectively in 2009, so significant improvements have been achieved for both (see **Table C.12**). The main reasons for poor status were identified as high or rising nitrate concentrations, with some failures for pesticides and other chemicals. The main reason for poor quantitative status is that abstraction levels, mainly for public water supply, exceed the rate at which aquifers recharge⁴⁸.

Table C.12 Chemical and quantitative 2019 Cycle 2 classification for groundwaters – Thames River Basin District⁴⁹

No. of water bodies Quantitative status Chemical status

⁴⁷ Environment Agency Catchment Data Explorer (CDE), Thames River Basin District Summary



https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/6/Summary (Accessed 9 March 2021)

⁴⁸ Environment Agency (2015), Thames River Basin District River Basin Management Plan

⁴⁹ Environment Agency Catchment Data Explorer (CDE), Thames River Basin District Summary

https://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/6/Summary (Accessed 9 March 2021)

	Poor	Good	Poor	Good
47	17	30	29	18

Flood Risk

Flooding can result from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources. The Environment Agency's Flood Risk Maps available on its website show what is at risk of flooding, including people, economic activity and natural and historic environment⁵⁰. Of the nearly 15 million people within the River Basin District, 227,670 are at high risk of flooding. There are two defined flood risk areas - London and Medway. These are areas where there is a significant risk of flooding from local sources, such as surface water, groundwater and ordinary watercourses. The London flood risk area contains 8,225,928 people, of which 140,854 are at high risk⁵¹ of flooding. The Medway flood risk area contains 234,260 people, of which 6,639 are at high risk of flooding. In terms of services at high risk of flooding, there are 95 out of 6,699 in the London flood risk areas and 6 out of 246 in the Medway flood risk area⁵².

The extreme floods of 2007 prompted the Pitt Review (2008) and the subsequent Flood and Water Management Act 2010 which in part regulates the implementation of sustainable drainage systems (SuDS) to increase infiltration and reduce flooding from surface water runoff. In 2008-2009, the Environment Agency spent approximately £427 million on building, improving and keeping flood defences such as managed river channels, walls and raised embankments, flood barriers and pumps in good condition, which reduced the risk of flooding to over 176,000 households across England. The Government further recognised the importance of investing in flood risk and coastal management and committed to increase public spending on it from £600 million in 2007-2008 to £800 million in 2010-2011. Climate change may have a significant effect upon future flood risk in the region.

Saltmarsh is an important natural resource and ecosystem service. Through reducing wave energy close to tidal defences, it can provide demonstrable flood and coastal risk management benefits, as well as supporting wildlife habitats and species of national and international significance. Saltmarsh extent is conserved and enhanced through management measures driven in particular by the Habitats and Birds Directives and the WFD. The Drought Plan has the potential to affect saltmarsh extent if any of the following occur: change in drainage patterns, disruption to the estuarine processes and changes in land use on or adjacent to the marsh⁵³.

C.4.2 Future Baseline

Originally, the WFD set a target of aiming to achieve at least 'good status' in all water bodies by 2015. However, provided that certain conditions are satisfied, it was acknowledged that in some cases the achievement of good status may be delayed until 2021 or 2027. The primary objective in the short-term is to ensure no deterioration in status between status classes: the 2015 water body classification is the



⁵⁰ Environment Agency (2013) Flood Risk Maps – Risk of Flooding from Surface water – Thames River Basin District: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/456969/LIT8979_FloodRiskMaps_Thames_Su rfaceWater_v2.pdf

⁵¹ High risk means there is a chance of flooding if greater than 1 in 30 (3.3%)

⁵² Services have been defined as schools, hospitals, nursing/care/retirement homes, police stations, fire and ambulance stations, prisons, sewerage treatments works and electricity installations ⁵³ Environment Agency (2007) Saltmarsh management manual.
baseline from which deterioration between classes is assessed; no deterioration between status classes is permitted unless certain and specific conditions apply.

Climate change is considered likely to adversely impact on surface and groundwater resources over the longer term, with some modest impacts potentially arising over the medium term to 2040. The Thames Catchment Flood Management Plan (CFMP)⁵⁴ assumes the following key trends:

- Milder wetter winters resulting in increases in peak river flows of 20%, meaning that flooding will happen more often and large scale severe flooding will be more likely to happen.
- More frequent, short duration intense storms in summer causing more widespread and regular flash flooding from overwhelmed drainage systems and some rivers.

The recently published national framework for water resources highlights that if no action is taken between 2025 and 2050, around 3,435 million extra litres of water per day will be needed to address future pressures, with around 50% of the national need in the South East region (comprising Affinity Water, Essex and Suffolk Water, Cambridge Water, Southern Water, SES Water and Thames Water). The aforementioned water companies have come together to form Water Resources South East (WRSE) and are required to produce a Regional Plan to build resilience to a range of uncertainties and future scenarios. This plan will set out a preferred plan of options for the region that delivers best value to customers, society and the environment and should include other sectors beyond public water supply. The final plan will be produced by 2023 and will directly feed into the next water company WRMPs.

The UK Climate Change Risk Assessment (CCRA) 2017 Evidence Report⁵⁵ draws together and interprets the evidence gathered by CCRA regarding current and future threats and opportunities for the UK posed by the impacts of climate change up until 2100. The assessment identified several risk areas for climate change risks associated with the water environment, including:

- Reduced water availability in the summer, combined with increased water demand from a growing population, likely to challenge the ecological health of rivers and lakes
- Major supply-demand deficits forecasted for the Thames River Basin Projected as a result of increased temperatures, changing weather patterns and population growth, posing a risk to public water supplies from drought and low river flows.
- Increased frequency and severity of rainfall and flooding events represents the most significant climate change risks to UK infrastructure and the number of assets exposed to significant levels of flood risk could double by the 2080s
- An increase in precipitation in winter months due to a combination of greater depths and more frequent heavy rainfall events suggesting larger volumes of runoff with potential negative impacts on flood risk and sewer overflows in urban environments.
- Flash-flooding associated releases from combined sewer overflows (CSO) could in turn increase associated illnesses at the coast due to the varying occurrence of microbial pathogens in the marine environment.



⁵⁴ Environment Agency (2009) Thames Catchment Flood Management Plan – Summary Report 2009. <u>https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/293903/Thames_Catchment_Flood_Managem</u> ent_Plan.pdf

⁵⁵ Committee on Climate Change (2017) The UK Climate Change Risk Assessment 2017 Evidence Report

The NPPF⁵⁶ states that inappropriate development in areas at risk of flooding (in Flood Zone 1⁵⁷, Flood Zone 2⁵⁸, Flood Zone 3a⁵⁹ or Flood Zone 3b - the functional floodplain); should be avoided by directing development away from areas at highest risk. The NPPF requires that where development is necessary, it should be made safe without increasing flood risk elsewhere, as defined in the Technical Guidance to the NPPF⁶⁰. The NPPF requires the application of a sequential, risk-based approach (operated through Strategic Flood Risk Assessment) to the location of development to avoid where possible flood risk to people and property and to manage any residual risk, taking account of the impacts of climate change. Following application of the Sequential Test, if it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding, the Exception Test can be applied if appropriate. This includes development for water-compatible uses (e.g. water transmission infrastructure and pumping stations) and essential infrastructure (e.g. water treatment works that need to remain operational in times of flood).

C.4.3 Key Issues

The key issues arising from the baseline assessment for water are:

- The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives and ensure no deterioration where improvement is not feasible.
- The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives and ensure no deterioration.
- The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change impacts on surface waters and groundwaters.
- The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply.
- The need to ensure that people understand the value of water.

Flooding is not viewed as a key issue for the SEA water topic, because none of the drought options involve the construction of permanent physical infrastructure within areas at risk of flooding. Two of the drought options included in the Draft DP involve river augmentation: the WBGWS and Hoddesdon Transfer Scheme (River Lee Flow Augmentation). The WBGWS is a strategic drought option, the licence for which is held by the Environment Agency. Operation of the scheme would be managed between Thames Water and the Environment Agency, taking into consideration environmental implications. This is detailed in the Environment Agency Drought Plans that were recently updated 2015.



⁵⁶ MHCLG (2019) National Planning Policy Framework:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

⁵⁷ Low probability of river or sea flooding (<0.1%) which has critical drainage problems

⁵⁸ Medium probability of river (1%-0.1%) or sea flooding (0.5%-0.1%)

⁵⁹ High probability of river (>1%) or sea flooding (>0.5%)

⁶⁰ MHCLG (2014) Flood Risk and Coastal Change, Technical guidance to the National Policy Planning Framework <u>https://www.gov.uk/guidance/flood-risk-and-coastal-change</u> (Accessed 9 June 2020)

C.5 Soil, Geology and Land Use

C.5.1 Baseline

Geology

Geological sites maybe sensitive to changes in water quality, water levels (for example waterlogged deposits), pollution and land use practices. The River Thames river catchment is geologically diverse and includes a number of major aquifers. The Thames Valley includes areas of limestone in the Cotswolds as well as Chalk and drift deposits in the Thames floodplain. The London area includes major Chalk aquifers and to the south of London, there are Greensand aquifers (towards the North Downs).

Geological Conservation Review (GCR) sites have been highlighted, which relate to geological important sites, related to their scientific elements and understanding of earth sciences, which are important on a national and international level⁶¹. GCRS are also designated as SSSIs. Several geological SSSIs are found within the catchments, however some are not directly designated because of geology, although the geological variation does impact on the flora present. The main reason for a geological citation for an SSSI are related to disused quarries and geological important sites such as gravels used to reconstruct climate change. There are around 100 GCRs within the Thames supply area.

Soils

The Soil Map of England and Wales⁶² identifies dominant soil subgroups (which are summarised in **Table C.13**). In terms of agricultural land quality, planning policy seeks to protect best and most versatile agricultural land (defined as land in Grades 1, 2 and 3a of the Agricultural Land Classification).

Soil type	Occurrence	Characteristics
Elmton 1 and 3	Dominant bands over the WRZs	Shallow well drained calcareous fine loamy soils over limestone
Newmarket 2 and Andover 1	Dominant bands over the WRZs	Shallow well drained calcareous soils
Batcombe and Hornbeam 2	Widespread and occur in dominant bands from east to west across the WRZs	Fine silty over clayey and fine loamy over clayey soils, and deep fine loamy over clayey soils, respectively. Both types are slowly permeable with some slight seasonal waterlogging
Upton 1	Bands to the north of the area covered by the WRZs	Well drained calcareous silty soils over chalk
Wantage 1	Bands to the south of the area covered by the WRZs	Well drained calcareous silty soils over chalk
Denchworth and Windsor	Narrower ribbons to the north of the area covered by the WRZs	Slowly permeable seasonally waterlogged clayey soils

Table C.13Soil types in the WRZs



⁶¹ <u>http://jncc.defra.gov.uk/page-2947</u>

⁶² Produced by the Soil Survey of England and Wales for MAFF

Soil type	Occurrence	Characteristics
Kelmscot	Narrower ribbons to the north of the area covered by the WRZs	Calcareous fine loamy soils over gravel, variably affected by groundwater
Coombe 1 and 2	Narrower ribbons to the north of the area covered by the WRZs	well drained calcareous fine silty soils over chalk
Wickham 3 and 4 soils	Narrower ribbons to the south of the area covered by the WRZs	Slowly permeable seasonally waterlogged loamy or silty over clayey soils
Grove and Block	Pockets in the west of the WRZs	Moderately permeable calcareous loamy soils over chalky gravel which are affected by groundwater

The majority of land in the Thames river basin is farmed, and it is noted that agricultural practices have a major influence on soil quality. Good soil structure is beneficial to water retention and crop yield. It can be seen from **Figure C.5** that the majority of agricultural land is classified as Grade 3 or higher (with the swathe of agricultural land in the Chilterns being of particularly high quality). Soil quality and structure is affected by changes in land use, groundwater levels and farming practices. Soil quality can influence run-off rates and therefore flooding and water quality.

Contaminated land is defined as land where substances could cause significant harm to people or protected species; or significant pollution of surface waters or groundwaters. Some types of contaminated land can be designated as special sites for a variety of reasons, including land that seriously affects drinking water, surface waters (e.g. lakes and rivers) and important groundwater sites. Data on contaminated land are compiled by the British Geological Society⁶³.

Minerals Safeguarding Areas (MSAs) are designated by Mineral Planning Authorities for areas that include known deposits of minerals which are desired to be kept safeguarded from unnecessary sterilisation by non-mineral development.



⁶³ https://data.gov.uk/dataset/contaminated-land





C.5.2 Future Baseline

The vision of Defra's Soils Strategy for England⁶⁴ is for all England's soils to be managed sustainably and degradation threats tackled successfully by 2030. This will improve the quality of England's soils and safeguard their ability to provide essential services for future generations.

The Water White Paper described the Government's intentions to take forward a catchment-based approach to water quality and diffuse pollution and work towards Common Agricultural Policy reforms that will promote the farming industry's role as custodian of the natural environment⁶⁵. The Water White Paper also identified that the strategic policy statement for Ofwat and revised social and environmental guidance would give a strong steer on Government support for approaches that offer good value for customers and the potential to prevent and manage future risks to drinking water quality. These policy objectives were reflected in regulatory guidance from Government for the 2014 water resources management planning process and the 2014 water company price review process. The catchment-based approach has now been implemented across England, with catchment partnerships now in place across the Thames Water region to take forward the approach over the coming years. The catchment-based approach is further emphasised in the national framework for water resources as a 'must have' component of the Regional Plans due to published in 2023.

One of the core planning principles of the National Policy Planning Framework (NPPF) is to encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value. The NPPF also places great importance with respect to Green Belt policy, the aim of which is to prevent urban sprawl by keeping land permanently open. Green Belt serves five purposes: to check the unrestricted sprawl of large built-up areas; to prevent neighbouring towns merging into one another; to assist in safeguarding the countryside from encroachment; to preserve the setting and special character of historic towns; and to assist in urban regeneration, by encouraging the recycling of derelict and other urban land. Although the NPPF promotes a presumption in favour of sustainable development, this does not apply where proposed developments may affect European or other designated sites covered by specific policies.

C.5.3 Key Issues

The key sustainability issues arising from the baseline assessment for soil, geology and land use are:

- The need to protect and enhance geological features of importance (including geological SSSIs) and maintain and enhance soil function and health.
- The need to manage the land more holistically at the catchment level, benefitting landowners, other stakeholders, the environment and sustainability of natural resources (including water resources).
- The need to make use of previously developed land (brownfield land) and to reduce the prevalence of derelict land in the region.



⁶⁴ Defra (2009), Safeguarding our soils – A Strategy for England

⁶⁵ Defra (2011) Water for Life - Water White Paper

C.6 Air and Climate

C.6.1 Baseline

Local Air Quality

Drought options may involve the operation of abstraction and treatment operations in locations where such operations do not normally take place, with the potential for negative effects, although typically in the short term.

The baseline situation can be best described through reference to the local authorities in the Thames Water WRZs that have declared Air Quality Management Areas (AQMA). A local authority declares an AQMA when UK National air quality objectives⁶⁶ are unlikely to be met. The local authorities which have declared an AQMA within their boundaries are illustrated in Figure C.6. There are 81 AQMAs in total within the Thames River Basin. The figure demonstrates that the two main pollutants of concern are NO₂ and PM₁₀. In London, all 33 local authorities have declared AQMAs (34 for NO₂ and 29 for PM₁₀). The majority of the AQMAs in the UK have been declared because of emissions from road transport.

The National Emission Ceilings Directive (2001/81/EC) was transposed into UK legislation in 2002 through the National Emission Ceilings Regulations 2002. This set national emission limits for the four main air pollutants (sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia) associated with acidification and eutrophication of the natural environment and the formation of ground level ozone which impacts human health. These were revised in 2016 (Directive 2016/2284/EU) and transposed into UK legislation in 2018, under which the UK has ambitious targets in place to reduce the emissions of five damaging pollutants (the original four plus PM_{2.5}) by 2020 and 2030. The Clean Air Strategy (2019) sets out how the government aim to work towards these goals. Currently the UK is compliant with legislation for most pollutants, except for NO₂.

In April 2015, the Supreme Court ruled that the UK Government must redraft the national nitrogen dioxide (NO₂) air quality action plan, as well as 16 regional action plans, including Greater London, with the aim of ensuring that these areas reach compliance with legal NO₂ limits as soon as possible. In response, the Government published an updated plan in 2017 along with individual zone plans for the 37 zones identified as having air quality issues with NO₂, including Greater London⁶⁷, Eastern⁶⁸, South West⁶⁹ and South East⁷⁰ zones. It is expected that all regions covered by the Thames River Basin will be compliant by 2022, with the exception of Greater London which is expected to be compliant by 2026.



⁶⁶ The UK air quality framework is derived from a mixture of domestic, EU and international legislation

⁶⁷ https://uk-air.defra.gov.uk/assets/documents/no2ten/2017-zone-plans/AQplans_UK0001.pdf (Accessed 9 June 2020)

 ⁶⁸ https://uk-air.defra.gov.uk/assets/documents/no2ten/2017-zone-plans/AQplans_UK0029.pdf
 ⁶⁹ https://uk-air.defra.gov.uk/assets/documents/no2ten/2017-zone-plans/AQplans_UK0030.pdf
 ⁶⁹ (Accessed 9 June 2020)

⁷⁰ https://uk-air.defra.gov.uk/assets/documents/no2ten/2017-zone-plans/AQplans_UK0031.pdf (Accessed 9 June 2020)





Legend

Greenhouse Gases and Climate Change

The predominant greenhouse gas of interest is carbon dioxide (CO_2). National and regional CO_2 emissions totals are provided in **Table C.14** and are apportioned to their source categories

Table C.15.

	2005 2017 Percentage Diff change		Difference between			
Region/Country	Total Emissions (Mt CO ₂)	Per capita (t CO ₂)	Total Emissions (Mt CO ₂)	Per capita (t CO ₂)	between 2005 and 2017 total emissions	2005 and 2017 per capita
South East	65	8.0	44	4.8	-33%	-3.1
South West	40	7.9	27	4.7	-33%	-3.1
East of England	45	8.2	33	5.3	-28%	-2.9
Greater London	47	6.3	30	3.4	-37%	-2.9
UK	527	8.7	352	5.3	-33%	-3.4

Table C.14 End-user carbon dioxide emissions and carbon dioxide emissions per capita by region, 2005 and 2017⁷¹

Table C.15 Percentage contribution to carbon dioxide emissions by sector (2017)⁷²

	Percentage Contribution by Source Sector				
Area	Industry & Commercial % (millions tonnes)		Road Transport		
		% (millions tonnes)	% (millions tonnes)		
South East	8.9% (12.2)	13.7% (13.4)	15.7% (20.2)		
South West	6.1% (8.3)	7.8% (7.7)	9.2% (11.8)		
East of England	6.8% (9.3)	9.2% (9.0)	11.3% (14.5)		
Greater London	7.9% (10.8)	11.2% (11.0)	6.2% (8.0)		
UK	38.7% (136.1)	27.9% (98.1)	36.6% (128.7)		

At 3.4 tonnes per person per year, London's CO₂ emissions are the lowest in the country (on a regional basis), well below the UK average of 5.3 tonnes⁷³ and a reduction by almost 50% compared to 2005 emissions. This is, in part, due to high usage of the public transport system (which itself is becoming greener) compared to greater reliance on private cars outside the capital.

In 2018/19, Thames Water achieved their GHG emissions targets for both water and wastewater, with a decrease of 2.2 ktCO₂e to 275.7 ktCO₂e. In April 2019, TWUL made a pledge to achieve net zero carbon emissions by 2030. TWUL is committed to becoming more sustainable and already generates 22% of its own electricity and it's Basingstoke sewage treatment works is 100% powered by electricity generated on-site.



⁷¹ BEIS (2019) UK Local Authority Carbon Dioxide Emissions Estimates 2017: Statistical Release

⁷² BEIS (2019) UK local authority and regional carbon dioxide emissions national statistics: 2005-2017

⁷³ BEIS (2019) UK Local Authority Carbon Dioxide Emissions Estimates 2017: Statistical Release

Emissions associated with delivering a megalitre (MI) of drinking water and wastewater service in 2018/19 have both decreased compared to 2017/18 - by 16.3% (20.6 kgCO₂e/MI) and 6.1% (127.0 kgCO₂e/MI) respectively compared to 2017/18⁷⁴. 2018/19 was the second year of using 100% renewable grid electricity.

Forecast future climate change is likely to influence processes within the hydrological cycle such as runoff and evapotranspiration. The impact of climate change on the water environment and water-related infrastructure is summarised in **Table C.16**.

Sector	Impact
	Reduction in yields, either in total or at certain times of the year.
	Increased evaporation losses from surface water stores
Water Resources	Increased sediment and pollution runoff into watercourses.
(i). water supply	Increased risk of algal blooms and pollution in reservoirs.
	Increase in demands in summer months leading to increase in average and peak
(ii). water demand	requirements.
	Increased pressure on treatment and distribution system.
	Increased requirements for agriculture.
	Increased riverine storm occurrence and flood risk.
Flood	Improvements and higher specifications required for flood defences, urban drainage and
management	rainwater disposal.
	Establishment of new flood defences which may alter river system
	Lowered water quality in lowland rivers, with implications for instream ecosystems and
	water abstractions.
Water quality	Increases or decreases in river levels and/or flows results in changes to water quality
management	parameters e.g. temperature, salinity, dissolved oxygen
management	Altered potential for polluting incidents.
	Increased potential for combined sewer overflows due to an increase in extreme storm
	occurrences.
Navigation	Lower summer flows leading to reduced pavigation opportunities in rivers and capals
Navigation	
Aquatic	Altered babitat potential, with species at their environmental margins most affected
ecosystems	Alered habitat potential, with species at their environmental margins most anected.
Water-based	Impacts through changes in river flows and water quality
recreation	inpacts through changes in fiver nows and water quality.

Table C.16 Potential impact of climate change on the water environment and water-related infrastructure

Drought options could influence CO_2 emissions through additional pumping and treatment requirements. The DP is a response plan that sets out to address the supply of water during times of drought, which may become more prevalent and intense due to the effects of climate change, although not necessarily over the next five years. The use of drought permits or orders is to ensure continuity of supply is maintained under severe drought conditions e.g. 1:200 or 1:500 and also under climate change, however, it is recognised that it is preferable to avoid the use of potentially damaging drought options. Thames Water seeks to address this issue through developing greater resilience to more



⁷⁴ Thames Water (2019) Corporate Responsibility and Sustainability Report 2018/19 <u>https://corporate.thameswater.co.uk/about-us/corporate-responsibility-and-sustainability/report/addressing-climate-change</u> (Accessed 9 June 2020)

severe droughts through the statutory Water Resources Management Planning process and through this process we are planning to develop resilience to 1:200 and 1:500 year droughts.

Adaptation to Climate Change

The UK Climate Change Risk Assessment (CCRA) 2017 Evidence Report⁷⁵ draws together and interprets the evidence gathered by CCRA regarding current and future threats and opportunities for the UK posed by the impacts of climate change up until 2100. The assessment identified six key areas of inter-related climate change risks for the UK, including:

- Flooding and coastal change risks to communities, businesses and infrastructure.
- Risks to health, well-being and productivity from high temperatures. •
- Risks of shortages to the public water supply, and for agriculture, energy generation and • industry.
- Risks to natural capital, including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity.
- Risks to domestic and international food production and trade. .
- New and emerging pests and diseases, and invasive non-native species, affecting people, plans and animals.

C.6.2 Future Baseline

Government and international targets indicate significant cuts in greenhouse gas emissions will take place by 2027. The UK met the first and second of its legislated carbon budgets (2008-2017) with headroom of 36 and 384 MtCO₂e, respectively and is projected to meet the third carbon budget (until 2022) with headroom of 88 MtCO₂ e^{76} . However, there are projected shortfalls against the fourth and fifth carbon budgets. In 2019, the UK set a new target to reduce greenhouse gas emissions by at least 100% (compared to 1990 levels) by 2050⁷⁷, an update from the previous target of an 80% reduction as set out in the Climate Change Act 2008. To achieve this ambition, emissions from buildings must reduce to almost zero and industrial processes will need to adapt, both significant to TWUL's operations.

The UK is currently meeting all statutory air guality limits, except for NO₂⁷⁸, where roadside NO₂ concentrations in particular have been identified as being above legal limits. In response, the government has created an air quality plan for NO279, setting out how it aims to meet the ambitious and legally-binding targets set out for NOx and four other damaging air pollutants in the wider clean air strategy⁸⁰. This strategy concludes that with the commitments and policies set out in the clean air strategy, the UK should meet all emissions ceilings in 2020 and 2030.

More local targets for carbon emissions have been set by various local authorities within the Thames Water region, notably the Mayor of London's 2050 target for London to be a zero carbon city. The Mayor



⁷⁵ Committee on Climate Change (2017) The UK Climate Change Risk Assessment 2017 Evidence Report

⁷⁶ Department for Business, Energy & Industrial Strategy (2019) Updated energy and emissions projections 2018. Accessed https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/794590/updatedat energy-and-emissions-projections-2018.pdf ⁷⁷ The Climate Change Act 2008 (2050 Target Amendment) Order 2019

⁷⁸ Nitrogen Dioxide

⁷⁹ Defra and DfT (2017) Air quality plan for nitrogen dioxide (NO2) in UK (2017)

⁸⁰ Defra (2019) Clean Air Strategy 2019

of London's 'Zero carbon London' plan⁸¹ sets out how London will reach net zero and reduce its emissions by 60% (compared to 1990 levels) by 2030 and by almost 80% by 2040.

Climate change is a key theme with regards to biodiversity⁸², climate change is likely to have an impact on biodiversity in the future by exacerbating pressures such as changes to the timing of seasonal activity and water scarcity.

The 2018 UK Climate Projections (UKCP18) estimate that summers in the Thames River Basin area are likely, on average, to be hotter and drier which could affect the frequency and severity of drought events.

C.6.3 Key Issues

The key sustainability issue arising from the baseline assessment for air and climate is:

- The need to reduce air pollutant and greenhouse emissions and limit air emissions to comply with air quality standards.
- The need to mitigate against climate change through the reduction of greenhouse gas emissions in order to contribute to risk reduction over the long term.
- The need to adapt to the impacts of climate change for example through, sustainable water resource management, water use efficiencies, specific aspects of natural ecosystems (e.g. connectivity) as well as accommodating potential opportunities afforded by climate change.



⁸¹ Mayor of London (2018) Zero carbon London: A 1.5°C compatible plan

⁸² Natural Environment White Paper The Natural Choice: Securing the Value of Nature (2011); DEFRA Biodiversity 2020: A strategy of wildlife and ecosystem services (2011).

C.7 Archaeology and Cultural Heritage

C.7.1 Baseline

Implementation of drought options could affect historic landscape character and historic structures associated with the water environment and the historical context of their setting. Archaeological remains are sensitive to changes in water quality, water levels (for example waterlogged deposits), pollution and land use practices.

Heritage designations for the Thames River Basin are shown in Figure C.7. The Thames River Basin includes internationally recognised World Heritage Sites⁸³ (for example, the Tower of London, Blenheim Palace, the Royal Botanic Gardens at Kew, the Palace of Westminster, Westminster Abbey and St. Margaret's Church, Maritime Greenwich).

Nationally important archaeological sites are statutorily protected as Scheduled Monuments (SMs)⁸⁴. There are currently around 19,861 entries in the Schedule for the UK⁸⁵. There are approximately 1,765 SMs located within the Thames Management Catchment. Registered Parks and Gardens also make up part of the UK's cultural heritage of national importance (1,669 in 2018-19 in England). There are approximately 428 sites designated as such in the Thames Management Catchment. An overview of all cultural heritage sites in the four regions encompassing the Thames Management Catchment area is provided in Table C.17.

Asset	London	South East	East of England	South West
World Heritage Site	4	2	0	4
Scheduled Monuments	165	2,660	1,746	6,980
Listed Buildings	19,187	76,864	58,214	90,186
Registered Historic Parks and Gardens	153	376	218	304
Registered Historic Battlefields	1	6	1	10
Protected Historic Wrecks	0	21	2	27

Table C.17 Heritage assets by region, 2018-19⁸⁶

Conservation Areas are usually designated by the local planning authority, or Historic England can designate them in London (in consultation with London Boroughs). They are designated for their special architectural and historic interest. Conservation Areas can include historic town and city centres, fishing and mining villages, 18th and 19th century suburbs, model housing estates, country houses set in historic parks and/or historic transport links and their environment. There are over 8,000 conservation areas in England. Individual local authorities provide details on specific conservation areas.

Historic England collects data on buildings at risk. There were 5,073 designated assets on the Heritage at Risk (HAR) register in 2019, including; 648 sites in London, 471 sites in the South East, 391 sites in



⁸³ World Heritage Sites are places of international importance for the conservation of mankind's cultural and natural heritage. The World Heritage List was set up by the World Heritage Convention, established by UNESCO in 1972. www.englishheritage.org.uk

⁸⁴ Nationally important archaeological sites designated under the Ancient Monuments and Archaeological Areas Act, 1979, www.culture.gov.uk/historic_environment/scheduled_ancient_monuments/ 85 Historic England (2019) Heritage Indicators 2019

⁸⁶ Historic England (2019) Heritage Indicators 2019

East of England and 1,436 sites in the South West. In 2019, 310 entries were removed from the Register for positive reasons, but 247 were added. 65% of sites on the 1999 Register have now been removed.

Historic Environment Record (HER) databases linked to a Geographic Information System (GIS) are held by County Councils, District Councils or Unitary Authorities. They represent unique repositories of, and signposts to, information relating to landscapes, buildings, sites and artefacts spanning from the Palaeolithic period to modern times. Presenting this wealth of information for the Thames Water supply area would be difficult, however, it can be interrogated where the Drought Plan options have the potential to affect such assets.

In relation to unknown assets, there are a number of floodplains within the Thames Water supply region which are either known or suspected to be of high importance for waterlogged archaeology. Such evidence includes both material (wooden artefacts and structures such as trackways) and evidence of past environmental change from the deposits themselves. The waterlogged conditions that preserve these remains may be rain-fed or groundwater fed. If the latter, then clearly abstraction levels can be a critical factor in maintaining conditions in which preservation of the remains is viable within the same location or impacted reach. In addition, there are waterlogged deposits that are specifically associated with chalk, such as springs and their intimately associated wetlands which again can contain important archaeological information, especially palaeo-environmental evidence. Approximate locations of areas important for palaeo-environmental deposits were identified according to a spreadsheet supplied by English Heritage⁸⁷.



⁸⁷ English Heritage (2011) National Monument Record Wetland Heritage List Data 111006.



C.7.2 Future Baseline

The NPPF was introduced in 2012 to replace the Planning Policy Statements. The NPPF aimed to make the planning system less complex and more accessible, and changed the emphasis on planning to have a presumption in favour of development. However, core planning principles include those aiming to protect heritage assets, including *"conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations"*⁸⁸. The NPPF was revised in 2019 but the policy on historic environment was broadly unchanged.

Recent and ongoing national economic difficulties may have a negative effect on removing heritage assets from the heritage at risk register. Climate change could have variable impacts on heritage assets in the future. Some types of assets and landscapes have already experienced and survived significant climatic changes in the past and may demonstrate considerable resilience in the face of future climate change. However, many more historic assets are potentially at risk from the direct impacts of future climate change⁸⁹.

C.7.3 Key Issues

The key sustainability issue arising from the baseline assessment for archaeology and cultural heritage is:

• The need to conserve or enhance sites of archaeological importance and cultural heritage interest, particularly those which are sensitive to the water environment.



⁸⁸ CLG (2012) National Planning Policy Framework, Communities and Local Government.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

⁸⁹ English Heritage (2010) Climate Change and the Historic Environment

C.8 Landscape and Visual Amenity

C.8.1 Baseline

The landscape character network⁹⁰ defines landscape character as 'a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse'. Some landscapes are special because they have a particular amenity value, such as those designated as Areas of Outstanding Natural Beauty (AONB). Others may have an intrinsic value as good examples or be the only remaining examples of a particular landscape type. Some landscapes are more sensitive to development whereas others have a greater capacity to accommodate development. Assessments of landscape character and landscape sensitivity enable decisions to be made about the most suitable location of development to minimise impacts on landscapes.

Nationally designated landscape sites (including AONBs, National Parks and Green Belt) and Natural England National Character Areas (NCAs) are shown on **Figure C.8** for the Thames River Basin.

Nationally Designated Sites

AONBs are defined as 'precious landscapes whose distinctive character and natural beauty are so outstanding that it is in the nation's interest to safeguard them'⁹¹. They are designated under National Parks and Access to the Countryside Act, 1949, strengthened by the Countryside and Rights of Way Act, 2000. The primary purpose of the AONB is 'to conserve and enhance the natural beauty of the landscape.' There are five AONB within, or partially within, the River Thames management catchment. This is summarised in **Table C.18**.

Name of Site and Type	Water Resource Zone and Distance	Region(s)	Key Characteristics
Chilterns	SWOX, SWA, Henley, Kennet Valley (AONB within each WRZ)	South East, London and East of England	Part of the Chalk ridge extending from Dorset to Yorkshire. Heavily wooded character. Important diversity of habitats from chalk grassland to beech woodland. Major recreation resource – used for scenic drives, walking and riding.
Cotswolds	SWOX (AONB within WRZ)	London, South East, West Midlands, South West	Jurassic limestone creating distinctive character. Nationally important for limestone grassland and ancient beechwood. Recreation resource – includes the Cotswolds National Trail.
Kent Downs	London (AONB within WRZ).	London and South East	Traversed by three river valleys – Darent, Medway and Stour.

Table C.18 AONBs within Thames WRZs



⁹⁰ <u>www.landscapecharacter.org.uk</u>, accessed 14th July 2006

Name of Site and Type	Water Resource Zone and Distance	Region(s)	Key Characteristics
			Chalk ridge – unimproved chalk grassland is an important habitat.
			Orchards, hop gardens, horticulture & arable farmland.
			River valleys, ancient lanes and wooded foreground of upland ridges.
			Includes the uplands of Marlborough, Berkshire and North Hampshire Downs.
North Wessex Downs	SWOX, Kennet Valley (AONB within WRZ)	London, South East and South West	Richly farmed landscapes including Pewsey Meadows.
			Includes the Neolithic stone circle at Avebury.
			Recreation resource – at Avebury, also Ridgeway National Trail and Kennet and Avon Canal.
	London and Guildford (AONB within WRZ)	South East and London	Links together a chain of upland landscapes.
Surrey Hills			Chalk landscape – chalk landscape and unimproved heath, deciduous woodland.
			Recreation resource – Box Hill and Devil's Punch Bowl, Greensand Way and North Downs National Trail.

National Parks are areas protected due to their beautiful countryside, wildlife and cultural heritage. The South Downs National Park covers a small part of the southern Thames River Basin within the Guildford WRZ. Water supply for the Guildford WRZ is based on the upper River Wey. Most of the River Wey valley falls within the boundary of the Surrey Hills AONB.

The main characteristics of Green Belt is their openness and their permanence. The main aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open. The Green Belt therefore aims to check the unrestricted sprawl of large built-up areas; prevent neighbouring towns merging into one another; assist in safeguarding the countryside from encroachment; preserve the setting and special character of historic towns; and assist in urban regeneration nu encouraging the recycling of derelict and other urban land.

Natural England National Character Areas

Natural England National Character Areas take account of landscape features (also referred to in the Biodiversity, Flora and Fauna topic). These are shown geographically in **Figure C.8** and **Table C.19** summarises the key features.







Legend

National Character Area	Key Messages
Chilterns	The Chilterns NCA is a predominantly wooded and farmed landscape with an underlay of chalk bedrock rising from the London Basin and offering wide views over adjacent vales.
	River Thames breaches escarpment to the south at Goring Gap, flowing past riverside towns such as Henley.
	The surrounding countryside is an area utilised for agriculture interspersed with woodland and hedged boundaries.
	Parts of Chilterns area furthest from London are recognised as special and attractive, falling within the Chilterns AONB.
	Major urban fringe and growth areas such as Luton and Hemel Hempstead are located within the Chilterns NCA, although outside of these AONBs.
South Suffolk and North	The NCA stretches from Bury St Edmunds to Ipswich following the line of the A14 through Gipping Valley. The landscape is gently undulating with a chalky boulder clay plateau as a result of multiple small-scale river valleys dissecting the plateau.
	The area is one dominated by its ancient landscape of wooded arable countryside, with a noticeable feeling of enclosure throughout and a complex network of hedgerows, meadows and parklands extending eastwards.
Claylands	The soils within the area are moderately fertile, chalky clay soils which provide vegetation with a calcareous character.
	Irregular field patterns can still be seen despite enlargements in the second half of the 20th century.
	Area extends from Hertfordshire to the west to Essex coast in the east and include notable areas such as the suburbs of North London, St. Albans and Colchester.
Northern	Arable agriculture is a large part of the industry in the area, although despite this, soil quality ranges from good to poor, with the London clay often waterlogged in winter and cracking in summer.
Thames Basin	The area is rich in geodiversity, archaeology and history with landscapes spanning from the Hertfordshire plateau to the more open arable sections of the Essex heathlands.
	Rapid urban expansion since the mid-19th century has led to an increase in housing developments, schools and amenities for local populations, leading to a detrimental effect on tranquillity.
North Kent Plain	The North Kent Plain is a strip of open, low and gently undulating land between the Thames Estuary to the north and the chalk of the Kent Downs to the south.
	It is a highly productive agricultural area with good quality soils used predominately for arable farming.
	Ancient woodland surrounds Blean, with additional woodland further west. Despite this, the landscape is mostly open and expansive, leading to the area being called as the "Garden of England".

Table C.19 Natural England National Character Areas (NCAs)



National Character Area	Key Messages
	Forming a chain of chalk hills, the North Downs NCA extends from Hogs Back in Surrey to the famous White Cliffs of Dover.
North Downs	The settlements in the area consist of traditional small villages and farms while twisting sunken lanes cut across the scarp and are a feature of much of the dip slope.
	The beauty of the area is reflected by its location within the Kent Downs and Surrey Hills AONB.
	The Thames Basin Lowlands is a low lying plain situated within the London Basin between the suburbs of South Norwood and Hale, located on the Surrey/Hampshire border.
Thomas Basin	Overall the landscape is largely flat, with small sections of gently undulating land.
Lowlands	The underlying geology consists mostly of London Clay, with small outcrops of Bracklesham and Barton Group sand, silt and clay between Esher and Cobham.
	Part of the North Downs Chalk bedrock, fringed with Thanet Formation and Lambeth Group sediments, underlies Croydon and Sutton.
	High Weald NCA is covered by ancient countryside and cited as one of the best surviving medieval landscapes in northern Europe.
High Weald	It encompasses the ridged and faulted sandstone core of the Kent and Sussex Weald and comprises a mixture of fields, small woodlands and farmsteads with extensive connections to these areas through historic tracks and paths.
	The majority of the area (78%) is covered by the High Weald AONB with prominent medieval patterns of small pasture fields enclosed by thick hedgerows and shaws (narrow woodlands) remaining fundamental to the character of the landscape.
	A broad area of low lying clay which wraps around the northern, western and southern edges of the High Weald.
	Mostly agricultural land able to support pastoral farming as a result of the heavy clay soils, although lighter soils can be found to the east.
Low Weald	The landscape is predominantly covered by densely wooded areas with a large amount of ancient woodland.
	Approximately 9% of the NCA is situated within the adjacent designated Surrey Hills, Kent Downs and High Weald AONB with 23% of the land categorised as greenbelt.
Wealden Greensand	Around 25% of the area contains extensive belts of woodland, including ancient woods and more recent conifer plantations. Area also features open areas of heath on acidic soils, river valleys and mixed farming with areas of fruit growing.
	Over half of area covered by South Downs National Park, Kent Downs AONB and Surrey Hills AONB and serves as a significant place of interest for landscape, geology and biodiversity.
	Underlying geology has shaped the scarp-and-dip slope topography with clear links apparent between vernacular architecture, industry and local geology.



National Character	Key Messages
Area	
	The area accommodates a mix of internationally and nationally designated sites related to biodiversity, including 3 SPAs 2 RAMSAR sites and 8 SACs.
	Majority of the landscape is urban with low lying land situated within a wedge shaped area. It widens from Reading, including Slough, Windsor, the Colne Valley and the southwest London Fringes.
Thames Valley	Hydrological features are the most prominent within the area and include the Thames and its tributaries, the Grand Union Canal and the reservoirs which form the South- West London Waterbodies SPA and Ramsar site. These features are vital for providing water supply services to London and surrounding suburbs whilst also being crucial for wildlife and recreation.
	Due to the flood risk, flows and water levels in the River Thames are managed upstream of Teddington. Both flood defence and water quality improvement techniques enhance opportunities for biodiversity and recreation throughout the NCA.
Berkshire and	A vast area containing arable fields stretching across rolling Chalk hills with scattered settlements. The escarpment provides wide views of the Berkshire and Marlborough Downs with visible landmarks including chalk-cut horse figures, beech clumps and ancient monuments.
Downs	Avebury stone circle is a popular visitor destination and part of a World Heritage Site, with numerous other Scheduled Monuments and heritage features across the landscape, although Heritage features are at risk from damage by cultivation and animal burrowing.
	An area characterised by its open, gently undulating lowland farmland on mostly Jurassic and Cretaceous clays.
Upper Thames Clay Vales	The World Heritage site of Blenheim Palace falls within the NCA boundaries, coupled with 5000 ha of the North Wessex Downs AONB and smaller sections of the Chilterns and Cotswolds AONB.
	The landscape is contrasting, with enclosed pastures of the clay lands with wet valleys, mixed farming, hedge trees and field trees opposed by more open, arable lands.
	A band of low lying limestone hills stretch from east to west across the area from the Vale of Aylesbury to Swindon. It is surrounded by the flat lands of the Oxfordshire clay vales, which allows for extensive views across the countryside.
Midvale Ridge	Swindon and Oxford are the main towns within the area; outside of this the remaining settlements are mostly small nucleated villages along the top of the ridge and the springline.
	The majority of the area is agricultural with a mixed arable/ pastoral farming landscape, cereals being the most important arable crop.
	The soil types are made up of heavy rendzinas, stagnogleys and lighter sandy brown earths with small patches of sandy soils.
	It is an area of significant importance for its geological sites, yielding fossils of international importance.



National	
Character	Key Messages
Area	
	An area known for its predominantly oolitic Jurassic Limestone belt that stretches from the Dorset coast to Lincolnshire. The limestone within the area has been widely used in buildings and walls.
Cotswolds	The pattern of the landscape is steep scarp crowned by a high, open wold. The scarp provides a backdrop to the major settlements of Cheltenham, Gloucester, Stroud and Bath and provides expansive views across the Severn and Avon Vales to the west. Smaller settlements are located at the scarp foot linked by a network of roads and public rights of way.
	A landscape of mixed, largely pastoral agriculture and small limestone built towns. Over 80% of the area is used for agricultural purposes and less than 10% for urban, although development has occurred rapidly from the late 20th century onwards.
Avon Vale	It is an undulating and low lying area cut by the River Avon (Bristol) and surrounded to the west, south and east by higher land.
	Smaller settlements and farmsteads are clustered along streams and lesser rivers, linked by narrow winding lanes. Ancient patterns of flood meadows and drainage ditches dominate these valley floors, with wet grasslands and woodlands.
	An area dominated by its gently rolling chalk downland which forms part of the sweep of Cretaceous Chalk spanning the Dorset coast and across the Chilterns to north of the wash.
Salisbury Plain and West	The area is sparsely populated with a main focus on agriculture. There are few settlements, leading to a vast, open landscape and a strong sense of remoteness
Wiltshire Downs	The plain is predominantly covered by its chalk grassland, one of the largest remaining areas of calcareous grassland in north western Europe
	The area is well protected with SPA, SAC and SSSI designations due to its rich populations of stone curlew, hen harrier and rare bumblebee species
	Rounded undulating hills with many long, low ridgelines. Great variety of landform with distinctive local features, such as Hemplow Hills.
	Dominant Jurassic scarp slope of limestone and Lias clay hills capped locally with ironstone-bearing Marlstone and Northampton Sands. Glacial boulder clay covers the northern and eastern areas, with sands and gravels along river valleys.
Northampton-	The Upper Nene Valley divides the gently undulating Northamptonshire Heights to the north from the hillier Cherwell/Ouse plateau (the 'Ironstone Wolds') to the south and has been exploited for sand and gravel.
shire Uplands	Rivers rise and flow outwards in all directions, including the rivers Cherwell, Avon, Welland, Tove, Ouse, Nene and Ise, and the area forms the main watershed of Middle England.
	Sparse woodland cover, but with scattered, visually prominent, small, broadleaved woods, copses and coverts, particularly on higher ground.
	Mixed farming dominates with open arable contrasting with permanent pasture.
	Typical 'planned countryside' with largely rectangular, enclosed field patterns surrounded by distinctive, high, often A-shaped hedgerows of predominantly hawthorn and blackthorn,



National Character Area	Key Messages
	with many mature hedgerow trees, mostly ash and oak. Some ironstone and limestone walls in places and some localised areas of early irregular enclosure.
	A landscape which is broad and gently undulating, with a lowland plateau dissected by shallow river valleys
Bedfordshire	This is contrasted by the Bedfordshire Greensand Ridge, a narrow and elevated outcrop of Greensand with acidic soils and grassland, heathland and woodland habitats.
and Cambridge- shire	The Forest of Marston Vale is located within the NCA, as well as a small section of the Chilterns AONB. The area is visible from the elevated ground of the Yardley Whittlewood Ridge, Bedfordshire Greensand Ridge, East Anglian Chalk and Chilterns NCAs
Claylands	Semi natural habitats supporting an array of rare species can be found within the predominantly arable and commercially farmed landscape
	The River Great Ouse and its tributaries run through the site and are visible across the landscape.
	A largely remote and tranquil landscape between the North Sea and rising ground inland, consisting of shallow creeks, drowned estuaries, mudflats and broad tracts of tidal salt marsh.
Greater Thames Estuary	Despite proximity to London, the NCA only has a few major settlements and small villages towards the higher ground. It contains some of the most scarcely populated sections of the English coast and is vastly different to the densely populated urban areas towards London.
	Sea defences protect large areas of reclaimed grazing marsh and its associated ancient fleet and ditch systems, and productive arable farmland. Historic military landmarks are characteristic features of the coastal landscape.
	Part of the central southern England belt of chalk, the Hampshire Downs rises 297m in the north-west and is located on the Hampshire-Wiltshire border.
	A steep scarp to the north delineates the Downs. The area overlooks the Thames Basin the Weald to the east. It is characterised by its elevated, open and rolling landscape covered by large arable fields with low hedgerows on thin chalk soils, scattered woodland blocks and shelterbelts.
Hampshire	The Chalk is a large and important aquifer; hence groundwater protection and source inerrability designations cover most of the area. Catchment sensitive farming to control pollution, run-off and soil erosion is a vital activity.
Downs	The aquifer feeds a number of small streams flowing north and east, although the dominant catchments are those of the rivers Test and Itchen, which flow in straight sided with relatively deeply incised valleys across most of the area.
	The Itchen is a SAC and the Test a designated SSSI. These rivers, with the watermeadows, peat soils, mires and fens of their flood plains, are the most important habitats of the area.
	The valleys are home to the main settlements, the local road system and important economic activities such as watercress growing and fly fishing.



National Character Area	Key Messages
	The area is characterised by its "whale-backed" spine of chalk and stretches from the Hampshire downs in the west to the coastal cliffs of Beachy Head in East Sussex.
South Wessex Downs	Its location falls largely within the South Downs National Park. 8% of the area is classified as urban, with the coastal conurbation of Brighton and Hove situated in the east of the NCA
	The landscape is diverse and complex with significant variation from physical, historical and economic influences Much of the landscape today has been formed and maintained by human activities, most notably agriculture and forestry

'Tranquillity' can be defined as the quality of calm that is experienced by people in places full of the sites and sounds of nature. The Campaign for Rural England (CPRE) developed tranquillity mapping for England to identify areas that are either disturbed or undisturbed by urban areas (towns and cities), traffic (road, rail and airports), power stations, pylons, power lines and open-cast mines⁹².

Implementation of drought options has the potential to influence landscape and visual amenity, for example, effects on water levels in rivers beyond those occurring naturally as a result of the drought alone. These effects are likely to be experienced locally, close to the area of water abstraction, rather than for the National Character Area as a whole.

C.8.2 Future Baseline

It is envisaged that landscape and designated sites will be maintained and enhanced for the enjoyment of the public (although not through the DP itself), although with the pressures for housing in many parts of the Thames river basin, there are likely to be some threats to visual amenity more broadly beyond designated landscape areas (including within Green Belt). Climate change and land use change (e.g. due to agricultural reform associated with the UK's exit from the EU and Common Agricultural Policy) may also, in the longer term, lead to changes to landscape character.

C.8.3 Key Issues

The key sustainability issue arising from the baseline assessment for landscape and visual amenity is:

• The need to protect and improve the natural beauty of the region's AONBs, National Parks and other areas of natural beauty.

The need to protect and improve the character of landscapes and townscapes.

C.9 Inter-relationships

It is noted that there are inter-relationships between SEA topics, for example, the potential impacts of changes to flow regime and water quality on ecology. Inter-relationships that result in changes to individual effect are considered through the assessment of synergistic effects.



⁹² CPRE tranquillity mapping for England: http://www.cpre.org.uk/what-we-do/countryside/tranquil-places

Appendix D Assessment Tables



Drought Plan option	This opt media ca The a	ion compi ampaign a assumptio	rises wide re very dil n includeo Londoi	-scale mec fficult to es d in the LT n and 0 an	lia activity stimate. TV OA / FCD d 3.9% for	and adve VUL has ii as part of Thames \	M rtising to e nplemente the saving /alley. This	ledia/Wate encourage ed media c gs achieve s figure is	r Efficienc voluntary ampaigns d when th based on	y Campaig reduction in 2003 a e trigger is informatio	gn n in water (nd 2005/6, s reached on gained i	usage. The and the d is that the in the 2005	e demand ata obtain re would b 5 and 2006	savings tl ed over th e saving drought	hat are like hat period l of betweer periods.	ly to accru has been a 10 and 2.2	ie from a inalysed. % for
Summary commentary of scheme adverse effects						No advers	se impacts	s have bee	n identifie	d for this d	drought pl	an option.					
SEA Objectives Adverse Effects Assessment Summary	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Summary commentary of scheme beneficial effects	Beneficial impacts include reducing demand for effects on maintaining surface water and groundv Reducing wa				or water, s Iwater lev vater dem	ecuring su els/flows, s and will als	upply of wa sustainabl so help to	ater for cu e manage improve tl	stomers/b ment of at ne resilien	usinesses ostractions ce of wate	. Reducin and enab r supplies	g the dema bling long to to drough	and for wa term impro t.	ater will als ovements	o have be in water ef	neficial ficiency.	
SEA Objectives Beneficial Effects Assessment Summary		None		None								None	None	None			

SE	A topics and objectives				Assessment of option	1				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The media/water efficiency campaign is assumed to be communicated through radio and newspaper advertisements. Such methods of publicity are considered to have no impact on biodiversity, flora or fauna, or designated sites of nature conservation interest other than the potential to reduce consumer demand for water and subsequent reduced requirement for abstraction at source (and therefore, potential for positive impacts on flow sensitive habitats/species).	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The media/water efficiency campaign is assumed to be communicated through radio and newspaper advertisements. Such methods of publicity are considered to have no impact on avoiding the introduction or spreading of INNS.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The media/water efficiency campaign will result in water savings which will contribute towards improving the security of supply for customers in TWUL's supply region. There is potential for the media/water efficiency campaign to raise awareness of the importance and value of water environment for health and well-being.	Low (beneficial)	High	Medium	High	Short-term	Temporary to permanent	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	No impacts on recreation, tourism or navigation are anticipated as a result of the media/water efficiency drought option.	l n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The media/water efficiency campaign will result in water savings which will contribute towards improving the security of supply for businesses in the region.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	The media/water efficiency campaign is assumed to be communicated through radio and newspaper advertisements and as such will not involve any increased material resource use. This option will reduce the amount of water used in the region. It will not involve any increased waste production.	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	The media/water efficiency campaign is assumed to be communicated through radio and newspaper advertisements and as such will result in promoting the sustainable management of natural resources including efficient and sustainable use of water, ensuring a supply of water to homes/businesses.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The media/water efficiency campaign is assumed to be communicated through radio and newspaper advertisements. Such methods of publicity are considered to have beneficial impact on water, acknowledging that reduced consumer demand for water will result in reduced requirement for abstraction at source, minimising impacts on levels and flows.	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial

Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	Reductions in demand for water would result in reduced requirement for increased abstraction at source, avoiding associated impacts on surface water and groundwater quality.	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	The media/water efficiency campaign is assumed to be communicated through radio and newspaper advertisements. Such methods of publicity are considered to have beneficial impact on water, acknowledging that reduced consumer demand for water will result in reduced requirement for abstraction at source.	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	The media/water efficiency campaign is assumed to be communicated through radio and newspaper advertisements. Such methods of publicity are considered to have beneficial impact on water, acknowledging that reduced consumer demand for water will result in reduced requirement for abstraction at source. This may have long term impacts on consumer water usage.	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	No impacts on geology, geomorphology and quality/quantity of soils are anticipated as a result of the media/water efficiency campaign.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	No impacts on air quality are anticipated as a result of the media/water efficiency drought option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and climate	6.2 To reduce greenhouse gas emissions.	The media/water efficiency campaign is assumed to be communicated through radio and newspaper advertisements and as such will not involve any increased resource use, or increased greenhouse gas emissions.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Demand management measures are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The media/water efficiency campaign is considered to have no direct impact on the historic environment, heritage assets and their settings and archaeologically important sites. There is the potential for reduced consumer demand for water to result in reduced requirement for abstraction at source, potentially reducing any impacts of drought related archaeology and cultural heritage impacts.	Low (beneficial)	Low	Medium	Moderate	Short-term	Temporary	None	Negligible beneficial
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The media/water efficiency campaign is considered to have no direct impact on landscape and visual amenity or any changes to access to the countryside or open space. There is the potential for reduced consumer demand for water to result in reduced requirement for abstraction at source, potentially reducing any impacts of drought related landscape or visual impacts. There is the potential for the media/water efficiency campaign to raise awareness and understanding of natural occurrence of drought its impacts and function on the countryside or wildlife compared to those of unsustainable abstraction during times of drought.	Low (beneficial)	Low	Medium	Moderate	Short-term	Temporary	None	Negligible beneficial

Drought Plan option	Tham	es Water n	naintains a	n ongoin Water is v	g leakage a vorking to	activity an replace m	d network any old w	Leak pressure ater mains	age Redu managem in order t	ction: ent progra o make lo	amme. In a ng-term, s	ddition to ustainable	a find and leakage ro	fix' appro eductions.	ach to leal	k repair, T	"hames
Summary commentary of scheme adverse effects	Minor a	adverse el	fects ident	tified are a	associated	with emis move	ssions to a ments. All	ir (air pollu other adve	utants and erse effec	l greenhou ts identifie	ise gas en ed are negi	nissions) a ligible.	as a result	of constru	iction activ	vities and	' vehicle
SEA Objectives Adverse Effects Assessment Summary		None		None	None		None	None		None	None				None		
Summary commentary of scheme beneficial effects	Minor to moderate beneficial effects have been identified with respect to sustainable provision of water thro leakage after having been abstracted at source. These effects are generally considered to					ough water b be long t	r savings t erm and p	hat would ermanent	have othe in nature.	rwise bee	en lost to						
SEA Objectives Beneficial Effects Assessment Summary		None		None								None	None			None	None

	Leakage Reduction									
SEA topic	s and objectives		1	1	Assessment o	foption		1		1
Торіс	SEA objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/high)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	Construction activities associated with leakage detection and repair activities may result in disturbance to local habitats and species during the works. The majority of works are anticipated to be in an urban setting. Assuming best practice construction methods, impacts of the construction phase are anticipated to be negligible. The reduction in water lost through leakage will result in reduced requirement for abstraction at source and therefore, potential for positive impacts on flow and sensitive habitats/species.	Low (adverse) Low (beneficial)	Low (adverse) Medium (beneficial)	Medium	High	Long term	Permanent	Negligible adverse	Minor beneficial
Biodiversity fauna and flora	1.2 To avoid introducing or spreading INNS.	Leakage detection and repair activities will not affect the spread of INNS.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well- being).	The drought option will help to ensure levels of service are maintained through enabling provision of water that would have otherwise been lost to leakage. Construction activities associated with leakage detection and repair activities may result in nuisance effects associated with traffic and noise. However, these will be short term at any one location (likely to be urban) and assuming best practice construction methods, effects will be minimal.	Low (beneficial) Low (adverse)	High (beneficial) Low (adverse)	Medium (beneficial) Small (adverse)	Medium	Long-term (beneficial) Short-term (adverse)	Permanent (beneficial) Temporary (adverse)	Negligible adverse	Moderate beneficial
	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	It is assumed that public rights of way will be maintained during repair activities and there will be no effects on recreational opportunity.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	Low	Long-term	Temporary	None	Moderate beneficial
	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increased leakage detection and repairs and network pressure management ('fix and find') will result in the reduction of water lost in the supply network and therefore the energy and chemicals used to treat it. It utilises existing infrastructure. Repairs may require raw materials. It has been assumed that any materials required would be obtained locally.	Low (beneficial) Low (adverse)	Low	Medium	High	Long-term	Permanent	Negligible adverse	Negligible beneficial
Material assets and resource us	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	Increased leakage detection and repairs and network pressure management ('fix and find') will result in the reduction of water lost in the supply network, reduce the requirement for abstraction at source and therefore enable more efficient water resource management and ensure maintenance of supply.	Low (beneficial)	High	Medium	High	Long-term	Permanent	None	Moderate beneficial

	Leakage Reduction									
SEA topi	cs and objectives				Assessment of	foption				
	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The drought option will not directly result in, or modify any abstraction (surface water or groundwater) and therefore will not effect surface water or groundwater levels. However, the reduction in water lost through leakage will result in reduced requirement for abstraction at source.	Low (beneficial)	Medium	Medium	Moderate	Long-term	Permanent	None	Minor beneficial
	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	Construction activities associated with leakage detection and repair activities may result in the potential for impacting on local surface and groundwater quality. Assuming best practice construction methods, impacts of the construction phase are anticipated to be negligible. The reduction in water lost through leakage will result in reduced requirement for abstraction at source, and therefore also mitigate any surface water quality effects associated with abstraction.	Low (beneficial) Low (adverse)	Low	Medium	High	Short-term (adverse) Long-term (beneficial)	Temporary (adverse) Permanent (long term)	Negligible adverse	Negligible beneficial
	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	The option will contribute to more sustainable abstractions by reducing the amount of water already abstracted that is lost through leakage.	Low (beneficial)	Medium	Medium	High	Long-term	Permanent	None	Minor beneficial
	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	The option will improve the efficiency of the water supply network. There may be some effect on customer water use if it is seen that leakage 'find and fix' is being undertaken.	Low (beneficial)	Medium	Medium	Medium	Long-term	Permanent	None	Minor beneficial
Water										
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment- wide approach to land management.	Construction activities associated with leakage 'find and fix' activities may result in localised disturbance to geology and land use. However, repair activity will be on pipelines which are already in situ.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None
	6.1 To maintain and improve air quality.	Vehicle trips necessary for leakage detection and repair will cause emissions affecting air quality, including some within the London Low Emissions Zone.	Low (adverse)	High	Small	Low	Short-term	Temporary	Minor adverse	None

	Leakage Reduction									
SEA topi	cs and objectives				Assessment o	of option				
	6.2 To reduce greenhouse gas emissions.	Vehicle trips necessary for leakage detection and repair will cause emissions of greenhouse gas emissions. Leakage detection and repairs will result in the reduction of water lost in the supply network and long term energy savings associated with this reduction (decreased greenhouse gas emissions associated with decreased need for water treatment and pumping).	Low (beneficial) Low (adverse)	Medium	Medium	Moderate	Short-term (adverse) Long-term (beneficial)	Temporary (adverse) Permanent (beneficial)	Minor adverse	Minor beneficial
	6.3 To consider the need for adaptive measures for climate change.	Demand management measures are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Long-term	Permanent	None	Minor beneficial
Air and Climate										
	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	Leakage 'find and fix' activity will be on pipelines which are already in situ, and as such, it is not anticipated that any sites of archaeological or cultural heritage importance will be affected. The setting of any surrounding heritage assets may be impacted for the short term, however, considering the option is an acceleration of ongoing leakage reduction activity this is considered negligible.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Archaeology and cultural herita	1g									
Landscape and visual amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The majority of works are anticipated to be in an urban setting. Assuming best practice construction methods, impacts of the construction phase are anticipated to be negligible. The scheme will have no direct effect on landscape and visual amenity in operation.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None

Drought Plan option	The c achieve	lemand sa d when the	vings that e measure of	t are likely is implem year. This	to accrue lented is ti s figure wa	from a ten hat there w is reviewe	nporary us vould be s d and upd	Temp se ban are aving of b ated base	oorary Use very diffic etween 0 a d on inforr	e Ban. cult to esti and 4.2% f mation gai	mate. The for Londor ined in the	assumption and 0 and 2005 and	on include d 4.7% for 2006 drou	d in the L Thames \ ght perio	TOA / FCD /alley, dep ds.	for the sa ending on	vings the time
Summary commentary of scheme adverse effects	No majo	or adverse	effects ha	ave been id ffecting so	dentified. / ome busin	A minor ao esses tha	lverse effe t rely on sj	ect has bee prinklers/ł	en identifie nosepipes	ed in terms in their lin	s of promo e of work	oting a sus (e.g., land	stainable e scaping/h	conomy a orticulture	lue to the i	emporary	use ban
SEA Objectives Adverse Effects Assessment Summary	None	None	None	None		None	None	None	None	None	None	None	None	None	None	None	None
Summary commentary of scheme beneficial effects	Beneficia have be	al impacts eneficial ef	include re fects on n	educing th naintaining water effic	e demand g surface v ciency. Re	for water, vater and g ducing wa	resulting a groundwa ater deman	in securin ter levels/l nd will also	g the supp flows, sust o help to in	bly of wate tainable m nprove the	er for custo anagemer e resilienco	omers/bus nt of abstra e of water	inesses. F actions an supplies t	Reducing t d enabling o drought	he deman g long tern	d for water n improver	r will also nents in
SEA Objectives Beneficial Effects Assessment Summary		None		None	None				None			None	None	None			

SE	A topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	A temporary use ban is considered to have no impact on biodiversity, flora and fauna, other than to acknowledge that reduced consumer demand for water will result in reduced requirement for abstraction at source (and therefore, potential for positive impacts on flow, sensitive habitats/species etc.).	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial
Biodiversity, flora and	1.2 To avoid introducing or spreading INNS.	The temporary use ban is likely to have no impact on avoiding the	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	Introduction of spreading of inves. A temporary use ban will provide water savings which will contribute towards improving security of supply of water in the TWUL's supply region. Drinking water quality will not be affected by the restrictions.	Low (beneficial)	High	Medium	High	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Bioths of Way)	Reducing the demand for water is unlikely to have any impacts , for recreation, tourism and navigation.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with goor access to essential services, including a secure, affordable supply of water.	The principal impact will be on domestic customers as the ban would preclude use of hosepipes for those use categories set out under the temporary ban powers. The temporary use ban would include an exemption for commercial businesses in respect of the washing of private cars and washing of windows. The elderly and disabled would also be exempted from the measures imposed under the temporary use ban. There may be some impact on the horticultural business sector in general, as plant buying patterns have the potential to change during the imposition of a temporary use ban.	Low (adverse)	High	Medium	Moderate	Short to medium-term	Temporary	Minor adverse	None
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	A sprinkler ban will reduce the demand for water in the region, improving the efficiency of existing resource use. It will not result in any increase in the generation of waste.	Low (beneficial)	High	Medium	Moderate	Medium-term	Temporary	None	Moderate beneficial
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	A temporary use ban will reduce the demand for water in the region.	Low (beneficial)	High	Moderate	High	Medium-term	Temporary	None	Moderate beneficial
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	This option will not directly result in, or modify any abstraction (surface water or groundwater). Reduction in demand for demand for water will result in reduced requirement for abstraction at source, minimising impacts on levels and flows.	Low (beneficial)	Medium	Medium	Moderate	Medium-term	Temporary	None	Minor beneficial
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	Reductions in demand for water would result in reduced requirement for increased abstraction at source, avoiding associated impacts on surface water and groundwater quality.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	This option will not directly result in, or modify any abstraction (surface water or groundwater), Reduction in demand for demand for water will result in reduced requirement for abstraction at source	Low (beneficial)	Medium	Medium	Moderate	Medium-term	Temporary	None	Minor beneficial

Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	This option will have a beneficial impact on water, acknowledging that reduced consumer demand for water will result in reduced requirement for abstraction at source. This may have medium to long-term impacts on consumer water usage.	Low (beneficial)	Medium	Medium	Moderate	Medium-term	Temporary	None	Minor beneficial							
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	No impacts on geology, geomorphology and quality/quantity of soils are anticipated as a result of the temporary use ban.	n/a	n/a	n/a	n/a	n/a	n/a	None	None							
Air and Climate	6.1 To maintain and improve air quality.	No impacts on air quality are anticipated as a result of the temporary use ban.	n/a	n/a	n/a	n/a	n/a	n/a	None	None							
Air and climate	6.2 To reduce greenhouse gas emissions.	The temporary use ban will not involve any increased resource use, or increased greenhouse gas emissions .	n/a	n/a	n/a	n/a	n/a	n/a	None	None							
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Demand management measures are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Long-term	Permanent	None	Minor beneficial							
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The temporary use ban is considered to have no direct impact on the historic environment, heritage assets and their settings and archaeologically important sites. There is the potential for reduced consumer demand for water to result in reduced requirement for abstraction at source, potentially reducing the magnitude of any drought related archaeology and cultural heritage impacts.	Low (beneficial)	Low	Medium	Moderate	Medium-term	Temporary	None	Negligible beneficial							
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The temporary use ban is considered to have no direct impact on landscape and visual amenity or any changes to access to the countryside or open space. There is the potential for reduced consumer demand for water to result in reduced requirement for abstraction at source, potentially reducing the magnitude of any drought related landscape or visual impacts.	Low (beneficial)	Low	Medium	Moderate	Medium-term	Temporary	None	Negligible beneficial							
Drought Plan option	Appli	cation to L depend	Defra to gr ing on the	ant Non E time of ye	ssential U ear. A cons	se Bans, a servative e	Ordinary L s part of a stimate of	Drought O. n ordinary savings b	rder to bai y drought (between 2.	n Non-Ess order appl 5 and 4%	ential Use lication. Sa are assum	: avings of l ned as par	between 5 t of TWUL	and 8% ai 's drought	e predicte planning j	d to be po process.	ssible
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Summary commentary of scheme adverse effects	No m impact	ajor advei s on recre assets, si	se effects ation and ich as visi	are predi tourism a ual impact	cted relatii ssets, and s on parks	ng to the in business s and gard	nplementa es/econon lens and/o	ation of the ny, may be r grounds	e ordinary e minor an e of listed b	drought c d moderat ouildings. ,	order. Advi te respecti All adversi	erse effec: ively. They e impacts	ts associa v may also identified	ted with re be minor are short-	estriction o adverse et term and te	f water us fects on h emporary.	e and leritage
SEA Objectives Adverse Effects Assessment Summary	None	None	None			None	None	None	None	None	None	None	None	None	None		None
Summary commentary of scheme beneficial effects	Bene	ficial effec	ts include	a reductio	on in the d	emand for consumer	water and s, and imp	l associate	ed efficien e resilienc	t resource e of water	e use, main supplies t	ntenance d to drought	of water flc	ows/levels,	maintena	nce of sup	oply to
SEA Objectives Beneficial Effects Assessment Summary		None		None	None				None			None	None	None			

SE/	A topics and objectives				Assessment of option	l								
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)				
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The use of an ordinary drought order to ban non-essential use is considered to have no impact on biodiversity, flora and fauna, other than to acknowledge that reduced consumer demand for water will result in reduced requirement for abstraction at source (and therefore, potential for positive impacts on flow, sensitive habitats/species etc.).	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial				
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The use of an ordinary drought order to ban non-essential use is likely to have no impact on avoiding the introduction or correction of INNS	n/a	n/a	n/a	n/a	n/a	n/a	None	None				
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The use of an ordinary drought order to ban non-essential will provide water savings which will contribute towards improving security of supply of water in the TWUL's supply region. Drinking water quality will not be affected by the restrictions.	Low (beneficial)	High	Medium	High	Short-term	Temporary	None	Moderate beneficial				
Population and human health	2.2 To protect and enhance the water environment for other users including recreation tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	There may be potential for minor impacts upon recreational , opportunity due to any restrictions on filling of swimming pools, watering of sports pitches etc. There may be minor impacts associated with the setting of tourist attractions for example visual impacts on the grounds of popular tourist sites.	Low (adverse)	High	Medium	Moderate	Short-term	Temporary	Minor adverse	None				
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option carries the risk of economic impact on businesses that benefit directly or indirectly from water usage (e.g. window cleaning businesses, sports and leisure facilities, garden and landscape orientated businesses.	Low (adverse)	High	Medium	Moderate	Short-term	Temporary	Moderate adverse	None				
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An ordinary drought order to ban non-essential use will reduce the demand for water in the region. It will not result in any increase in the generation of waste.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial				
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	The use of an ordinary drought order to ban non-essential use will reduce the demand for water in the region.	Low (beneficial)	High	Moderate	High	Short-term	Temporary	None	Moderate beneficial				
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	This option will not directly result in, or modify any abstraction (surface water or groundwater). Reduction in demand for water will result in reduced requirement for abstraction at source, minimising impacts on levels and flows.	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial				
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	The reduction in demand for water will result in reduced requirement for abstraction at source and therefore any water quality impacts associated with surface water quality.	n/a	n/a	n/a	n/a	n/a	n/a	None	None				
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	This option will not directly result in, or modify any abstraction (surface water or groundwater), Reduction in demand for demand for water will result in reduced requirement for abstraction at source	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial				
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	This option will have a beneficial impact on water, acknowledging that reduced consumer demand for water will result in reduced requirement for abstraction at source. This may have long term impacts on consumer water usage.	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial				

Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	No impacts on geology, geomorphology and quality/quantity of soils are anticipated as a result of the ordinary drought order to ban non-essential use.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	No impacts on air quality are anticipated as a result of an ordinary drought order to ban non-essential use.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and climate	6.2 To reduce greenhouse gas emissions.	The use of an ordinary drought order to ban non-essential use will not involve any increased resource use, or increased greenhouse gas emissions.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Demand management measures are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There may be minor impacts associated with the setting of heritage assets, for example, visual impacts on registered parks and gardens and /or the grounds of listed buildings. Notwithstanding these impacts, an ordinary drought order to ban non-essential use is considered to have no direct impact on the historic environment, heritage assets and their settings and archaeologically important sites. There is the potential for reduced consumer demand for water to result in reduced requirement for abstraction at source, potentially reducing the magnitude of any drought related archaeology and cultural heritage impacts.	Medium (adverse) Low (beneficial)	Low (Adverse) Low (beneficial)	Medium	Moderate	Short-term	Temporary	Minor adverse	Negligible beneficial
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	An ordinary drought order to ban non-essential use is considered to have no direct impact on landscape and visual amenity or any changes to access to the countryside or open space. There is the potential for reduced consumer demand for water to result in reduced requirement for abstraction at source, potentially reducing the magnitude of any drought related landscape or visual impacts. This option is not anticipated to have any implications for access to the countryside.	Low (beneficial)	Low	Medium	Moderate	Short-term	Temporary	None	Negligible beneficial

Drought Plan option	An Em	ergency D a	rought Or ccrue fron	der will be n an emerg	used as a gency droi	last resor ught order	t, when all are very c	Emerger other reas difficult to	ncy Droug sonable di estimate.	ht Order: rought opi TWUL has	tions have not yet in	been imp nplemente	lemented. d an Emer	The dema gency Dro	and saving bught Orde	s that are l er.	likely to
Summary commentary of scheme adverse effects	Signific assets	ant advers s, and bus	se effects inesses/e	are predic conomy (p	ted relatin opulation	g to the in and huma pa	plementai n health). rks and ga	tion of the Other adv ardens an	emergeno verse effec d/or groun	ey drough ts include ds of liste	t order, res potential d building	stricting w minor imp Is).	ater use w acts on he	vith impac eritage ass	ts for recre sets (e.g. v	eation and isual impa	tourism cts on
SEA Objectives Adverse Effects Assessment Summary	None	None	None			None	None	None	None	None	None	None	None	None	None		None
Summary commentary of scheme beneficial effects	None None None None None None None None							ows/levels,	, maintena	nce of sup	ply to						
SEA Objectives Beneficial Effects Assessment Summary		None		None	None				None			None	None	None			

SEA to	ppics and objectives				Assessment of option	n				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	An emergency drought order is considered to have no impact on biodiversity, flora and fauna, other than to acknowledge that reduced consumer demand for water will result in reduced requirement for abstraction at source (and therefore, potential for positive impacts on flow, sensitive habitats/species etc.).	Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	None	Minor beneficial
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	An emergency drought order is likely to have no impact on	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	An emergency drought order will provide water savings which will contribute towards improving security of supply of water in the TWUL's supply region. Drinking water quality will not be affected by the restrictions.	Low (beneficial)	High	Medium	High	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Depending on the scale of the requirements of the required demand and supply restrictions, there could potentially be significant impacts on recreation and tourism, particularly activities that may benefit directly or indirectly from water usage (e.g. swimming pools, sports pitches, the setting of tourist attractions and visual impacts on the grounds of popular tourist sites). In the worst case scenario, publicity regarding water restrictions may cause a loss of tourism revenue, as tourists delay or cancel trips to the affected area.	Medium (adverse)	High	Medium	Moderate	Short-term	Temporary	Major adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Depending on the scale of the requirements of the required demand and supply restrictions, there could potentially be significant impacts on businesses/economy, particularly those that benefit directly or indirectly from water usage (e.g window cleaning businesses, sports and leisure facilities, garden and landscape orientated businesses.	Medium (adverse)	High	Medium	Moderate	Short to medium-term	Temporary to Permanent	Major adverse	None
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An emergency drought order to ban non-essential will reduce the demand for water in the region. It will not result in any increase in the generation of waste.	Low (beneficial)	Medium	Medium	Moderate	Medium-term	Temporary to permanent	None	Minor beneficial
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	The use of an emergency drought order will reduce the demand for water in the region.	Low (beneficial)	High	Moderate	High	Medium-term	Temporary to permanent	None	Moderate beneficial
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	This option will not directly result in, or modify any abstraction (surface water or groundwater). Reduction in demand for water will result in reduced requirement for abstraction at source, minimising impacts on levels and flows	Low (beneficial)	Medium	Medium	Moderate	Medium-term	Temporary	None	Minor beneficial
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	The reduction in demand for water will result in reduced requirement for abstraction at source and therefore any water quality impacts associated with surface water quality.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	This option will not directly result in, or modify any abstraction (surface water or groundwater), Reduction in demand for demand for water will result in reduced requirement for abstraction at source.	Low (beneficial)	Medium	Medium	Moderate	Medium-term	Temporary	None	Minor beneficial

Wator.	4.4 To promote measures to enable and sustain	This option will have a honoficial impact on water	Low (bonoficial)	Madium	Madium	Mederate	Madium tarm	Tomporary to	Nono	Minorhonoficial
Water	long term improvement in water efficiency	acknowledging that reduced consumer demand for water will	LOW (Deficicial)	Wedium	Medium	Woderate	Wedium-term	nermanent	None	
	iong term improvement in water emclency.	result in reduced requirement for abstraction at source. This						permanent		
		may have medium to long-term impacts on consumer water								
		usage.								
Soil, geology and land use	5.1 To protect and enhance geology, the quality	No impacts on geology, geomorphology and quality/quantity	n/a	n/a	n/a	n/a	n/a	n/a	None	None
	and quantity of soils and geodiversity and	of soils are anticipated as a result of the use of an emergency								
	promote a catchment-wide approach to land	drought order.								
	management.									
Air and Climate	6.1 To maintain and improve air quality.	No impacts on air quality are anticipated as a result of the use	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and climate	6 2 To roduce groophouse gas omissions	The use of an emergency drought order.	n/2	n/2	2/2	n/2	n/2	n/2	Nono	Napa
Air and climate	6.2 TO reduce greenhouse gas emissions.	any increased resource use or increased greenhouse gas	II/d	II/d	li/a	II/d	II/d	II/d	None	None
		emissions.								
Air and climate	6.3 To consider the need for adaptive measures	Demand management measures are a key component of	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Minor beneficial
	for climate change.	Thames Water's Drought Plan. The Plan aims to ensure								
		resilience of water supplies to drought.								
Archaeology and Cultural	7.1 To conserve and enhance the historic	There may be minor impacts associated with the setting of	Medium (adverse)	Low (Adverse)	Medium	Moderate	Medium-term	Temporary	Minor adverse	Negligible beneficial
Heritage	environment, heritage assets and their settings	heritage assets, for example, visual impacts on registered	Low (beneficial)	Low (beneficial)						00
	and to protect archaeologically important sites.	parks and gardens and /or the grounds of listed buildings.								
		Notwithstanding these impacts, an ordinary drought order to								
		ban non-essential use is considered to have no direct impact								
		on the historic environment, heritage assets and their								
		settings and archaeologically important sites. There is the								
		potential for reduced consumer demand for water to result in								
		reduced requirement for abstraction at source, potentially								
		reducing the magnitude of any drought related archaeology								
		and cultural heritage impacts.								
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and	An ordinary drought order to ban non-essential use is	Low (beneficial)	Low	Medium	Moderate	Medium-term	Temporary	None	Negligible beneficial
	improve access to designated and undesignated	considered to have no direct impact on landscape and visual	· · ·							0.0
	landscapes, townscapes and the countryside.	amenity or any changes to access to the countryside or open								
		space. There is the potential for reduced consumer demand								
		for water to result in reduced requirement for abstraction at								
		source, potentially reducing the magnitude of any drought								
		related landscape or visual impacts. This option is not								
		anticipated to have any implications for access to the								
1		countryside		1 1		1	1	1		

Residual Effect significance (negligible/minor adverse/moderate adverse/major adverse)

None	
Negligible adverse	
Minor adverse	
Moderate adverse	
Major adverse	

Drought Plan option	Artifi groundw the rech Recharge peak yi	cial recha vater abstr narge site. e scheme eld for NL	rge (AR) is action alre AR is bas (CHARS), ARS is 19 ex	s the techi eady occu ed on ove which is e 0MI/d, hov ttended pe	nique of in rs. Treated rall catchr essentially vever, afte eriods of re	creasing t d water is nent water a subset o r sustaine echarge. 1	North he rate of oumped ir balances of NLARS d use yield herefore y	London A recharge (nto the aqu , and is us with slight d would be vield is vul	rtificial Re of an aquit uifer and s sed to prev tly differen e reduced. nerable to	charge Sc fer which g tored for u rent over-a t operatio Over exte severe mu	heme: generally o ise at a lat ibstraction nal rules) nded perio ulti-year di	contains re er date, w n of native 48 boreho ods of use roughts of	easonably hen it is al groundwa les along t (more tha successi	good qua ostracted d ater. Toge the Lee Va in 16 mon ve drough	lity water a either at or ther with C Illey are inv ths) the sc ts.	and from v r downstre Chingford J volved. Th cheme will	vhich eam from Artificial te current require
Summary commentary of scheme adverse effects	Adverse	effects id with res	entified ar spect to en	e associa nissions t	ted with er o air (air p	nergy use ollutants a	and mater nd greenl	ials requir house gas	ed for the emissions	re-abstrac s) as a res	tion of sto ult of the a	ored water additional	and its tre pumping a	eatment. A and treatm	dverse eff ent require	fects are a ements.	lso likely
SEA Objectives Adverse Effects Assessment Summary	None	None	None	None	None		None	None		None	None	None			None	None	None
Summary commentary of scheme beneficial effects	Majo	r beneficia	I effects a	re identifi	ed with res	spect to si ir	istainable nproving t	provision he resilien	of a large ace of wate	quantity o er supplies	f water (a to drougi	t a rate of t ht.	up to 190N	11/d) durin	g periods (of drough	t, and
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None		None	None	None	None		None	None

SEA topics and objectives				Assessment of opt	tion				
Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/hig h)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The drought option abstracts from the confined aquifer under north London and so has no impact on surface water levels. No operational impacts on SSSIs, other designated or undesignated habitats or species have been identified.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
1.2 To avoid introducing or spreading INNS.	The artificial recharge option will not introduce or affect the spread of INNS, as it involves clean treated water pumped and stored in groundwater for re-abstraction.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The drought option will help to ensure levels of service are maintained through provision of up to 190MI/d of water.	High (beneficial)	High	Medium	High	Short-term	Temporary	None	Major beneficial
2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	No impacts on recreation, tourism and navigation, or green infrastructure are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity.	High (beneficial)	High	Medium	High	Short-term	Temporary	None	Major beneficial
3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	The option utilises existing infrastructure. An increase in energy use is envisaged due to re-abstraction of aquifer-stored water. Materials would be required outside of the environmental drought period associated with the treatment of water for recharge.	Medium (adverse)	Low	Medium	High	Short-term	Permanent	Minor adverse	None
3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	Groundwater levels will be drawn down during the operation of this scheme. However, the drought option abstracts from the confined aquifer and so no impact on surface water levels are anticipated. Recharge to the aquifer is made during times of surplus water supply, which is drawn from multiple sources including surface water from Rivers Lee and Thames and groundwater from New River wells. Water is drawn at times when the abstraction will cause no significant impact on surface water flows.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
14.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	AR at sites where the chemistry of the recharge water and the groundwater are compatible should not have adverse effects on groundwater quality. There is a low risk of groundwater deterioration during extended pumping under severe drought conditions. Recharge to the aquifer is made during times of surplus water supply. No impacts on water quality downstream of abstraction points are anticipated. Recharge water would be potable water sourced from local WTW.	Low (adverse)	Low	Medium	Low	Short-term	Temporary	Negligible adverse	None

4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	The option will contribute to more sustainable abstractions by undertaking recharge to the aquifer during times of surplus water supply, to allow for re-abstraction during times of drought with no significant impacts on surface water WFD status.	Low (beneficial)	Medium	Medium	High	Long-term	Permanent	None	Minor beneficial
4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	With no land take and no identified hydrological impacts no effects on geology, geomorphology or soils are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
6.1 To maintain and improve air quality.	An increase in emissions is envisaged due to the re-abstraction of aquifer-stored water. The boreholes associated with the drought option are located in the London Boroughs of Enfield and Haringey, both of which have declared AQMAs for nitrogen dioxide and particulate matter. The local area surrounding some of the boreholes may be urban.	Medium (adverse)	Medium	Small	Low	Short-term	Temporary	Moderate adverse	None
6.2 To reduce greenhouse gas emissions.	An increase in emissions is envisaged due to the re-abstraction of aquifer-stored water. Therefore there will be a associated short term increase in greenhouse gas emissions associated with the additional pumping and treatment requirements. An increase in energy use, emissions and CO ₂ are also envisaged outside of the environmental drought period associated with the provision, treatment and storage of water for recharge.	Medium (adverse)	Low	Medium	High	Short-term	Temporary	Minor adverse	None
6.3 To consider the need for adaptive measures for climate change.	Supply-side measures are a key component of Thames Water's Drought Plan. The Drought Plan aims to ensure resilience of water supplies to drought.	High (beneficial)	High	Medium	High	Short-term	Temporary	None	Major beneficial
7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	Abstraction from the boreholes is within existing licence limits. In order for the drought option to be feasible, it requires maintaining groundwater levels at the abstraction locations via Artificial Recharge. Over the long term the option is not anticipated to adversely effect the historic environment, sites of archaelogical or cultural heritage importance or palaeo-environmental remains or their setting.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	With no construction requirements or long term adverse hydrological effects there will be no adverse effects to the quality or access to designated or undesignated landscapes, townscapes and the countryside.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
I	1								

Drought Plan option	TGWTW licence fo schen	' is a desa or 200 MI/o ne. The TC	lination pla d peak and GWTW wol	ant that us I 200 MI/d uld take be	ses brackis average, a etween 4-6	1 sh water a nd the wa weeks to	hames Ga bstracted ter treatme ramp up t increa	ateway Wa from the 1 ent plant h o full outp ased to fu	ter Treatm Thames Tic as a maxii ut, howeve Il output fr	ent Works deway and mum outp er the sch om zero o	treats the treats the ut of 100 l eme is ma utput.): water to j MI/d. There intained in	potable sta e is an Ope n a state of	andard. Th erating Agi f readines:	ne source l reement g s so it doe	has an abs overning t s not need	straction Ise of the I to be
Summary commentary of scheme adverse effects	The scal emis mana	e of water ssions, m ngement il	abstractio oderate efi npacts, du Impac	on, treatmo fects on re le to disch cts should	ent includi source co harge of br be short t	ng RO, an nsumptio ine from t erm and t	d waste st n, and mir he desalin emporary,	tream pum nor effects nation plan assuming	pping requi on greent t and gene t the plant	ired for im nouse gas eration of s was only i	plementai emission sludges fr amped up	tion of this s. The trea om clarific o to full ou	option wi tment pro ation and tput in dro	ll have mo cess woul filtration t ought situa	oderate ado d also hav units and F ations.	verse effec ve minor w RO membr	cts on air 'aste 'anes.
SEA Objectives Adverse Effects Assessment Summary	None	None	None	None	None					None	None	None			None	None	None
Summary commentary of scheme beneficial effects	Use of th	ne TGWTV	V would ha	ive major i	beneficial	effects reg availa	garding ma bility of wh	aintenance nich is not	e of supply influenced	r reliability d by the ef	in drougl fects of di	ht conditio rought.	ns throug	h provisio	n of up to	150MI/I su	pply, the
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	None	None		None	None

SEA	topics and objectives				Assessment of op	otion				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	I Certainty of effect (low/moderate/hi gh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	No operational impacts of the option on European designated sites have been identified. Impacts on flows are negligible and the waste stream is released via STW effuent outfal so that it is diluted by the effluent from Beckton STW before discharge to the Thames. Dilution and dispersion were appropriately considered in the design of the TGWTW, and the discharge is a small volume when compared to that in the tideway. Compliant intake screens are in place. Therefore no operational impacts on SSSs, other designated or undesignated habitats or species have been identified.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The desalination option will not introduce or affect the spread of INNS, as impacts on flows are negligible and the waste stream is released via STW effluent outfall so that it is diluted by the effluent from Beckton STW before discharge to the Thames. Dilution and dispersion were appropriately considered in the design of the TGWTW.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The drought option will help to ensure levels of service are maintained through enabling provision of 150MI/d of water.	High (beneficial)	High	Medium	High	Short-term	Temporary	None	Major beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	The drought option is not expected to impact on other users, including recreation, tourism and navigation.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity.	High (beneficial)	High	Medium	High	Short-term	Temporary	None	Major beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Energy use required for water abstraction, treatment including RO, and waste stream pumping is considered significant.	High (adverse)	Low	Medium	Medium	Short-term	Temporary	Moderate adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	The RO process would produce a waste stream of approximately one third (75M/d) of the initial intake (200M/d), which would be composed of a high concentration of salts and other contaminants removed from the raw water. The clarification and filtration units and RO membranes would be backwashed periodically to prevent clogging. Sludges produced by this process would require disposal.	Low (adverse)	Low	Medium	High	Short-term	Temporary	Negligible adverse	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	There is the potential for changes to estuarine flow, including at low water spring tides. However, any potential impacts are considered negligible.	Low (adverse)	Low	Low	Medium	Short-term	Temporary	Negligible adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	There is the potential for a change in estuarine water quality due to discharge of the concentrated waste stream. However this is mitigated through the release of the waste stream via STW outflows so that it is diluted by the effluent from Beckton STW before discharge to the Thames. Dilution and dispersion were appropriately considered in the design of the TGWTW and therefore adverse effects to the Tideway and WFD status are considered negligible.	Low (adverse)	Low	Low	Medium	Short-term	Temporary	Negligible adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	The option will not affect the sustainability of other surface water or groundwater abstractions.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Soil, geology and land use	5.1 To protect and enhance geology, the quality	No impacts on land use and geology are anticipated. The plant	n/a	n/a	n/a	n/a	n/a	n/a	None	None
	and quantity of soils and geodiversity and	has already been commissioned.								
	promote a catchment-wide approach to land									
	management.									
Air and Climate	6.1 To maintain and improve air quality.	An increase in air emissions is envisaged due to the amount of	Medium (adverse)	Medium	Small	Low	Short-term	Temporary	Moderate adverse	None
		power required for water abstraction, treatment including RO,								
		and waste stream pumping. TGWTW is in relatively close								
		proximity (less than 2km) to Newham AQMA, declared with								
		respect to nitrogen dioxide and particulate matter (therefore								
		considered of medium sensitivity to the effects). However, there								
		is an agreement with London Borough of Newham, as part of								
		the planning conditions, to buy the same amount of energy used								
		at the desalination plant as renewable energy, therefore the								
		magnitude of effect is considered medium rather than high.								
Air and climate	6.2 To reduce greenhouse gas emissions.	There will be a significant volume of greenhouse gas emissions	Medium (adverse)	Low	Medium	Medium	Short-term	Temporary	Minor adverse	None
		associated with this drought option due to the amount of power								
		required for water abstraction, treatment including RO, and								
		waste stream pumping. However, the fuel will be derived from								
		renewable source and electricity generated on site.								
Air and climate	6.3 To consider the need for adaptive measures	Supply-side measures are a key component of Thames Water's	High (beneficial)	High	Medium	High	Short-term	Temporary	None	Major beneficial
	for climate change.	Drought Plan. The Drought Plan aims to ensure resilience of						,		,
		water supplies to drought.								
Archaeology and Cultural	7.1 To conserve and enhance the historic	The drought option is not anticipated to impact any sites of	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Heritage	environment, heritage assets and their settings	archaeological or cultural heritage importance or palaeo-								
	and to protect archaeologically important sites.	environmental remains.								
Landscape and Visual	8.1 To protect, enhance the quality of and	No impacts on landscape and visual amenity are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Amenity	improve access to designated and undesignated									
	landscapes, townscapes and the countryside.									
L				1	1	1	1	1	1	1
	1	1								

Drought Plan option	Artifi groundw The Chin smal demand abstractio	cial recha vater abstr gford Artin ler scale. I ls and dro on from fo	rge (AR) is action alru he recharg ficial Rech t is not res ught dema ur boreho sou	s the techn eady occu ge site. AF narge Sche stricted to ands. CHA les in the rce that we	nique of in rs. Treated R is based eme is a si use unded NRS which Lee Valley ould be us	creasing t d water is on overal milar sche r the NLAI is essent . The norm ed in the o	Chingfor the rate of pumped in catchmen to Non RS Operation ally a sub- nal operation event of di	rd Artificial recharge nto the aqu nt water ba rth Londor ing Agreen set of NLA ing strateg rought. Th	l Recharge of an aquit uifer and s alances, ar n Artificial nent but c RS with sl ny for CHA e impleme	Scheme fer which g tored for u ad is used Recharge an be use ightly diff RS is to s ntation tin	(CHARS): generally of use at a lat to preven Scheme (d under an erent oper upport me ne for this	contains ro ter date, w t over-abs NLARS) N ny conditio ational ru eting peal supply-sio	easonably hen it is al traction of lorth Lond ons althou les. The so k demands de measur	good qua bstracted of f native gro on Artificia gh its use sheme is lia s in non-dr re is 7-14 o	lity water either at o oundwate al Recharg is primari censed fo ought pei ays.	and from v r downstre r. ge Scheme ily to meet r 16MI/d m riods, but i	vhich eam from e but on a peak aximum t is also a
Summary commentary of scheme adverse effects	Minor at are pos	dverse eff sible with	ects may o	occur due o greenho	to air emis use gas ei	ssions ass missions,	sociated w material u	vith energy se and gro	v use for th bundwater	e re-abstr quality. H	raction of s owever, al	stored wat II adverse	er and its effects ide	treatment. Intified are	Negligibl short teri	e adverse m and tem	impacts porary.
SEA Objectives Adverse Effects Assessment Summary	None	None	None	None	None		None	None		None	None	None			None	None	None
Summary commentary of scheme beneficial effects	Moderat	e benefici	al effects a	are identifi	ied with re	spect to s	ustainable	e provisior	n water (up drought.	to 12MI/d), thus pro	oviding im	provemen	ts in the re	esilience c	• of water su	pplies to
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None		None	None	None	None		None	None

	SEA topics and objectives				Assessment o	f option				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/high)	Duration of effect (short-term/medium term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that experiments to biogenerative and the services that	The drought option abstracts from the confined aquifer under north London and so has no impact on surface water levels. No operational impacts on SSSs, other designated or undesignated habitats or species have been identified.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The artificial recharge option will not introduce or affect the spread of INNS, as it involves clean treated water pumped and stored in groundwater for re-abstraction.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The drought option will help to ensure levels of service are maintained through provision of up to 16MI/d of water.	Low (beneficial)	High	Medium	High	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as we as terrestrial recreational resources (including National Trails and Public Rights of Way).	No impacts on recreation, tourism and navigation, or green I infrastructure are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	High	Short-term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of vaste, encourage its re-use and eliminate waste sent to landfill.	The option utilises existing infrastructure. An increase in energy use is envisaged due to re-abstraction of aquifer-stored water. Materials would be required outside of the environmental drought period associated with the treatment of water for recharge.	Low (adverse)	Low	Medium	High	Short-term	Permanent	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	Groundwater levels will be drawn down during the operation of this scheme. However, the drought option abstracts from a confined aquifer and so no impact on surface water levels are anticipated. Recharge to the aquifer is made during times of surplus water supply, which is drawn from multiple sources including surface water from Rivers Lee and Thames and groundwater from New River wells. Water is drawn at times when the abstraction will cause no significant impact on surface water flows.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	AR at sites where the chemistry of the recharge water and the groundwater are compabile should not have adverse effects on groundwater quality. There is a low risk of groundwater deterioration during extended pumping under severe drought conditions. Recharge to the aquifer is made during times of surplus water supply. No impacts on water quality downstream of abstraction points are anticipated. Recharge water would be potable water sourced from local WTW.	Low (adverse)	Low	Medium	Low	Medium-term	Temporary	Negligible adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	The option will contribute to more sustainable abstractions by undertaking recharge to the aquifer during times of surplus water supply, to allow for re-abstraction during times of drought. Abstraction during drought events will be from the confined chalk aquifer, so no adverse effects on other water resources are anticipated.	Low (beneficial)	Medium	Medium	High	Short-term	Permanent	None	Minor beneficial
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchmen wide approach to land management.	With no land take and no identified hydrological impacts no t- effects on geology, geomorphology or soils are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	An increase in emissions is envisaged due to the re-abstraction of aquifer-stored water. The boreholes associated with the drought option are located in the London Boroughs of Enfield and Haringey, both of which have declared AQMAs for nitrogen dioxide and particulate matter. The local area surrounding some of the boreholes may be urban.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	An increase in emissions is envisaged due to the re-abstraction of aquifer-stored water. Therefore there will be a associated short term increase in greenhouse gas emissions associated with the additional pumping and treatment requirements. An increase in energy use, emissions and CO ₂ are also envisaged outside of the environmental drought period associated with the provision, treatment and storage of water for recharge.	Low (adverse)	Low	Medium	High	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Supply-side measures are a key component of Thames Water's Drought Plan. The Drought Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Medium	High	Short-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	Abstraction from the boreholes is within existing licence limits. In order for the drought option to be feasible requires maintaining groundwater levels at the abstraction locations via Artificial Recharge. Over the long term the option is not anticipated to adversely effect the historic environment, sites of archaeological or cultural heritage importance or palaeo- environmental remains or their setting.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	With no construction requirements, long term adverse hydrological effects there will be no adverse effects to the quality or access to designated or undesignated landscapes, townscapes and the countryside.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
	and the countryside.	Involuogical energy and energy with the or autory senies to une quality or access to designate or undesignated landscapes, townscapes and the countryside.								

Drought Plan option	The Lo The ag Lee Va condition flow (impleme further f	wer Tham reement is alley reser ns mean th of 800MI/d entation of reductions	es Operati based on voir group nat Tames However greater d to 400Ml/	ing Agreer ensuring s. Four pa Water's al ; as the vo emand cou d and ther	To nent (LTO, that suffic ass-forwar bstractions lume of av ntrol meas a 300MI/d . Envirol	Redu reduce the cient flow p rd flow val s cannot o vailable re- ures by T In advano nment Age	action in ta e minimum oasses ovu easses ovu ease the p servoir sto WUL, for e e of a dro eacy to ad	he Lowest n pass-for to day-to- er Tedding cluded in t pass-forwa orage redu xample, h ught perm lopt the low	residual f ward flow day opera tton weir, the LTOA, ard flow to ces, this t osepipe b it applicat wer TTF of	low (300M over Teda tional dec relative to known as drop belo riggers re- ans. This ion, which 200MI/d a	Vd to 2000 lington We isions on a the preva Teddingto w the TTF ductions in stepwise in would be as set out i	MI/d): bir to 200M Thames W iling sease on Target i agreed fo n the TTF reduction to reduce in the M2 I	IVd. Vaters abst onal reserv Flows (TTI or that day in a stepw progresse o the TTF to icence.	traction fro voir storag F) . Under . Normally ise fashio s from 80 o 200MI/d,	om the low ge of the Ti r normal po y there is a n. Each si 0MI/d to 60 . TWUL wo	ver River 1 hames Va eriods, the a minimun tep require 00MI/d, foll ould agree	Thames. lley and a LTOA n residual as the lowed by with the
Summary commentary of scheme adverse effects	lf imple Freshw saturatio adve	emented, t vater flows on and red erse effect:	he drough to the upp uced phos s are expe	nt option w oer Thame sphate dill ccted on a as	rould have s Tideway ttion), whic range of a ssociated	moderate will reduc ch may ex quatic ecc with fish, i	adverse e e. Modera acerbate v ological re including i	effects on ite adverse water qual ceptors, si migration.	flows in th e effects a ity issues uch as ma Moderate	e lowest r re predicto in the upp croinverte adverse e	eaches of ed on wate er Tidewa brates, ma ffects may	the fluvial er quality i y with the acrophyte y occur on	Thames, n the fluvia potential f s and fish. navigatio	mainly in a al Thames for modera . The adve n.	terms of vo (reduced ate advers erse effects	elocity rea dissolved e effects. I s include t	luction. oxygen Moderate hose
SEA Objectives Adverse Effects Assessment Summary			None				None			None	None				None		None
Summary commentary of scheme beneficial effects	If	implement	ed, the dr custome	ought opti rs/busines	on would i sses. Majo	have a ma r beneficia	jor benefi al effects a	cial effects are also ex	s for popul pected in	ations an regard to	d human h improved i	ealth in te resilience	rms of ens of water s	suring sup upplies to	oply of wat drought.	er and oth	ner
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	None	None		None	None

	SEA topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/high)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	Moderate to major hydrological reductions in velocity upstream of Teddington Weir are expected, as are moderate water quality effects in the tideway. The result is a wide range of effects on a large number of ecological receptors. Designated sites identified as potentially impacted at lower pass forward flows include Langham Pond SSSI, Dunsey Meadow SSSI and Syon Park SSSI, which are identified as having uncertain sensitivity in the Lower Thames EAR and moderate impacts, which will be sightly lessened with regards to this option. Adverse effects relating to freshwater species of the lowest reaches of the fluvial River. Thames and the transitional species of the Tideway range from minor to moderate. The types of effects are greatest regarding fish: communities. Moderate temporary adverse effects include localised water quality deterioration, increased predation, habitat fragmentation and impacts on migration affecting species such as migratory salmonids, European eel, lamprey and brown trout. Moderate adverse effects to fish communities relate to a moderate risk deterioration regarding the fish component of the WFD waterbody GBS306039114 Thames Upper. Moderate adverse effects to macroinvertebrates are also identified.	Moderate (adverse)	High	Large	Moderate	Short-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The changes to flow velocity and water quality as result of the drought option are considered likely to have minor effects on the distribution of a wide range of INNS, including zebra mussel, Chinese mitten crab and spionid worm (<i>Marenzelleriawiréni</i> sp.)	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Implementation of the drought option will help to maintain essential public water supplies (provision of up to an additional 100MI/d of water) during drought conditions and therefore help maintain public health.	High (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Major beneficial
Pepulation and human health	12.10 protect and enhance the water environment for other users including recreation, tourism, nawajation, as wel as terrestrial recreational resources (including National Trails and Public Rights of Way).	The River Thames is highly valued for its navigational and recreational uses. In the fluxial River Thames, restrictions on lock use would be imposed both as a result of haural drought conditions (to maintain critical water levels) and the requirements to keep Moseley Weir and Teddington Weir closed (at least for most of the time) in order for the drought option to operate effectively. There may be impacts on boats that are navigating between the Tideway and the lower freshwater River Thames. There is also potential for additional risks to avaigation as a result of increased sedimentation in the navigation channel in the upper Tideway as fewer and fewer vessels use the avaigation channel, with implications on manoursultily for larger boats. Overall, impacts on navigation are considered moderate adverse. Anglers may be affected by any reduction in the presence of fish species as a result o the adverse impacts to fish communities.	Moderate (adverse)	Medium	Large	Moderate	Short-term	Temporary	Moderate adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Implementation of the drought option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. However, adverse impacts to navigation are expected, which may present temporan adverse effects to the businesses such as marinas, passenger boats and hire boat operators.	Medium (adverse) High (beneficial) y	Medium (adverse) High (beneficial)	Medium	Moderate	Short-term	Temporary	Moderate adverse	Major beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waske, encourage its re-use and eliminate waste sent to landfill.	An increase in abstraction (100MI/d) is likely to result in a proportional increase in the use of energy, chemicals and generation of waste. However, this is a temporary increase in abstraction that occurs at high volumes under normal operating conditions.	High (adverse)	Low	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the	No opportunities to promote the sustainable management of natural resources were identified for this option.	e n/a	n/a	n/a	n/a	n/a	n/a	None	None

Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The drought option would have a moderate to major hydrological impact. The lowest reaches of the River Thames (Datchet abstraction to Teddington Weir) would experience a reduction in river flow during natural low flow periods. As the river is impounded with river levels (and wetted area) maintained for navigation, the flow reduction would only lead to a reduction in velocity, which is considered major from Penton Hook lock to Teddington Weir. The drought option would result in a major reduction in velocity, which is considered major from This would have limited impact on river levels, however, due to the reduction in freshwater flow, there would be estuarine water quality implications (decreasing with distance downstream to London Bridge). Overall significance is considered to be moderate as implementation of the option is within normal licensed operations.	Moderate (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	In the adversely impacted reach of the fluvial River Thames there would be a mimor to moderate water quality risk for dissolved oxygen concentration (increasing downstream) during drought option implementation. Implementation of the drought option could have moderate risk of short-term deterioration to related freshwater WFD waterbolds (G8106039022322) and G800060902322) in terms of the macroinvertebrate community. The drought option would result in a major reduction in freshwater flow that enters the Upper Tideway over Teddington weir, resulting in estuarine water quality implications, however, some flows would be maintained. The risk to dissolved oxygen is considered moderate to in the Impacted reach of the Thames Tideway. Consented discharges to the River Thames and its tributaries are considered to present moderate pressures in the lowest reaches of the fluvial Thames (ammonia and dissolved oxygen) and upper Tideway (dissolved oxygen).	Moderate (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. However, the drought option will not reduce the amount of water available for other licence holders to abstract in the freshwater River Thames and it is not anticipated that the drought option will limit the feasibility of other abstractors in the Tideway.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment- wide approach to land management.	Minor impacts on geomorphology are anticipated with respect to in-channel structures, such as weirs/locks, and their influence on sediment dynamics by creating ponded areas upstream of structures. It is anticipated that there would be low amounts of sediment in transport during a drought.	Low (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	This measure would cause temporary increases in emissions associated with the abstraction and treatment of water (up to 100MI/d). The option is in close proximity (or within) a number of AQMAs, including Spelthorne AQMA and Richmond AQMA.	Medium (adverse)	Medium	Small	Low	Short-term	Temporary	Moderate adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	This measure would cause temporary increases in energy use and greenhouse gas emissions associated with the abstraction and treatment of water (up to 100Mi/d).	Medium (adverse)	Low	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Supply-side measures are a key component of Thames Water's Drought Plan. The Drought Plan aims to ensure resilience of water supplies to drought.	High (beneficial)	High	Small	High	Short-term	Temporary	None	Major beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The length of the impacted reach of the River Thames includes a wealth of archaeology and cultural heritage assets. However, water levels will not be significantly affected adjacent to these assets due to the requirement to maintain levels for navigation. Assuming water levels are maintained, the potential impact of this drought option on the setting of the heritage assets associated with the Thames, including sub-surface water dependent heritage assets, is considered negligible.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No designated landscape areas are within the area of influence, and no effects on non-designated areas of natural beauty or access to values areas of landscape character are anticipated. There is no land take associated with the scheme.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

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							Earlier re	eduction i	n residual	flow on t	he LTCD:		
Drought Plan option	The Thames. Vall operati there fashion. The Earl	Lower Tha The agre ey and Lee on, the LT is a minin Each ste	ames Ope ement is l e Valley re OA condi num resid p requires ion in resi	rating Agr based on e eservoir gr tions mea ual flow o s the imple idual flow	eement (L ensuring t roups. Fo n that Tan f 800MI/d. ementatio from 800 on the LT at e	TOA) pro that suffici- nes Water However, n of great MI/d to 60 CD droug	vides a gu ient flow µ orward flo 's abstrac as the vo er deman OMI/d, fol ht option	iide to day passes over w values a tions cani lume of a d control i lowed by t provides g ICD for th	y-to-day o er Tedding are includ not cause vailable re measures further rec gain in ab be period	perationa gton weir, ed in the l the pass- eservoir s by TWUL ductions t straction of when that	l decision relative to LTOA, kno forward fl torage rec , for exam o 400MI/d capability t flow ban	s on Tham o the preva own as Tec ow to drop luces, this ple, hosep and then t that would d is operal	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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Summary commentary of scheme adverse effects	If implen the case flow im Tham diss expec quality i	nented, the e without i pacts (maines Tidewa colved oxy ted on a ra impacts. M	e measure implemen inly in the ay. As a re gen satur ange of ac finor adve	e would rea tation of the form of ve esult there ation and puatic ecolorise erse effect	sult in mii he measu elocity red is potent reduced p logical red s may occ	nor advers re. Theref duction) ir ial for min hosphate ceptors, su cur on nav	e effects ore, all ide o the fluvia or advers dilution), uch as ma igation as	due to rec entified eff al Lower 1 e effects 1 which ma peroinverte s a result o	duced flow fects are e fhames, m regarding ny exacerb ebrates, m of extende option.	vs passed extensions ninor adve extended pate water nacrophyt ed periods	forward of s of what perse effect periods of quality is es and fis s of restri	over Teddi could occu s relate to of water qu sues in the h, as a res ctions on l	7 1 2 8 1 4
SEA Objectives Adverse Effects Assessment Summary			None				None			None	None		
Summary commentary of scheme beneficial effects	lf imple	mented, tl	he measu	re would h	ave a mo are a	derate ber also expec	neficial eff cted throu	iects rega Igh improv	rding ensu ved resilie	uring supp ence of wa	oly of wate ter suppli	er to custo es to drou	
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	

es Waters iling seas dington t below th triggers r ipe bans. 00MI/d .	s abstract sonal rese arget flow e TTF agr reductions This step	ion from ta ervoir stor vs (TTF) . reed for th s in the TT owise redu	he lower I age of the Under nou at day. No F in a ste uction pro	River Thames rmal ormally owise gresses
be equa le.	l to the dif	fference in	reductio	n agreed
ngton We r under b the reduc ality impa e upper T ult of the ock use t	ir earlier a paseline co ction in fre acts in the ideway. M extended han would	and for lon onditions. eshwater fi fluvial Th linor adver periods o have occ	ger than In additio lows to th ames (rec se effects f flow and urred with	would be n to the e upper luced s are ' water hout the
		None		None

omers and businesses. Minor beneficial effects light. None None None None None

	SEA topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Re eff (lii re;
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The measure would allow greater abstraction from the Lower River Thames to be brought forward by a short period. Changes in abstractions and resulting effects on hydrology (velocities and water quality) have the potential to impact on macroinvertebrates, macrophytes and fish for a slightly longer duration than would have occurred without this drought option. Considering the effects are limited to an extension of what would occur without the option the sensitivity of the system is considered moderate and overall effects are considered minor adverse.	Low (adverse)	Moderate	Large	Moderate	Short-term	Temporary	Minor adverse	
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	As the anticipated effects of the measure are limited to extended durations of each step reduction in TTF, which would occur anyway, potential effects regarding INNS are considered to be negligible.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Implementation of the drought option will help to maintain essential public water supplies (earlier availability of increased abstraction rates).	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	The River Thames is highly valued for its navigational and recreational uses. In the fluvial River Thames, restrictions on lock use would be imposed as a result of natural drought conditions (to maintain critical water levels). The drought option would extend the duration of these impacts on navigation. Considering effects are limited to an extension of what would occur without implementation of the measure, the sensitivity of navigation related receptors to the effects is considered low.	Moderate (adverse)	Low	Large	Moderate	Short-term	Temporary	Minor adverse	
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	 Implementation of the drought permit will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. However, there is potential for minor adverse impacts to navigation which may present temporary adverse effects to the businesses such as marinas, passenger boats and hire boat operators. 	y Moderate (adverse) Low (beneficial)	Low (adverse) High (beneficial)	Medium	Moderate	Short-term	Temporary	Minor adverse	
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	The earlier increase in abstraction is likely to result in a small proportional increase in the use of energy, chemicals and generation of waste. However, this is a temporary increase in abstraction that occurs at high volumes under normal operating conditions.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The drought option would extend the duration of hydrological effects associated with each step-wise reduction of pass-forward flows over Teddington Weir. Therefore, periods of reduced velocity in the lowest reaches of the River Thames (Datchet abstraction to Teddington Weir) would be extended, as would reduced freshwater flows into the Upper Tideway over Teddington Weir.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	In the adversely impacted reach of the fluvial River Thames, there would be extensions to the duration of water quality effects associated with each step-wise reduction in TTF. At the lowest TTFs (300MI/d) there could be increased risk of short-term deterioration to related freshwater WFD waterbodies (GB106039023231 and GB106039023232) in terms of the macroinvertebrate community. The drought option would result increased duration of reduced freshwater flows into the Upper Tideway over Teddington weir, resulting in extended periods of estuarine water quality implications.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	

esidual beneficial fect significance kely to remain after asonable mitigation)
NI
None
None
NONE
Moderate beneficial
None
NONE
Moderate beneficial
None
None
None
None

Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	f The measure will not reduce the amount of water available for other licence holders to abstract in the freshwater River Thames, and the measure is not expected to limit the feasibility of other abstractors in the Tideway.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	Extended periods of minor impacts on geomorphology are anticipated, these relate to in-channel structures, such as weirs/locks and their influence on sediment dynamics. It is anticipated that there would be low amounts of sediment in transport during a drought.	Low (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	Temporary emissions would be associated with the additional abstraction and treatment of water. The option is in close proximity to or within a number of AQMAs, including Spelthorne AQMA and Richmond AQMA. However, considering the drought option only extends the period of increased abstraction, overall effects are considered negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Temporary energy use and greenhouse gas emissions would be associated with the abstraction and treatment of water.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	e Supply-side measures are a key component of Thames Water's Drought Plan. The Drought Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The length of the impacted reach of the River Thames includes a wealth of archaeology and cultural heritage assets. However, water levels will not be significantly affected adjacent to these assets due to the requirement to maintain levels for navigation. Assuming water levels are maintained, the potential impact of this drought option on the setting of the heritage assets associated with the Thames, including sub-surface water dependent heritage assets, is considered negligible.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No designated landscape areas are within the area of influence, and no effects on non-designated areas of natural beauty or access to values areas of landscape character are anticipated. There is no land take associated with the scheme.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
L				1		1			1	1

Drought Plan option	ELRI deman	ED compr nd in Lond	ises a nur Ion, as we	nber of gr Il as contr	oundwate ibute to ti	er abstract he manag	East Lor tion locati ement of g	ndon Resc ons along groundwa	ource Deve the route ter level ri	elopment of the Ch ses. Dema	(ELRED): annel Tur and saving	nel Rail L g/deploya	ink which ble output	can be us 18MI/d av	sed to me verage and	et water su d 20.57MI/	upply d peak.
Summary commentary of scheme adverse effects	Negligibl are also There is	le adverse o likely wi also the p	e effects ic th respect potential fo	lentified a t to emiss or minor, t	re associa ions to air temporary	ated with r (air pollu v adverse	energy us Itants and effects on	e and mat greenhou other abs term	erials requise gas en se gas en stractors, l and temp	uired for t nissions) a however, a orary.	he re-absa as a resul these effe	traction of t of the ao cts are un	f stored w Iditional p certain. A	ater and it umping al II adverse	ts treatme nd treatme effects a	nt. Advers ent require re short to	se effects sments.) mediun
SEA Objectives Adverse Effects Assessment Summary	None	None	None	None	None		None		None		None	None			None	None	None
Summary commentary of scheme beneficial effects	Moderate beneficial effects are identified with respect to sustainable provision of a moderate quantity of water (at a rate of up to 21MI/d) during periods of dra and minor improvements in the resilience of water supplies to drought.										ⁱ drough						
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	None	None		None	None

SEA	topics and objectives				Assessment of opti	ion				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The scheme abstracts from the confined chalk aquifer under north London and so has no impact on surface water levels. No operational impacts on SSSIs, other designated or undesignated habitats or species have been identified.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Abstraction from the confined aquifer has no impact on surface waters and therefore will not introduce or affect the spread of INNS.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The drought option will help to ensure Levels of Service are maintained through enabling provision of 18MI/d of water. There are no construction requirements.	Low (beneficial)	High	Medium	Moderate	Medium-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	There are no construction requirements and no effects anticipated on surface water flows. No impacts of the drought option on other users of the water environment are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	Moderate	Medium-term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An increase in energy use and chemicals for water treatment is envisaged due to increased water abstraction. An increase in production of waste associated with additional abstraction and treatment of water would also occur.	Low (adverse)	Low	Medium	High	Medium-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	Groundwater levels will be drawn down during the operation of this scheme. As the scheme abstracts from the confined chalk aquifer no impact on surface water levels are anticipated.	Low (adverse)	Low	Small	Moderate	Medium-term	Temporary	Negligible adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	There is a low risk of the scheme resulting in saline intrusion into the chalk aquifer, however, considering the distance to saline sources, no effects are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	As groundwater levels will be drawn down during the operation of this option. It is noted that the option would be operating within licence and therefore any potential impacts on other licences have been assessed, with none impacts on other licences identified	Low (adverse)	Medium	Small	Low	Medium-term	Temporary	Minor adverse	None

Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	As no impacts on surface waters are anticipated, no impacts on geomorphology are anticipated. No construction is required for implementation of this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	There would be increases in air emissions associated with abstraction of water. The option is within close proximity of a number of AQMAs, including Newham AQMA, Waltham Forest AQMA and Hackney AQMA.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	There would be small, short-term increases in greenhouse gas emissions associated with abstraction of water. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions. The sensitivity to this effect is rated as low due to the short term and temporary effect.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Supply-side measures are a key component of Thames Water's Drought Plan. The Drought Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Long-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are no construction requirements. Abstraction from the borehole is within existing licence limits and from the confined chalk aquifer with no effects on surface water levels anticipated. Therefore effects on the historic environment, heritage assets or their setting are not expected.	n/a+E19	n/a	n/a	n/a	n/a	n/a	None	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	There are no construction requirements. Abstraction from the borehole is within existing licence limits and from the confined chalk aquifer with no effects on surface water levels anticipated. Therefore no potential for effects on landscape and visual amenity are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Drought Plan option	Stratfo Strat baseloa	ord Box is ford Inter ad abstrac	a ground national S tion of ap	lwater sou Station. De proximate	urce in Eas mand sav ely 3MI/d t	st London rings/depl o control ;	which is oyable ou groundwa	St run at low tput Up to ter levels 3N	ratford Bo level of b 5MI/d ave at Stratfor M/d to 8MI	ox: aseload o erage, 5Ml rd Box. Th /d.	utput in o ⁄d peak. T e option a	rder to ke he schem available c	ep ground e is licens luring a d	dwater lev sed for 8M rought is s	els suppr I/d but it i to increas	essed to p s operated e the outp	orotect d at a out from
Summary commentary of scheme adverse effects:	Minor a	dverse, te	mporary e	effects ide	ntified are	e associat	ed with en and prox	nissions te kimity to s	o air (air p ensitive re	ollutants) eceptors (as a resu AQMAs).	lt of the a	dditional	pumping a	and treatn	nent requi	rements
SEA Objectives Adverse Effects Assessment Summary [completes automatically]	None	None	None	None	None		None		None		None	None			None	None	None
Summary commentary of scheme beneficial effects	Moderate beneficial effects are identified with respect to sustainable provision of water (at a rate of up to 5MI/d) during periods of drought, and minor improvements in the resilience of water supplies to drought.																
SEA Objectives Beneficial Effects Assessment Summary [completes automatically]	None	None		None		None	None	None	None	None	None	None	None	None		None	None

SE	A topics and objectives				Assessment of opt	ion				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographica &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	No operational impacts of the option on European designated sites were identified by the Review of Consents. The scheme abstracts from the confined chalk aquifer under north London and so has no impact on surface water levels. No operational impacts on SSSIs, other designated or undesignated habitats or species have been identified.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Abstraction is from the confined aquifer has no impact on surface waters and therefore will not introduce or affect the spread of INNS.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The drought option will help to ensure Levels of Service are maintained through enabling provision of 5MI/d of water. There are no construction requirements.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	There are no construction requirements and no effects anticipated on surface water flows. No impacts of the drought option on other users of the water environment are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An increase in energy use and chemicals for water treatment are envisaged due to increased water abstraction. An increase in production of waste associated with additional abstraction and treatment of water.	Low (adverse)	Low	Medium	High	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	Groundwater levels will be drawn down during the operation of this scheme. As the scheme abstracts from the confined chalk aquifer, no impact on surface water levels are anticipated. It is noted that the option would be operating within licence and therefore any potential impacts on other licences associated with groundwater levels have been assessed, with no impacts on other licences identified.	Low (adverse)	Low	Small	Moderate	Medium term	Temporary	Negligible adverse	None

Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	No adverse effects on surface water or groundwater quality are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	As groundwater levels will be drawn down during the operation of this option groundwater abstractions in the vicinity of the abstraction could be temporarily impacted. Further information on location and depth of abstractions would be required for a better estimate of impact. However, it is noted that the option would be operating within licence.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	As no impacts on surface waters are anticipated, no impacts on geomorphology are anticipated. No construction is required for implementation of this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	There would be increases in air emissions associated with abstraction of water. The option is within close proximity of Newham AQMA.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	There would be small, short-term increases in greenhouse gas emissions associated with abstraction of water. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions. The sensitivity to this effect is rated as low due to the short term and temporary effect.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Supply-side measures are a key component of Thames Water's Drought Plan. The Drought Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Medium-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are no construction requirements. Abstraction from is within existing licence limits and from the confined chalk aquifer with no effects on surface water levels anticipated. Therefore no potential for effects on the historic environment, heritage assets or their setting.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	There are no construction requirements. Abstraction is within existing licence limits and from the confined chalk aquifer with no effects on surface water levels anticipated. Therefore no potential for effects on landscape and visual amenity are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Drought Plan option	Old Foi	rd is a gro	oundwater	source in peak. T	i East Lon his source	don whic e is opera	h abstract ted in con	s from the junction w	Old Ford: confined vith Stratfe	chalk aqu ord Box. 1	iifer. Dem he impler	and saving nentation	gs/deploy time is 7-	able outp 14 days.	ut: 4.5MI/d	d average,	4.5MI/d
Summary commentary of scheme adverse effects	Minor ac prox	dverse, te imity to s	mporary e ensitive re	effects ide eceptors (ntified are AQMAs).	e associat There is a	ed with en Iso the po	nissions to tential for	o air (air p minor, tei uncertain	ollutants) mporary a	as a resu dverse ef	lt of addit fects on o	ional pum ther abstr	ping and actors, he	treatment owever, th	t requirem nese effect	ents and Is are
SEA Objectives Adverse Effects Assessment Summary	None	None	None	None	None		None		None		None	None			None	None	None
Summary commentary of scheme beneficial effects	Moderate beneficial effects are identified with respect to maintaining public health and sustaining the economy, as are minor benefits due to improved res										silience						
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	None	None		None	None

SEA	A topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	No operational impacts of the option on European designated sites n were identified. The scheme abstracts from the confined chalk aquifer under north London and so has no impact on surface water levels. No operational impacts on SSSIs, other designated or undesignated habitats or species have been identified	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Abstraction is from the confined aquifer has no impact on surface waters and therefore will not introduce or affect the spread of	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The drought option will help to ensure Levels of Service are maintained through enabling provision of 4.5Ml/d of water. There are no construction requirements.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	There are no construction requirements and no effects anticipated on surface water flows. No impacts of the drought option on other users of the water environment are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An increase in energy use and chemicals for water treatment are envisaged due to increased water abstraction and the potential for the requirement to treat water of poor water quality. An increase in production of waste associated with additional abstraction and treatment of water. This has been assessed as negligible considering that the majority of water treatment waste is sent to beneficial use.	Low (adverse)	Low	Medium	High	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	Groundwater levels will be drawn down during the operation of this scheme. As the scheme abstracts from the confined chalk aquifer, no impact on surface water levels are anticipated. It is noted that the option would be operating within licence and therefore any potential impacts on other licences associated with groundwater levels have been assessed, with no impacts on other licences identified.	Low (adverse)	Low	Small	Moderate	Medium-term	Temporary	Negligible adverse	None

Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	Monitoring of the groundwater quality is required around the site to assess whether the site is at risk from contamination arising from the contaminated land around the site. This is principally for source protection rather than environmental impact.	n/a						None	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	As groundwater levels will be drawn down during the operation of this option groundwater abstractions in the vicinity of the abstraction could be temporarily impacted. Further information on location and depth of abstractions would be required for a better estimate of impact. However, it is noted that the option would be operating within licence.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	As no impacts on surface waters are anticipated, no impacts on geomorphology are anticipated. No construction is required for implementation of this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	There would be increases in air emissions associated with abstraction of water. The option is within close proximity of a number of AQMAs (e.g. Tower Hamlets AQMA, Hackney AQMA and Newham AQMA).	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	There would be small, short-term increases in greenhouse gas emissions associated with abstraction of water. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions. The sensitivity to this effect is rated as low due to the short term and temporary effect.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Supply-side measures are a key component of Thames Water's Drought Plan. The Drought Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Medium-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are no construction requirements. Abstraction is within existing licence limits and from the confined chalk aquifer with no effects on surface water levels anticipated. Therefore no for effects on the historic environment, heritage assets or their setting are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	There are no construction requirements. Abstraction is within existing licence limits and from the confined chalk aquifer with no effects on surface water levels anticipated. Therefore no potential for effects on landscape and visual amenity are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Drought Plan option	The The WE and the Level 2 o is ope An imp and s	WBGWS is o BGWS is o control cu ortant do ortant pre prinkler b	s a strateg upstrea wned and ment Ager rve on the wn to 66 M requisite an). Under	gic droug am tributa operated ncy. TWU Lower TI II/d over t to use of the new	ht scheme ary of the I by the En L may requ hames Cou the longes schem schem the schem protocol, l	e under wi River Ken wironmen uest the E ntrol Diag t drought e also pro ne is the t in a sever exc	West Berl nich grour net) in ora t Agency nvironme ram. The o TWUL hav vides ber imely intro e drought, ceeding th	Ashire Gro adwater is ler to incre in accorda nt Agency option pro ve on reco pefit to the oduction o , a TUB wo the Level 2	undwater discharge ease the fl ance with t o switch vides up t ord (240 da Fobney a Fobney a of Level 2 ould be in demand n	Scheme (ed into tri low to the the West o n and o to 123MI/o ays). The bstraction measures place in a nanageme	WBGWS) butaries o West Lor Berkshire perate the benefit to implemen n during a of Thame severe d nt measu	: f the Rive don reser Groundw scheme b London. tation time severe du severe du ses Water's rought we res.	r Thames voir abstr ater Sche once rese Yield wou e for full o rought. Levels of ll before t	(including action loc me Agree rvoir stora Ild reduce peration i Service (his trigge	the River ations. ment (201: age has dr over the over the s betweer enhanced r was read	r Lambour 5) between awn down period the a 2-21 days media can ched, effec	n an n TWUL 1 to the scheme s. The mpaign ctively
Summary commentary of scheme adverse effects	Minor ad might (associa the HRA and the sluice to	lverse sho cause a re ated with t Screenin River Lar maintain	rt-term ef duction in he potent g Report, nbourn SA flows to t	fects asso groundw ial to imp that the c AC as wat the SAC. I	ociated wir /ater level: act on oth Irought op er levels c Minor advo	th extensi s at some er abstrac tion is un could be n erse effec	ve pumpin sites, and tors. Neg likely to h haintained ts due to a Al	ng is likely I discharg Iigible adv ave a sign more effe air emissio I adverse (v to lead to e of groun verse impa hificant eff ectively du ons assoc effects are	o suppres adwater m acts are al fect on the ring drou iated with e tempora	sed grour ay cause nticipated designat ght condi additiona ry.	ndwater le impacts to on biodiv ed feature tions with al abstract	vels in the o river wa ersity, flo es of the k the reduc tion and p	e months : ter quality ra and fau (ennet and ction of ar roximity t	following a r. Moderati na, as it w d Lambour d existing f o nature c	the drougi e adverse vas consid rn Floodpi licence an onservatio	ht, which affects lered in lain SAC Id a new on sites.
SEA Objectives Adverse Effects Assessment Summary		None	None	None	None		None				None	None			None		
Summary commentary of scheme beneficial effects	Moderate beneficial effects on population and human health are anticipated due to maintenance of water supplies for customers and economic activity. Maintaining flow in watercourses during a prolonged drought may have a minor beneficial effect, and may also avoid declines in water quality in affected resources.											ity. cted					
SEA Objectives Beneficial Effects Assessment Summary	None	None				None	None			None	None	None	None	None			

SE	A topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficia effect significance (likely to remain a reasonable mitiga
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The WBGWS comprises seven separate wellfields located in the Kennet and Pang Valleys. Without mitigation there is the potential to affect the Kennet and Lambourn Floodplain SAC and River Lambourn SAC. For the Kennet and Lambourn Floodplain SAC this was due to the lowering of groundwater levels under the Thatcham Reedbeds, with the potential for adverse impact on the surface water regime on which the habitat assemblage in the reedbeds is dependent. The Appropriate Assessment identified two measures to avoid or mitigate this impact. The first was the reduction of the Speen licence, which has been implemented by Thames Water. The second was augmenting the groundwater supply to Thatcham Reedbeds. Thames Water have now implemented the latter being in the form of sluice to allow a small offtake from the Kennet into the Kennet and Lambourn Floodplain SAC. The HRA Screening Report concluded that once them modified operational licence is in place it is considered unlikely that the drought option would have a significant effect on the River Lambourn SAC or Kennet and Lambourn Floodplain SAC designated features of the sites as water levels could be maintained more effectively during drought conditions.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The option comprises abstractions from a series of well fields and water is discharged to watercourses in Berkshire during times of drought, therefore will not introduce INNS and is unlikely to result in the spread of INNS.	s n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Option will help to maintain essential public water supplies (provision of up to an additional 126Ml/d of water, reducing to 67 Ml/d) during drought conditions and therefore help maintain public health. Regarding nuisance, there is no construction proposed for this option therefore no adverse effects are expected to public health.	Medium	High	Small	High	Short-term	Temporary	None	Major beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	This option supplements flows in a number of watercourses in Berkshire during times of drought, therefore there is potential for beneficial effects with respect to recreation (e.g. angling) and enjoyment of local public rights of way.	Low (beneficial)	Medium	Medium	Low	Short-term	Temporary	None	Minor beneficial
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity.	Medium (beneficial)	High	Medium	Medium	Short-term	Long	None	Major beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (123 MI/d, reducing to 66 MI/d) will likely result in proportional increases in energy use and waste generation.	Medium (adverse)	Low	Medium	Medium	Short-term	Temporary	Minor adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The scheme abstracts from a series of well fields and water is discharged s to watercourses in Berkshire and so has a beneficial environmental impact on these watercourses during a prolonged drought. However, the impact of extensive pumping is likely to lead to suppressed groundwater levels in the months following the drought which might cause adverse environmental impact through reduction in groundwater levels at some sites.	Low (adverse) Low (beneficial)	High	Medium	Low	Short-term	Temporary	Minor adverse	Minor beneficial
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affectin water body status.	The option is likely to have beneficial effect as a result of the option g supplementing flows with local groundwater over the short term which will reduce the potential water quality impacts that can be exacerbated during low flows. Discharging groundwater into river water bodies could impact upon the water quality of the rivers, however the impact is considered to be minor as the groundwater is unlikely to be of lesser quality. This would be subject to further study and therefore is assessed with low certainty.	Low (adverse) Low (beneficial)	Medium	Medium	Low	Short-term	Temporary	Minor adverse	Minor beneficial
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	The impact of extensive pumping is likely to lead to suppressed groundwater levels in the months following the drought which might cause adverse environmental impact through reduction in groundwater levels at some sites. This may mean other groundwater abstractors may find that their ability to abstract is affected if groundwater levels fall to very low levels.	Medium (adverse)	Medium	Medium	Low	Short-term	Temporary	Moderate adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	e 5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	Impacts on geomorphology are unlikely if the option is operated carefully.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	The option will increase air emissions associated with abstraction and treatment of water. However, no AQMA are in proximity to the option.	Medium (adverse)	Low	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions.	Medium (adverse)	Low	Medium	Moderate/high	Short-term	Temporary	Minor adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Supply-side measures are a key component of Thames Water's Drought Plan. The Drought Plan aims to ensure resilience of water supplies to drought.	Medium (beneficial)	High	Small	Medium	Short-term	Temporary	None	Major beneficial



Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are a number of heritage assets in close proximity to the watercourse that would receive flow form this option during times of drought (numerous Listed Buildings and Donnington Grove Registered Park and Garden). Therefore there is the potential for small scale temporary beneficial effects regarding their character and appearance. However, the impact of extensive pumping is likely to lead to suppressed groundwater levels in the months following the drought may delay the recovery in flows. Overall the sensitivity of the assets to these effects is considered to be low.	Low (beneficial) Low (adverse)	Low	Medium	Low	Short-term	Temporary	Negligible adverse	Negligible benefici
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	During operation water is discharged to watercourses in Berkshire and so may be considered to enhance visual amenity in the North Wessex Downs AONB. However the impact of extensive pumping may lead to suppressed groundwater levels in the months following the drought and may delay the recovery in flows which could impact on visual amenity. Overall the impacts are considered to be negligible as the local distinctiveness is unlikely to be affected.	Low (beneficial) Low (adverse)	Low	Medium	Low	Short-term	Temporary	Negligible adverse	Negligible benefici


Drought Plan option	Sundrid The dr	Sundridge 1: Water is abstracted by Thames Water from boreholes drilled into the Hythe Aquifer at Sundridge The allows an annual average abstraction rate of 1.36MI/d (equivalent to 489MI/y) with a maxin The drought order involves relaxing the annual average licence rate so that for the 6 months of the drought orde over 6 months). Benefit of up to 8MI/d.											
Summary commentary of scheme adverse effects:	The hyd term ef change being lin Pits S Cordulia fragme optio moder river o The ass the pote Upper D	rological i fects pred es in water nited with SSSI due t aenea. Th entation of n on fish. ate when c or lake leve sessments ntial chan arent cond	mpacts in icted due r quality a the droug o reductio e signific habitats, Overall in considerin el will hav of impac ges in the cluded tha	the EAR a to reducti nd therefor th order in on in lake ance of in with reduce pacts on the resi e a visual ts on the e physical t there is p	are moder ons of flo ore the ove n place, a levels, pou npacts on ced river t biodivers dual effec impact or environme environme no direct o	rate in Rea ws, veloci erall risk i moderate tential imp NERC fis NERC fis flows inhi ity are ass ts after m the lands ent associ ent associ ent of the evidence t	ach 1 and ities and l s moderat adverse : bacts on k h species biting mig sessed as itigation. scape sett ated with associate to sugges	minor in I evels in th te adverse short-tern reeding b were iden ration. Mo Major adv Minor adv ting of the ting of the the Sundu to reaches t that the low flo	Reach 2, h he River D b. The feas n impact. I irds, and j ntified as I boderate ao verse due verse due verse shou a area and ridge drou s of the Ri abstractio ow stress o	oowever, t arent. Rea sibility of t Moderate potential moderate lverse imp to the hig rt term eff the Daren of the permi ver Daren on at the c occurs.	he high se ach 1 of th the surfac adverse s reduction for brown bacts on V h sensitiv fects may th sensitiv to talley F it are base t. It should urrent rate	ensitivity of e River Da e water ab hort term of in suitabi trout and VFD status ity of ecol occur on l ath Nation ed on cons d be noted es are redu	
SEA Objectives Adverse Effects Assessment Summary			None				None				None		
Summary commentary of scheme beneficial effects		Benefi	cial effect	s associat	ted with th	ne maintei	nance of e	essential p	oublic wate	er supplie	s and imp	proved res	
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	

urrent lic m daily p	ence (Lic beak of 8M	ence num 11/d.	ber 9/40/1	/123/GR)							
8MI/d co	uld be abs	stracted ea	ach day (1	,470MI							
the waterbody results in major adverse short- ent is considered to be medium sensitivity to traction at Sevenoaks Wildfowl Reserve may fects are anticipated on the Sevenoaks Gravel ty or distribution of habitats which support eals with a minor impact for sea trout based on are likely based on the impact of the drought gical receptors, however, this is reduced to ndscape values, as a significant reduction in al Trail, which may be noticeable by walkers. rvative assessments (worst case scenario) of that the AMP6 Low Flows Investigations of the cing flows in the river during the periods when											
		None									
ience of water supplies to drought.											
None	None		None	None							

S	A topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/high)	Scale of effect: geographica &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/te mporary)	Residual adverse effect significance likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The EAR identifies moderate adverse effects on a national designated site. The impact of a reduction in lake levels on the Sevenoaks Gravel Pits SSSI is likely to be of low magnitude for breeding birds as the extent of the hydrological impact will be small and the impacts will not extend outside of the drought implementation period. Impacts on the ecological integrity of the site is not likely to occur as the ponds will not dry up completely. There is potential for a reduction in suitability or distribution of habitats which support Cordulia aenea, for which the site is designated, causing a decline in ecological status of the site. Moderate adverse effects are expected to aquatic habitats and species including NERC habitats/species and ecologically significant species. The significance of impacts on NERC fish species were identified as a moderate for brown trout, euopean eel, bullhead and sea trout based on the fragmentation of habitats, with reduced river flows inhibiting migration. The significance of impacts on water vole were identified as moderate. The EAR identifies moderate impact on WFD status based on the impact of the drought option on fish and macroinvertebrates, and minor for macrophytes.	Medium (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The EARs assessed the impact of the drought option on the distribution of invasive non-native flora and fauna species including Signal crayfish, Spiny-cheeked crayfish, Chinese mitten crab, Zebra mussel, Australian swamp stonecrop, Floating pennywort and Parrot's feather. The sensitivity of the river reaches to INNS overall is considered to be moderate as there are a number of invasive species known to be present in the catchment. Mitigation includes direct removal and appropriate disposal of invasive species if identified during monitoring.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 8 MI/d of water) during drought conditions, and therefore help maintain public health.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	 A significant reduction in river or lake level will have a visual impact on the landscape setting of the area and the Darent Valley Path National Trail, which may be noticeable by walkers. It is unlikely that bird information sites and hides would be removed or lead to a reduction in bird watchers to the area. The river or lakes will not dry out as a result of the drought order, therefore, there will be a minor impact on recreation. The Darent contains a wide diversity of coarse fish including roach, chub, perch, pike, eels, gudgeon, carp and tench. The close proximity to central London makes the catchment very popular with anglers. Any impacts of the drought order on fish population or distribution may impact anglers and therefore impacts on angling are considered to be minor adverse. 	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	 Impacts of the drought order on navigation are unknown, but would be of major significance if there was a reduction in lake level that considerably disrupted sailing activity, particularly on Chipstead Lake. This impact is assessed as moderate adverse based on navigation having medium sensitivity. Implementation of the drought option may restrict the feasibility of the surface water abstraction at Sevenoaks Wildfowl Reserve. This has been assessed as a moderate adverse based on the abstractor having medium sensitivity. The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. This is considered a moderate beneficial effect as people and businesses have a high sensitivity to access to water during times of drought. 	Medium (adverse) Low (beneficial)	Medium (adverse) High (beneficial)	Small	Low	Short-term	Temporary	Moderate adverse	Moderate beneficial



Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None

Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies a moderate impact on one reach of the River Darent which will remain drier for longer based on reduced groundwater levels, and a minor to negligible effects on the other reach of the river. The impact would be limited to the duration of the drought order only (which can theoretically be implemented at any time year). The impact would manifest as reductions in water flows, velocities and levels.	Medium (adverse)	High	Medium	Moderate	Short-term	Temporary	Major adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	The risk of the drought order to dissolved oxygen saturation levels has been assessed as medium in Reach 1 of the River Darent, negligble in hydrological Reach 2 and minor in hydrological Reach 3. The risk of the drought order to total ammonia concentration levels was identified as negligible. The upper reach of the River Darent is considered to be medium sensitivity to changes in water quality and therefore the overall risk is moderate adverse.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing' by the EA. The feasibility of surface water abstraction at the Sevenoaks Wildfowl Reserve may be limited with the drought order in place. This has been assessed as a moderate impact overall.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	The EAR suggests minor temporary impacts to geomorphology in Reach 1 and negligible in Reach 2 . This is due to reductions in flow and potential loss of wetted perimeter. No land take is required for the option and therefore there is no impacts on land use, soil or geology are anticipated as a result of the operation of this option.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option will increase emissions associated with abstraction and treatment of water (up to 12 Ml/d). The drought option is located less than a 100m from the A25 AQMA and less than 1km from the M25 AQMA, therefore the sensitivity to changes in air quality is medium and the overall significance is assessed as minor adverse with low certainty.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	Moderate	Long-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are heritage assets in proximity to the option and zone of influence, including the Scheduled Ancient Monuments A major Roman Villa, an Anglo-Saxon settlement and prehistoric remains 600m SSE of Darent Court Farm - A Preceptory of the Knights Hospitallers, known as St. John's Jerusalem, and an associated fish pond at Sutton-at-Hone and the registered park and garden Combe Bank. However they are unlikely to be impacted over the duration of the drought permits' implementation and therefore the impact is considered negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None



Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No construction activities are required for this option. The option is located within the Kent Downs AONB and a significant reduction in river or lake level will have a visual impact on the landscape setting of the area and the Darent Valley Path National Trail, which may be noticeable by walkers. However, the river or lakes will not dry out as a result of the drought order, therefore there will be a minor impact on landscape.	Low (adverse)	High	Small	Moderate	Short-term	Temporary	Minor adverse	None
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None

Drought Plan option	Sundridg The dr coul	ge 2: Wate rought ord d be abstr	er is abstr ler involve acted eac	acted by 1 an a es relaxing h day. The	Thames W annual ave g the annu e Sundride	/ater from erage rate ual averag ge 2 drou	boreholes of 1.36Ml le licence ght order l Drou	s drilled ir /d (equiva rate and i is anticipa ight Order	nto the Hyd lent to 489 ncreasing nted to be c. Benefit o	the Aquife 9MI/y) with the peak in place fo of up to 12	er at Sund h a maxim licence ra or up to si 2MI/d.	ridge. TW num daily j nte so that fx consecu
Summary commentary of scheme adverse effects:	The hydr term eff change being lin Pits S Cordulia fragme option o may occ The ass the pote Upper D	rological i fects pred s in water nited with SSSI due t aenea. Th entation of n fish. Ove cur on lance sessments ntial chan arent conce	mpacts ir icted due r quality a the droug o reductio e signific thabitats, erall impac dscape va scof impac ges in the cluded tha	the EAR a to reducti nd therefor th order in on in lake ance of in with redu cts on bio lues, as a ts on the e physical at there is a	are moder fons of flo ore the ove n place, a levels, poor npacts on ced river i odiversity a significan environme environme no direct o	rate in Rea ws, veloci erall risk i moderate tential imp NERC fis flows inhi are asses flows inhi are asses flows inhi ent associ ent associ ent of the evidence	ach 1 and ities and li s moderation adverse s bacts on b bacts on b bacts on b bacts on b bacts on b bacts biting mig sed as Ma bact biting mig sed as Ma bacts biting mig sed as Ma bacts biting bacts bacts biting bacts ba	minor in I evels in the adverse short-tern preeding b were iden ration. Mo jor advers or lake le Trail, whi the Sundr the Sundr d reaches t that the low flo	Reach 2, h he River Da . The feas impact. M irds, and p ntified as r oderate ad se due to t vel will ha ich may be ridge droug s of the Riv abstraction w stress o	owever, t arent. Rea ibility of t Moderate potential moderate iverse imp the high s ve a visua e noticeat ght permi ver Daren on at the c occurs.	he high se ach 1 of th he surfac adverse s reduction for brown bacts on V ensitivity al impact o ble by wall t are base t. It should urrent rate	ensitivity of e River Da e water ab hort term of in suitabi trout and VFD status of ecologi on the land kers. ed on cons d be noted es are redu
SEA Objectives Adverse Effects Assessment Summary			None				None				None	
Summary commentary of scheme beneficial effects	Benef	icial effec	ts associa	nted with t	he mainte	nance of (essential	oublic wat	er supplie	es during	times of d	rought, ar
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None

L are lice eak of 8N	ensed to a II/d.	bstract, fr	om the gr	ound, at						
or the 6 r ive mont	nonths of hs consec	the droug quent to th	nht order, ne Sundric	12MI/d Ige 1						
the waterbody results in major adverse short- ent is considered to be medium sensitivity to traction at Sevenoaks Wildfowl Reserve may ffects are anticipated on the Sevenoaks Gravel ty or distribution of habitats which support eels with a minor impact for sea trout based on are likely based on the impact of the drought al receptors. Minor adverse short term effects scape setting of the area and the Darent Valley ervative assessments (worst case scenario) of that the AMP6 Low Flows Investigations of the cing flows in the river during the periods when										
		None								
l improve	ed resilien	nce to the	drought e	ffects.						
None	None		None	None						

	SEA topics and objectives	Assessment of option												
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/high)	Scale of effect: geographica &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/te mporary)	Residual adverse effect significance (likely to remain after reasonable mitigation	Residual be effect signif (likely to re) reasonable				
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The EAR identifies moderate adverse effects on a national designated site. The impact of a reduction in lake levels on the Sevenoaks Gravel Pits SSSI is likely to be of medium magnitude for breeding birds as the extent of the hydrological impact will be small and the impacts will not extend outside of the drought implementation period. Impacts on the ecological integrity of the site are not likely as the ponds will not dry up completely, and it is considered likely that mitigation can be easily implemented to control the level of the small lake. There is potential for a reduction in suitability or distribution of habitats which support Cordulia aenea, for which the site is designated, causing a decline in ecological status of the site. Moderate adverse effects to aquatic habitats and species including NERC habitats/species and ecologically significant species. The significance of impacts on NERC fish species were identified as moderate for brown trout, sea trout, European eel and bullhead, based on the fragmentation of habitats, with reduced river flows inhibiting migration. The significance of impacts were identified as negligible for white-clawed crayfish and moderate for water vole. The EAR identifies minor to moderate impact on WFD status based on the impact of the drought option on fish, macroinvertebrates and macrophytes.	Medium (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	N				
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The EARs assessed the impact of the drought option on the distribution of invasive non-native flora and fauna species including signal crayfish, zebra mussel, Chinese mitten crab, Australian swamp stonecrop and parrot's feather. The sensitivity of the river reaches to INNS overall is considered to be moderate as there are a number of invasive species known to be present in the catchment. The assessment results of the drought option noted the possible spread of INNS with the impact ranging from negligible to moderate. Mitigation includes direct removal and appropriate disposal of invasive species if identified during monitoring.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	N				
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 12 MI/d of water) during drought conditions and therefore help maintain public health.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate				
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	A significant reduction in river or lake level will have a visual impact on the landscape setting of the area and the Darent Valley Path National Trail, which may be noticeable by walkers. It is unlikely that the bird information sites or hides would be removed or lead to a reduction in bird watchers to the area. The river or lakes will not dry out as a result of the drought order, therefore impacts on recreation should be no more than minor. The Darent contains a wide diversity of coarse fish including roach, chub, perch, pike, eels, gudgeon, carp and tench. The close proximity to central London makes the catchment very popular with anglers. Any impacts of the drought order on fish population or distribution may impact anglers and therefore impacts on angling are considered to be minor adverse.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	N				
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Impacts of the drought order on navigation are unknown, but would be of major significance if there was a reduction in lake level that considerably disrupted sailing activity, particularly on Chipstead Lake and is assessed as moderate adverse based on navigation having medium sensitivity. Implementation of the drought may restrict the feasibility of the surface water abstraction at Sevenoaks Wildfowl Reserve may be limited with the drought order in place. This has been assessed as a moderate adverse effect, based on the abstractor having medium sensitivity. The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. This is considered a moderate beneficial effect as people and businesses have a high sensitivity to access to water during times of drought.	Medium (adverse) Low (beneficial)	Medium (adverse) High (beneficial)	Small	Low	Short-term	Temporary	Moderate adverse	Moderate				

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Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (up to 12 MI/d) over and above what occurs under normal operation will usually result in related and proportional increases in energy use and waste.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies a major impact on one river reach and minor impacts on two other reaches. The impact would be limited to the duration of the drought order only (which can theoretically be implemented at any time year). The impact would manifest as reduction of flows, velocities and levels.	High (adverse)	High	Small	Moderate	Short-term	Temporary	Major adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	Medium risk of increasng local dissolved oxygen stressors within hydrological reach 1 and medium risk to SRP concentrations in hydrological reach 3. Negligible risk to DO and ammonia in hydrological reach 3. The reaches are considered to have medium sensitivity to changes in water quality and the overall effect is moderate adverse.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing' by the EA. The feasibility of the surface water abstraction at Sevenoaks Wildfowl Reserve may be limited with the drought permit in place. This has been assessed as a moderate impact. A further three potable water and a quarry groundwater abstractions may be limited by the drought permit with a minor impact assessed. The overall effect is moderare adverse.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	The EAR suggests minor temporary impacts to geomorphology in one reach and negligible in other reaches, overall assessed as minor adverse. This is due to the reductions in flow and potentially large changes in wetted width and depth. No land take is required for the option and therefore no impacts on land use, soil or geology are anticipated as a result of this option.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option will increase emissions associated with abstraction and treatment of water (up to 12 Ml/d). The drought option is located less than a 100m from the A25 AQMA and less than 1km from the M25 AQMA, therefore the sensitivity to changes in air quality is medium and the overall significance is assessed as minor adverse with low certainty.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	Moderate	Long-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are heritage assets in proximity to the option and zone of influence including 12 Scheduled Ancient Monuments and the registered park and garden Combe Bank. However they are unlikely to be impacted during drought permit implementation, and therefore the impact is considered negligible. The EARs have assessed the impacts on unknown water dependent assets as negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None

Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No construction activities are required for this option. The option is located within the Kent Downs AONB and a significant reduction in river or lake level will have a visual impact on the landscape setting of the area and the Darent Valley Path National Trail, which may be noticeable by walkers. However, the river or lakes will not dry out as a result of the drought order, therefore there will be a minor impact on landscape.	Low (adverse)	High	Small	Moderate	Short-term	Temporary	Minor adverse	Ν
		river or lakes will not dry out as a result of the drought order, therefore there will be a minor impact on landscape.								

None

	Lower Thames: To reduce the minimum pass-forward flow over Teddington Weir to 100MI/d or 0MI/d depending on agreement with the Environment Agency.														
Drought Plan option	The Lower Thames Operating Agreement (LTOA) provides a guide to day-to-day operational decisions on Thames Waters abstraction from the lower River Thames. The agreement is based on ensuring that sufficient flow passes over Teddington weir, relative to the prevailing seasonal reservoir storage of the Thames Valley and Lee Valley reservoir groups. Four pass-forward flow (Teddington target flows, TTF) values are included in the LTOA. Under normal periods, the LTOA conditions mean that Tames Water's abstractions cannot cause the pass-forward flow to drop below the TTF agreed for that day. Normally there is a minimum residual flow of 800Ml/d. However, as the volume of available reservoir storage reduces, this triggers reductions in the TTF in a stepwise fashion. Each step requires the implementation of greater demand control measures by TWUL, for example, hosepipe bans. This stepwise reduction progresses from 800Ml/d to 6000Ml/d, followed by further reductions to 400Ml/d and then 300Ml/d. In advance of a drought permit application, which would be to reduce the TTF to 100Ml/d or 0Ml/d, TWUL would agree with the Environment Agency to adopt the lower TTF of 200Ml/d as set out in the M2 licence. The assessment is based on the worst case – Scenario 2: Reduction in pass forward flows from 200Ml/d to 0Ml/d.														
Summary commentary of scheme adverse effects	If implemented, the drought permit would have major adverse effects on flows in the lowest reaches of the fluvial Thames, mainly in terms of velocity reduction. Freshwater flows to the upper Thames Tideway will reduce, potentially completely. Adverse effects are predicted on water quality in the fluvial Thames (reduced dissolved oxygen saturation and reduced phosphate dilution) which may exacerbate water quality issues in the upper Tideway with the potential for major adverse effects. Minor to major adverse effects are expected on a range of aquatic ecological receptors, such as macroinvertebrates, macrophytes, fish and algae. The major adverse effects are predominantly associated with adverse effects to fish, including migration. Adverse effects also identified with respect to Langham Pond SSSI, Dumsey Meadow SSSI and Syon Park SSSI. Major adverse effects may occur on navigation. The combination of maintenance of water levels, restrictions on lock use, and small restrictions regarding navigability in the Thames Tideway would result in major adverse effects on boats that are navigating between the Tideway and the fluvial River Thames.														
SEA Objectives Adverse Effects Assessment Summary							None			None	None		None		
Summary commentary of scheme beneficial effects	If implemented, the drought permit would have a major beneficial effects for populations and human health in terms of ensuring supply of water and other customers/businesses. Major beneficial effects are also expected in regard to improved resilience of water supplies to drought.														
SEA Objectives Beneficial Effects Assessment Summary	None None None None None None None None														



	SEA topics and objectives			Assessment of option							
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/high)	Scale of effect: geographical &/or population affected) (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/te mporary)	Residual adverse effect significance (those likely to ren after reasonable mitigation)		
Biodiversity, flora and fau	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The key hydrological impacts of the Lower Thames drought permit relate to moderate to major effects on velocity upstream of Teddington Weir, and major water quality effects in the tideway (forms part of the Thames Estuary Marine Conservation Zone). The result is a wide range of effects on a large number of ecological receptors, which includes moderate to minor impacts on a number of nationally designated sites (Langham Pond SSSI, Dumsey Meadow SSSI and Syon Park SSSI). Adverse effects relating to the freshwater species of the lowest reaches of the fluvial River Thames and the transitional species of the Tideway range from moderate to major. The types of effects are greatest regarding fish communities. Major, temporary adverse effects include those that relate to localised water quality deterioration, increased predation, habitat fragmentation and impacts on migration affecting species which include migratory salmonids, European eel, lamprey and brown trout. A range of impacts on WFD potential of the River Thames at various locations inlcuding major impacts on the macroinvertebrate (WFD waterbody GB106039023232) component and moderate impacts on fish, diatom and macrophyte components. Major adverse effects on NERC receptor depressed river mussel and other fish species. The effects associated with the small construction requirements (generators, submersible pumps and pipes) are considered to be limited. The residual impact on environmental features is dependent on the mitigation measures and their timely and effective application once the trigger has been identified. At this stage it is not possible to provide an accurate indication as to the residual impacts on environmental features due to implementation of mitigation measures, therefore a precautionary approach to assessment has been taken.	High (adverse)	High	Large	Moderate	Short-term	Temporary	Major adverse		
Biodiversity, flora and fau	na 1.2 To avoid introducing or spreading INNS.	The changes to flow velocity and water quality as result of the drought permit are considered likely to have minor to moderate adverse effects associated with the spreading a wide range of INNS including for example Zebra mussel, Chinese mitten crab, asian clam and spionid worm (<i>Marenzelleriawiréni.</i>)	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse		
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Implementation of the drought permit will help to maintain essential public water supplies (provision of up to an additional 200MI/d of water) during drought conditions and therefore help maintain public health. Some construction is required for option implementation, therefore there may be negligible effects on human health (e.g., noise and dust nuisance).	Low (adverse) High (beneficial)	Low (adverse) High (beneficial)	Small (adverse) Medium (beneficial)	Moderate	Short-term	Temporary	Negligible adverse		
Population and human health	2.2 To protect and enhance the water environment for othe users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	r The River Thames is highly valued for its navigational and recreational uses. The EAR identifies impacts of the drought option on navigation and recreation. In the fluvial River Thames, restrictions on lock use would be imposed both as a result of natural drought conditions (to maintain critical water levels) and the requirements to keep Moseley Weir and Teddington Weir closed (at least for most of the time) in order for the drought permit to operate effectively. The reduction in pass forward flows over Teddington Weir would result in impacts due to insufficient working navigable depth at some locations in the Thames Tideway (Richmond, Brentford and Kew), these are considered small in the context of existing restrictions. However, when considering the further restrictions on navigation imposed at Teddington and other locks upstream as a result of drought conditions, there will be impacts on boats that are navigating between the Tideway and the lower freshwater River Thames. There is also the potential for additional risks to navigation as a result of increased sedimentation in the navigation channel in the upper Tideway as fewer and fewer vessels use the navigation channel, with implications on manoeuvrability for larger boats. Overall, impacts on navigation are considered major adverse. Anglers may be affected by any reduction in the presence of fish species as a result of the adverse impacts to fish communities identified. The requirement for back-pumping may present some disruption to the public rights of way in proximity to Molesey weir and Teddington weir.	Major (adverse)	High	Large	Moderate	Short-term	Temporary	Major adverse		
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Implementation of the drought permit will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. However, significant adverse impacts to navigation are expected, which may present temporary adverse effects to the business of a number of the marina, passenger boat and hire boat operators.	Medium (adverse) c High (beneficial)	Medium (adverse) High (beneficial)	Medium	Moderate	Short-term	Temporary	Moderate adverse		

main	Residual beneficial effect significance (those likely to remain after reasonable mitigation)
	None
9	None
	Major beneficial
	None
2	Major beneficial

Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An increase in abstraction (200MI/d) is likely to result in a proportional increase in the use of energy, chemicals and generation of waste. However, this is a temporary increase in abstraction that occurs at high volumes under normal operating conditions. Construction activities will likely generate some waste as well.	High (adverse)	Low	Small	Moderate	Short-term	Temporary	Moderate adverse
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The drought permit would have a major hydrological impact. The lowest reaches of the River Thames (Datchet abstraction to Teddington Weir) would experience a reduction in river flow during natural low flow periods. As the river is impounded with river levels (and wetted area) maintained for navigation, the flow reduction would only lead to a reduction in velocity as a result of the drought permit, the reduction in velocity is considered major from Penton Hook lock to Teddington Weir. The drought permit would result in a major reduction in freshwater flow that enters the Upper Tideway over Teddington Weir. This would have limited impact on river levels, however, due to the reduction in freshwater flow associated with the drought permit, there would be estuarine water quality implications (decreasing with distance downstream to London Bridge).	High (adverse)	Medium	Small	Moderate	Short-term	Temporary	Major adverse
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	In the adversely impacted reach of the fluvial River Thames there would be a minor to moderate water quality risk for dissolved oxygen concentration (increasing downstream) during drought permit implementation. Implementation of the drought permit would have moderate (GB106039023231) and major risk (GB106039023232) of short-term deterioration to related freshwater WFD waterbodies in terms of the macroinvertebrate community. The drought permit would result in a major reduction in freshwater flow that enters the Upper Tideway over Teddington weir, resulting in estuarine water quality implications (but decreasing with distance downstream to London Bridge). The risk to dissolved oxygen is considered major in the impacted reach of the Thames Tideway. The impact of consented discharges to the River Thames and its tributaries is considered to present moderate and major pressures in the lowest reaches of the fluvial Thames (ammonia and dissolved oxygen) and upper Tideway (dissolved oxygen) respectively.	Major (adverse)	Medium	Small	Moderate	Short-term	Temporary	Major adverse
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. However, the drought permit for both scenarios will not reduce the amount of water available for other licence holders to abstract in the freshwater River Thames and it is not anticipated that the drought permit will limit the feasibility of other abstractors in the Tideway.	n/a	n/a	n/a	n/a	n/a	n/a	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	Y The EAR identifies minor impacts on geomorphology that relate to in-channel structures, such as weirs/locks and their influence on sediment dynamics by creating ponded areas upstream of the structure. It is anticipated that there would be low amounts of sediment in transport during a drought.	Low (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Minor adverse
Air and Climate	6.1 To maintain and improve air quality.	In addition to the temporary emissions associated with the abstraction and treatment of water (up to 200MI/d), the option will result in temporary emissions as a result of the back-pumping component of the option. The option is in close proximity (or within) a number of AQMAs, including Spelthorne AQMA and Richmond AQMA.	Medium (adverse)	Medium	Small	Low	Short-term	Temporary	Moderate adverse
Air and climate	6.2 To reduce greenhouse gas emissions.	In addition to the temporary energy use associated with the abstraction and treatment of water (up to 200MI/d). The option will involve additional temporary energy use and therefore greenhouse gas emissions to enable the back-pumping component of the option.	Medium (adverse)	Low	Medium	Moderate	Short-term	Temporary	Minor adverse
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	High (beneficial)	High	Small	High	Short-term	Temporary	None
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The length of the impacted reach of the River Thames includes a wealth of archaeology and cultural heritage assets. However, water levels will not be significantly affected adjacent to these assets due to the requirement to maintain levels for navigation. Assuming water levels are maintained, the potential impact of this drought permit on the setting of the heritage assets associated with the Thames, including sub-surface water dependent heritage assets, is considered negligible.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse

e	None
	None
	None
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	None
e	None
	None
	N 4 - i - u h Ci - i - L
	Najor benéficial
е	None
	l I

Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No designated landscape areas in proximity. Temporary minor adverse effects as a result of the visual intrusion of the construction and decommissioning activities, primarily to local residents or walkers using public rights of way. No significant effects on non-designated areas of natural beauty or access to values areas of landscape character. There is no land take associated with the scheme.	Moderate (adverse)	Low	Small	Moderate	Short-term	Temporary	Minor adverse

None

Drought Plan option	Water is abstracted from the Kent Chalk at Crayford. TWUL are licensed to abstract, from the ground, at an annu 4,964MI/year). Implementation of the drought permit would provide a 2.8MI/d increase in abstraction beyond anticipated to be applied for up to 6 consecutive months between May and Dece There is no construction phase associated with the Crayford drought permit, only a change to operating pumpin already installed) that boost treated water off site. A temporary generator may TWUL is also licensed to abstract from the North Kent Chalk aquifer for public water supply at Wansunt approxin								an annua beyond e nd Decem pumping ator may k approxim			
Summary commentary of scheme adverse effects:	Hydrological impacts on two reaches of the River Cray are considered to be negligible, as no reduction in reaches of the lower Cray are expected as a result of increased abstraction. Other effects associated with t excluding a minor, short-term effect associated air emissions due to increased energy use, given								on in the su with the dru liven the al			
SEA Objectives Adverse Effects Assessment Summary [completes automatically]			None	None			None				None	None
Summary commentary of scheme beneficial effects	Moderate beneficial impacts are expected with regard to ensuring supply of water to local population and other beneficial impacts associated with improved resilience of water supplies t								nd other cu Ipplies to d			
SEA Objectives Beneficial Effects Assessment Summary [completes automatically]	None	None		None		None	None	None	None	None	None	None

average rate of 13.6MI/d (working out at than isting licence limit. The drought permit is per inclusive. regime, specifically the force pumps (that are e required. tely 1km away from the Crayford abstraction.										
rface (fresh) water contribution to the tidal bught plan option are also largely negligible, ea of influence is within an AQMA.										
		None	None	None						
stomers/businesses. There is also likely to be lrought.										
None	None		None	None						

SEA	A topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographica &/or population affected (small/medium/large)	I Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	There are no designated sites within the area of influence of the drought permit, either in relation to impacts on groundwater levels and flows, or river flows. The closest site is Footscray Meadow Local Nature Reserve, but this is outside the area of influence, upstream from the Shuttle confluence. There are a number of NERC sites for which the hydrological impact is negligible for all. There is one SSSI (Wansunt Pit) outside the area of influence but within 1km. However there are negligible effects on the reaches and no construction, therefore impacts are not anticipated further afield.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	There is uncertainty surrounding the likely effect of flow and level impacts on the ability of invasive species to distribute further within the watercourse. Hydrological effects are negligible, thus impacts on INNS are also assumed to be negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to 2.8Ml/d of water) during drought conditions and therefore help maintain public health. No construction is proposed, and therefore no effects on human health (e.g., noise and dust nuisance) are expected.	Low (beneficial)	High	Small	Moderate	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Hydrological impacts associated with implementation of the drought option are assumed to be negligible, thus no impacts on other users of the water environment (e.g., anglers) are expected. No construction is proposed, so no impacts on terrestrial recreational resources area anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. The only identified groundwater abstraction in the area of influence is a TWUL abstraction (Wansunt), and impacts on this abstraction are expected to be negligible.	Low (adverse) Low (beneficial)	Low (adverse) High (beneficial)	Medium	Medium	Short-term	Temporary	Negligible adverse	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An increase in abstraction is likely to result in a proportional increase in the use of energy and generation of waste. However, existing infrastructure would be used, minimising such increases.	Low (adverse)	Low	Medium	Medium	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR reports the effect on Reach 1, River Cray from Bexley Pumping Station to weir in Hall Place Gardens as uncertain (assumed negligible), and the effect on flows in Reach 2, River Cray from weir in Hall Place Gardens to tidal limit is also negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	Water quality within the catchment consistently achieves High WFD status for temperature, pH, Ammonia (NH3) and DO. The exception to this is phosphate which consistently achieves Good WFD status. Hydrological and water quality effects associated with drought permit implementation are expected to be negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None



4.3 To ensure appropriate and sustainable	Local resource availability is described as 'Water not available for	Low (adverse)	Low	Small	Low	Short	Temporary	Negligible adverse	None
management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	licensing'. Howvver, given that there is no adverse surface water hydrological impact associated with the drought permit, there would be no impact on surface water abstractions. The only identified groundwater abstraction in the area of influence is a TWUL abstraction (Wansunt), and effects on this abstraction are expected to be negligible.								
4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	No soils or geological SSSIs are reported as being impacted in the EAR. There is one geological SSSI beyond the zone of influence but within 1km. There is no construction proposed and negligible effects hydrological effects are anticipated. Impacts on geology, geomorphology and soils are not expected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
6.1 To maintain and improve air quality.	There is no construction, although increased abstraction would cause a small increase in energy use and associated air emissions. The option is located within an AQMA and therefore has high sensitivity to emissions.	Low (adverse)	High	Small	Low	Short-term	Temporary	Minor adverse	None
6.2 To reduce greenhouse gas emissions.	There is no construction although increased abstraction would cause a small increase in energy use and associated greenhouse gas emissions.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Long-term	Temporary	None	Minor beneficial
7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The Hall Place Scheduled Ancient Monument and Gardens are within the drought plan area of influence. However, no construction is proposed and hydrological effects will be negligible, therefore these sites will not be affected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The London Loop Public Right of Way runs in close proximity to the River Cray. The river forms part of the landscape setting of the trail. However, anticipated hydrological impacts are negligible therefore landscape values would not be affected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
	A.4 To promote measures to enable and sustain long term improvement in water efficiency. 5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management. 6.1 To maintain and improve air quality. 6.2 To reduce greenhouse gas emissions. 6.3 To consider the need for adaptive measures for climate change. 7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites. 8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	Interlangeneric of users in decision in the case of the outer is no decision and construction is the end of the outer is no decision. Interlangeneric of users in decision in the case of influence is a TWL abstraction (Wansuch, and effects on this abstraction are expected to be negligible. 4.4 To promote measures to enable and sustain long term improvement in water efficiency. No opportunities to promote long-term improvement in water efficiency have been identified for this option. 5.1 To protect and enhance geology, the quality and quarity of soils and geodiversity and promote a catchment-wide approach to land management. No soils or geological SSS is are reported as being impacted in the EAR. There is no construction proposed and negligible effects there is no construction proposed and negligible effects are anticease. In our expected. 6.1 To maintain and improve air quality. There is no construction, although increased abstraction would cause a small increase in energy use and associated air emissions. 6.2 To reduce greenhouse gas emissions. There is no construction although increased abstraction would cause a small increase in energy use and associated greenhouse gas emissions. 6.3 To consider the need for adaptive measures for climate change. Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought. 7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites. The Hall Place Scheduled Ancient Monument and Gardens are within the drought plan area of influence. However, no constructi	Interplies white protecting ecosystem functions supplies white protecting ecosystem functions that rely on water resources. white protecting ecosystem functions that rely on water resources. a.4.1 To promote measures to enable and sustain long term improvement in water efficiency. No opportunities to promote long-term improvement in water efficiency have been identified for this option. 5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a cathemet-wide approach to land management. No soils or geological SSSI serven the zone of influence but within them There is on construction proposed and neglible effects hydrological effects are anticipated. Impacts on geology, geomorphology and soils are not expected. n/a 6.1 To maintain and improve air quality. There is no construction, although increased abstraction would cause a small increase in energy use and associated air emissions. The option is located within an AQMA and therefore has high sensitivity to emissions. Low (adverse) 6.2 To reduce greenhouse gas emissions. There is no construction although increased abstraction would cause a small increase in energy use and associated greenhouse gas emissions. 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I/a 7.1 To conserve and enhance the histortic environment, heritage assets and thei	Initial call of update the function of mathem mutation in the construction and the construction and the construction and the construction in the area of influence is a volual above the construction in the area of influence is a volual above the construction in the area of influence is a volual above the construction in the area of influence is a volual above the construction in the area of influence is a volual above the construction in the area of influence is a volual above the construction in the area of influence is a volual above the construction in the area of influence is a volual above the construction is the area of influence is a volual above the construction is the area of influence is a volual above the construction is the area of influence is a volual above the construction is the area of influence is a volual above the construction is the area of influence is a volual above the construction is the area of influence is a volual above the construction is the area of influence is a volual above the construction is proposed and negligible effects and enables of influence is a volual above the indication would cause a small increase in energy use and associated are ensions. 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Indicipated impact associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit, three woold be invariant or surface associated with the drough permit associated with the merit associated associated with the drough permit associated with the merit or surface associated with the area of influences but within management. n/a n/a n/a 6.1 To maintain and improve air quality. 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Drought Plan option	Horton Kirby: This drought permit is for abstraction from the Lower Greensand aquifer at Horton Kirby using a Recovery (ASR) scheme which is not yet licensed. The option would be to bring forward the Aquifer Storage and H the Greensand aquifer. Benefit of up to 2.6 Ml/d. There is a construction phase associated with this drought permit, which includes connecting a pipeline from the k Works (WTW) and adjustments made to the WTW for water quality purposes. Note the drought permit does not ap chalk aquifer.									- LF bp			
Summary commentary of scheme adverse effects:	Negligible adverse hydrological effects are predicte d as the aquifer is confined with no continuity with the chalk o water to be abstracted being injected into the aquifer. The construction phase is restricted to the area within the that any impacts associated with construction. Minor adverse short-term air quality effects are possible, as the o abstraction and treatment of water and the drought option is located less than 1km fro									r 9 0 M			
SEA Objectives Adverse Effects Assessment Summary		None	None	None	None		None		None	None	None		
Summary commentary of scheme beneficial effects	Beneficial effects comprise maintenance of essential public water supplies during tin												
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	

oorehole drilled for an Aquifer Storage and Recovery (ASR) scheme which abstracts from									
oreholes to the Horton Kirby Water Treatment ply to the Horton Kirby abstraction from the									
river and the option is non-consumptive with disting site, and as such, it is not anticipated tion will increase emissions associated with in the M20 AQMA.									
		None							
nes of dr	ought.								
None	None		None	None					

	SEA topics and objectives									
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/te mporary)	Residual adverse effect significance likely to remain after reasonable mitigation)	Residual bene effect significa (likely to rema reasonable mi
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	All construction will take place on site. This disturbance is anticipated to be short term, temporary and reversible and is therefore expected to be of negligible impact. As no hydrological impact of the drought permit is predicted there is no impact on designated sites, NERC species, or WFD status.	e Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The EARs conclude that there will be impact no impact on the distribution of invasive non-native flora and fauna species, as there are no hydrological impacts.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 5 MI/d of water) during drought conditions and therefore help maintain public health.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate be
Population and human health	2.2 To protect and enhance the water environment for othe users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	r Angling and the Darent Valley Path National Trail are unlikely to be impacted over the duration of drought permit implementation therefore there will be no impact on recreation.	, n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Due to the negligible hydrological impact, there will be no impact on navigation. The underlying aquifer is confined in this location and so the drought permit would not impact on abstractions from the chalk aquifer (at Horton Kirby). The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. This is considered a moderate beneficial effect as people and businesses have a high sensitivity to access to water during times of drought.	Low (beneficial)	High (beneficial)	Small	Low	Short-term	Temporary	None	Moderate be
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	The construction phase will involve additional use of materials and energy. It is assumed that materials and equipment required during construction will be sourced locally to minimise transport. Increases in abstraction (up to 5 Ml/d) over and above what occurs under normal operation will typically result in proportional increases in energy use and waste.	d Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained	No opportunities to promote the sustainable management of natural resources have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The hydrological impact of the drought permit has been assessed as negligible, as the option is non-comsumptive with the water used for abstraction being injected into the Lower Greensand Aquifer. The-Greensand aquifer is also confined and not in continuity with the river or chalk.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	y Given that there is no adverse hydrological impact associated with the drought permit, water quality would not be affected.	n n/a	n/a	n/a	n/a	n/a	n/a	None	None



Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing' by the EA. However, the underlying aquifer is confined in this location and so the drought permit would not impact on abstractions from the chalk aquifer (at Horton Kirby). No other public water supply abstractions will be derogated by the drought permit.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



GRL george and and were VT To group at an analysis of the future state of t											
0.1 or difficult 6.2 To reduce greation and improve of stability: Name in the static contraction methods, method of the control is control in the control in the control is control in the control in the control in the control is control in the control is control in the control is control in the control in the control is	Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment- wide approach to land management.	Given that there is no adverse hydrological impact associated with the drought permit, geomorphology would not be affected. All construction will take place on site. This disturbance is anticipated to be short term, temporary and reversible and is therefore expected to be of negligible impact on land use, soil or geology are anticipated as a result of the operation of this option.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
out and climate b.2 To reduce greenhouse gas emissions. Contruction will move the delayery of materials will be sourced locally to the set. Low Small Low Short-term Temporary Negligble adverse No Air and climate b.2 To creduce greenhouse gas emissions. Contruction will move the delayery of materials will be sourced locally to the set. Low Small Low Short-term Temporary Negligble adverse No Air and climate b.3 To consider the need for adaptive measures for climate to move in the short term. Drought permitty/orders are a key component of Thames Water's to drought. Low (beneficial) High Small Mederate Low Small Mederate I ong term Temporary Noe Menor be and a such, it is not anticipated that any site of an adaptive measures for climate and a such, it is not anticipated that any site of an adaptive measures for climate and a such, it is not anticipated that any site of an adaptive measure mediate and the setting state and a such, it is not anticipated that any site of an adaptive measure mediate and the setting state and a such, it is not anticipated that any site of an adaptive measure mediate and the setting state and a such, it is not anticipated that any site of an adaptive measure mediate the tenesitient state of an adaptive measure mediate the tenesitient state of an adaptive measure mediate the tenesitient state of an adaptive measure mediate that the existe of an adaptive measure mediate that the existe of an ada such, it is not anticipate advisite of an	Air and Climate	6.1 To maintain and improve air quality.	Assuming best practice construction methods, impacts of the construction phase on air quality are anticipated to be negligible. The option will increase the emissions associated with the abstraction and treatment of water (up to 5 MI/d). The drought option is located less than 1km from the M20 AQMA, therefore the sensitivity to changes in air quality is medium and the overall significance is assessed as minor adverse with low certainty.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate 6.3 To consider the need for adaptive messures for climate Drought permits/orders are a key component of Thanes Water's Dought Plan. The Plan aims to ensure resilience of water supplies Low (beneficial) High Small Moderate Long term Temporary None Minor be Archaeology and Cultural hertage assets and their settings and to protect archaeologically important sites. The construction phase is restricted to the area within the existing stee, and as such, it is not anticipated that any sites of archaeological or cultural hertage exists in proximity to the importance will be affected. There are hertage assets in proximity to the order on and site and agarden Frank shall. However they are unlikely to be impacted over the duration of the drought permits' minipated and venices on site. The Dark tall and the registreed part and agarden frank shall. However they are unlikely to be impacted over the duration of drought permits' minipated and venices on site. The Dark tall and the registreed part and agarden frank shall. However they are unlikely to be impacted over the duration of drought permits' minipated and venices on site. The Dark tall and the registreed part and agarden frank shall. However they are unlikely to be impacted over the duration of drought permits' minipated and venices on site. The Dark tall and the registreed part and 	Air and climate	6.2 To reduce greenhouse gas emissions.	Construction will involve the delivery of materials and equipment to the site. It is assumed that materials will be sourced locally to minimise transport requirements, and therefore CO2 emissions. Increased water abstraction would cause an increase in energy use in the short term.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Archaeology and Cultural 7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeological visual marked bits is and as such, it is on a stricpated that any sites of archaeological visual archaeological visual Amenity The construction phase is restricted to the area within the existing site, and as such, it is on a stricpated that any sites of archaeological visual Amenity and their settings and undesignated landscapes, townscapes and their settings and undesignated landscapes, townscapes and their settings of drought permit implementation. The construction phase is restricted to the area within the existing site, and as such, it is not anticipated that any sites of archeeological visual Amenity and their settings and to protect. The construction phase is restricted to the area within the existing site, and as such, it is not anticipated that any sites of archeeological visual Amenity are heritage assess in proximity to the option, including Scheduled Andeent Monument, Medieval moated site and associated fish pond, Franks Hall and the registered park and garden Franks Hall. However they are unlikely to be impacted over the duration of the drought permits' implementation and therefore the impact is considered negligible. Low (adverse) Low Small Low Short-term Temporary Negligible adverse Nor area environment, area envintege assesterin proxining is a construction, area environment, a	Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	Moderate	Long-term	Temporary	None	Minor ben
Landscape and Visual Amenity8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.There may be a negligible adverse impact to landscape and visual amenity during construction, due to plant and vehicles on site. The Darent Valley Path National Trail is unlikely to be impacted over the duration of drought permit implementation.Low (adverse)LowSmallModerateShort-termTemporaryNegligible adverseNor	Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The construction phase is restricted to the area within the existing site, and as such, it is not anticipated that any sites of archaeological or cultural heritage importance will be affected. There are heritage assets in proximity to the option, including Scheduled Ancient Monument, Medieval moated site and associated fish pond, Franks Hall and the registered park and garden Franks Hall. However they are unlikely to be impacted over the duration of the drought permits' implementation and therefore the impact is considered negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
	Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	 There may be a negligible adverse impact to landscape and visual amenity during construction, due to plant and vehicles on site. The Darent Valley Path National Trail is unlikely to be impacted over the duration of drought permit implementation. 	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None



Drought Plan option	Enysfo the no 2482M The dro Amend	ord: Thame rmal oper /ll/year. Th a bught orde dments to	es Water c ating licer e baseline bstracting r involves rate (e this asse	an abstra ace at Eyn e referenc i during w an increa quating to ssment to	ct up to 7. sford. Eyr e conditio retter mon ase in peal o 2,505.8M o reflect th updated	34MI/d on hsford is a ns of this ths. Howe k rate of a k rate of a l/y). Ben e correct l between	a particu ggregated assessme ever, this i bstraction pefit of up baseline r the draft	lar day an d with Hor ent are ba s incorrec to 11.6 M to 11.6 M eference o and final s	d up to an ton Kirby sed on Th t and Tha /d and rel /d (althou conditions submissio	average which all ames Wate mes Wate axation of gh expect for the E n of the 1	of 2.09MI/ ows a tota fer abstrac r are not o f annual lid ted to be a fynsford au hames Wa	d for the li I daily abs cting 5 Ml/ currently u cence limi around 6.6 bstraction ater Droug	icencing y stractions Id from Ey using the l it to allow MI/d durin licence a pht Plan.	ear (witho for both s nsford du Eynsford a 6 months ng drier mo nd propos	out a droug ites up to ring drier abstraction of abstrac onths). red drougi	ght permi 11.36MI/c months a n. ction at pe ction at permit,	t) under lay and nd not eak daily will be
Summary commentary of scheme adverse effects:	Major ad resul fragr droug stonecro restr	lverse sho It in major mentation ht option op, parrot icting the landsc	rt-term ef , short-ter of habitat on fish, m s feather a size of bo ape setting	fects are j m advers s and red acrophyte and floatin ats able t g of the a	predicted of e effects to uced river es and ma ng pennyw o use river rea and tho	on one rea o water qu flows inh croinverte vort) are p r. Modera e Darent \	ach of the uality. Maj ibiting mi ebrates. M ossible. N te effects /alley Patl	River Dar or short-to gration. M oderate ad lajor adve on anglers h National	ent as par erm effect loderate a dverse eff rse short- s are pred Trail redu	rt of it cou s are pos dverse im ects asso term effec icted as w iction in r	ild dry up sible on N pacts on ciated wit cts are ant rell as min iver level	as a resul ERC fish s WFD statu h the spre cipated o or advers will have,	t of droug species br s are anti ad of the n navigat e short-te which ma	ht option rown trout cipated ba invasive s ion due to rm visual y be notice	implemen and euro sed on th pecies (Au reduced l impact ma eable by v	tation. Ti pean eel c e impact e ustralian s ake or riv ay occur c valkers.	nis would lue to of the swamp 'er levels on the
SEA Objectives Adverse Effects Assessment Summary [completes automatically]			None				None				None				None		
Summary commentary of scheme beneficial effects	lf im;	olementeo	, the drou customers	ght permi ;/busines:	t would ha ses. Minor	ave model beneficia	rate benef I effects a	icial effec re also ex	ts for pop pected in	ulations a regard to	nd humar improved	health in resilience	terms of e	ensuring s supplies t	supply of t	water and t.	other
SEA Objectives Beneficial Effects Assessment Summary [completes automatically]	None	None		None		None	None	None	None	None	None	None	None	None		None	None

	SEA topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/te mporary)	Residual adverse effect significance likely to remain after reasonable mitigation)	Residua effect s (likely f reason
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The EAR identifies no effects on national designated sites. Despite its proximity Farningham Wood SSSI and LNR to the River Darent, this site is elevated approximately 40m above the river which suggests that due to the local topography, it will not be in connectivity with either the river or the underlying aquifer. Major adverse effects are expected to aquatic habitats and species, including NERC habitats/species and ecologically significant species. Impacts on NERC fish species include major impacts on brown trout and European eel. These are based on fragmentation of habitats, and reduced river flows inhibiting migration. Moderate impacts on water vole and bullhead. Moderate impacts on WFD status are expected based on the impacts on fish, macrophytes and macroinvertebrates. Major impacts are anticipated for fish and macrophyte ecological communities. Overall the impact on biodiversity is assessed as major, however there is potential to reduce the magnitude of impact through mitigation. There is considerable uncertainty surrounding the effect mitigation will have therefore a precautionary approach has been adopted.	High (adverse)	High	Medium	Moderate	Short-term	Temporary	Major adverse	
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The sensitivity of the river reaches to invasive non-native flora and fauna species overall is considered to be moderate, as there are a number of invasive species known to be present in the catchment. Moderate changes to the distribution and abundance of Australian swamp stonecrop, parrots feather and floating pennywort are anticipated.	Medium (adverse)	Medium	Small	Moderate	Long-term	Permanent	Moderate adverse	
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 11.6 MI/d of water) during drought conditions, and therefore help maintain public health.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Mod
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	 A significant reduction in river or lake level may result in major impacts to navigation through restricting the size of boats able to use the river. Angling may have moderate impacts due to reduction in habitat availability and/or quality, fragmentation of habitats and increased significance of obstacles, density dependent mortality, and alteration to feeding and migration. A significant reduction in river level will have a visual impact on the landscape setting of the area and the Darent Valley Path National Trail, which may be noticeable by walkers. It is unlikely that bird information sites or hides would be removed, or there would be a reduction in bird watchers to the area. 	High (adverse)	High	Small	Moderate	Short-term	Temporary	Major adverse	
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	A significant lowering of lake or river levels may result in impacts to navigation through restricting the size of boats able to use the river, which would result in moderate adverse effects, based on navigation having medium sensitivity. There is low risk to one Southern Water Services abstraction and a negligible risk to other smaller abstractors. This has been assessed as a moderate impact based on the abstractor having medium sensitivity. The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. This is considered a moderate beneficial effect as people and businesses have a high sensitivity to access to water during times of drought.	Medium (adverse) Low (beneficial)	Medium (adverse) High (beneficial)	Small	Low	Short-term	Temporary	Moderate adverse	Mod
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (up to 11.6 MI/d) over and above what occurs under normal operation will likely result in proportional increases in energy use and waste generation.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	

al beneficial significance to remain after able mitigation)
None
None
derate beneficial
None
derate beneficial
None

Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies a major impact on one reach of the River Darent, where the drought option could potentially cause drying within the reach. The impact would be limited to the duration of the drought order only (which can theoretically be implemented at any time of the year).	High (adverse)	High	Medium	Moderate	Short-term	Temporary	Major adverse	
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	 There are no significant water quality pressures within the zone of influence. However there is high risk that flows in the River Darent could be reduced to zero as a result of implementation of the drought option, and the hydrological assessment concluded major impact on hydrology. Consequently the risk to water quality from the drought order is considered High for dissolved oxygen, SRP and ammonia concentrations. The reaches are are considered to have medium sensitivity to changes in water quality and therefore the overall assessment is major adverse. 	High (adverse)	Medium	Small	Moderate	Short-term	Temporary	Major adverse	
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing' by the EA. There is low risk to one Southern Water Services abstraction and a negligible risk to other smaller abstractors. This has been assessed as a minor impact.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	
Soil, geology and land use	e 5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	The EAR suggests low risk to geomorphology in one reach and is assessed as minor adverse as it is temporary. The risk is due to the reductions in flow and potentially large changes in wetted width and depth. No land take is required for the option and therefore no impacts on land use, soil or geology are anticipated as a result of the operation of this option.	Low (adverse)	High	Small	Moderate	Short-term	Temporary	Minor adverse	
Air and Climate	6.1 To maintain and improve air quality.	The option will increase emissions associated with the abstraction and treatment of water (up to 11.6 Ml/d). The drought option is located less than 5km from the M25 AQMA, therefore the sensitivity to changes in air quality is medium and the overall significance is assessed as moderate adverse with low certainty.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	Moderate	Long-term	Temporary	None	M
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are heritage assets in proximity to the option and zone of influence, including 10 Scheduled Ancient Monument. However they are unlikely to be impacted during drought permit implementation and therefore the impact is considered negligible. The EARs have assessed the impacts on unknown water dependent assets as negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No construction activities are required for this option. The option is located within the Kent Downs AONB, and a significant reduction in river or lake level will have a visual impact on the landscape setting of the area and the Darent Valley Path National Trail, which may be noticeable by walkers. The river is unlikely to dry out as a result of the drought order, therefore, there will be a minor impact on landscape.	Low (adverse)	High	Small	Moderate	Short-term	Temporary	Minor adverse	

None
None
inor beneficial
None
None

Drought Plan option	TWUL a would co The 6Ml can Wansu TWUL i	are licenso omprise a /d increas not be sus int drougo s also lice	ed to abst 6.0MI/d in e in avera stained fro ht permit, nsed to a	ract, from crease in ge licence om the we however, bstract fro	the Chall abstractio limit repu and bore TWUL ha om the No	c aquifer L on beyond resents th ehole at W ve indicat rth Kent C	elow War l existing e maximu /ansunt fo ed that if g Chalk aqui	nsunt pum licence lin Dece m that cai r 6 month groundwa fer for pul	Wansunt. ping stati nit, and is mber incl n be abstr s. Curren ter quality blic water	on, at an a anticipate usive. acted acc tly it is as deteriora supply at	annual ave ed to be a ording to sumed th tes during Crayford,	erage rate oplied for what the i at there is g impleme approxin	of 13.6Ml up to six network ca no const entation ad nately 1km	/d (4,977M consecuti an receive ruction ph dditional to a away fro	ll/year). Th ve month: . It is pos nase asso nase asso neatment i m the Wai	ie drough 5 between 5 sible that ciated wit may be re nsunt abs	It permit May and t this rate th the equired. straction.
Summary commentary of scheme adverse effects:	Hydrold surface (plan op	ogical imp (fresh) wa otion are a	acts on R ter contril Iso largel	each 1 of bution to a y negligib	the River the tidal re le, exclud	Cray are t eaches of ing a min	uncertain the lower or, short-t	and assur Cray is ex erm effect wit	ned to be rpected as t associat hin an AQ	negligible a result o ed air emi MA.	, and effe of increase ssions du	cts on Rea ed abstrac e to increa	ach 2 are o ction. Oth ased ener	also neglig er effects gy use, gi	gible as n associate ven the ar	o reductic d with the ea of influ	on in the e drought uence is
SEA Objectives Adverse Effects Assessment Summary [completes automatically]			None	None			None				None	None			None	None	None
Summary commentary of scheme beneficial effects	Modera	te benefic	ial impac	ts are exp	ected with beneficial	n regard te impacts f	o ensuring for associ	g supply o ated with	f water to improved	local pop resilience	ulation an	d other ci supplies t	ustomers/ to drought	businesse t.	es. There i	s also like	ely to be
SEA Objectives Beneficial Effects Assessment Summary [completes automatically]	None	None		None		None	None	None	None	None	None	None	None	None		None	None

SEA	topics and objectives				Assessment of option	n				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The EAR states there is one designtated site within the ZoI of the drought permit (Wansunt Pit SSSI), however this was not taken forward for assessment as the hydrological impacts have been assessed as negligible. There are a number of NERC sites within the area of influence and these are identified and assessed as negligible in the EAR. There are areas of ancient woodland within 1km. However, negligible hydrological effects are expected on the River Cray and there will be no construction, therefore impacts to biodiversity and designated sites are anticipated to be negligible overall.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	There is uncertainty surrounding the likely effect of flow and level impacts on the ability of invasive species to distribute further within the watercourse. Hydrological effects are negligible, thus impacts on INNS are also assumed to be negligible.	Low (adverse)	Low	n/a	n/a	n/a	n/a	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to 6MI/d of water) during drought conditions and therefore help maintain public health. No construction is proposed, and therefore no effects on human health (e.g., noise and dust nuisance) are expected.	Low (beneficial)	High	Small	Moderate	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Hydrological impacts associated with implementation of the drought option are assumed to be negligible, thus no impacts on other users of the water environment (e.g., anglers) are expected. No construction is proposed, so no impacts on terrestrial recreational resources area anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. The only identified groundwater abstraction in the area of influence is a TWUL abstraction (Crayford), and impacts on this abstraction are expected to be negligible.	Low (adverse) Low (beneficial)	Low (adverse) High (beneficial)	Medium	Medium	Short-term	Temporary	Negligible adverse	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An increase in abstraction is likely to result in a proportional increase in the use of energy and generation of waste. However, existing infrastructure would be used, minimising such increases.	Low (adverse)	Low	Medium	Medium	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR reports the effect on Reach 1, River Cray from Bexley Pumping Station to weir in Hall Place Gardens as uncertain (assumed negligible), and the effect on flows in Reach 2, River Cray from weir in Hall Place Gardens to tidal limit is also negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None

Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	Water quality within the catchment consistently achieves High WFD status for temperature, pH, Ammonia (NH3) and DO. The exception to this is phosphate which consistently achieves Good WFD status. Hydrological and water quality effects associated with drought permit implementation are expected to be negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. Howver given that there is no adverse surface water hydrological impact associated with the drought permit, there would be no impact on surface water abstractions. The only identified groundwater abstraction in the area of influence is a TWUL abstraction (Crayford), and effects on this abstraction are expected to be negligible.	Low (adverse)	Low	Small	Low	Short	Temporary	Negligible adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	 5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management. 	No specific soils or geological SSSIs are reported as being impacted in the EAR and no construction is proposed. Impacts on geology, geomorphology and soils are not expected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	There is no construction, although increased abstraction would cause a small increase in energy use and associated air emissions. The option is located within an AQMA and therefore has high sensitivity to emissions.	Low (adverse)	High	Small	Low	Short-term	temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	There is no construction although increased abstraction would cause a small increase in energy use and associated greenhouse gas emissions.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Long-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The Hall Place Scheduled Ancient Monument and Gardens are within the drought plan area of influence. However, no construction is proposed and hydrological effects will be negligible, therefore these sites will not be affected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The London Loop Public Right of Way runs in close proximity to the River Cray. The river forms part of the landscape setting of the trail. However, anticipated hydrological impacts are negligible therefore landscape values would not be affected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Drought Plan option	The in summe limit in licence	ntention c er drough case ther by up to 5	of the incro t. This will e is a drou 5%, but ab	ease in Mi I help ens ught peric stractions	2 annual li ure that th od followin s would sta	cence (Lo ne reservo ng on in th ay within a	Increase wer Tham irs can be e next yea the daily l	in M2 ann es) droug full by th ar. Implem icence lim	nual licent ht permit e end of th nentation hit. Abstra operations	ce (Lower is to enab he calenda would incr ctions wo s).	Thames): le recover ar year rat rease in th uld still be	ry of stora ther than l ne average e restricte	nge in the being rest e maximur d when flo	Thames re ricted by a m abstract ows are m	eservoirs the annual tion permi nedium to l	after a per total abs tted under ow (as pe	iod of traction r the M2 r normal
Summary commentary of scheme adverse effects:	Advers	e effects i	identified	are limite	d to neglig	yible, temp	oorary adv water p	verse effec oumping a	cts from e nd treatm	missions ent requir	of air poll ements.	utants and	d greenho	use gases	s associate	ed with ao	ditional
SEA Objectives Adverse Effects Assessment Summary [completes automatically]	None	None	None	None	None		None	None	None	None	None	None			None	None	None
Summary commentary of scheme beneficial effects	Major provi Tha restricte med	beneficia ision of a mes reser d by the a dium to lo	l effects a large quai voirs afte nnual tota w (as per l	re identifi ntity of wa r a period al abstrac normal op	ed with rea ater (at a ra of summe tion limit, perations)	spect to th ate of 91M er drought in case th and there	ne popula I/d) during . This will ere is a di fore the b	tion and h g periods help ensu rought per enefits are	uman hea of drough ure that th riod follov e achieved	lth, water t. The dro e reservo ring on in l with no a	and air ai ught optic irs can be the next y adverse ef	nd climate on achieve full by th year. Abst ffects on e	e. These r es this by e end of ti ractions w environme	elate to he enabling i he calenda vould still ental featu	elping with recovery c ar year rat be restric res or oth	the susta f storage her than b ted when er abstrac	ainable in the being flows are tors.
SEA Objectives Beneficial Effects Assessment Summary [completes automatically]	None	None		None			None	None	None		None	None	None	None		None	None

SEA	topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	There are no designated sites impacted by the operation of the n drought option, and there would be no impacts on habitats, species or WFD compliance.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	There are several INNS known to inhabit the section of the Thames River associated with the option. However, with implementation of the option is not expected to influence the distribution or abundance of INNS present, or introduce any new INNS.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The drought option will help to ensure levels of service are maintained through enabling provision of water (at a rate of 91MI/d), and therefore help maintain public health.	Medium (beneficial)	High	Medium	High	Short term	Temporary	None	Major beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	With no construction requirements and operational hydrological effects assessed as negligible, no effects on other water environment users are likely.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. This will be achieved with no adverse hydrological impacts, and therefore no impacts on other abstractors is anticipated.	Medium (beneficial)	High	Medium	High	Long term	Temporary	None	Major beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Option requires no construction and will use existing infrastructure. Option will result in an increase in annual maximum abstraction by up to 5%. Therefore there will be proportional (minor) increases in energy use and waste for water abstraction and treatment.	Low (adverse) Low (beneficial)	Low	Medium	Medium	Short term	Temporary	Negligible adverse	Negligible beneficial
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies no adverse hydrological impact associated with the drought option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	With no construction requirements and no operational hydrological effects the EAR identifies that water quality would not be affected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	The option enables recovery of storage in the Thames reservoirs after a period of summer drought. This will help ensure that the reservoirs can be full by the end of the calendar year rather than being restricted by the annual total abstraction limit, in case there is a drought period following on in the next year. Abstractions would still be restricted when flows are medium to low (as per normal operations). Local resource availability is described as 'Water not available for licensing', however no adverse effects on environmental features or other abstractors have been identified.	Medium (beneficial)	High (beneficial)	Medium	High	Short term	Temporary	None	Major beneficial
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	As no adverse hydrological impacts have been identified, and no impacts on geomorphology are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	The option involves the increase in the annual maximum abstraction permitted under the M2 licence by up to 5%. Therefore there will be a short term increase in emissions associated with the additional pumping and treatment requirements. The option is within 5km of a number of west London AQMAs.	Low (adverse)	Low	Local	Low	Short term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	The option involves the increase in the annual maximum abstraction permitted under the M2 licence by up to 5%. Therefore there will be a associated short term increase in greenhouse gas emissions associated with the additional pumping and treatment requirements.	Low (adverse)	Low	Medium	High	Short term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	The option is likely to be implemented during November and December, during which time flows would be expected to be recovering. The increased abstraction would be limited to when flows are sufficiently high enough in the River Thames. The continued abstraction would result in higher reservoir storage levels going into the following year than would occur without the use of the drought permit. Depending on flows in the subsequent year, this could result in lower abstractions due to decreased need to fill the reservoirs.	Medium (beneficial)	Medium	Medium	Medium	Short term	Temporary	None	Moderate beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	With no construction requirements and no adverse hydrological impacts identified, no adverse effects to heritage assets are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Landscape and Visual	8.1 To protect, enhance the quality of and	With no construction requirements and no adverse hydrological	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Amenity	improve access to designated and undesignated	impacts identified, no adverse effects to landscape values are								
	landscapes, townscapes and the countryside.	anticipated.								

Drought Plan option	Waddon Drought Permit: Water is abstracted from the Chalk Aquifer at Waddon boreholes. The existing abstraction licence (28/39/41/12) Waddon at a peak day rate of 15.5 Ml/d with an average rate per year and month of 7.6 Ml/d (working out at no more be for a 7Ml/d increase in abstraction beyond existing licence limit (average rate per year of 7.6Ml/d) throug The drought permit could potentially start in any month of the year although it is anticipated to be applied for durin to September inclusive). The revised abstraction arrangements would remain in place for 6 months or less if wat returned to adequate levels to safeguard future water supplies, as agreed with the Environment Agency. There i drought permit.										19/41/12) p at no more /d) through for during ess if wate y. There is	9 9 7	
Summary commentary of scheme adverse effects	Under a effect o satura recov inclu Moderat effects	a worst cas on water le tion. Mode rery of leve Iding maj e to minor s were ide	se scenar vels/flows erate adve els and flo or adverse adverse ntified on	io, Waddo s). With re- rse effects ows by up e impacts effects on the landso essent	n Ponds r duction in s are also to one mo on Europ the Wilde cape value tial part of	nay dry u htrough- identified onth. Thes ean eel (N rness Isla es associa f the lands	o (for up a flow in W with resp se hydrold IERC fish and, Spen- ated with scape seta	o 3 month addon Pol bect to the species), cer Road I Waddon F ling and cl	ns) when ta nds, there River Wa cts could moderate Netlands, Ponds, whi haracter o	hey would is a risk (ndle dowi result in r adverse and Wand ich form a f the Wan	d otherwis of increase nstream o najor adve effects to dle Valley local ame dle trail w	e not have ed water te f the pond erse, medi brown tro Wetland L enity featu hich is va) suurriu
SEA Objectives Adverse Effects Assessment Summary			None				None				None		
Summary commentary of scheme beneficial effects	Moderat	e beneficia	al effects	are expect	ted due to	provisior	n of additi resil	onal wate ience of w	r supply. 1 ater supp	There are lies to dro	also likely bught.	' to be min	c
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	



SEA	topics and objectives				Assessment of op	tion				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	There is potential for moderate to minor adverse effects on Wilderness Island LNR and Wandle Valley Wetland LNR. Major adverse effects identified on European eel (NERC species) including potential for mortality due to desiccation of habitats. Moderate adverse effects on fish communities and to brown trout/ trout, barbel and bullhead. Moderate adverse impacts identified for bird species including greater scaup, reed bunting, grasshopper warbler and northern lapwing. If appropriate mitigation is applied, the magnitude of effect may be reduced.	Medium (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Major adverse INNS impacts in the Waddon Ponds may occur as a result of changes in the distribution Chinese mitten crab. Minor adverse impacts were identified for the River Wandle regarding the distribution and abundance of invasive floral species.	Medium (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Moderate adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	Implementation of the drought permit will help to maintain essential public water supplies (provision of up to an additional 7MI/d of water) during drought conditions and therefore help maintain public health. No construction is proposed, and therefore no effects on human health (e.g., noise and dust nuisance) are expected.	Low (beneficial)	High	Medium	High	Medium-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Waddon Ponds (located within a small urban park) form a local amenity feature in the London Borough of Croydon with significant recreational value. Under a worst case scenario Waddon ponds may dry up (for up to 3 months) when they would otherwise not have without a drought permit.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The drought option will contribute to the maintenance of supply reliability in drought conditions. However, there is some uncertainty regarding the potential for impacts on the feasibility of a nearby groundwater abstraction under operation of the drought option.	Low (beneficial) Low (adverse)	High (beneficial) Medium (adverse)	Medium	Moderate (beneficial) Low (adverse)	Short-term	Temporary	Minor adverse	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Option requires no construction and will use existing infrastructure. Option will result in up to 7MI/d increase in abstraction beyond its existing licence limit with an associated increases in energy use and waste for water abstraction and treatment.	Low (beneficial)	Low	Medium	Medium	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	t n/a	n/a	n/a	n/a	n/a	n/a	None	None

Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	There is potential for major adverse hydrological effects. Under a worst case scenario, Waddon ponds may dry up (for up to 3 months) when they would otherwise not have without a drought permit. Moderate adverse effects were also identified with respect to the River Wandle downstream of the ponds. The drought permit would not affect the lowest flows but median to low flows (approximately Q50-Q90). The drought permit would extend the recovery of levels and flows by up to one month.	High (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Major adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	With reduction in through-flow in Waddon Ponds, there is risk of increased water temperature and a reduction in dissolved oxygen saturation, which would be exacerbated if the ponds dry. In the River Wandle further downstream there is no significant relationship between flow and water quality, and risks to water quality from drought permit implementation are considered minor.	High (adverse)	Low	Small	Moderate	Medium-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing'. The EAR generally identifies minor risks of short-term deterioration or prevention of the Croydon and Wandsworth water body (GB106039023460) achieving Good Ecological Potential (GEP). Generally negligible to low risks are identified in the EAR with respect to other abstraction pressures.	Medium (adverse)	Low	Small	Moderate	Medium-term	Temporary	Minor adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	There are no construction requirements. Implementation of the drought option and a prolonged environmental drought may lead to loss of vegetation, which could leave sediment exposed to erosion upon commencement of higher flows when drought conditions cease. This may be the case in the middle and lower section of the impacted part of the River Wandle, which contains some in-channel macrophytes. The EAR describes geomorphology impacts as minor in this reach (and negligible regarding the upstream reach and Waddon Ponds).	Low	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option involves an increase in abstraction of up to 7MI/d, and there will be an associated short-term increase in air emissions. The option is within Croydon AQMA.	Low (adverse)	Medium	Medium	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	The option involves an increase in abstraction of up to 7MI/d, and there will be an associated short-term increase in greenhouse gas emissions.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Minor beneficial

Archaeology and Cultural	7.1 To conserve and enhance the historic	There are two Scheduled Ancient Monuments in proximity	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Heritage	environment, heritage assets and their settings	(Roman Villa East of Beddington Park and Dovecote,				-		/		
5	and to protect archaeologically important sites.	Beddington Park), however, as identified by the EAR,								
		impacts on these heritage assets are unlikely.								
		The presence of springs in chalk catchments and their								
		related surface waters or wetlands can contain important								
		archaeological information, especially palaeo-								
		environmental evidence. The drought option is likely to								
		reduce groundwater levels and have impacts on Waddon								
		Ponds. However, these impacts will be an extension of								
		significant impacts of the natural drought and the								
		groundwater levels are anticipated to respond rapidly to								
		rainfall in subsequent recharge events.								
Landscano and Visual	P 1 To protect, ophance the quality of and	There are no designated landscape areas in the area of	Low (advorca)	Madium	Small	Madarata	Short torm	Tomporary	Minoraduorca	Nono
Amonity	improve access to designated and undesignated	influence. The Wandle Trail runs along the Piver Wandle	Low (auverse)	Medium	Sillan	Wouerate	Short-term	remporary		None
Amenity	landscapes, townscapes and the countryside	from Croydon to the River Thames. The ponds form an								
	landscapes, townscapes and the countryside.	essential part of the landscape setting and character of								
		the trail that is valued by walkers. In a worst case scenario								
		the impact of the proposed drought permit may result in								
		Waddon Ponds drving up when they may not have done								
		so without a drought permit in place. If drving up of the								
		ponds were only to occur with a drought permit in place.								
		this would probably occur during the latter half of the								
		drought permit. Drving out of the ponds would adversely								
		effect the visual amenity value and local distinctiveness of								
		the non-designated landscape.								
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Drought Plan option	Bauto determ MI/d, a	Bauton 1: Water is abstracted from the Inferior Oolite Aquifer at Baunton from four boreholes. The operation of determined by the flow conditions in the River Churn at Cirencester Gauging Station. The River Churn flow const MI/d, abstraction is permitted at a rate of up to 21.6MI/d with an annual average rate equivalent to 16.64MI/d. No Churn is less than 32MI/d.										ration of t ow constr MI/d. No a
	The drou	The drought permit would involve a temporary suspension of the 32MI/d flow constraint on the River Churn at Cirer than 32MI/d, abstraction would be permitted to a maximum rate of 6.3MI/d. Benefit										
Summary commentary of scheme adverse effects:	Major effect or lower re the na	Major adverse effect on the upper reach of the River Churn, moderate adverse, short-term effects effect on the lower reach of the River Churn. The upper and middle reach effect is associated with a lower reach effect associated with reduced flow from upstream . Moderate, adverse, short-term effect the nationally designated site North Meadow SSSI as offtakes from the River Churn support the n water level management practice at the s							ects on th ith a delay effects of he macroj the site).	e middle i red recove n NERC fis ohyte com		
SEA Objectives Adverse Effects Assessment Summary			None				None				None	
Summary commentary of scheme beneficial effects		B	eneficial e	ffects ass	ociated w	ith the dro	ought opt	ion includ	e maintair	ning essei	ntial public	c water su
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None

e existing abstraction licence (28/39/2/63) is int is at 32 Ml/d. When flow is greater than 32 straction is permitted when flow in the River										
cester. When flows in the River Churn are less of up to 6MI/d.										
ach of the River Churn and a minor adverse y of groundwater contributing to flow, with the n species are possible, as are minor effects on nunity at the site (uncertainty surrounds the										
		None								
plies during times of drought.										
None	None		None	None						

SEA	topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/te mporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual benefic effect significand (likely to remain reasonable mitig
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The EAR identifies minor adverse effects on the nationally designated site North Meadow SSSI, with respect to macrophytes only. Offtakes from the River Churn appear to provide flow through the central ditch system supporting the sites macrophyte community, but uncertainty surrounds the water level management practice at the site. There are negligible effects on the internationally important site North Meadow and Clattinger Farm SAC as it its hydrologically isolated from the drought option. Minor adverse effects are also anticipated towards Perrott's Brook KWS in Reach 1 due to a reduction in the abundance or distribution of species supported by the site. Moderate to minor adverse effects to aquatic habitats and species including NERC habitats/species and ecologically significant species. The significance of impacts on NERC fish species ranges from minor to moderate for brown/sea trout and eels between Sep to Apr as a result of habitat dessication. Modertate to minor impacts on WFD status potential is predicted based on the impact of the drought option on fish, macroinvertebrates and macrophytes. The residual impact on environmental features is dependent on the mitigation measures that are taken and a precautionary approach has been adopted due to the uncertainty around these.	Medium (adverse)	Medium	Medium	Low	Short-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The drought permit is likely to have a negligible impact to the distribution of non-native species, such as invasive macroinvertebrates (signal crayfish and zebra mussel) or invasive macrophytes.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 6 MI/d of water) during drought conditions, and therefore help to maintain public health.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate benef
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Due to the natural drying of the reaches in natural drought conditions, it is unlikely that drought permit implementation will have any further impacts on existing trails and footpaths or navigation/angling.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Implementation of the drought permit will have negligible impact on other abstractors. The assessment was constrained by limited information, but no impacts on known abstractors have been identified. No impacts on navigation are likely. Therefore the sensitivity of navigation, tourism and other abstractors is low and the impacts are negligible. The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. This is considered a moderate beneficial effect as people and businesses have a high sensitivity to access to water during times of drought.	Low (adverse) Low (beneficial)	Low (adverse) High (beneficial)	Small	Moderate	Short-term	Temporary	Negligible adverse	Moderate benef
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (up to 6MI/d) over and above what occurs under normal operation will likely result in related and proportional increases in energy use and waste.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None


Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies a major impact on Reach 1 and a moderate impact on Reach 2 of the River Churn associated with a delayed recovery of groundwater contributing flow in the river. A minor impact on Reach 3 has been identified as a result of reduced flow coming from Reach 2. Impacts are anticipated to be limited to during the hydrological winter for a short duration of up to 1 month. The impact would also manifest as reduction of flows, velocities and levels. Overall the impact on flow is assessed as moderate adverse.	Major (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Major adverse	None
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Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	The risk of the drought permit to dissolved oxygen saturation levels is considered to be no risk in Reach 1 and 2 but minor risk in Reach 3. The risk of the drought permit to total ammonia concentration levels was identified as negligible for all reaches. There is no risk from other discharges. The sensitivity to water quality changes is therefore however given the low risk of dissolved oxygen saturation in Reach 3 the overall significance is minor adverse.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing' by the EA. However, other water company public water supplies and non- public water supply abstractions, were reviewed and it was considered that the implementation of the drought permit will have a negligible impact on other abstractions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	The EAR suggests minor impacts to geomorphology in the impacted reaches. The drought permit may result in a reduction in wetted width and depth than might otherwise be expected under the current hydrological regime. This may result in a potential minor reduction in bank and bed stability. No land take is required for the option and therefore there is no impacts on land use, soil or geology are anticipated as a result of the operation of this option.	Low (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option will increase air emissions associated with abstraction and treatment of water (up to 6 MI/d). However, no AQMA are in proximity to the option.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought, and therefore will have a beneficial impact on adaptation to climate change.	Low (beneficial)	High	Small	Moderate	Short-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	Heritage assets in proximity to the option and zone of influence including 4 Scheduled Ancient Monuments. However they are unlikely to be impacted over the duration of the drought permit implementation.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No construction activities are required for this option, however there will be changes to water levels in three reaches of the River Churn for a short duration. The option is located in the Cotswolds AONB, but due to the natural drying of the reaches in natural drought conditions, it is unlikely that drought permit implementation will have any impacts on the local distinctiveness of the landscape.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None

									Bauton 2				_
	Water is the flow is pern	abstracte condition nitted at a l	d from th s in the Ri rate of up	e Inferior (iver Churn to 21.6MI/	Oolite Aqu at Cirenc d with an	uifer at Ba cester Gau annual av	unton fro Iging Stat rerage rate	m four bo ion. The R e equivale	reholes. T liver Churl nt to 16.64 32MI/d.	he operat n flow coi 1MI/d. No	ion of the Istraint is abstracti	e existing a at 32 MI/c on is pern	l. ni
Drought Plan option	The dro than 3	ught perm 32MI/d, abs	it would in straction v	Bauton 2: from the Inferior Oolite Aquifer at Baunton from four boreholes. The operation of the existing ab n the River Churn at Cirencester Gauging Station. The River Churn flow constraint is at 32 M/d. 'e of up to 21.6Ml/d with an annual average rate equivalent to 16.64Ml/dWl. No abstraction is permit 32Ml/d. would involve a temporary suspension of the 32Ml/d flow constraint on the River Churn at Cirence action would be permitted up to a maximum rate of 17Ml/d (compared to the Baunton 1 drought would provide a benefit of up to 17Ml/d. it is anticipated to be applied for up to six consecutive months between May and December, alth istraction arrangements would remain in place for 6 months or less if water resources within the levels to safeguard future water supplies, as agreed with the Environment A_ There is no construction phase associated with the Environment A_ rt-term effects are predicted on three reaches (one reach of the River Churn, one reach of the Ar n two reaches (one reach of the River Churn and one reach of the River Coln) a minor impact in conscester Watercourses. With an overall assessment of major adverse, short term effects identific cies are possible, as are minor effects on the nationally designated site North Meadow SSI as o unity at the site (uncertainty surrounds the water level management practice at the site). Negligilit r as the drought option is located in Cotswolds AONB. However due to the natural drying of the t permit implementation will have significant impacts on the local distinctiveness of the landscap the Baunton 1 option.									
	The d year. Th	rought per ne revised	mit is ant abstractic	icipated to on arrange	be applie ments wo levels t	ed for up to ould remain o safegua <u>There is r</u>	to six con in in place and future no constru	secutive n for 6 mor water sup Iction pha	nonths be hths or les plies, as a se associa	tween Ma s if water greed wit ated with	y and Dec resource h the Env this droug	ember, al s within th ironment ght permit	/ 16 4
Summary commentary of scheme adverse effects	Major a moder impac NE macroj effec unlikely	adverse, si ate impact of on the C ERC fish sp ohyte com ots may oc that droug	hort-term t in two re irenceste pecies are munity at cur as the pht permit	effects are aches (on r Watercou possible, the site (u drought o implemen	e predicte e reach or urses. Wit as are mi ncertaint option is l ntation wi	ed on three f the River th an over inor effect y surroun located in ll have sig	e reaches Churn ar all assess s on the r ds the wa Cotswold nificant ir	(one reach ad one rea ment of n ter level n s AONB. I npacts on the Ba	h of the Ri ch of the l najor adve designate nanageme dowever d the local aunton 1 c	iver Churn River Coll rse, short d site Nor nt practic lue to the distinctive option.	n, one rea n) a minon t term effe th Meado e at the si natural di eness of t	ch of the r impact in ects identii w SSSI as ite). Neglig rying of th the landsc	Al o ii c ii e aj
SEA Objectives Adverse Effects Assessment Summary			None				None				None		ſ
Summary commentary of scheme beneficial effects		B	eneficial e	ffects ass	ociated w	ith the dr	ought opt	ion includ	e maintair	ning essei	ntial publi	c water sι	۲.
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	

bstraction When flo itted whei	n licence (i ow is grea n flow in ti	28/39/2/63 iter than 3 he River () is deterr 2 MI/d, ab Churn is le	nined by straction ess than
ocester. W permit m	/hen flows aximum r	s in the Ri ate of 6.3I	ver Churn MI/d). The	are less option
hough it c e TWUL s gency.	ould be in upply area	nplemente a have ret	ed at any t urned to a	time of idequate
mpney Bi one reach ed. Mode offtakes fi ble, adve reaches pe. Effect	rook, Rive n of the Ri rate, adve rom the R rse, short in natural ts are sim	r Frome a ver Churn rse, short iver Churn term lanc drought (ilar to tho	nd River (and a neq -term effe n support Iscape and conditions se associa	Coln), a gligible cts on the d visual s, it is ated with
		None		
oplies dur	ing times	of drougl	ht.	
None	None		None	None

SEA	topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/l igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/te mporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual benefic effect significand (likely to remain reasonable mitig
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The EAR identifies minor adverse effects on the nationally designated site North Meadow SSSI. Offtakes from the River Churn appear to provide flow through the central ditch system supporting the sites macrophyte community, but uncertainty surrounds the water level management practice at the site. There are negligible effects on the internationally important site North Meadow and Clattinger Farm SAC as it is hydrologically isolated from the drought option. Minor adverse impacts are anticipated towards Perrot's Brook Marsh KWS ans Down Ampney Pits KWS however the sensitivity of these sites is low or uncertain. Negligible impacts are anticipated for Cotswold Water Park SSSI, Wildmoorway Meadows SSSI, Stratton Football Pitch Dew Pond KWS, Winson Meadows SSSI and Whelford Meadows SSSI. Minor to moderate adverse effects to aquatic habitats and species including NERC habitats/species and ecologically significant species. The significance of impacts on NERC fish species were identified as minor to moderate for brown trout and European eels as Minor to moderate impacts on WFD status are predicted based on the impact of the drought option on fish, macroinvertebrates and macrophytes.	Medium (adverse)	Medium	Medium	Low	Short-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The drought permit is likely to have a negligible impact to the distribution of non-native species, such as invasive macroinvertebrates (signal crayfish and zebra mussel) or invasive macrophytes. The delay in recovery of flows is unlikely to influence the migration of invasive invertebrate species to previously uncolonised habitats of the Churn catchment, especially when set against baseline conditions of a dry summer.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 17MI/d of water) during drought conditions, and therefore help to maintain public health.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate benef
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Due to the natural drying of the reaches in natural drought conditions, it is unlikely that drought permit implementation will have any further impacts on existing trails and footpaths or navigation. Flows during a drought will be low such that further reduction in flows would not be likely to further reduce the angling quality of the reach.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Implementation of the drought permit will have negligible impact on other abstractors. The assessment was constrained by limited information, but no impacts on known abstractors have been identified. No impacts on navigation are likely. Therefore the sensitivity of navigation, tourism and other abstractors is low and the impacts are negligible. The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. This is considered a moderate beneficial effect as people and businesses have a high sensitivity to access to water during times of drought.	Low (adverse) Low (beneficial)	Low (adverse) High (beneficial)	Small	Moderate	Short-term	Temporary	Negligible adverse	Moderate benef
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (up to 17MI/d) over and above what occurs under normal operation will likely result in related and proportional increases in energy use and waste.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies major impacts in three reaches (one reach of the River Churn, one reach of the River Frome and one reach of the Ampney Brook), a moderate impact in two reaches (one reach of the River Churn and one reach of the River Coln) a minor imapct in one reach (of the River Churn) and a negligible impact on the Cirencester Watercourses. The impact would manifest as reduction of flows, velocities and levels resulting in drying of the channel. Overall the impact is assessed as major adverse. Impacts on the Cirencester Watercourses affected by the option are expected to be negligible.	High (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Major adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	There are three significant water quality pressures within the zone of influence. Additional pressures from Ampney St Peter STW and Fairford STW may result in medium-low risk to water quality. There is high risk that flows in the River Churn, River Frome and Ampney Brook could be reduced to zero as a result of implementation of the drought option, and the hydrological assessment concluded major impact on hydrology. Consequently the risk to water quality from the drought order is considered High for dissolved oxygen, SRP and ammonia concentrations. The reaches are are considered to have low sensitivity to changes in water quality and therefore the overall assessment is moderate adverse. However, no risks to water quality are anticipated in the remaining two reaches of the River Churn or the Cirencester Watercourses.	High (adverse)	Low	Medium	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing' by the EA. However, other water company public water supplies and non- public water supply abstractions were reviewed and it was considered that the implementation of the drought permit will have a negligible impact on other abstractions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	Minor and temporary impacts to geomorphology in the three reaches of the River Churn and one reach of the Ampney Brook, River Frome and River Coln may occur. The drought permit may result in a reduction in wetted width and depth than might otherwise be expected under the current hydrological regime. This may result in a potential minor reduction in bank and bed stability.	Low (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option will increase air emissions associated with abstraction and treatment of water (up to 17MI/d). However, no AQMA are in proximity to the option.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	Moderate	Long-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	Heritage assets in proximity to the option and zone of influence are unlikely to be impacted over the duration of the drought permit implementation.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None

ial		

Landscape and Visual	8.1 To protect, enhance the quality of and	No construction activities are required for this option, however there will	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Amenity	improve access to designated and undesignated	be changes to water levels in three reaches of the River Churn for a short								
	landscapes, townscapes and the countryside.	duration. The option is located in the Cotswolds AONB, but due to the								
		natural drying of the reaches in natural drought conditions, it is unlikely								
		that drought permit implementation will have any impacts on the local								
		distinctiveness of the landscape.								

Drought Plan option	Latton: (28/39/2, of 15MI/ The dro limit wo	Water is a /10) perm d (and no ught pern uld be ind	abstracte its abstra ot exceed nit would creased f	d by Thai action fro ling 5,475 l be for a from 5,475	mes Wate m the Gr MI in any 5MI/d inc 5MI to up	er from b eat Oolite year). crease in to 6,390	oreholes e at Latto the avera MI. Bene	drilled in on at a pe age licent fit of up a	nto the Gi ak day ra ce limit (to to 5Ml/d.	reat Oolit ite of 20N o 20MI/d)	e Aquife 11/d with a for the d	r at Lattor an averag luration o
Summary commentary of scheme adverse effects:	Moderat option. concent adverse of speci	te to mino This wou tration. M short-te es suppo	or advers Ild result inor adve rm effect orted by t	e, short-t in moder erse, shor ts on NER he design	erm hydi ate adve rt-term in RC fish sj nated site	rological rse effec npacts or pecies an e or deter	effects a ts to wate the feas d on the ioration i	re predic er quality ibility of Down Ar n habitat	ted on the , due to r some oth npney Pit quality, c	e river as educed c ner groun ts KWS a causing a	they ma lissolved dwater a re anticip decline	y remain oxygen s bstraction bated due in ecolog
SEA Objectives Adverse Effects Assessment Summary			None				None				None	
Summary commentary of scheme beneficial effects	Benefic	ial effects	include	those ass	sociated	with mai	ntaining o	essential	public wa	ater supp	blies duri	ng times o
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None



	SEA topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/te mporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Resi effe (like reas
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The EAR identifies minor adverse effects on Down Ampney Pits KWS. Reduction in abundance or distribution of species supported by the designated site or deterioration in habitat quality, causing a decline in ecological status of the site. This impact is restricted to Reach 1. Minor/ moderate adverse effects to aquatic habitats and species including NERC habitats/species and ecologically significant species brown trout, bullhead and brook lamprey. The impacts include increased stress and predation on species in refuges as a result of delay in recovery of flows and a reduction in species abundance or distribution as a result of changes in water quality A minor impact on WFD status is predicted based on the impact of the drought option on macroinvertebrates with moderate impacts to fish in Reach 1 only.	n Medium (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The drought permit is considered likely to have a negligible impact as a result of changes in the distribution of non-native species such as Nuttall's pondweed (wg=hich can have an impact on Starry Stonework macrophyte - red list) or least duckweed in the impacted reaches.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Option will help to maintain essential public water supplies (provision of up to an additional 5MI/d of water) during drought conditions and therefore help maintain public health.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Due to the natural drying of the Ampney Brook in natural drought conditions, it is unlikely that drought permit implementation will have any impacts on existing trails and footpaths or navigation/angling.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Implementation of the Latton drought permit may impact on the feasibility of the some of the other groundwater abstractions, this is assessed as minor adverse based on the abstractors having medium sensitivity. No impacts on navigation, therefore no effects on related businesses or tourism are anticipated. The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. This is considered a moderate beneficial effect for people and businesses.	Low (adverse) Low (beneficial)	High	Small	Low	Short-term	Temporary	Minor adverse	
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (up to 5 MI/d) over and above what occurs under normal operation will result in short-term increases in energy use and waste.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies moderate risk of increased duration of watercourses remaining drier for longer based on reduced groundwater levels in one reach and minor for the other for reaches. Impact anticipated to be limited to during hydrological winter for a short duration of approximately 9 days. The reaches are high sensitivity to flow based on historic abstraction effects however, due to the short duration the overall impact significance is assessed as moderate adverse. The impact would also manifest as reduction of flows, velocities and levels.	Low (adverse)	High	Small	Moderate	Short-term	Temporary	Moderate adverse	

idual beneficial ect significance ely to remain after sonable mitigation)
None
None
Moderate beneficial
None
Moderate beneficial
None
None
None

Water	4.2 To protect and enhance surface and groundwater quality an avoid adversely affecting water body status.	The EAR identifies moderate risk due to reduced dissolved oxygen saturation, increased SRP concentration and ammonia. Also moderate risk from Ampney St Peter STW discharge.	Medium (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing' by the EA. Implementation of the Latton drought permit may affect the feasibility of some other groundwater abstractions in the study area. There are four groundwater abstractions greater than 0.5Ml/d. Discussion would be required with the individual groundwater abstractors to understand pump depths and other elements of the abstraction facilities. Consequently, the impacts on other abstractors is therefore considered minor. There are five surface water abstractions below 0.5 Ml/d in the hydrologically impacted areas however all abstractions operated prior to the 2008 PWS reductions and are not expected to be limited.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	e 5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	 The EAR suggests minor impacts to geomorphology in four reaches. The drought permit may result in a reduction in wetted width and depth, extended drying of a channel, changes in sediment dynamics and potential reductions in bank and bed stability than under the current hydrological regime. No land take is required for the option and therefore there is no impacts on land use, soil or geology are anticipated as a result of the operation of this option. 	Low (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option will cause short-term increases in emissions associated with the abstraction and treatment of water (up to 5MI/d). However, no AQMA are in proximity to the option, no construction activities are required, and the use of existing infrastructure and treatment facilities will minimise emissions of air pollutants.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	Moderate	Long-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are heritage assets in proximity to the option and zone of influence including 3 Scheduled Ancient Monuments. However they are unlikely to be impacted over the duration of the drought permits' implementation and therefore the impact is considered negligible. The EARs have assessed the impacts on unknown water dependent assets as negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No construction is required for this option. There will be a change to water levels in one reach for a short duration. It is not a sensitive landscape and due to the natural drying of the Ampney Brook in natural drought conditions, it is unlikely that drought permit implementation will have any impacts on the local distinctiveness of the landscape.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None

None
None
Minor beneficial
None
None

Drought Plan option	Under no at Bibu The dro	Meysey Hampton: Under normal licence conditions water is abstracted from the Inferior Oolite Aquifer at Meysey Hampton. When pre at Bibury is greater than 68 MI/d, abstraction (licence number 28/39/5/45) of up to 10.1MI/d is permitted from the In 68MI/d, no abstraction from the Inferior Oolite boreholes is permitted The drought permit would allow abstraction from the Great Oolite boreholes at a rate of 11.37 MI/d when preceding Bibury is less than 68 MI/d (i.e. as per the terms of the now revoked 'summer' licence). Bei									ec fe 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		
Summary commentary of scheme adverse effects:	Major a minor sł fish abunda Ampne	dverse, sł nort-term (species a ance or di y Pits KW	nort-term of effects to re predict stribution S may occ	effects are water qua ed, compi as a resu cur, howey	e predicted lity as dis rising incr lt of chang ver it is res	d on four i solved ox eased stro ges in wat silient to t	reaches o ygen satu ess and p ter quality the impac	f river as t tration leve redation o r, and impa ts of desic di	they may i els may bo on species acts on sp acts on sp action as ry summe	remain dry e affected in refuge pawning p movemen rs.	yer for lon by lower s as a res otential. I nt of water	iger as res river flow. ult of dela Minor adve r from the	iul N 9 ers ac
SEA Objectives Adverse Effects Assessment Summary			None				None				None		
Summary commentary of scheme beneficial effects				Bene	ficial effec	cts include	e mainten	ance of es	ssential pu	ıblic wate	r supplies	during tir	ne
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	N

ceding flo erior Ooli flow (me efit of up	eding flow (mean 5 days before) at River Coln rior Oolite boreholes. When flow is less than low (mean 5 days before) in the River Coln at fit of up to 11.37MI/d.								
Ilt of the Moderate in recov se effect quifer to	drought o adverse, ery of flov s on the l surface w	option. Th short-tern ws, reduct ocal desig vaterbodie	is would i n effects o ion in spe inated site s often ce	result in on NERC ccies down eases in					
		None							
es of dro	ught.								
None	None		None	None					

	SEA topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/te mporary)	Residual adverse effect significance likely to remain after reasonable mitigation)	Residu effect s (likely reason
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The EAR identifies minor adverse effects on local designated site (Down Ampney Pits KWS). The local non-statutory designated site is likely to be resilient to some degree to the impacts of desiccation considering the movement of water from the aquifer to surface waterbodies often ceases in dry summers. Minor to moderate adverse effects to aquatic habitats and species including NERC habitats/species and ecologically significant species. The significance of impacts on NERC fish species were identified as moderate for brown trout and lamprey and minor to moderate for bullhead. These impacts relate to the risk of increased stress and predation on species in refuges as a result of delay in recovery of flows, reduction in species abundance or distribution as a result of changes in water quality, and those relating to the impact on spawning potential. The EAR identifies moderate impact on WFD status based on the impact of the drought option on fish, and minor for macroinvertebrates and macrophytes.	Medium (adverse)	Medium	Medium	Low	Short-term	Temporary	Moderate adverse	
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The drought permit is likely to have a negligible impact on the distribution of invasive non-native flora and fauna species, such as Nuttall's pondweed, least duckweed and signal crayfish. The delay in recovery of flows will not have any influence in the spreading of signal crayfish species beyond that expected under baseline conditions of a dry summer and dry watercourse.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 11 Ml/d of water) during drought conditions and therefore help maintain public health.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Mod
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Due to the natural drying of the reaches in natural drought conditions, it is unlikely that drought permit implementation will have any impacts on existing trails and footpaths or navigation/angling.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The sensitivity of tourism in these river reaches is low and therefore there will be negligible adverse effects. No navigation in these reaches. Implementation of the drought permit will not impact on the feasibility of any of the surface water or groundwater abstractions in the reaches considered. The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. This is considered a moderate beneficial effect as people and businesses have a high sensitivity to access to water during times of drought.	Low (adverse) Low (beneficial)	Low (adverse) High (beneficial)	Small	Moderate	Short-term	Temporary	Negligible adverse	Mod
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (up to 11 MI/d) over and above what occurs under normal operation will usually result in related and proportional increases in energy use and waste.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	

al beneficial significance to remain after able mitigation)
None
None
derate beneficial
None
derate beneficial
None
None

Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies moderate impact on 4 reaches and a minor effect on one reach of watercourse, as there would be a delay in groundwater level recovery with a consequent delay in groundwater contributing to flow within these watercourses. This is considered a large scale effect as total of 49 km (made up of the four river reaches) have the potential to be impacted and therefore the overall magnitude of effect is considered to be major adverse based on the high sensitivity of the river to low flows which is evident from historic effects. However the impact is anticipated to be limited to the hydrological winter for a short duration of approximately 1 month.	Medium (adverse)	High	Large	Moderate	Short-term	Temporary	Major adverse	
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	 The risk of the drought permit to dissolved oxygen saturation levels is moderate in one reach and negligible in four others. The risk of the drought permit to total ammonia concentration levels was identified as negligible throughout the hydrological zone of influence of the Meysey Hampton drought permit. The reaches are at good status and therefore considered medium sensitivity to changes and therefore the overall risk is minor adverse. Impacts associated with consented discharges identified a negligible risk in the first reach with respect to water quality and a potential beneficial effect from flow. 	Low (adverse)	Medium	Large	Moderate	Short-term	Temporary	Minor adverse	
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing' by the EA. However, implementation of the drought permit will not impact on other groundwater or surface water abstractions and therefore there will be a negligible adverse impact.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment- wide approach to land management.	The EAR suggests minor impacts and temporary to geomorphology in the impacted reaches, due to the reduction in wetted width and depth, extended drying of a channel, changes in sediment dynamics and potential reductions in bank and bed stability than under the current hydrological regime. No land take is required for the option and therefore there is no impacts on land use, soil or geology are anticipated as a result of the operation of this option.	Low (adverse)	Medium	Large	Moderate	Short-term	Temporary	Minor adverse	
Air and Climate	6.1 To maintain and improve air quality.	The option will increase the emissions associated with the abstraction and treatment of water (up to 11 MI/d). No AQMA are in proximity of the option.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	Moderate	Long-term	Temporary	None	M
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are heritage assets in proximity to the option and zone of influence including Scheduled Ancient Monument. However they are unlikely to be impacted over the duration of the drought permits' implementation and therefore the impact is considered negligible. The EARs have assessed the impacts on unknown water dependent assets as negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No construction activities are required for this option. However, there will be changes to water levels in four reaches for a short duration. It is not a sensitive landscape and due to the natural drying of the reaches in natural drought conditions, it is unlikely that drought permit implementation will have any impacts on the landscapes local distinctiveness .	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	
		· · · · · · · · · · · · · · · · · · ·			-	•	•	•	•	•

None
None
inor beneficial
None
None

Drought Plan option	Farmoor: The permit involves changes to the conditions associated with the naturalised flows in the River Thames at Farmoon restrained. This results in a benefit of up to 30MI/d. Surface water is abstracted from the River Thames and transferr Stored water is treated at Farmoor water treatment works (WTW) or Swinford WTW for treatment and public water su Farmoor drought permit implementation, back-pumping of river flows from further downstream is proposed to help sensitive reaches.											
Summary commentary of scheme adverse effects	Moderate moderate Thames high risk the main	e adverse, e risk of sl due to pot to water o stem of th	short terr hort-term rential effe quality in e River Tl	n effects v deteriorat ects to nav both the n names and	with respe ion to the vigation ar nainstem (d distribut	ect to Bioo fish comp nd angling of the Rivo aries (this	liversity, f conent of g. Major a er Thames s includes	flora and f twoWFD v dverse, sh s and dist risks ass	auna inclu waterbodie hort term (tributaries ociated wa	uding mod es. Model effects to . Discharg ith the bad	lerate adv rate adver water wer ge pressui ck pumpiri	erse effect se, short t e identifie res (STW c g element
SEA Objectives Adverse Effects Assessment Summary			None								None	
Summary commentary of scheme beneficial effects	Moderate to droug	e beneficia ht.	nl effects a	are expect	ed due to	provision	of additio	onal water	supply, a	nd minor	effects ar	e associat
SEA Objectives Beneficial Effects Assessment Summary	None	None		None			None	None	None	None	None	None

r under w ed to the upply to t maintain	under which normal abstraction is ed to the pumped storage Farmoor Reservoir. upply to the SWOX WRZ. As part of the maintain a minimum flow (or level) in								
s regardi, erm effec I, includii ischarge: of the sci	ng INNS, f ts to recre ng major r s) pose a r heme).	iish comm ational us eductions risk to wat	ounity and se of the R s in velocis ter quality	River ty and t in both					
		None							
ed with in	ed with improved resilience of water supplies								
None	None		None	None					

SE	A topics and objectives				Assessment of option	n				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The EAR has anticipated moderate adverse effects on N Kennington Pool SNCI due to habitat degredation as a result of reduced river velocity due to lower flows in the distributaries. Elsewhere, minor to negligible impacts on various regionally, nationally and internationally designated sites. Moderate adverse effects to aquatic habitats and species including NERC habitats/species and ecologically significant species such as <i>Ranunculus</i> spp. Moderate adverse effects to fish community (including effects on migration) and moderate-minor risk of short-term deterioration to the fish component of two WFD water bodies.	Medium (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The EAR identifies a moderate adverse impact as a result of changes to distribution of invasive macrophtes in both Reach 1 and 2.	Medium (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	Option will help to maintain essential public water supplies (provision of up to an additional 30Ml/d of water) during drought conditions and therefore help maintain public health. Construction activities may affect people living locally (Oxfordshire greenbelt), however these would be small in scale and mitigated and therefore considered negligible.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Thames Path National Trail. There are a number of marinas located along the impacted stretch of the River Thames. The potential hydrological effects identified in the EAR could result in moderate adverse effects on navigation. Changing distributions and numbers of fish species identified in the EAR may impact anglers who use the river. There are a number of recreational resources in proximity (Oatlands Road Recreation Ground; Queen's College Recreation Ground; University Sports Ground ; Abingdon Vale Cricket and Football Club; and The Springs Golf Club) however, no effects anticipated.	Medium (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. However, potential for some adverse effects such as businesses associated with navigation e.g. marinas, passenger boat/ hire boat operators.	Low (adverse) Low (beneficial)	Medium (adverse) High (beneficial)	Small	Low	Short-term	Temporary	Minor adverse	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increase in energy use and chemicals for treatment of abstracted water (up to 30MI/d). The option will make use of existing infrastructure (beneficial impact). However, will also require additional equipment and energy use to enable the back-pumping component of the option.	Low (adverse) Low (beneficial)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	Negligible beneficial

Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	The flow benefits created as a result of the back-pumping operation at times of very low flow outweigh the adverse effects associated with the poorer water quality being back- pumped into the watercourses. The option will not impact on the feasibility of other abstractions identified in the zone of influence identified above. However, although the drought permit would not impact on the feasibility of the Didcot abstraction occurring it may affect the amount of water that is permitted to be abstracted.	Low (adverse)	Medium	Medium	Medium	Short-term	Temporary	Minor adverse	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	Adverse impacts in surface water levels and flows are anticipated, including major-moderate reduction in velocities for those watercourses where water levels are controlled including the mainstem of the River Thames. Reduction in velocity and level for distributaries that are not level controlled. No effects on groundwater levels are anticipated.	High (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Major adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	Adverse impacts are anticipated related to the risk identified for the quality of water in the EARs as a result of option implementation. The EAR identifies a high risk with regard to surface water quality (specifically with regard to SRP) as well as medium risk with regard to dissolved oxygen in the distributaries of the Thames only. Discharge pressures (STW discharges) pose a risk to water quality. No construction impacts on water quality anticipated after mitigation. However, the back pumping operation generations additional water quality risks associated with the recirculation of Oxford STW discharged water to both the distributaries of the Thames.	Medium (adverse)	High	Medium	Moderate	Short-term	Temporary	Major adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. The EAR identifies that the option is unlikely to impact the feasibility of any groundwater or surface water abstractions in the zone of influence (including those for agriculture). However, there are potential short term temporary adverse effects with respect to local WFD waterbodies.	Low (adverse)	Medium	Medium	Medium	Short-term	Temporary	Minor adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	e 5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	The EAR identifies minor impacts on geomorphology that relate to reduced velocity, deposition of sediments and their re-suspension in higher flows.	Medium (adverse)	Low	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	In addition to the emissions associated with the abstraction and treatment of water (up to 30MI/d), the option will result in emissions as a result of the back-pumping component of the option. Within proximity to Oxford city council AQMA (4.8km).	Low (adverse)	Low	Small	High	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	In addition to the energy use associated with the abstraction and treatment of water (up to 30MI/d). The option will involve additional energy use and therefore greenhouse gas emissions to enable the back-pumping component of the option.	Low (adverse)	Low	Medium	High	Short-term	Temporary	Minor adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought, and therefire will have a beneficial impact on adaptation to climate change.	Low (beneficial)	Medium	Medium	Medium	Short-term	Temporary	None	Minor beneficial

Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The length of the impacted reach of the River Thames and its location presents a wealth of assets with respect to archaeology and cultural heritage. Assuming water levels are maintained, the potential impact of this drought permit on the setting of the heritage assets associated with the Thames, including sub-surface water dependent heritage assets, is considered negligible.	Low (adverse)	Low	Medium	Medium	Short-term	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No designated landscape areas in proximity. Temporary minor adverse effects as a result of the visual intrusion of the construction and decommissioning activities, primarily to local residents or walkers using public rights of way. No significant effects on non-designated areas of natural beauty or access to values areas of landscape character. The option is within greenfield land however, there is no land take associated with the scheme.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Minor adverse	None

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Drought Plan option	Axford 1 As a resu peak of 1 drought related c construc	Drought F ult of inves 3.1 MI/d w permit ass onstraint o tion assoc	Permit: stigations vith maxin sessment of 6 MI/d v siated with	by the En num abstra has been t vill be rem n this optic	vironmen action col undertake loved and on.	t Agency, nstrained en based c I the avera	from Apri to 6 MI/d v on these n ge daily a	l 2017, the vhen flow ew licence bstractior	e new abs rs in the R e conditio າ limit will	traction li iver Kenn ns and th increase	cence limi et at Knig e associat to 13.1 MI	it at Axford hton gaug ed drough /d. This w	d iii ii
Summary commentary of scheme adverse effects	Moderate impleme during th regarding recovery to Hunge or preven between impacts	e adverse, ntation. U le hydrolo g River Ke . Negligib erford) wat ntion of ac May and I on SRP co	short tern nder dry gical wint nnet SSS le advers ter body (chieving G December oncentrati	n reductio weather co er (Octobe I conserva e effects p GB106039 iES with d with drou ons are an	ons in flov onditions er to Marc tion obje oredicted f 023172) w rought per ight perm ticipated	vs in the F there wou ch). Moder ctives are for the Ke yould be a ermit imple it impleme , where the	liver Kenn Id be a su ate advers considere nnet and L t moderation t moderation entation. N ere is also	et would ibsequent ed modera ambourn e risk fror n. Potenti linor adve a modera	manifest a delay in g term effec ate during SAC. The n May to I al modera arse effect ate advers	as a reduc groundwa ts are ant drought p macroin December te impact ts on inva se effect to	ction in lev ter recove icipated w bermit imp vertebrate and mino s on sea to sive macro o surface v	rels and ve ery, but thi ith respect and fish c r risk from rout and b ophyte sp water qual	- istoxireli
SEA Objectives Adverse Effects Assessment Summary			None		None		None				None		
Summary commentary of scheme beneficial effects	Beneficia reducing	al impacts vulnerabi	include e lity to dro	nsuring su bught.	upply of w	vater to lo	cal popula	ntion and o	other cust	tomers/bu	sinesses.	There are	a
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	



SI	EA topics and objectives	Assessment of option											
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary (Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ł igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficia effect significance (likely to remain a) reasonable mitiga			
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem	 Hydrological impacts in the River Kennet have been assessed as moderate in Reach 1 and 2, due to reduction in flows manifested as reduction in levels and velocities, and negligible in Reach 3. Adverse effects have been identified in relation to the changes in flow during drought permit implementation. Impacts on the River Kennet SSSI conservation objectives are identified as moderate during drought permit implementation and minor during the period of groundwater recovery. Negligible adverse effects predicted for the Kennet and Lambourn SAC. Moderate adverse impacts are antipcated on the NERC Act Section 41 species sea trout, brown trout, and minor impacts on European eel. The EAR identifies minor (January to March) to moderate (May to December) impact on WFD status based on the impact of the drought option on fish, macroinvertebrates and macrophyte communities. Moderate impacts are anticipated for chalk habitats and NERC coastal and floodplain grazing marshes. 	Medium (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Moderate adverse	None			
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS	The minor changes in flow and limited effects on water quality are not considered likely to significantly affect distribution and abundance of signal crayfish, New Zealand mud snail and European physa - which have been assessed as negligible in the EAR. Moderate water quality impacts associated with increased SRP concentrations may provide more favourable conditions for invasive flora species (e.g. floating pennywort) associated with eutrophic conditions. Therefore, the drought option has potential to increase the abundance and/or distribution of invasive macrophyte species and has been assessed as minor impact.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None			
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance	Option will help to maintain essential public water supplies (provision of up to an additional 7.1Ml/d of water) during drought conditions and therefore help maintain public health. No construction is proposed, and therefore no effects on human health (e.g., noise and dust nuisance) are expected.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate benefic			
Population and human health	 and value of the water environment for health and well-being). 2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails 	The fish assessment in the EAR identifies a potential short term alteration to fish community composition as a result of drought permit implementation, therefore there is a potential minor adverse effect on angling in hydrological Reach 2 between May-Dec.	Low (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Minor adverse	None			
Population and human health	 and Public Rights of Way). 2.3 To promote a sustainable economy with good access to essential services, including a secure. 	Option will contribute to the maintenance of supply reliability in drought conditions (7.1Ml/d) without impacting on other abstractors, therefore ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate benefic			
Material assets and resource use	affordable supply of water. 3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumptior of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to	Implementation will result in an increase in energy use and chemicals for treatment of abstracted water (7.1Ml/d). The option has the benefit that it will make use of existing infrastructure without the requirement for additional equipment.	Low (adverse)	Low	Medium	Low	Short-term	Temporary	Negligible adverse	None			
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water suppl for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None			



Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The drought permit would lead to a reduction in flows that would manifest as a reduction in levels and velocities (not considered significant with regard to potential marginal habitats), and impacts are considered moderate adverse. This would be limited to the period of drought permit implementation, which could last for up to 6 consecutive months during the period May to December. Under dry weather conditions, there would be a subsequent delay in groundwater recovery but this is unlikely to prevent recovery occurring during the hydrological winter (October to March).	Medium (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Moderate adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	The drought option would increase risk to SRP concentrations due to rivers inability to buffer nutrient pressres under low flow conditions . Although drought option would not alter quality of water flowing into Reaches 1 and 2, it would reduce the ability of the watercourse to buffer additional nutrient pressures. The EAR suggests a low risk is associated with dissolved oxygen saturation and negligible risk associated with ammonia. Overall water quality is assessed as moderate impact.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing'. There is no risk associated with any additional groundwater or surface water absractors.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Water	4.4 To promote measures to enable and sustain	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management	Some potential for adverse geomorphological impacts are identified by the EAR associated with structure, for example wiers. The overall assessment of this is considered minor and is not thought to have an impact on the geology or soils.	Low (adverse)	Low	Small	Moderate	Medium-term	Temporary	Negligible adverse	None
Air and Climate	6.1 To maintain and improve air quality	The option involves an increase in abstraction of 7.1Ml/d. There would be a short-term increase in air emissions associated with abstraction and treatment. The option is within 5km of the Marlborough AQMA.	Low (adverse)	Medium	Low	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.1 To maintain and improve air quality.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.6.3 To consider the need for adaptive measures	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought, which may become more prevalent due to climate change.	Low (beneficial)	Medium	Small	High	Short-term	Temporary	None	Minor beneficia
Archaeology and Cultural Heritage	 for climate change. 7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites. 	There are two registered parks and gardens in the vicinty of the impacted river reaches (Ramsbury Manor and Littlecote House). There is also a scheduled monuments within 500m. However, it is not anticipated that the hydrological impacts would affect the integrity of these heritage assets. Additonally, there are no construction requirements associated with the drought option, therefore the overall impact is assessed as negligible.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The option lies within North Wessex Downs AONB. The hydrology assessment identifies a moderate impact on the River Kennet. The drought permit is unlikely to reduce river levels below levels already experienced that year or in recent years. Therefore, it is considered that the drought permit will have no impact on visual amenity of the North Wessex Downs AONB.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None



Drought Plan option	Axford 2. As a con As of Ap to 6 MI/d amount i surround average a	Axford 2: As a consequence of the Environment Agency's Restoring Sustainable Abstraction investigation, the abstraction licence at Axford has recently been reviewed. As of April 2017, the new abstraction licence limit at Axford has been set at an average of 9.34 MI/d and peak of 13.1 MI/d with maximum abstraction constrained to 6 MI/d when flows in the River Kennet at Knighton gauging station are below 100 MI/d. When the flow constraint is in force, only 3 MI/d of the abstracted amount is permitted to leave the Kennet Catchment and feed other parts of the WRZ. The other 3 MI/d of water must be used to supply Axford and the surrounding villages and returned to the River Kennet via local STWs. The Axford 2 drought permit will effectively remove this flow constraint and increase of the average and peak abstraction to 20 MI/d (an additional benefit of 14 MI/d) regardless of the flow as recorded at Knighton gauging station									wed. rained d se of the						
Summary commentary of scheme adverse effects	Major ad and a neg weather (October Conserva adverse body (GE achieving Decembe	or adverse, short term effects are expected in relation to a reduction in flows in the River Kennet in Reach 1 and 2 with a moderate adverse effect in Reach 3 I a negligible adverse effect in Reach 4. Impacts would manifest as a reduction in levels and velocities during drought permit implementation. Under dry ather conditions, there would be a subsequent delay in groundwater recovery, but this is unlikely to prevent recovery occurring during the hydrological winter tober to March). Moderate adverse, short-term effects are anticipated with respect to biodiversity, flora and fauna. Impacts regarding River Kennet SSSI nservation Objectives are considered moderate during drought permit implementation and minor during the period of groundwater recovery. Negligible verse effects predicted for the Kennet and Lambourn SAC. The macroinvertebrate and fish component of the Middle Kennet (Marlborough to Hungerford) water dy (GB106039023172) would be at moderate risk from May to December and minor risk from January to March of short-term deterioration or prevention of nieving GES with drought permit implementation. Potential moderate impacts on sea trout and brown trout (NERC Act Section 41 Species) between May and cember with drought permit implementation.															
SEA Objectives Adverse Effects Assessment Summary			None		None		None				None				None		
Summary commentary of scheme beneficial effects	Moderate water su	e beneficia oplies to d	al effects a drought.	are expect	ed due to	provision	of additio	onal water	supply, a	nd also m	inor bene	ficial effec	cts associ	ated with	improving	the resili	ience of
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	None	None		None	None

ence at Axford has recently been reviewed.
MI/d with maximum abstraction constrained
in force, only 3 MI/d of the abstracted
be used to supply Axford and the
move this flow constraint and increase of the
ton gauging station

S	EA topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (those likely to remain after reasonable mitigation)	Residual beneficia effect significance (those likely to re after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	Major hydrological effects have been identified in relation to the significant changes in flows that would manifest as a reduction in levels and velocities flow during drought permit implementation. Impacts on the River Kennet SSSI Conservation Objectives are identified as moderate during drought permit implementation and during the period of groundwater recovery. Negligible adverse effects predicted for the Kennet and Lambourn SAC. The EAR considers the macroinvertebrate, fish and macrophyte component of the Middle Kennet (Marlborough to Hungerford) water body (GB106039023172) to be at moderate risk of short-term deterioration or prevention of achieving GES with drought permit implementation. Impacts on the NERC Act Section 41 Species are moderate for sea trout and brown trout and minor for European eel. Futher moderate impacts are anticipated for coastal and floodplain grazing marshes habitat, chalk stream habitat and a number of notable species including; <i>Ranunculus sp.</i> , grayling, bullhead and various macroinvertebrates.	Medium (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	There is uncertainty surrounding the likely effect of flow and level impacts on the ability of invasive macroinvertebrates (e.g., such as signal crayfish, New Zealand mud snail and European physa) to distribute further within the watercourses. However, implementation of the drought permit may increase abundance or range of invasive macrophytes (e.g., Japanese knotweed, giant hogweed, Himalayan balsam and Australian swamp stonecrop) through additional habitat availability, although the level of impact beyond that of natural drought is uncertain. The EAR assessed this impact as negligible but has been assessed as minor here due to the uncertainty .	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	 Option will help to maintain essential public water supplies (provision of up to an additional 14Ml/d of water) during drought conditions and therefore help maintain public health. No construction is proposed, and therefore no effects on human health (e.g., noise and dust nuisance) are expected. 	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate benefic
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	The River Kennet contains a wide diversity of fish species. The location and surrounding area makes the catchment very popular with anglers. The EAR identifies moderate impacts on the fish community between May and December, and January and March. Therefore, there is a potential short term alteration to fish community composition as a result of drought permit implementation, which may have minor impacts to anglers. The River Kennet itself is navigable between Newbury and Reading. Navigation is not possible within the River Og (Reach 1) and the River Kennet between the River Og confluence and Hungerford (Reach 2). As such, the potential to affect navigation is minor. The North Wessex Downs AONB is a unique and spectacular landscape. The River Og and River Kennet form an essential part of the landscape of the AONB . The drought permit is unlikely to reduce river levels below levels already experienced that year or in recent years.Therefore, it is considered that the drought permit will have no impact on visual amenity of the North Wessex Downs AONB.	Low (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Minor adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Doption will contribute to the maintenance of supply reliability in drought conditions (14MI/d) without impacting on other abstractors, therefore ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate benefic
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumptior of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Implementation will result in an increase in energy use and chemicals for treatment of abstracted water (14Ml/d). The option has the benefit that it will make use of existing infrastructure without the requirement for additional equipment.	Low (adverse)	Low	Medium	Low	Short-term	Temporary	Negligible adverse	None



Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The drought permit would lead to a reduction in flows that would manifest as a reduction in levels and velocities (not considered significant with regard to potential marginal habitats), and impacts are considered major adverse in Reach 1 and 2 of the River Kennet. This would be limited to the period of drought permit implementation, which could last for up to 6 consecutive months during the period May to December. Under dry weather conditions, there would be a subsequent delay in groundwater recovery but this is unlikely to prevent recovery occurring during the hydrological winter (October to March). Hydrological impacts to Reach 3 of the River Kennet are assessed at moderate whilst Reach 4 is negigible. The overall assessment is therefore major adverse.	Major (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Major adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	The EAR suggests the drought option would result in medium risk associated with SRP and dissolved oxygen saturation beyond that occurring under natural drought conditions for Reach 1, 2 and 3. A low risk is associated with ammonia. Marlborough STW (upstream of the impacted reach) presents a medium risk to water quality in the impacted reaches (specifically with regard to ammonia and phosphorous). The risk would also likely be medium without a drought permit in place.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'Water not available for licensing'. There is no risk associated with any additional groundwater or surface water abstractors.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	Overall, geomorphology impacts are assessed as moderate in the Reaches 1 and 2 and minor in Reach 3. Impacts could include changes in wetted width and depth, in-channel structures or macrophytes influencing ponding and sediment dynamics, or declines in bed stability.	Moderate (adverse)	Medium	Small	Moderate	Medium-term	Temporary	Moderate adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option involves an increase in abstraction of 14Ml/d. There would be a short-term, temporary increase in air emissions associated with abstraction and treatment. The option is 4.4km from the Marlborough AQMA. Considering the proportional increase in abstraction, the distance to the AQMA and the temporary nature of effects the potential magnitude of effect is considered to be minor.	Low (adverse)	Medium	Low	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	The option involves an increase in abstraction of 14MI/d. There would be a short-term increase in greenhouse gas emissions associated with abstraction and treatment.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	Medium	Small	High	Short-term	Temporary	None	Minor beneficia



Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are anumber of heritage assets in the immediate vicinty of the impacted river reaches including registered parks and gardens, scheduled monuments and an historic battlefield. However, it is not anticipated that the hydrological impacts would affect the integrity of these heritage assets. Additonally, there are no construction requirements associated witht the drought option, therefore the overall impact is assessed as negligible.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The option lies within North Wessex Downs AONB. The drought permit would lead to a reduction in flows that would manifest as a reduction in levels which could affect locals and visitors who use the local area. These effects would relate to a short section of river, would be short term and temporary in nature and would occur during a time of naturally low river levels.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None



Drought Plan option	Bibury: The drought permit involves additional abstraction from existing boreholes. Current licence (28/39/06/0062) allow 6.819MI/d for public water supply and an arrangement for river flow augmentation as described below. The drought permit would increase abstraction at the current boreholes by up to 5MI/d. The arrangement for river flow augmentation would continue. Minor construction works are required to bring the option online as a drought permit source. There is limited tree temporary water treatment facility may be required. No significant construction impacts on the environment are a									52) allows : nited treatment are ant		
Summary commentary of scheme adverse effects:	Potential adverse effects identified relate to a minor reduction in flow in the River Coln, and associated minor in geomorphology of the reaches, and location within AONB. There may also be minor adverse temporary effects i be short-term and temporary.									inor impac ffects relat		
SEA Objectives Adverse Effects Assessment Summary				None	None		None				None	
Summary commentary of scheme beneficial effects	Beneficial impacts have been identified primarily through ensuring supply of water to local population a be beneficial impacts associated with improving the resilience of water supplies to drought.								ulation and	d other cu		
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	

or abstraction at a peak daily rate of											
ent capability at Bibury and therefore a cipated.											
ts on NEI ed to con	RC specie struction.	s, WFD st All impac	atus, the ts identifi	ed will							
		None	None								
tomers/b	ousinesse	s. There a	re also lik	ely to							
None	None		None	None							

SEA	topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after) reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species).	The EAR identifies negligible effects on nationally designated sites (Winson Meadows SSSI, Whelford Meadows SSSI and Cotswold Water Park SSSI) . Minor adverse effects to aquatic habitats and species including NERC habitats/species and ecologically significant species such as brown trout, Ranunculus sp., bullhead and brook lamprey. The EAR predicts negligible (diatoms) to minor (macroinvertebrates, macrophytes, fish) impact on WFD potential in the River Coln. Minor construction works (temporary water treatment facilities) are required in order to bring the option online therefore may result in noise/dust niussance, with impacts on biodiversity. The EAR assessed the impacts associated with construction to be negligible.	Low (adverse)	Medium	Medium	Moderate	Short term	Temporary	Minor adverse	None
Biodiversity, flora and fauna	1.4 To avoid introducing or spreading INNS.	Although there is potential for an increase in distribution and abundance of INNS (signal crayfish, acute bladder snail, flatworm, New Zealand mud snail and shrip are present) as a result of the drought permit implementation, the impact significance and magnitude is considered to be negligible (no risk to water quality and modest reduction in water levels).	Low	Low	Medium	Moderate	Short term	Temporary	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Option will help to maintain essential public water supplies (provision of up to 5MI/d of water) during drought conditions and therefore help maintain public health. Minor construction works are required in order to bring the option online (temporary water treatment facilities) - therefore may result in noise/dust nuisance during construction.	Low (beneficial) Low (adverse)	High (beneficial) Medium (adverse)	Medium	Moderate	Short term	Temporary	Minor adverse	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism and navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	No impacts on recreation, tourism and navigation are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a resilient, high quality and affordable supply of water over the long term.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. No impacts on navigation have been identified, therefore no impacts on related businesses or tourism are anticipated.	Low	High	Small	Moderate	Short Term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction over and above what occurs under normal operation will usually result in related and proportional increases in energy use and waste. The option will make use of existing infrastructure, with minor construction works required in order to bring the option online (temporary water treatment facilities)	Low	Low	Medium	Medium	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient and sustainable use of water; ensure resilient water supplies for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies minor hydrological impact on the two identified reaches based on the predicted reduction flow of 3.5Ml/d.	Low	Medium	Medium	Moderate	Shert term	Temporary	Minor adverse	None



Water	4.2 To protect and enhance surface and groundwater quality and protect and enhance estuarine waterbodies.	Assuming best practice construction methods, impacts from construction on water are anticipated to be negligible. The EAR identifies that the implementation of the Bibury drought option will have a negligible impact on water quality. The discharge from a local trout farm may be exacerbated by the implementation of the drought option, but it is anticipated to be low localised risk.	Low	Low	Medium	Moderate	Short term	Temporary	Negligible adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources including contributing to the achievement of WFD objectives	Water resource available is described as "water not available for licencing" by the EA. Implementation of the drought permit will have a negligible impact on other groundwater and surface water abstractions. The three surface water abstractions in Reach 1 are for Bibury Trout Farm and are through flows rather than consumptive.	Low	Low	Medium	Moderate	Short term	Temporary	Negligible adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, geomorphology and the quality and quantity of soils.	The EAR suggests minor impacts to geomorphology in the impacted reaches . The evidence of in-channel weirs (in Reach 1) and in-channel macrophytes (both reaches) could lead to sediment trapping and deposition, but due to the low impact and unlikely impact to sediment transportation this impact would be limited. No impacts on land use, soil or geology are anticipated as a result of the operation of this option.	Low (adverse) Low (beneficial)	Medium (adverse) Low (beneficial)	Low	Moderate	Short term	Temporary	Minor adverse	Negligible beneficial
Air and Climate	6.1 To reduce air pollutant emissions.	The option will increase air emissions associated with abstraction and treatment of water (up to 5ml/day), however no AQMAs are in proximity of the option.	Low	Low	Small	Low	Short Term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Increased abstraction would cause an increase in energy use in the short term. Minor construction is anticipated, which would result in energy use/short term increases in greenhouse gas emissions.	Low (adverse)	Low	Small	Low	Short term	Temporary	Negligible adverse	None
Air and climate	6.3 To adapt and improve resilience to the threats of climate change.	Drought orders/permits are a key componant of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought, and therefore will have a beneficial impat on adaptation to climate change.	Low	High	Small	Moderate	Short term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and protect archaeologically important sites.	Heritage assets in proximity to the option and zone of influence are unlikely to be impacted over the duration of the drought permit implementation.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The drought option is located within AONB (Cotswolds). However, minor impact on water flows/level are expected, and it is not anticipated that this will affect the visual amenity of the area.	Low	Medium	Medium	Moderate	Short term	Temporary	Minor adverse	None



Drought Plan option	Gateham Under no borehole abstracti month of The oper 400MI/d f licence c	pton: ormal licer s are with on licence 95MI/d ar ation of th or 5 days, onditions.	nse condit in 100 me e (28/39/23 nd an annu ne existing , then abs . This wou	ions wate tres of the /173) peri- ual maxin g abstract traction n ild provid	er is abstra e River Th mits abstr num of 3,4 ion licenc nust be ma e a benefi	acted from ames; the action fro 770MI/ ye e is limite aintained t of 3.5MI/	n the Creta other thr m the Cha ar. d by flow at or below d. There i	aceous Ch ee are app alk aquifer condition w 101.5Ml/ s no consi	alk aquife proximate at Gateha s in the Ri d. Propos truction p	er at Gatel ly 250m fr ampton at iver Tham sed compr hase asso	hampton. om the riv a peak da es at Cave ises: 3.5M ociated wit	The Gateh rer). Norm ry rate of 1 ersham Ga II/d - conti th this dro	ampton a al abstrac 105MI/d wi auging Sta nuation o ught optic	bstraction tion comp ith an ave ation - who f abstract on.	n consists prises: The rage rate p en flows a ion from b	of 7 borel e existing per year al re less tha oreholes	holes (4 nd an beyond
Summary commentary of scheme adverse effects:	There are quality al nature co	e negligibi nd other a onservatio	le hydrolo Ibstractor Ion sites. A	gical imp s are expe Il adverse	acts assoc acted. The effects ic	ciated with re may be lentified a	h Gatehan e minor ad re short-te	npton droi verse effe erm and te	ught perm cts due to emporary.	iit implem 9 emissior	entation. I Is to air as	No impact ssociated	s on biodi with addit	iversity, g tional abs	eomorpho traction ai	ology, wate nd proxim	er ity to
SEA Objectives Adverse Effects Assessment Summary	None	None	None	None	None		None		None	None	None	None			None	None	None
Summary commentary of scheme beneficial effects	Moderate beneficia	e beneficia l impacts	al impacts associate	are expe d with im	cted with i proving th	regard to ne resilien	ensuring s ce of wate	supply of er supplie:	water to lo s to droug	ocal popul ht.	lation and	other cus	tomers/bi	usinesses	. There are	e also like	ly to be
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	None	None		None	None

SI	EA topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence o effect (permanent/ temporary)	f Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficia effect significance (likely to remain a) reasonable mitiga
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy	Hydrological impacts would be negligible. The EAR reports no significant impacts on designations, or NERC or notable species. Other within a 1km area of influence (e.g., areas of ancient woodland) are unlikely to be affected by implementation of this drought option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The EAR reports the implementation of the drought permit will not increase dispersal of invasive flora species. For other invasive species significant effects are unlikely due to the negligible impact on surface waters.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	g Option will help to maintain essential public water supplies (provision of up to an additional 3.5Ml/d of water) during drought conditions and therefore help maintain public health. Regarding nuisance, there is no construction proposed for this option therefore no adverse effects are expected to public health.	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Moderate benefici
Population and human health	2.2 To protect and enhance the water environment for other users including recreation tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	There is no hydrological impact on surface water features as a result of drought permit implementation. Therefore, there will be no impact on angling or navigation. The option is within proximity of the Thames Path National Trail however there is no construction proposed and negligible hydrology effects therefore no effects on visual amenity from the path anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	d Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	Medium	Short-term	Long	None	Moderate benefici
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (3.5 MI/d) over and above what occurs under n normal operation will result in short-term increases in energy use and waste. The option will make use of existing infrastructure, avoiding new construction (and associated use of materials) and minimising additional energy use and waste generation.	Low (adverse)	Low	Medium	Medium	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water suppl for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when thi impacts on habitats and/or navigation.	The reach addressed in the EAR is the River Thames from Goring Lock to s Whitchurch Lock. The course of the River Pang is about 8km away from Gatehampton to the southwest, therefore, significantly outside the drawdown zone identified in the EAR. The drought permit would have a negligible impact on flows in the Rivers Thames and Pang.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affectin water body status.	There are no additional discharge pressures with a dry weather flow or g maximum flow of greater 0.5 Ml/d within the hydrogeological impacted zone of the Gatehampton drought permit, thus no impacts on water quality or WFD status are expected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	There are no additional abstraction pressures greater than 0.5MI/d within the hydrogeological impacted zone of the Gatehampton drought permit, thus no impacts on other abstractions are expected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	As negligible adverse hydrological impacts were identified, no impacts on geomorphology are anticipated. No construction is required for implementation of this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
6.1 To maintain and improve air quality.	There would be small increases in air emissions associated with abstraction of water. The option is within proximity of sites designated for nature conservation at national level.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
6.2 To reduce greenhouse gas emissions.	There would be small, short-term increases in greenhouse gas emissions associated with abstraction of water. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions. The sensitivity to this effect is rated as low due to the short term and temporary effect.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	Medium	Small	High	Short-term	Temporary	None	Minor beneficial
7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	Heritage assets within the area of influence include Grim's Ditch: two sections in Portobello Wood, Holies Shaw and High Holies Wood Gap – Scheduled Ancient Monuments. These are unlikely to be impacted over the duration of drought permit implementation. There is also one listed building within 500m and further listed buildings between 500m and 1km. However there is no construction proposed and negligible hydrological effects, therefore no effects on heritage assets are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The option is within the North Wessex Downs AONB. There is no construction proposed and a negligible hydrological effect predicted therefore no significant effects on landscape are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
	 4.4 To promote measures to enable and sustain long term improvement in water efficiency. 5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management. 6.1 To maintain and improve air quality. 6.2 To reduce greenhouse gas emissions. 6.3 To consider the need for adaptive measures for climate change. 7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites. 8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside. 	4.4 To promote measures to enable and sustain No opportunities to promote long-term improvement in water efficiency long term improvement in water efficiency. As negligible adverse hydrological impacts were identified, no impacts on geomorphology are anticipated. No construction is required for implementation of this option. 5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management. As negligible adverse hydrological impacts were identified, no impacts on geomorphology are anticipated. No construction is required for implementation of this option. 6.1 To maintain and improve air quality. There would be small increases in air emissions associated with abstraction of water. The option is within proximity of sites designated for nature conservation at national level. 6.2 To reduce greenhouse gas emissions. There would be small, short-term increases in greenhouse gas emissions associated with abstraction of water. However, no construction and their use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions. The sensitivity to this effect is rated as low due to the short term and temporary effect. 6.3 To consider the need for adaptive measures for climate change. Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought. 7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites. Heritage assets within the area of influence include Grim's Ditch: two sections in Portobello Wood, Holies Shaw and	4.4 To promote measures to enable and sustain tong term improvement in water efficiency. The been identified for this option. n/a 5.1 To protect and enhance geology, the quality and geodiversity and mainty of soils and geodiversity and promote a catchiment-wide approach to land management. As negligible adverse hydrological impacts were identified, no impacts on promote a catchiment-wide approach to land management. n/a 6.1 To maintain and improve air quality. There would be small increases in air emissions associated with abstraction of water. The option is within proximity of sites designated for nature conservation at national level. Low (adverse) 6.2 To reduce greenhouse gas emissions. There would be small, short-term increases in greenhouse gas emissions. The sensitivity to this effect is rated as low due to the short term and temporary effect. Low (adverse) 6.3 To consider the need for adaptive measures for dimance the historic Prought permits/orders are a key component of Thames Water's Drought. 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However there is no construction proposed and an egligible hydrological effect predicted hierefore.	14 To promote measures to enable and sustain Na opportunities to promote long-term improvement in water efficiency have been identified for this option. n/a n/a 15.1 To protect and enhance geology, the quality and quanty of obisis and geodivers and inprovement in water efficiency inprovement. n/a n/a 5.1 To protect and enhance geology, the quality and quanty of obisis and geodivers and quanty of and inprove and quanty of and inprove access to designated and undesignated and undesignated and undesignated for and angligible hydrological effect, therefore no significant effects on landscape are anticipated. n/a n/a 6.3 To consider the need for adaptive measures and permits/orders are a key component of Thames Water's brought. 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There would be small increases in greenhouse gas emissions. The evalue for this option, and the use of existing fordistructure and trens and temporary effect. Low (beneficial) Low (beneficial) Medium 6.3 To consider the need for adaptive measures in air ensile were stating indicator in protocol (sign are a key component of Thames Water's Drought protein in Portobelle Wood, Holies Shuw and High Holies Wood Sgu and temporary effect. I.ow (beneficial) Medium Small 7.1 To conserve and enhance the historic minimate incres	A.1 To promote measures to anable and suttain long term improvement in water efficiency n/a n/a n/a n/a 1.1 To protect measures to readie and suttain long term improvement in water efficiency n/a n/a n/a n/a n/a 1.1 To protect measures to readies and suttain long term improvement in water efficiency n/a n/a n/a n/a n/a n/a 1.1 To protect measures to readies and suttain incomote su caturation static approach to long management. n/a n/a <td>6.4 To produce measures to evaluation together improvement in water efficiency.n/a</td> <td>1.1 To promote nearing to evaluate and statumant to water efficiency. N/a N/a</td> <td>ΔT_{10} monotone measure. Le endolt and statuti No approximation to prome an imported in the state efficiency $1/a$ 1</td>	6.4 To produce measures to evaluation together improvement in water efficiency. n/a	1.1 To promote nearing to evaluate and statumant to water efficiency. 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Drought Plan option	Ogbourn The Ogb Chalk W operating achieve be pump anticipat impleme	e Energer ourne gro FD ground g licence. the abstra ed to Ogb ed. The di nted at an	ncy Boreh undwater lwater boo Implemen ction fron ourne W1 rought pen y time of	oles (EBH abstractio dy near Og tation of t n these bo W for trea mit is anti year.): gbourne S gbourne S he drougl reholes. V tment via icipated te	mprises te it George. ht permit v Vorks will the existi o be applie	en borehol The Ogbo would inve include c ing pipelin ed for up a	les constr burne EBH blve abstra onnection te from the to 6 conse	ucted betw l are locat action of 4 o of mobile e borehole ecutive mo	ween 1970 ed appros 4 MI/d froi e generato es to the V onths betw) and 1979 kimately 1 n these bo ors and sta WTW. No s veen May (). Water wo km away fi oreholes. I arters to e significant and Decer
Summary commentary of scheme adverse effects	Moderate River Og adverse, macroin adverse, consider during d	e adverse, being dry short-terr vertebrate short-terr red minor, rought per	short-ten r, and a re n effects o s and fish n effects o however rmit imple	m effects a duction in on macroin . A minor to water a there is a mentation	are anticip flows in f nvertebra adverse, s re likely as high risk f n	bated with the River I tes. The N short-tern s the abst to water q	respect t Kennet. C liddle Ken n effect on raction wi uality ass	o biodiver hanges in net water angling a Il cause th ociated w	rsity, flora flow in th body is co nd recrea ne River O ith the Ma	and faum e River K onsiderec tion relate g to rema rlborough	a. Impacts ennet (a d I at moder es is posik in dry for n STW disc	on fish m esignated ate risk of ole due to i longer. Flo charge duo
SEA Objectives Adverse Effects Assessment Summary					None		None				None	
Summary commentary of scheme beneficial effects	Moderate supplies	e beneficia to drough	al effects a at.	are expect	ed due to	provision	of additio	onal water	supply. N	linor ben	eficial effe	cts are as:
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None

uld be abstracted from the Berkshire Downs om those used for the TWUL normal linor construction works are required to ch borehole pump. The abstracted water will construction impacts on the environment are ber inclusive, although it could be												
ay occur due to an extension in duration of SSSI) also have potential for moderate short-term deterioration of WFD status for mpacts on fish communities. Moderate w changes in the River Kennet are to reduced dilution in the River Kennet												
		None	None									
ociated v	vith impro	ving the r	esilience	of water								
None	None		None	None								

SEA	A topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ł igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation	Residual beneficial effect significance (likely to remain after) reasonable mitigation
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	Minor construction works required involve connection of mobile generators and starters to each borehole pump, however these are not expected to be significant. The EAR identifies no significant reductions in wetted width or marginal habitats. The extension in duration of River Og being dry may cause moderate impacts on brown trout, bullhead and grayling, and minor impacts on European eel. As a result of changes to flow, moderate adverse impacts have been identified on macroinvertebrates and fish in the River Kennet (a designated SSSI), including fragmentation of habitats and increased significance of obstacles/barriers to migration, and alteration to community composition as a result of water quality deterioration. The Middle Kennet water body (GB106039023173) would be at moderate risk of short-term deterioration of WFD status for macroinvertebrates and fish.	Medium (adverse)	Medium	Medium	Medium	Short-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Implementation of the option may cause a delay in hydrological, recovery increasing the habitat suitability and therefore distribution of invasive species, however these impacts are expected to be negligible.	Low (adverse)	Low	Medium	Low	Short-term	Temporary	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Option will help to maintain essential public water supplies (provision of up to an additional 4MI/d of water) during drought conditions and therefore help maintain public health. Construction activities (mobile generators connected to borehole pump) are considered very small scale and short term. The Marlborough AQMA lies within 5km of the study area.	Low (adverse) Low (beneficial)	Medium (adverse) High (beneficial)	Medium	Low (adverse) High (beneficial)	Short-term	Temporary	Minor adverse	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	The fish assessment in the EAR identifies a potential minor alteration to community composition as a result of drought permit implementation, therefore there is a potential minor impact on angling. The River Og and Kennet contain a wide diversity of fish species. The location and surrounding area makes the catchment very popular with anglers. Any impacts of the drought permit on fish population or distribution may impact anglers. Navigation is not possible within the River Og (Reach 1) and the River Kennet between the River Og confluence and Hungerford (Reach 2). As such, the potential to affect navigation is minor.	Low (adverse)	Medium	Medium	Medium	Short-term	Temporary	Minor adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions without impacting on other abstractors, therefore ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	Medium	Short-term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Implementation will result in an increase in energy use and chemicals for treatment of abstracted water (4Ml/d). The option make use of existing infrastructure. However, will also require additional equipment and energy use to enable pumping from boreholes that are not used in non-drought conditions.	Low (adverse)	Low	Medium	Low	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies moderate risks on the River Og due to increased duration of reach being dry up until annual groundwater recovery occurs, leading to watercourses remaining drier for longer. The impact is anticipated to be up to 31 days with full recovery not occuring until the following hydrological summer. There may also be small changes to flow in the River Kennet (within normal range of medium to low flows) around the period when recovery of flow input from the River Og would otherwise have occurred without a drought permit being utilised. Impact anticipated to be up to 3 months, with recovery not occuring until the following hydrological summer.	Medium (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affectin water body status.	Assuming best practice construction methods, impacts from construction on water are anticipated to be negligible. Care should be taken at the end of the drought option operation to prevent contamination of the groundwater. The EAR identifies a moderate risk to phosphorus concentration, and negligible risks to dissolved oxygen and ammonia concentrations in both reaches. In the River Kennet reach there is a high risk to water quality associated with Marlborough STW due to reduced dilution in the River Kennet during drought permit implementation.	Medium (adverse)	Medium	Medium	Medium	Short-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. Abstraction will be temporary and short term, however, there is potential for duration of effects on groundwater to extend beyond the drought permit implementation period with potential adverse effects to the local WFD water body . The EAR identifies that the option is unlikely to impact the feasibility of any groundwater or surface water abstractions in the zone of influence (including those for agriculture).	Low (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	The minor construction works required (connection of mobile generators) are not anticipated to result in any adverse effects on soils. In operation in-channel structures, such as weirs/sluices, could influence sediment dynamics by creating ponded areas upstream of the structure. These areas will have very low flow velocities and increased depth in relation to other areas of the channel, this is likely to promote the deposition of fine sediment behind the structure. The EAR describes geomorphology impacts as minor in both reaches based on the anticipated low sediment concentrations (characteristic of a chalk fed river) and the relatively low amounts of sediment in transport during a drought. As the River Og channel is accustomed to drying up for extended periods, geomorphological impacts related to changes in wetted perimeters are not considered significant.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option involves abstraction of 4MI/d of water. There would be a short-term increase in air emissions associated with abstraction and treatment. The option is within 5km of the Marlborough AQMA.	Low (adverse)	Medium	Low	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	The option involves abstraction of 4MI/d of water. There would be a short-term increase in greenhouse gas emissions associated with abstraction and treatment.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Minor beneficial



Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are number of statutory sites in proximity to the Ogbourne boreholes, including three Scheduled Ancient Monuments and a Conservation Area associated with Ogbourne St. George. However, all are over 1km from minor construction works planned at the boreholes. Hydrological impacts associated with operation of the options are not anticipated to adversely effects these assets or any unknown water- dependent assets.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The option and impacted reaches are within North Wessex Downs AONB. The minor construction works planned are associated with existing borehole sites. The AONB is a unique and spectacular landscape. The River Og and River Kennet form an essential part of the landscape of the AONB. The impacted reach of the River Og is an intermittently flowing river and there are naturally periods of no flow. The impact of the drought permit is to extend the period of recovery between the months of October to March. This delay to the recovery period occurs outside of the summer months when visitors to the North Wessex Downs would be greater. Considering these factors the value/sensitivity of the AONB is considered to be Medium.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None



Drought Plan option	Oxford C No abstra of the Ca closest p (Bradley additiona associate The drou Decembe	anal: action usu nal and Ri ooint of the and Perry al environr ed with the ght permiser inclusive	ally occur iver Trust, Oxford C Hills bore mental imp installati t could be e.	rs from the and trans anal to Gi holes). A bact at or a on of pum implemer	e Oxford (ferring it rimsbury I bstractior around the ops and te nted at an	Canal. The for storage Reservoir. as would b ese boreh mporary p y time of y	drought p e to Grims The availa e within n oles comp ipe conne ear althou	permit woo bury Reso able reso ormal ope pared to th ection acro gh is anti	uld involve ervoir and irce would erational v ne normal oss the sh icipated to	e abstracti onwards d be abstra rolumetric abstractio ort distan be impler	ion of 5 to to supply. acted from limits and n situation ce betwee mented for	10MI/d fi The abs borehol so the o n. Constr n the Ox r up to 6
Summary commentary of scheme adverse effects	Small cha minor ov emission Cherwell	anges to f erall. No ii s associa District C	low and ve npacts on ted with co ouncil AQ	elocity in l geomorp onstructio MA. Negli	Reach 1 o hology, w on and add gible effed	f the Oxfo ater qualid ditional ab cts identifi	rd Canal w ty and othe straction i ed for the	vill occur, er abstrac may occu risk to sp	however t stors are e r, and thes read of IN	the hydrol expected. se are con NS.	ogical imp Short-tern sidered to	act of th ו effects be mino
SEA Objectives Adverse Effects Assessment Summary	None				None		None		None	None	None	None
Summary commentary of scheme beneficial effects	Moderate of water :	e beneficia supplies to	l effects a o drought.	re expecte	ed due to	provision	of additio	nal water :	supply. M	inor benef	icial effec	ts are as
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None



SE	A topics and objectives	Assessment methodology				Assessment of option					
Торіс	Objective	Indicator questions	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence or effect (permanent/ temporary)	f Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	 •Will it protect the most important sites for nature conservation? •Will it protect and enhance aquatic, transitional and terrestrial species and habitats? •Will it contribute to the sustainable management of natural habitats and ecosystems, i.e. within their limits and capacities taking into account climate change adaptability? •Will it affect WFD compliance e.g. good ecological potential/status? •Will it ensure maintenance or support provision of fish passage with respect to migratory fish? •Will it protect or enhance natural capital and ecosystem services? •Will it maintain or enhance access to areas of natural heritage interest? 	The EAR confirms that no designated sites would be impacted by the drought option. Hydrological impacts were assessed as minor therefore a features assessment was not undertaken. No impacts on WFD compliance are anticipated. It is assumed that the abstraction would be adequately screened to prevent fish entrainment or impingement.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	• Will it limit, reduce or increase the risk of spread of Invasive Non-Native Species (INNS)?	There is uncertainty surrounding the likely effect of flow and level impacts upon invasive species ability to distribute further within the watercourse. However, the minor hydrological impact is not considered likely to significantly impact on the species as hydrological conditions and water levels are only subject to slight change. Invasive plant species can utilise flow of the watercourse for dispersal but are not reliant on it, implementation of the drought permit is unlikely to increase dispersal.	Low (adverse)	Low	Medium	Low	Short-term	Temporary	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	 • Will it help to ensure access to a secure and affordable supply of drinking water? • Will it help to protect or improve drinking water quality? • Will it raise awareness of the importance and value of the water environment for health and well-being? • Will it help to promote healthy communities and protect from risks to health and wellbeing? 	Option will help to maintain essential public water supplies (provision of up to an additional 10Ml/d of water) during drought conditions and therefore help maintain public health. Some construction is required for option implementation, therefore there may be minor effects on human health (e.g., noise and dust nuisance).	Low (beneficial) Low (adverse)	High (beneficial) High (adverse)	Medium	Moderate	Short term	Temporary	Minor adverse	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	●Will it protect or enhance opportunities for recreation and tourist activities, including navigation?	Flows and velocities would be increased slightly within Oxford Cana due to abstraction up to the first lock upstream. The increase would be small given the size of the abstraction with no impacts on fish or angling. The Canal and River Trust will still be able to manage water levels during drought permit implementation. Therefore no impacts on navigation are anticipated.	I Low (adverse)	Low	Small	Moderate	Short term	Temporary	Negligible adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	 Will it assist in ensuring provision of essential infrastructure services to support a sustainable economy? 	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. No impacts on navigation, therefore no effects on essential services are anticipated.	Low (beneficial)	High	Small	Moderate	Short term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	 • Will it minimise the use of energy and promote energy efficiency? • Will it make use of existing infrastructure? • Will it help to encourage sustainable design or use of sustainable materials (e.g. supplied from local resources)? • Will it reduce the amount of waste generated and increase the proportion sent to reuse or recycling? 	An increase in abstraction (5-10Ml/d) is likely to result in a proportional increase in the use of energy, chemicals and generation of waste. However, existing infrastructure would be used, minimising such increases.	Low (adverse)	Low	Small	High	Short term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	 •Will it help to minimise the demand for resources (including water)? •Will it enable efficient water resource management and ensure maintenance of water supplies? 	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	 Will it alter the flow or level regime or residence time of surface waters or groundwaters? Will it help to minimise risks associated with unsustainable abstraction of ground and surface waters? 	There would be no impact around the Bradley and Perry Wells boreholes normal licensed operational limits would not be exceeded. The Canal and River Trust has indicated that it would stil be able to manage water levels in the canal during operation . The EAR identifies a minor hydrological impact relating to minor increases in flow velocities in the canal.	Low (adverse)	Medium	Small	High	Short term	Temporary	Minor adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	 It minimise risks of adverse effects on water quality? It avoid contamination of groundwater? It affect WFD compliance (supporting elements to Good Ecological Potential/Status, including hydromorphology)? It affect bathing water compliance? It abstract from a water resource with resource availability (with reference to CAMS status and WFD considerations)? It affect WFD compliance e.g. Good Environmental Status? 	The EAR describes no risk to water quality or WFD status as a result of drought permit implementation.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	 Will it enable flexible control over the level of abstraction at short notice in response to changing environmental conditions? Will it enable a sustainable use of water resources that balances demand for water with environmental protection? 	Water resource availability is described as "water not available for licencing" by the EA. However, abstraction is within normal operational volumetric limits and so would not have any additional environmental impact compared to the normal abstraction situation. The water would be transferred via the canals therefore minimising energy use for pumping. There are no abstraction licences (>0.5Ml/d) in the zone of impact that could be impacted.	n/a	n/a	n/a	n/a	n/a	n/a	None	None			
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	 • Ill it encourage efficient water use? • Ill it contribute towards improving the awareness of water sustainability and its true value? 	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None			
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	 Will it avoid damage to and protect geologically important sites? Will it protect and enhance the quality of soils? Will it ensure efficient use of land (e.g. make use of previously developed land)? Will it contribute towards a catchment-wide approach to land management? 	No impacts on land use, soil or geology are anticipated as a result of the operation of this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None			
Air and Climate	6.1 To maintain and improve air quality.	• Will it increase emissions to air in an areas sensitive to emissions (e.g. in proximity to ar AQMA or to sensitive habitat or more deprived area)?	There would be emissions associated with abstraction and treatment of water. The drought option is in proximity to Cherwell District Council AQMA.	Low (adverse)	Medium	Small	Moderate	Short term	Temporary	Minor adverse	None			
Air and climate	6.2 To reduce greenhouse gas emissions.	 If it reduce or minimise air pollutant and greenhouse gas emissions? If it result in an increase in greenhouse gas emissions over and above that that would be produced to supply an equivalent quantity of water in non-drought conditions? 	There would be energy use and emissions associated with the abstraction and treatment of water, however, this is unlikely to be more than would be produced to supply an equivalent quantity of water in non-drought conditions.	Low (adverse)	Low	Small	High	Short term	Temporary	Negligible adverse	None			
Air and climate	6.3 To consider the need for adaptive measures for climate change.	 Will it reduce vulnerability to risks associated with climate change effects (e.g. reduce the adverse effects of droughts and floods)? Will it improve resilience/adaptability to likely effects of climate change, e.g. by increasing water storage capacity, or transferring water from areas with surplus? 	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	Moderate	Short term	Temporary	None	Minor beneficial			
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	 Will it avoid damage to and protect the historic environment, heritage assets and their settings, places and spaces that enhance local distinctiveness? Will it maintain and enhance the historic environment, including palaeo-environmental deposits? Will the hydrological setting of water-dependent assets be altered, such as important wetland areas with potential for paleo-environmental deposits? Will it improve access, value, understanding or enjoyment of heritage assets and culturally/historically important assets in the region? 	There are no heritage assets in proximity to the option and zone of influence. The EAR identifies no significant impacts on groundwater levels or water levels in the canal therefore, no adverse effects on the historic environment or water dependant heritage assets.	n/a	n/a	n/a	n/a	n/a	n/a	None	None			
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	 Will it avoid adverse effects and enhance designated landscapes? Will it help to protect and improve non-designated areas of natural beauty and distinctiveness (e.g. woodlands) and avoid the loss of landscape features and local distinctiveness? Will it improve access to valued areas of landscape character? 	The Oxford Canal National Trail is within the area of influence. However, construction requirements are limited to installation of pumps and temporary pipe connection across the short distance between the Oxford Canal and Grimsby Reservoir. No impacts to access are anticipated. Loss of local distinctiveness is unlikely as water levels in the canal would be maintained. The trail is unlikely to be impacted over the duration of the drought permit implementation as water levels are only subject to slight change.	n/a	n/a	n/a	n/a	n/a	n/a	None	None			
SE	A topics and objectives	Assessment methodology	Assessment of option											
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Торіс	Objective	Indicator questions	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)			
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	 Will it protect the most important sites for nature conservation? Will it protect and enhance aquatic, transitional and terrestrial species and habitats? Will it contribute to the sustainable management of natural habitats and ecosystems, i.e. within their limits and capacities taking into account climate change adaptability? Will it affect WFD compliance e.g. good ecological potential/status? Will it ensure maintenance or support provision of fish passage with respect to migratory fish? Will it protect or enhance natural capital and ecosystem services? Will it maintain or enhance access to areas of natural heritage interest? 	Screening identified no designated sites that are suseptible to flow and level impacts within the ZoI of the drought permit. Major adverse effects are anticpated on ecological communities (macroinverteprates, macrophytes and fish) as well as on the WFD status for Letchcombe Brook for these components. NERC species brown trout and other notable species (e.g. Ranunculus sp., bullhead and brook lamprey) all have major impacts associted with the potential for mortalities due to reduce flow and reduced species abundance and diversity. This has been assessed as major impact to biodiversity, flora and fauna overall, however, the application of mitigation measures has the potential to reduce this but a precautionary approach has been applied.	High (adverse)	High	Medium	Moderate	Medium term	Temporary	Major adverse	None			
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	• Will it limit, reduce or increase the risk of spread of Invasive Non-Native Species (INNS)?	Minor adverse impacts are considered likely for invasive flora (Canadian Pondweed <i>Elodea candensi</i> s and Least duckweed <i>Lemna minuta</i>) for both reaches associated with more favourable conditions (slow flowing water and high nutrient levels).	Low (adverse)	Medium	Medium	Moderate	Short term	Temporary	Minor adverse	None			
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	 It help to ensure access to a secure and affordable supply of drinking water? Will it help to protect or improve drinking water quality? Will it raise awareness of the importance and value of the water environment for health and well-being? Will it help to promote healthy communities and protect from risks to health and wellbeing? 	Option will help to maintain essential public water supplies (provision of up to an additional 4.5MI/d of water) during drought conditions and therefore help maintain public health.	Low (beneficial)	High	Medium	Moderate	Short term	Temporary	None	Moderate beneficial			
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	• Will it protect or enhance opportunities for recreation and tourist activities, including navigation?	Impacts on recreation have been identified in relation to the several trails and footpaths that are in place along Letcombe Brook through Wantage and Grove which are frequented by locals. However, as Letchcombe Brook is known to naturally drying, the impact is expected to be minor. No impacts are anticipated for navigation or angling.	Low (adverse)	Low	Medium	Moderate	Short term	Temporary	Minor adverse	None			
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	● Will it assist in ensuring provision of essential infrastructure services to support a sustainable economy?	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. No impacts on navigation have been identified, therefore no effects on related businesses or tourism are anticipated.	Low (beneficial)	High	Medium	Medium	Short term	Temporary	None	Moderate beneficial			
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	 Will it minimise the use of energy and promote energy efficiency? Will it make use of existing infrastructure? Will it help to encourage sustainable design or use of sustainable materials (e.g. supplied from local resources)? Will it reduce the amount of waste generated and increase the proportion sent to reuse or recycling? 	Increases in abstraction over and above what occurs under normal operation will usually result in related and proportional increases in energy use and waste. The option will make use of existing infrastructure (beneficial impact).	Low (adverse) Low (beneficial)	Low	Medium	Moderate	Short term	Temporary	Negligible adverse	Negligible beneficial			
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	 Will it help to minimise the demand for resources (including water)? Will it enable efficient water resource management and ensure maintenance of water supplies? 	No opportunities to promote the sustainable management of natural resources have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None			
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	 Will it alter the flow or level regime or residence time of surface waters or groundwaters? Will it help to minimise risks associated with unsustainable abstraction of ground and surface waters? 	The EAR identifies a major hydrological impact on both reaches of Letcombe Brook. The drought permit will deplete flow in the river at some locations in the upper reach underlain by Chalk, and potentially extending into the lower reach underlain by Upper Greensand by 100%. Elsewhere there would be major reductions in flow.	High (adverse)	High	Medium	High	Medium term	Temporary	Major adverse	None			
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	 It minimise risks of adverse effects on water quality? Will it avoid contamination of groundwater? Will it affect WFD compliance (supporting elements to Good Ecological Potential/Status, including hydromorphology)? Will it affect bathing water compliance? Will it abstract from a water resource with resource availability (with reference to CAMS status and WFD considerations)? Will it affect WFD compliance e.g. Good Environmental Status? Will it affect river basin management plans? 	The EAR identifies moderate risk with regard to water temperature, and dissolved oxygen and ammonia with a high risk to SRP. Also a moderate localised water quality risk associated with Wantage STW discharge (Reach 2) which reduces to minor downstream.	High (adverse)	Medium	Small	Moderate	Short term	Temporary	Major adverse	None			

Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	 Will it enable flexible control over the level of abstraction at short notice in response to changing environmental conditions? Will it enable a sustainable use of water resources that balances demand for water with environmental protection? 	Water resource availability is described as "water not available for licencing" by the EA at Q95. The EAR identifies one surface water abstraction at Letcombe Brook Dandridges Mill that would be impacted if the drought option was implemented. Although the DP is not expected to severely impact flow in Reach 2, the river is expected to reduce and the abstraction may be limited (high risk).	High (adverse)	High	Medium	Moderate	Short term	Temporary	Major adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	 Will it encourage efficient water use? Will it contribute towards improving the awareness of water sustainability and its true value? 	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	 Will it avoid damage to and protect geologically important sites? Will it protect and enhance the quality of soils? Will it ensure efficient use of land (e.g. make use of previously developed land)? Will it contribute towards a catchment-wide approach to land management? 	The EAR suggests moderate impacts on geomorphology are anticipated in Reach 2, associated with risk of increased sedimentation of Wantage STW sourced suspended solids, and risk of re-entrainement of these at the return to high flows. Elsewhere, minor impacts on geomorphology in Reach 1 associated with changes to sediment dynamics around structures. No impacts on land use, soil or geology are expected as a result of the operation of this option. The banks are generally steep, and variation in wetted width would only occur in the limited shallower sections of the reaches.	Medium (adverse)	Medium	Medium	Moderate	Short term	Temporary	Moderate adverse	None
Air and Climate	6.1 To maintain and improve air quality.	• Will it increase emissions to air in an areas sensitive to emissions (e.g. in proximity to an AQMA or to sensitive habitat or more deprived area)?	The option will increase air emissions associated with abstraction and treatment of water (up to 4.5Ml/d), however no AQMAs are in proximity of the option. There is no construction associated with this option.	Low (adverse)	Low	Small	Low	Short term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	 It reduce or minimise air pollutant and greenhouse gas emissions? Will it result in an increase in greenhouse gas emissions over and above that that would be produced to supply an equivalent quantity of water in non-drought conditions? 	Increased abstraction would cause an increase in energy use in the short term. There is no construction associated with this option.	Low (adverse)	Low	Medium	Moderate	Short term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	 • Will it reduce vulnerability to risks associated with climate change effects (e.g. reduce the adverse effects of droughts and floods)? • Will it improve resilience/adaptability to likely effects of climate change, e.g. by increasing water storage capacity, or transferring water from areas with surplus? 	Drought orders/permits are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (adverse)	High	Small	Moderate	Short term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	 It avoid damage to and protect the historic environment, heritage assets and their settings, places and spaces that enhance local distinctiveness? It maintain and enhance the historic environment, including palaeo-environmental deposits? It he hydrological setting of water-dependent assets be altered, such as important wetland areas with potential for paleo-environmental deposits? It improve access, value, understanding or enjoyment of heritage assets and culturally/historically important assets in the region? 	No constuction activities are associated with this drought option. There will be a temporary, short-term change to water levels during operation of this drought option. There is one scheduled monument (a roman villa) within 1km of the impacted reach. Letchcome Brook dries under natural drought conditions, therefore it is unlikely to cause any impacts to heritage assets. No effects on the historic environment are anticipated.	Low	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	 I state of the state o	No construction activities would be conducted during implementation of the plan. There will be a change to water levels in two reaches of Letcombe Brook for a short duration. The option is located within the North Wessex Downs AONB. However, Letcombe Brook dries under natural drought conditions and the AONB is therefore unlikely to be impacted over the duration of the drought permit implementation.	Low	Low	Medium	Moderate	Short term	Temporary	Negligible adverse	None

Drought Plan option	Childrey The Child Water's I drought	Warren: drey Warre licence to permit opt	en abstrac abstract fi tion is to r	tion cons rom the C resume his	ists of one hildrey Wa storical ab	e boreholo arren bore straction	e located a pholes was to previou	approxima s revoked us licence	ately 1 km as a resu limit of 4.	away froi It of the R 5MI/d.	m the sou lestoring S	rce of Letc Sustainable
Summary commentary of scheme adverse effects:	Short-ter water qu brown tr duckwee minor, si and treat	rm, tempol ality effect out). Othe ed), decline hort-term of tment of a	rary effect ts. This is r short-ter es in wate drying-up dditional v	is on wate likely to c m advers r quality (of Letcon vater. Neg	er levels ar contribute e effects a with regar nbe Brook gligible, sh	nd flows a to major nticipated ds to SRF along exi ort-term i	are anticip short-tern d include (?), and geo sting trail increases	bated, con n, tempora changes t comorphole s and foo in air emi	nprising a ary effects o the distu ogical cha tpaths, an ssions are	100% dec on biodi ribution a nges (sha d minor ii e expected	crease in f versity, flo nd abunda nllower ba ncreases i d to accon	low on Rea ora and fau ance of inv nks affecte n energy u npany incr
SEA Objectives Adverse Effects Assessment Summary			None		None		None				None	
Summary commentary of scheme beneficial effects Beneficial effects include ensuring water supply to the local population and other custo with improving the resilience of water supplies to drought.			omers/bu	sinesses.	There are							
SEA Objectives Beneficial Effects Assessment Summary	None	None		None			None	None	None	None	None	None



SEA	topics and objectives				Assessment of opti	ion				
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservatior interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	Screening identified no designated sites that are suseptible to flow and level impacts within the ZoI of the drought permit. Major adverse effects are anticpated on ecological communities (macroinverteprates, macrophytes and fish) as well as on the WFD status for Letchcombe Brook for these components. NERC species brown trout and other notable species (e.g. Ranunculus sp., bullhead and brook lamprey) all have major impacts associted with the potential for mortalities due to reduce flow and reduced species abundance and diversity. This has been assessed as major impact to biodiversity, flora and fauna overall, however, the application of mitigation measures has the potential to reduce this but a precautionary approach has been applied.	High (adverse)	High	Medium	Moderate	Medium term	Temporary	Major adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Minor adverse impacts are considered likely for invasive flora (Canadian Pondweed <i>Elodea candensi</i> s and Least duckweed <i>Lemna minuta</i>) for both reaches associated with more favourable conditions (slow flowing water and high nutrient levels).	Low (adverse)	Medium	Medium	Moderate	Short term	Temporary	Minor adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	Option will help to maintain essential public water supplies (provision of up to an additional 4.5Ml/d of water) during drought conditions and therefore help maintain public health.	Low (beneficial)	High	Medium	Moderate	Short term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Impacts on recreation have been identified in relation to the several trails and footpaths that are in place along Letcombe Brook through Wantage and Grove which are frequented by locals. However, as Letchcombe Brook is known to naturally drying, the impact is expected to be minor. No impacts are anticipated for navigation or angling.	Low (adverse)	Low	Medium	Moderate	Short term	Temporary	Minor adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. No impacts on navigation have been identified, therefore no effects on related businesses or tourism are anticipated.	Low (beneficial)	High	Medium	Medium	Short term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction over and above what occurs under normal operation will usually result in related and proportional increases in energy use and waste. The option will make use of existing infrastructure (beneficial impact).	Low (adverse) Low (beneficial)	Low	Medium	Moderate	Short term	Temporary	Negligible adverse	Negligible beneficial
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR identifies a major hydrological impact on both reaches of Letcombe Brook. The drought permit will deplete flow in the river at some locations in the upper reach underlain by Chalk, and potentially extending into the lower reach underlain by Upper Greensand by 100%. Elsewhere there would be major reductions in flow.	High (adverse)	High	Medium	High	Medium term	Temporary	Major adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	The EAR identifies moderate risk with regard to water temperature, and dissolved oxygen and ammonia with a high risk to SRP. Also a moderate localised water quality risk associated with Wantage STW discharge (Reach 2) which reduces to minor downstream.	High (adverse)	Medium	Small	Moderate	Short term	Temporary	Major adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Water resource availability is described as "water not available for licencing" by the EA at Q95. The EAR identifies one surface water abstraction at Letcombe Brook Dandridges Mill that would be impacted if the drought option was implemented. Although the DP is not expected to severely impact flow in Reach 2, the river is expected to reduce and the abstraction may be limited (high risk).	High (adverse)	High	Medium	Moderate	Short term	Temporary	Major adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	The EAR suggests moderate impacts on geomorphology are anticipated in Reach 2, associated with risk of increased sedimentation of Wantage STW sourced suspended solids, and risk of re-entrainement of these at the return to high flows. Elsewhere, minor impacts on geomorphology in Reach 1 associated with changes to sediment dynamics around structures. No impacts on land use, soil or geology are expected as a result of the operation of this option. The banks are generally steep, and variation in wetted width would only occur in the limited shallower sections of the reaches.	Medium (adverse)	Medium	Medium	Moderate	Short term	Temporary	Moderate adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option will increase air emissions associated with abstraction and treatment of water (up to 4.5Ml/d), however no AQMAs are in proximity of the option. There is no construction associated with this option.	Low (adverse)	Low	Small	Low	Short term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Increased abstraction would cause an increase in energy use in the short term. There is no construction associated with this option.	Low (adverse)	Low	Medium	Moderate	Short term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought orders/permits are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (adverse)	High	Small	Moderate	Short term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	No constuction activities are associated with this drought option. There will be a temporary, short-term change to water levels during operation of this drought option. There is one scheduled monument (a roman villa) within 1km of the impacted reach. Letchcome Brook dries under natural drought conditions, therefore it is unlikely to cause any impacts to heritage assets. No effects on the historic environment are anticipated.	Low	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None

Landscape and Visual	8.1 To protect, enhance the quality of and	No construction activities would be conducted during	Low	Low	Medium	Moderate	Short term	Temporary	Negligible adverse	None
Amenity	improve access to designated and undesignated	implementation of the plan.								
	landscapes, townscapes and the countryside.	There will be a change to water levels in two reaches of								
		Letcombe Brook for a short duration.								
		The option is located within the North Wessex Downs								
		AONB. However, Letcombe Brook dries under natural								
		drought conditions and the AONB is therefore unlikely to								
		be impacted over the duration of the drought permit								
		implementation.								

Drought Plan option	Ogbourn The licen Sustaina expected Mi/d. Min each bor significa May and	e 1: ble Abstra I deployak or constr ehole pun nt constru Decembe	tract an av action pro- ble output uction wo np. The ab uction imp r inclusive	verage of gramme. during th rks are re stracted acts on th acts on th a, althoug	8 MI/d and In a droug ese period quired to a water will he environ h it could	l peak of f ht, the an ls was 3.5 achieve th be pumpe ment are be implen	13.6 MI/d f nount of w MI/d. The e abstrac ed to Ogbo anticipate nented at	rom the O vater avail erefore, Og tion from purne WTN d. The dro any time o	gbourne k able for ak ybourne 1 these bord V for treat ought pern of year.	boreholes bstraction drought p eholes. W ment via mit is antic	will be w was phys permit pro prks will i he existin sipated to	as revoke ically limi poses to u nclude col g pipeline be applied	d in April ted by gro use the ex nnection o from the d for up to	2017 as a bundwater isting bor of mobile borehole o six cons	result of a r levels the reholes an generator s to the W ecutive m	the Restor erefore the d abstrac s and star TW. No onths bet	ring e t 3.5 rters to ween
Summary commentary of scheme adverse effects	Moderate River Og adverse, macroinv short-ter however impleme	e adverse, being dry short-terr vertebrate m effects there is a ntation.	short-tern , and a re n effects o s and fish to water a high risk	n effects duction ir on macroi . Minor ac re likely a to water c	are anticip flows in nvertebra lverse, sh is the abs quality ass	Dated with the River tes. The N ort-term e traction w sociated w	respect t Kennet. C liddle Ken ffects on ill cause t ill cause t	o biodiver hanges in nnet water angling a he River (arlborougi	rsity, flora flow in th body is c nd recreat Og to rema h STW dis	and fauna le River Ka onsidered tion are po ain dry for charge du	a. Impacts ennet (a d at moder ossible du longer. F le to reduc	on fish m esignated ate risk of e to impac low chang ced dilutio	ay occur SSSI) als short-ter cts on fish les in the n in the R	due to an so have po m deterio commun River Ken River Kenr	extensior otential fo ration of V nities. Moo net are co net during	n in durati r moderat VFD statu derate adv onsidered drought p	on of e s for verse, minor, permit
SEA Objectives Adverse Effects Assessment Summary					None		None				None				None	None	
Summary commentary of scheme beneficial effects	Moderate beneficial effects are expected due to provision of additional water supply. Minor beneficial effects are associated with improving the resilience of water supplies to drought.																
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	None	None		None	None

SE/	A topics and objectives	Assessment methodology				Assessment of option					
Торіс	Objective	Indicator questions	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	 Will it protect the most important sites for nature conservation? Will it protect and enhance aquatic, transitional and terrestrial species and habitats? Will it contribute to the sustainable management of natural habitats and ecosystems, i.e. within their limits and capacities taking into account climate change adaptability? Will it affect WFD compliance e.g. good ecological potential/status? Will it ensure maintenance or support provision of fish passage with respect to migratory fish? Will it protect or enhance natural capital and ecosystem services? Will it maintain or enhance access to areas of natural heritage interest? 	Minor construction works required involve connection of mobile generators and starters to each borehole pump, however these are not expected to be significant. The EAR identifies moderate hydrological impacts in Reach 1 (River Og) and minor impacts in Reach 2 (River Kennet), with no significant impacts to wetted width. Reach 2 intersects the River Kennet SSSI and designated features (macrophytes, macroinvertebrates, fish) could be impacted as a result of a reduction in flows. The impact on conservation objectives is considered to be moderate, based on medium, short-term impacts to species supported by the site, causing a declince in ecological status. The extension in duration of River Og being dry may cause impacts on brown trout, barbel, bullhead and grayling. These have been assessed in the EAR as of minor to moderate significance. The Middle Kennet water body (GB106039023173) would be at moderate risk of short-term deterioration of WFD status for macroinvertebrates and fish. The impact on chalk stream habitat is considered moderate.	Medium (adverse)	Medium	Medium	Medium	Short-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	• Will it limit, reduce or increase the risk of spread of Invasive Non-Native Species (INNS)?	Implementation of the option may cause a delay in hydrological, recovery increasing the habitat suitability and therefore distribution of invasive species, however these impacts are expected to be negligible.	Low (adverse)	Low	Medium	Medium	Short-term	Temporary	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	 Will it help to ensure access to a secure and affordable supply of drinking water? Will it help to protect or improve drinking water quality? Will it raise awareness of the importance and value of the water environment for health and well-being? Will it help to promote healthy communities and protect from risks to health and wellbeing? 	Option will help to maintain essential public water supplies (provision of up to an additional 3.5Ml/d of water) during drought conditions and therefore help maintain public health. Construction activities (mobile generators connected to borehole pump) are considered very small scale and short term. The Marlborough AQMA lies within 5km of the study area.	Low (adverse) Low (beneficial)	Medium (adverse) High (beneficial)	Medium	Low (adverse) High (beneficial)	Short-term	Temporary	Minor adverse	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	• Will it protect or enhance opportunities for recreation and tourist activities, including navigation?	The fish assessment in the EAR identifies a potential minor alteration to community composition as a result of drought permit implementation, therefore there is a potential minor impact on angling. The River Og and Kennet contain a wide diversity of fish species. The location and surrounding area makes the catchment very popular with anglers. Any impacts of the drought permit on fish population or distribution may impact anglers. Navigation is not possible within the River Og (Reach 1) and the River Kennet between the River Og confluence and Hungerford (Reach 2). As such, the potential to affect navigation is minor. The Ridgeway National Trail intersects Reach 1, however, the minor construction associated with this option will not be in this vicinity, therefore impacts will be negligible.	Low (adverse)	Medium	Medium	Medium	Short-term	Temporary	Minor adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	● Will it assist in ensuring provision of essential infrastructure services to support a sustainable economy?	Option will contribute to the maintenance of supply reliability in drought conditions without impacting on other abstractors, therefore ensuring a resilient supply for customers and economic activity.	Low (beneficial)	High	Medium	Medium	Short-term	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	 Will it minimise the use of energy and promote energy efficiency? Will it make use of existing infrastructure? Will it help to encourage sustainable design or use of sustainable materials (e.g. supplied from local resources)? Will it reduce the amount of waste generated and increase the proportion sent to reuse or recycling? 	Implementation will result in an increase in energy use and chemicals for treatment of abstracted water (3.5MI/d). The option make use of existing infrastructure. However, will also require additional equipment and energy use to enable pumping e from boreholes that are not used in non-drought conditions.	; Low (adverse)	Low	Medium	Low	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	 It help to minimise the demand for resources (including water)? Will it enable efficient water resource management and ensure maintenance of water supplies? 	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	 Mill it alter the flow or level regime or residence time of surface waters or groundwaters? Will it help to minimise risks associated with unsustainable abstraction of ground and surface waters? 	The EAR identifies short term, moderate adverse effects to the River Og regarding increased duration of the impacted reach being dry until annual groundwater recovery occurs, leading to watercourses remaining drier for longer. There may also be short term minor adverse effects to the River Kennet, with small changes to flow within normal range of medium to low flows around the period wher recovery of flow input from the River Og would otherwise have occurred without a drought permit being utilised.	Medium (adverse)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	None

Assuming best practice construction methods, impacts from construction on water are anticipated to be negligible. Care should be taken at the end of the drought option operation to prevent contamination of the groundwater. The EAR identifies a moderate risk to SRP concentration and a negligible risk to dissolved oxygen and ammonia. In the River Kennet reach there is a high risk to water quality associated with Marlborough STW due to reduced dilution in the River Kennet during drought permit implementation. Local resource availability is described as 'Water not available for licensing'. Abstraction will be temporary and short term, however, there is potential for duration of effects on groundwater to extend beyond the drought permit implementation period with potential adverse effects to the local WFD water body . The EAR identifies that the option is unlikely to impact the feasibility of any groundwater or surface water abstractions in the zone of influence (including those for agriculture). No opportunities to promote long-term improvement in water efficiency have been identified for this option. The minor construction works required (connection of mobile generators) are not anticipated to result in any adverse effects on soils. In operation in-channel structures, such as weirs/sluices, could influence sediment dynamics by creating ponded areas upstream of the structure. These areas will have very low flow velocities and increased depth in relation to other areas of the channel, this is likely to promote the deposition of fine sediment behind the structure. The EAR describes geomorphology impacts as minor in both reaches based on the anticipated low sediment concentrations (characteristic of a chalk fed river) and the relatively low amounts of sediment in transport during a drought.	Medium (adverse)	Medium Medium n/a	Medium Medium n/a Medium	Medium Moderate n/a Moderate	Short-term Short-term n/a Short-term	Temporary Temporary n/a Temporary	Moderate adverse Minor adverse None Negligible adverse	None None None None
Local resource availability is described as 'Water not available for licensing'. Abstraction will be temporary and short term, however, there is potential for duration of effects on groundwater to extend beyond the drought permit implementation period with potential adverse effects to the local WFD water body . The EAR identifies that the option is unlikely to impact the feasibility of any groundwater or surface water abstractions in the zone of influence (including those for agriculture). No opportunities to promote long-term improvement in water efficiency have been identified for this option. The minor construction works required (connection of mobile generators) are not anticipated to result in any adverse effects on soils. In operation in-channel structures, such as weirs/sluices, could influence sediment dynamics by creating ponded areas upstream of the structure. These areas will have very low flow velocities and increased depth in relation to other areas of the channel, this is likely to promote the deposition of fine sediment behind the structure. The EAR describes geomorphology impacts as minor in both reaches based on the anticipated low sediment concentrations (characteristic of a chalk fed river) and the relatively low amounts of sediment in transport during a drought. The option involves the abstraction of 3.5 Ml/d from the existing Ogbourne boreholes used in the revoked licence (from April 2017). Thore would be a chart tore increment in the relatively in the relatively in the relatively is the structure.	Low (adverse)	Medium n/a Low	Medium n/a Medium	Moderate n/a Moderate	Short-term n/a Short-term	Temporary n/a Temporary	Minor adverse Minor adverse None Negligible adverse	None None None
No opportunities to promote long-term improvement in water efficiency have been identified for this option. The minor construction works required (connection of mobile generators) are not anticipated to result in any adverse effects on soils. In operation in-channel structures, such as weirs/sluices, could influence sediment dynamics by creating ponded areas upstream of the structure. These areas will have very low flow velocities and increased depth in relation to other areas of the channel, this is likely to promote the deposition of fine sediment behind the structure. The EAR describes geomorphology impacts as minor in both reaches based on the anticipated low sediment concentrations (characteristic of a chalk fed river) and the relatively low amounts of sediment in transport during a drought.	n/a Low (adverse) Low (adverse)	Low	n/a Medium	n/a Moderate	n/a Short-term	n/a Temporary	None Negligible adverse	None
The minor construction works required (connection of mobile generators) are not anticipated to result in any adverse effects on soils. In operation in-channel structures, such as weirs/sluices, could influence sediment dynamics by creating ponded areas upstream of the structure. These areas will have very low flow velocities and increased depth in relation to other areas of the channel, this is likely to promote the deposition of fine sediment behind the structure. The EAR describes geomorphology impacts as minor in both reaches based on the anticipated low sediment concentrations (characteristic of a chalk fed river) and the relatively low amounts of sediment in transport during a drought.	Low (adverse) Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
The option involves the abstraction of 3.5 Ml/d from the existing Ogbourne boreholes used in the revoked licence (from April 2017).	Low (adverse)							
with abstraction and treatment. The option is within 5km of the Marlborough AQMA.		Medium	Low	Low	Short-term	Temporary	Minor adverse	None
The option involves the abstraction of 3.5 Ml/d from the existing Ogbourne boreholes used in the revoked licence (from April 2017). There would be a short-term increase in greenhouse gas emissions associated with abstraction and treatment.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	Medium	Small	High	Short-term	Temporary	None	Minor beneficial
There are number of statutory sites in proximity to the Ogbourne boreholes including three Scheduled Ancient Monuments and a Conservation Area associated with Ogbourne St. George. However, all are over 1km from minor construction works planned at the boreholes. Hydrological impacts associated with operation of the options are not anticipated to adversely effects these assets or any unknown water-dependent assets.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
The option and impacted reaches are within North Wessex Downs AONB. The minor construction works planned are associated with existing borehole sites. The AONB is a unique and spectacular landscape. The River Og and River Kennet form an essential part of the landscape of the AONB. The impacted reach of the River Og is an intermittently flowing river and there are naturally periods of no flow. The impact of the drought permit is to extend the period of recovery between the months of October to March. This delay to the recovery period occurs outside of the summer months when visitors to the North Wessex Downs would be greater. Considering these factors the value/sensitivity of the AONB is considered to be Medium.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None
	Ogbourne boreholes used in the revoked licence (from April 2017). There would be a short-term increase in greenhouse gas emissions associated with abstraction and treatment. Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought. There are number of statutory sites in proximity to the Ogbourne boreholes including three Scheduled Ancient Monuments and a Conservation Area associated with Ogbourne St. George. However, all are over 1km from minor construction works planned at the boreholes. Hydrological impacts associated with operation of the options are not anticipated to adversely effects these assets or any unknown water-dependent assets. The option and impacted reaches are within North Wessex Downs AONB. The minor construction works planned are associated with existing borehole sites. The AONB is a unique and spectacular landscape. 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The minor construction works planned are associated with existing borehole sites. Low (adverse) Medium The AONB is a unique and spectacular landscape. The River Og and River Kennet form an essential part of the landscape of the AONB. The impact of the River Og is an intermittently flowing river and there are naturally periods of no flow. The impact of the drought permit is to extend the period of recovery between the months of October to March. This delay to the recovery period o	Ogbourne boreholes used in the revoked licence (from April 2017). There would be short-term increase in greenhouse gas emissions associated with abstraction and treatment. Low (beneficial) Medium Small Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought. 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The Plan aims to ensure resilience of water supplies to drought. Low (beneficial) Medlum Small High Short-term Temporary None There are number of statutarysites in publicity to the Ogbourne boreholes including three Scheduled Ancient Konument and a Concervation Area scheduled Ancient Konument and a concervation Area schedule with operation of the profors are net ancipated to advestly effects these assets or any unknown water-dependent assets. N/A N/A

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SEA Objectives Adverse Effects Assessment Summary			None		None		None				None		
Summary commentary of scheme beneficial effects	Moderate beneficial effects include ensuring supply of water to local population and other c the resilience of water supplies to drought.					ther custo	omers/bus	inesses, a	n				
SEA Objectives Beneficial Effects Assessment Summary	None	None		None			None	None	None	None	None	None	



SEA	A topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	Negligible hydrological impacts are expected on three reaches of the River Kennet (medium risk to ammonia concentrations and low risk to dissolved oxygen in Reach 2 due to discharges from Reading STW, this has the potential to reduce habitat suitability to sensitive species) and a minor impact on a reach of Holy Brook (could impact spawning, migration, provision of cover, etc.; however hydrological impacts are minor and therefore no impacts are anticipated). Minor risk to NERC fish species at a reach of the River Kennet and Holy Brook. Risk to Reach 2 (River Kennet) for macroinvertebrates due to risk to ammonia concentrations and low risk to dissolved oxygen in Reach 2 due to discharges from Reading STW. This has the potential to reduce habitat suitability for sensitive species. Risk to other notable fish species due to an additional medium risk to ammonia concentrations and low risk to dissolved oxygen in Reach 2 due to discharges from Reading STW. No impacts have been identified for designated sites.	Low (adverse)	High	Small	Moderate/high	Short	Temporary	Minor adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Uncertainty remains over the potential for invasive macrophyte species to adversely affect floating pennywort and least duckweed, however hydrological impacts are negligible and therefore no impact is anticipated. For the reaches of the River Kennet there is an additional medium risk to SRP concentrations in Reach 2 due to discharges from Reading STW. This has the potential to increase growth rates of invasive macrophytes increasing abundance and distribution. For the reach of Holy Brook uncertainty remains over the potential presence of invasive macrophyte species, however, hydrological impacts are negligible and therefore no impact is anticipated	Low (adverse)	High	Small	Low	Short	Temporary	Minor adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 25MI/d of water) during drought conditions and therefore help maintain public health. No construction is proposed for this option therefore no adverse effects are expected to public health.	Low (beneficial)	High	Small/medium	High	Short	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Holy Brook forms part of the landscape and visual amenity value of the Southcote Linear Park. Any impact of the drought permit on river levels may impact walkers and those who visit the park. The River Kennet contains a number of fish species. The location and surrounding area makes the catchment very popular with anglers. Any impacts of the drought permit on fish population or distribution may impact anglers. Along the impacted reaches of the River Kennet, level is maintained and hydrological impacts manifest as a reduction in velocities only, therefore have minimal impact on navigation. The EAR identifies negligible sensitivity to these three aspects.	Low (adverse)	Medium	Small/medium	Moderate	Short	Temporary	Minor adverse	None

Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. High magnitude is applicable due to the size of the water increase. No impacts on other surface water or groundwater abstractions are expected. There are no effects likely on angling and recreation and therefore no affects on businesses associated with these activities.	Low (beneficial)	High	Medium	Medium	Short	Long	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (up to 25 MI/d) over and above what occurs under normal operation will result in short-term increases in energy use and waste. The option will make use of existing infrastructure, avoiding new construction (and associated use of materials) and minimising additional energy use and waste generation.	Medium (adverse) Low (beneficial)	Low	Medium	Medium	Short	Temporary	Minor adverse	Negligible beneficial
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR reports a negligible hydrological impact on three reaches of the River Kennet and a minor impact on a reach of Holy Brook (Holy Brook from 2.5km west of the Fobney Emergency Boreholes to the confluence with River Kennet). The reduction of the Summer Q95 and Summer Q99 flow in the brook as a result of the drought permit would be 5% and 12%, respectively. Due to uncertainty of the interaction between the Holy Brook and chalk aquifer the reach extends from the western limit of the cone of depression to the confluence with the River Kennet. The reduction in flow would manifest itself as a reduction of velocity, wetted width, depth and perimeter.	Low (adverse)	Medium	Small	Moderate	Short	Temporary	Minor adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	For the reach on Holy Brook, the EAR reports a medium risk (specifically with regard to SRP concentration). Risks to dissolved oxygen balance and ammonia balance are considered negligible. The Reading STW presents a water quality pressure to the River Kennet downstream of the confluence with Foudry Brook, i.e., a medium risk to ammonia, dissolved oxygen saturation and SRP.	Medium (adverse)	Medium	Small	Moderate	Short	Temporary	Moderate adverse	None

Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	The EAR reports negligible impacts on other abstractions. Implementation of the drought permit could have a minor impact on Kennet and Holy Brook (GB106039023140) with regard to WFD status.	Low (adverse)	Medium	Small	Moderate	Short	Temporary	Minor adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	Overall, geomorphology impacts are minor in Reaches 1, 2, 3 and 4. Deposition of fine sediment behind in-channel structures may occur, however reduction in flows during the operation of the drought permit is unlikely to lead to any significant changes in wetted width or wetted perimeter beyond that which is experienced in the normal range of hydrological variation due to the overall steep and managed nature of the reach channel banks.	Low	Medium	Medium	Low	Short	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	There is no construction associated with construction activities, however, increased abstraction/treatment would cause an increase in energy use and associated air emissions. The Reading AQMA is in proximity to the affected area.	Medium (adverse)	Medium	Small	Low	Short-term	Temporary	Moderate adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	There would be emissions associated with the abstraction of water. Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions. The sensitivity to this effect is rated as low due to the short term and temporary effect.	Medium (adverse)	Low	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (adverse)	High	Small	High	Long	Temporary	None	Minor beneficial

Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are scheduled monuments (High Bridge and Reading Abbey) and listed buildings in the area of influence, however, they are unlikely to be impacted by drought permit implementation.	Low (adverse)	Low	Small	Low	Short	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	Holy Brook forms part of the landscape and visual amenity value of the Southcote Linear Park. Any impact of the drought permit on river levels may impact walkers and those who visit the park.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None

Drought Plan option	Pangbourne: Water is abstracted from the Chalk aquifer at Pangbourne. The abstraction lies close to the River Pang Normal abstraction comprises a licence to abstract at a peak rate of 38.6MI/d. When flow in the River Pang, gauged a consecutive days, abstraction from two of the boreholes is not permitted. The deployable output from the remaining comprises 7MI/d – remove flow constraint and allow the full amount of the Pangbourne licence to be abstracted from is anticipated to be applied for up to 6 consecutive months between May and December inclusive, although the perm year. There is no construction phase associated with this drought permit.												
Summary commentary of scheme adverse effects	Negligibi ranging s would be STW disc Moderate impacts species (le hydrolog from majo e dry, and charges. S e impacts on the Sul (bullhead a	gical effec r to neglig major effe Sulham Br on the ge ham and ham d brook	cts are ant gible are a ects on wa ook has h omorpholo Tidmarsh t lamprey)	icipated c nticipated ter quality igh sensit ogy of Sul Woods ar are possi	on the Rive on Sulha / in Sulha ivity for V ham Broc nd Meadow ble.	er Pang fr m Brook. m Brook a VFD statu. vk are pos vs SSSI, I	om the Bl Major adv are also ex s. Short-te sible, ass NERC fish	ue Pool to verse hydr xpected dr prm major ociated w species (r	o the confi rological e ue to low impacts o ith reduct brown tro	luence wit ffects are dissolved on one oth ed flows in ut and Eu	h River Th predicted oxygen sa ner abstrac n areas wh ropean ee	18 0 0 10 10 10 10
SEA Objectives Adverse Effects Assessment Summary			None				None				None		
Summary commentary of scheme beneficial effects	Moderate minor be	e beneficia eneficial ef	l impacts fect asso	are expec ciated with	ted with i n improvir	regard to o	ensuring s ilience of	supply of water sup	water to lo plies to di	ocal popu rought.	lation and	other cus	ite
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	1



SE	A topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/H igh)	Duration of effect (short- n term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual bene effect signific (likely to rem reasonable m
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity an ecosystem services that contribute to the economy.	The EAR reports that for the Sulham and Tidmarsh Woods and Meadows SSSI the extension of the recovery of flows will be less than a week (compared to natural drought conditions) and the impact will be observed in the hydrological winter (October to March). As such, the impact on the key features of the designated site (although of national importance) has been assessed of being as low magnitude. The EAR also reports negligible effects or macroinvertebrates, macrophytes, fish and diatoms for WFD status. Minor effect on NERC fish species (brown trout and European eel) is expected. Minor impact on notable species on county and regional level (bullhead and brook lamprey) and minor impact on chalk stream habitat. Additionally, there is ancient woodland on the same site as a SSSI the effects on which are reported in the EAR to be negligible.	Low (adverse)	High	Small	High	Medium-term	Temporary	Minor adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Invasive macroinvertebrates in the study area are not expected to be significantly impacted by the implementation of the drought permit against a baseline of reduced flows characteristic of a drought. Invasive plant species in the study area can utilise flow of the watercourse for dispersal but are not reliant on it, so implementation of the drought permit is unlikely to increase dispersal.	Low (adverse)	Low	Small	High	Short-term	Temporary	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environmen for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 7MI/d of water) during drought conditions and therefore help maintain public health. Magnitude is rated as Medium due to the amount of additional water provided. Regarding nuisance, there is no construction proposed for this option therefore no adverse effects are expected to public health.	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Moderate b
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	The route of the Thames Path national trail runs in close proximity to the impacted reach of the River Pang and Sulham Brook. The EAR reports that changes to water levels could affect visual amenity for walkers however, considers any changes in river level as a result of the drought permit are considered unlikely to impact this. Sulham Brook can dry up and is considered intermittently-flowing. It is possible that the drought permit could extend upstream the length of Sulham Brook which dries by up to 500m. However, it is unlikely to cause any section of the brook to dry out which has not dried historically. Therefore the magnitude is considered low. In addition, there is minimal boating and angling activity on Sulham Brook in comparison to the nearby River Pang and River Thames. The EAR reports negligible effects for these. Additionally the site is within an AONB, is within 1km (from the central point) of a Registered Park and Garden and a number of listed buildings.	Low (adverse)	High	Small	High	Medium-term	Temporary	Minor adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity (beneficial impact). There are no significant groundwater abstractions within the area of influence, however there are three significant surface water abstractions. The drought permit is not anticipated to affect two of these abstractions. However, it may limit the feasibility of a surface water abstraction from Sulham Brook if the river dries up or recovery of flow to the river is extended. Discussion with the licence holder would be required at time of application, and effects on this abstraction are identified as high risk. There are no effects likely on angling and recreation and therefore no effects on businesses associated with these.	Low (beneficial) High (adverse)	High	Medium	Medium	Medium-term	Long	Major adverse	Moderate b
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (up to 7MI/d) over and above what occurs under normal operation will result in short-term increases in energy use and waste. The option will make use of existing infrastructure, avoiding new construction (and associated use of materials) and minimising additional energy use and waste generation.	Low (adverse)	Low	Medium	Medium	Short	Temporary	Negligible adverse	None



Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The EAR reports a negligible hydrological effect on Reach 1 (River Pang from the Blue Pool to the confluence with River Thames). However for Reach 2 (Sulham Brook from the vicinity of Sulham until the confluence with the River Thames) the EAR reports the drought permit is anticipated to increase the duration that the reach would dry by up to a handful of days, as well as extend the length of the intermittently-flowing reach. The impact would be restricted to sometime within the hydrological winter (October to March inclusive) that follows the drought permit being implemented. This is reported as a major impact.	High (adverse)	High	Small	High	Medium-term	Temporary	Major adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	A negligible effect predicted in EAR for Reach 1. Major effect predicted in EAR for Reach 2 with regard to dissolved oxygen saturation and minor with regard to ammonia and SRP. High water quality risk associated with Pangbourne STWs (associated with ammonia and dissolved oxygen saturation). Reach 2 has high sensitivity for WFD status.	High (adverse)	High	Small	Moderate/high	Medium-term	Temporary	Major adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. Negligible effects on surface water abstractions are predicted for Reach 1 (River Pang), however for Reach 2 there is a high risk associated with one abstraction from the Sulham Brook. Effects on groundwater abstractions are expected to be negligible.	High (adverse)	High	Small	Moderate/high	Medium-term	Temporary	Major adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	For Reach 1 the EAR reports a negligible effect for geomorphology. For Reach 2 the EAR reports a Moderate effect. The bank slope is generally steep, but impacts of reduced flows on wetted width are likely to be restricted to localised areas where bank slope is shallow.	Medium	Medium	Medium	Low	Medium	Temporary	Moderate adverse	None
Air and Climate	6.1 To maintain and improve air quality.	There would be emissions associated with abstraction of water. The option is within proximity of sites designated for nature conservation at national level.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	There would be emissions associated with the abstraction of water. Short- term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions. The sensitivity to this effect is rated as low due to the short term and temporary effect.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	Medium	Small	High	Long-term	Temporary	None	Minor ben
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The EAR reports effects on unknown water dependant assets would be negligible. Also, whilst there are listed buildings and a Registered Park and Garden within 1km there is no construction and therefore no direct effects likely and the drying out of the reach would be short term in terms of effects on settings.	Low (adverse)	Low	Medium	Moderate	Medium-term	Temporary	Negligible adverse	None



Landscape and Visual	8.1 To protect, enhance the quality of and	The River Pang and Sulham Brook is within and forms an essential part of the	Low (adverse)	Low	Small	High	Medium-term	Temporary	Negligible adverse	Non
Amenity	improve access to designated and undesignated	l landscape of the North Wessex Downs AONB and therefore any impacts of the								
	landscapes, townscapes and the countryside.	drought permit on the rivers could impact the lanscape and access for walkers								
		and others who visit the area. Sulham Brook can dry up and this reach is								
		therefore considered intermittently-flowing. It is possible that the drought								
		permit could extend upstream the length of Sulham Brook which dries by up								
		to 500m. However, it is unlikely to cause any section of the brook to dry out								
		which has not dried historically. The EAR reports a negligible effect on the								
		AONB.								
		The option is within the Chilterns NCA. It is a predominantly wooded and								
		farmed landscape with an underlay of chalk bedrock rising from the London								
		Basin and offering wide views over adjacent vales. Parts of this is also AONB								
		and as negligible effects predicted for the AONB similar is expected for the								
		NCA.								
		The magnitude is identified as low due to the sensitivity of the AONB to this								
		particular effect. In this case the Sulham Brook dries out historically.								



Drought Plan option	Playhato The abst annual a to 12.3M The drou inclusive	ch: traction is verage ab l/d providi ught permi e. There is	located ir straction ing a bene it could be no consi	the Souti 7.27MI/d, µ fit of 4.1M impleme ruction pl	h-West Ch beak abstr II/d. nted at an hase asso	nilterns Ch action 8.2 y time of j ciated wit	nalk groun MI/d. Prop year, how h this dro	ndwater bo bosed abs ever it is a ught perm	ody. It con straction is anticipated hit.	sists of tw s 2.8 - 4.11 d to be ap	vo boreho MI/d - incr plied for u	iles abstra ease in pe ip to 6 cor
Summary commentary of scheme adverse effects	Overall, emission effects a	adverse ei ns to air di nd the use	ffects ass ue to the a e of energ	ociated wi abstraction y for the a	ith this dro n of an ad additional	ought opti ditional 41 abstractic	ion are mi MI/d. Rema on.	nor to neg aining adv	gligible an verse effec	d tempora cts would	ary. There be neglig	would be ible, as the
SEA Objectives Adverse Effects Assessment Summary		None	None	None	None		None			None	None	
Summary commentary of scheme beneficial effects	There we supplies	ould be me to drough	oderate be ht.	eneficial ei	ffects ass	ociated wi	ith provisi	ion of wat	er supplie	s. Also, n	iinor bene	ficial effec
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None

ting fron k abstrac secutive i	n the Chal ction of ex months be	k. Norma disting lice etween Ma	l abstracti ence from ay and Dec	ion is 8.2MI/d cember
ninor adv y are ass	verse effectociated with	cts associ	ated with ble hydro	logical
		None	None	None
ts due to	improving	g the resili	ience of w	rater
None	None		None	None

SE	A topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficia effect significance (likely to remain a) reasonable mitiga
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	There is no construction associated with the option. The hydrological impact is reported in the EAR as negligible and the sensitivity of designated sites, NERC species and other notable species within 500m is negligible (due to their susceptibility to flow and level) and no impacts are anticipated. Designated sites, NERC species and other notable species within 1km would be expected to also have negligible sensitivity including the ancient woodland located between 500m and 1km due to the negligible hydrological impact.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The EAR reports for the following invasive flora species Japanese knotweed Fallopia japonica, Giant hogweed Heracleum mantegazzianum, Himalayan balsam Impatiens glandulifera, as these invasive plant species listed can utilise flow of the watercourse for dispersal but are not reliant on it, implementation of the drought permit will therefore not increase dispersal. For other invasive flora species Australian swamp stonecrop Crassula helmsii; parrot's feather Myriophyllum aquaticum; floating pennywort Hydrocotyle ranunculoides; water fern Azolla filiculoides and Nuttall's pondweed Elodea nuttallii, the EAR reports although the species may be susceptible to changes in flow and level, given the negligible impact magnitude on surface waters this is unlikely to occur.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	 Option will help to maintain essential public water supplies (provision of up to an additional 4.1Ml/d of water) during drought conditions and therefore help maintain public health. Regarding nuisance, whilst there is an AQMA located within 1km there is no construction proposed for this option therefore no adverse effects are expected to public health. 	Low (beneficial)	High	Medium	High	Short-term	Temporary	None	Moderate benefic
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	There are a number of marinas located along the River Thames and there is the Thames Path National Trail. Due to the negligible hydrological impact, the EAR reports no impact on navigation from the drought permit. Also there would be no impact on angling. No construction is proposed, therefore the Thames Path would not be affected. No significant effects are therefore anticipated on these resources.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. No impacts on navigation are expected, therefore no effects on related businesses or tourism are anticipated.	Low (adverse)	High	Medium	Medium	Short-term	Long	None	Moderate benefic
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumptior of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (4.1MI/d) will result in short-term increases in energy use and waste generation. However, the option will make use of existing infrastructure, minimising this additional energy use and waste generation.	Low (adverse)	Low (adverse)	Medium	Medium	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water suppl for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



Wator	4.1 To avoid adverse impact on surface and	The River Thames is located 1km south of the abstraction, with a series of	Low (adverse)	Low	Modium	Moderate/high	Short-torm	Tomporary	Nogligible adverse	None
	groundwater levels and flows, including when this impacts on habitats and/or navigation.	lakes formed from disused gravel pits lying between the river and the abstraction. The lakes are connected to the River Thames. The abstraction is located in the South-West Chilterns Chalk groundwater body and there would be an increase in abstraction of 4.1Ml/d. The EAR reports that even if the full amount of the abstraction increase was taken (via increased infiltration) from the River Thames around Playhatch, the impact on summer Q95 and summer Q99 as measured at the nearest upstream gauge at Reading would be 1.0% and 1.2% respectively and therefore the hydrological impact on the River Thames would be negligible. Regarding Berry Brook the EAR reports that given that the groundwater level within the chalk will already be below the level of the Berry Brook by 4-9km, abstraction from the chalk aquifer at Playhatch is unlikely to impact on flow in the Berry Brook therefore, the drought permit would have a negligible impact on it. Flow and water level in the Berry Brook would hence be maintained by the large and level-controlled River Thames and, in the vicinity of Playhatch, the nearby Caversham Lakes which it supports.								
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	As the hydrological impact in both reaches is negligible there is considered no risk to water quality deterioration. WFD status sensitivity is reported as negligible.	Low (adverse)	Low	Small	Moderate/high	Short-term	Temporary	Negligible adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. However, as the hydrological impact in both reaches is negligible, there is considered no risk to other abstractors and therefore no significant effects.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	As the hydrological impact in the two reaches is negligible, impacts on geomorphology are also considered negligible.	Low (adverse)	Low	Small	Moderate/high	Short-term	Temporary	Negligible adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option will cause short-term increases in air emissions associated with the abstraction of water (up to 4.1 MI/d). The abstraction site is in proximity (between 500m and 1km) to Reading AQMA, however, no construction activities are required, and the use of existing infrastructure and treatment facilities will minimise emissions of air pollutants.	Low (adverse)	Medium	Small	Low	Short-term	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure will minimise increases in greenhouse gas emissions. The sensitivity is rated as low as the impact which be short-term and temporary.	Low (adverse)	Low	Medium	Moderate/high	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Minor beneficia
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	Caversham Park, a registered park and garden, is located within 1km of the abstraction and there are listed buildings within 500m and a registered park- and garden in the vicinity. However, there is no construction for this option and negligible hydrological effects with the potential to affect setting therefore no significant effects on these heritage assets are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	There are no national designations for landscape in the vicinity, there would be no construction and hydrological effects would be negligible therefore significant landscape effects are not anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



Drought Plan option	Fobney I The Rive below 19 at extren Minor co direct flc although Only a vo Theale w	Direct: r Kennet a 5MI/d and ne low flow nstructior w away fr it could b ery severe rere below	and Holy I 173MI/d (ws (<173M n works w om the Ho pe implem drought 173MI/d.	Brook Ope (River Ken (II/d gauged ould be as oly Brook. ented at a would resu Only in 19	erating Ag net gauge d at Theal sociated The drou ny time o ult in this 76 have f	reement s ed at Thea e) to allov with the o ght permi f year. drought p lows this b	pecifies u le). Implei v abstract drought p drought p t is anticip permit beii low been i	rse of the mentation ion from F ermit. A te pated to be ng require recorded.	Arrowhead of the dro River Kenn mporary s e applied f d. The dro	d control bught peri- net at exp structure for up to bught peri-	structure mit would ense of flo will be ins 6 consecu mit would	to reduce allow mar ows to Hol stalled in t tive montl only be in	finij lythe nj
Summary commentary of scheme adverse effects	If implem River Ke moderate marginal and visu visit the	nented, the nnet. Imp e water qu habitats i al amenity park. How	e drought acts will ı vality risk in localise v value of vever, all a	permit wo manifest as for SRP du ed areas, a Southcote ndverse eff	ould have s a reduc uring the dversely dversely Linear P fects iden	a major h tion in low drought p affecting r ark, and ir tified are s	ydrologica vest flows ermit imp. nacroinve npacts on short-term	al impact o of up to 4 lementatic rtebrates, river leve a and temp	on Holy Bi 0%, along on. Habitat macroph Is may ad porary, an	rook betw with red t availabil ytes and j versely in d not exp	veen the A uctions in lity would phytobent mpact the vected to e	rrowhead velocities be negativ hos, and f visual am xtend bey	C ;, VE fis eI VO
SEA Objectives Adverse Effects Assessment Summary					None		None			None	None		
Summary commentary of scheme beneficial effects	<i>If implem WTW inta supply o increase the Rivei</i>	nented the ake. Flows f water to in flow at r Kennet.	e drought j s would be local pop a time of	permit wo e increase ulation and natural dr	uld have a d by 20 M d other cu ought wil	a minor be Il/d for the Istomers/I I also help	eneficial h duration businesse to allevia	ydrologica that the di s. Minor b te the imp	al impact (rought per penefits as pacts of na	on the Riv rmit is im ssociated atural dro	ver Kenne plemented with impr ught on m	t from the 1. Moderat oving the nacrophyte	Le re
SEA Objectives Beneficial Effects Assessment Summary				None		None	None			None	None	None	

low in the pulation Brook, p e third op s betwee plemente	e Holy Bro of the Arro providing a pening of n May and d when flo	ook by gate owhead co a benefit c the contro I Decembe ows in the	e closure ontrol stru of up to 20 ol structur or inclusiv River Kel	at flows ucture MI/d. e to re, nnet at
ontrol st levels an ely affecta sh. Holy I nity of th nd six m	ructure ar d wetted y ed throug Brook forr e park for onths.	nd its conf widths. Th h reductio ns part of walkers a	luence wi ere would ns in loss the lands nd those	th the d be a s of cape who
		None		
Arrowhea beneficia esilience s, fish, ma	d control al impacts of water s ammals al	structure associate supplies to nd birds ir	to the Fol ed with en o drought. n the habi	oney suring An tats of
None	None		None	None

SE	A topics and objectives	Assessment of option										
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	t Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficia effect significance (likely to remain a reasonable mitiga		
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	 The hydrological impact of the Fobney Direct drought permit is a reduction of flows by up to 40% and consequently a reduction in velocities, water level and wetted width, resulting in major impact for Reach 1 (Holy Brook). A range of moderate to minor impacts ecological features in Holy Brook are anticipated, including changes in habitat availability for brown/sea trout and potential impacts on spawning and migration. Moderate impacts on European eel are expected due to potential impacts on habitat availability and peak elver upstream migration. Impacts on macroinvertebrates will likely be minor. Other environmentally sensitive species that are potentially susceptible to the hydrological impacts of the drought permit comprise <i>Ranunculus</i> sp., <i>Ceraclea senili, Macronychus quadrituberculatu, Atrichops crassipe,</i> barbel; bullhead and brook lamprey. As the ecological value of the <i>Ranunculus</i> community is of district importance, overall the impact significance has been assessed as moderate from May to September and minor from October to December. The hydrological impact for Reach 2 (River Kennet) is considered to be beneficial due to increased flows during drought permit implementation. This would help to alleviate the impacts of natural drought on macrophytes, fish, mammals and birds in the habitats of the River Kennet. 	Medium (adverse) Low (beneficial)	Medium	Medium	Moderate	Short-term	Temporary	Moderate adverse	Minor beneficial		
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	During low flow conditions it is possible that some invasive flora species will increase in distribution and abundance. This impact is not attributable to the drought permit alone, and may already have been exacerbated by impacts of natural drought. Changes in water quality associated with the drought permit may provide more favourable conditions for the aquatic invasive species that are associated with eutrophic conditions (e.g. floating pennywort). Drought permit implementation is considered to have a minor impact to changes in abundance of invasive flora species (May to August only). Impacts on the abundance or distribution of the mud snail or European physa have been assessed as negligible. Reduction in water levels is likely to limit availibility of refuges for crayfish, which could have beneficial consequences with regards to an increase in predation on invasive species. However, the limited duration of the impact results in negligible (beneficial) impact.	Low (adverse) E Low (beneficial)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	Negligible benefici		
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Implementation of the drought permit will help to maintain essential public water supplies (provision of up to an additional 20MI/d of water) during drought conditions and therefore help maintain public health. Some construction is required for option implementation, therefore there may be minor effects on human health (e.g., noise and dust nuisance).	Low (adverse) Low (beneficial)	Low (adverse) High (beneficial)	Small	Moderate	Short-term	Temporary	Negligible adverse	Moderate benefici		
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	 Holy Brook forms part of the landscape and visual amenity value of Southcote Linear Park. A major impact on river levels will adversely impact the visual amenity of the park for walkers and those who visit the park. Anglers may be affected by any reduction in the presence of fish species in Holy Brook on a temporary basis during drought permit implementation. However there is not expected to be a significant reduction in fish species as such impacts to angling are assessed as minor. There are no significant risks to surface water or groundwater abstractions associated with the impacted reach, and no impacts on navigation are anticipated. 	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None		
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Implementation of the drought permit will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. No impacts on navigation are expected, therefore no effects on essential services are anticipated.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate benefici		



Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumptior of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An increase in abstraction (20MI/d) is likely to result in a proportional increase in the use of energy, chemicals and generation of waste. Construction activities will likely generate some waste as well.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water suppl for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The drought permit would have a major hydrological impact on the Holy Brook between the Arrowhead control structure and its confluence with the River Kennet. Impacts will manifest as a reduction in lowest flows of up to 40%, along with reductions in velocities, levels and wetted widths. However, the drought permit would have a beneficial hydrological impact on the River Kennet from the Arrowhead control structure to the Fobney WTW intake. Flows would be increased by 20 Ml/d for the duration that the drought permit is implemented.	High (adverse) Low (beneficial)	Medium	Small	Moderate	Short-term	Temporary	Major adverse	Minor beneficial
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	In the adversely impacted Holy Brook, there would be a medium water quality risk for SRP during drought permit implementation. In the beneficially impacted River Kennet, there would be a medium water quality risk for SRP during drought permit implementation. The risk is reduced compared to not having a drought permit (high risk associated). There is no risk associated with dissolved oxygen saturation and ammonia concentration in either Holy Brook or the River Kennet, and no risks associated with discharges. Implementation of the drought permit would have medium moderate , short term, temporary, reversible risks to the status of the Kennet and Holy Brook (GB106039023140) WFD with respect to macroinvertebrates, macrophytes and phytobenthos, and fish.	Medium (adverse) Low (beneficial)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	Minor beneficial
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions	Local resource availability is described as 'water not available for licensing'. However, there are no significant risks to surface water or groundwater abstractions associated with the impacted reach.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	Sections of Holy Brook are flow sensitive, particularly in the first half of the reach and there is expected to be a major geomorphological impact with respect to reductions in wetted width and depth. Impacts would be restricted to localised areas where bank slopes are shallow and therefore the magnitude has been assessed as medium (adverse). Given the riparian vegetation and artificial nature in other parts of the reach, impacts to bank stability are considered minor. As the River Kennet is level-controlled, and managed, reductions in wetted width are unlikely and geomorphological impacts are considered negligible.	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Air and Climate	6.1 To maintain and improve air quality.	Construction activities and increased abstraction/treatment would cause an increase in energy use and associated air emissions. The Reading AQMA is within 1km of the affected area.	Medium (adverse)	Medium	Small	Low	Short-term	Temporary	Moderate adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Construction activities and increased abstraction/treatment would cause an increase in energy use and associated greenhouse gas emissions.	Medium (adverse)	Low	Medium	Moderate	Short-term	Temporary	Minor adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High	Small	High	Long-term	Temporary	None	Minor beneficial



Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	Reading Abbey scheduled monumnet is located adjacent to Holy Brook at its confluence with the River Kennet, however any changes to the physical environment as a result of drought option implementation are unlikely to have any impact on this and any associated construction will not be in this area. Some listed buildings are located within 500m and 1km of the affected area. However, construction activities will be minor and impacts on these buildings are expected to be negligible.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	Holy Brook forms part of the landscape and visual amenity value of Southcote Linear Park. Impacts on river levels may have minor adverse impacts on the visual amenity of the park for walkers and those who visit the park.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None



Drought Plan option	Albury: The Albu River We flow in L abstracti Brook as anticipat year. Bea required	ary abstraction aw Brook aw Brook ion. During s gauged a ted the dro nefit of 6.8 it would k	ction cons ostraction as gauge g normal a at Albury f ought peri BMI/d. No ope at a tim	sists of fou is from the d at Albury abstraction fall below 2 mit could b construction e of excep	Ir borehol e Hythe a y falls bel n, TWUL I 2.27MI/d. I be applied on works otional dro	les (one d quifer of t ow 2.27Ml may abstra Proposed I for six co are requin bught.	isused) in he Lower /d, howev act 6.8Ml// drought o onsecutive red in orde	the vicini Greensan er, such k d (peak an option is e e months k er to imple	ity of Law od group. ow flow ha od annual a xtension o between N ement the	Brook; a The licen as never k average) a of abstrac lay to Dec drought p	tributary c ce include been recor at Albury (tion beyo cember inc bermit. Th	of the Rive s a flow co ded and th licence nu nd a lower clusive, al is drought	r o hi r t t t
Summary commentary of scheme adverse effects:	Moderate reaches invasive gas emis confluen	e adverse of Law Bro macroinvo ssions. Min sce with Ri	effects or ook. Mode ertebrates nor geom iver Tilling	n water qua erate advei 5. There wo orphologic gbourne), a	ality may rse effect: ould be m cal change and are pi	occur due s on NER(inor impa es are also redominar	to elevat C species cts on any c expected ntly short-	ed SRP cc (brown tro gling at pc d. Adverse term and	oncentratio out) are ai onds along e effects a temporary	ons, and i nticipated g Law Bro re largely /.	noderate a , as are m ok, and m limited to	adverse hy oderate ac iinor advei Reach 2 (yo Jv Ts (L
SEA Objectives Adverse Effects Assessment Summary			None				None				None		
Summary commentary of scheme beneficial effects	Moderate supplies	e beneficia to drough	al effects a ht.	are expect	ed due to	provision	of additio	onal water	supply. I	Minor ben	eficial effe	cts assoc	ia
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	l

Tillingbourne which is itself a tributary of the nstraint whereby abstraction must cease if s licence condition has never moderated the nber 28/39/30/0209) except when flows in Law imit of flow in associated Law Brook. It is ough it could be implemented at any time of permit is unlikely to be required but if it is										
drologica verse effe se effects aw Broo	l effects a ects due to associate k from Fo	re expecto o a potent ed with air rd Cress E	ed on the ial increas and gree Beds to	two se in nhouse						
		None	None	None						
nted with	improving	g the resil	ience of w	rater						
None	None		None	None						

SE	A topics and objectives	Assessment of option										
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographica &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Short- term/medium- term/long-term	Permanence of effect (permanent/ temporary)	f Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)		
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	A moderate hydrological impact is predicted for both reaches of Law Brook. Impacts on designated sites due to deterioration in habitat quality and extent/distribution of qualifying features are expected to be negligible. There is also an ancient woodland within 500m of the brook and further areas of ancient woodland within 1km and effects on these areas are also anticipated to negligible. Impacts on NERC species for Reach 1 are negligible, whereas minor and moderate adverse effects are likely on white clawed crayfish and brown trout respectively in Reach 2. Impacts on other notable species for Reach 1 are negligible, whereas negligible impacts on <i>Ranunculus</i> sp. and minor impacts on <i>Rhyacophila septentrioni</i> due to a reduction in abundance or distribution associated with geomorphological changes in Reach 2. Minor adverse effects are expected on the macroinvertebrate community.	Low (adverse)	High	Small	Low	Medium-term	Temporary	Moderate adverse	None		
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The reduction in flow velocity or water levels in the reach has the potential to impact the distribution of signal crayfish, in Reach 2 specifically, for a short period. This may result in comptetition/predation of the native white-clawed crayfish and the overall impact has been assessed as moderate in the EAR for September to October. An increase in suitable habitat availability may occur for the New Zealand mud snail, European physa and <i>Cheliocorophium curvispinum</i> due to delays in the recovery of flow velocity and river level, resulting in a minor impact. Negligible impacts are expected for invasive flora.	Low (adverse)	High	Small	Low	Medium-term	Temporary	Moderate adverse	None		
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	Option will help to maintain essential public water supplies (provision of up to an additional 6.8MI/d of water) during drought conditions and therefore help maintain public health.	Low (adverse)	High	Small	High	Medium-term	Temporary	None	Moderate beneficial		
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	Law Brook forms part of the setting of the Downs Link National Trail. Changes to water levels or delays to recovery in Law Brook is anticipated to have minor impacts on the setting of Downs Link National Trail. There are a number of ponds potentially used for fishing along the impacted reach of Law Brook. It is anticipated that there will be minimal disruption to angling. No boating activity takes places on Law Brook, and as such no impact on navigation from drought permit implementation is anticipated.	Low (adverse)	Medium	Small	Moderate/high	Medium-term	Temporary	Minor adverse	None		
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity. There may also be minor disruption to angling and associated businesses.	Low (beneficial) Low (adverse)	High (beneficial) Medium (adverse)	Medium	Medium	Medium-term	Long	Minor adverse	Moderate beneficial		
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction (up to 6.8 Ml/d) will typically result in proportional increases in energy use and waste.	Low (adverse)	Low	Medium	Medium	Short-term	Temporary	Negligible adverse	None		
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None		



Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	Hydrological effects on Law Brook from Pursers Farm to Ford Cress Beds (Reach 1) and Law Brook from Ford Cress Beds to confluence with River Tillingbourne (Reach 2) are both are identified as moderate. Reach 1 would be dry prior to a drought permit being required. The abstraction could delay recovery of the aquifer by up to a month (occurring sometime between October and March), i.e. delaying the time until groundwater would contribute to flow in the brook. There would be a short period after the resumption of baseflow when groundwater would not contribute as much flow to the river as it would without drought permit implementation, but this flow reduction would not be associated with reductions in levels, velocities, wetted width and wetted perimeter beyond those experienced in the normal range of hydrological variation. For Reach 2, there would result in a reduction in extreme low flows, most likely to occur around September, and unlikely to last for more than a month. The drought permit would be associated with a reduction in flows, velocities, levels and wetted widths. This would potentially pose a threat to marginal habitats, as parts of the reach are flow sensitive.	Medium (adverse)	Medium	Small	Moderate/high	Medium-term	Temporary	Moderate adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	A major effect with regard to SRP is expected for Reaches 1 and 2, g however SRP is a risk in Law Brook even without implementation of the drought permit. Minor impacts for dissolved oxygen and ammonia concentrations are also expected in both reaches. Law Brook is not classified as a WFD waterbody, however is a tributary of the River Tillingbourne which is a WFD waterbody. This has moderate sensitivity and is reported as requiring further assessment, hence effects on WFD status are uncertain.	High (adverse)	Medium	Small	Low	Medium-term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. However effects on other surface and groundwater abstractions are expected to be negligible.	Low (adverse)	Low	Small	Moderate/high	Medium-term	Temporary	Negligible adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	Overall, geomorphology impacts are expected to be minor in both reaches of Law Brook. There is some uncertainty associated with the availability of information about geomorphology, therefore a high sensitivity has been applied to take a precautionary approach.	Low (adverse)	High	Small	Low	Short	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option will result in minor increases in air emissions associated with abstraction and treatment of water (up to 6.8 Ml/d). The option is within proximity of sites designated for nature conservation at national level.	Low (adverse)	Medium	Small	Low	Medium	Temporary	Minor adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure will minimise increases in greenhouse gas emissions. The sensitivity to this effect is rated as low due to the short term and temporary effect.	Low (adverse)	Low	Medium	Moderate/high	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	Medium	Small	High	Short-term	Temporary	None	Minor beneficial



Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The Chilworth Gunpowder Works is unlikely to be impacted over the duration of the drought permit implementation. There is also a Registered Park and Garden (Albury Park) and a scheduled monument (Bowl Barrow on Shere Heath) within 500m and listed buildings between 500m and 1km. These are unlikely to be significantly affected as there will be no construction. Impacts on setting are also unlikely as flow reductions would not cause reductions in levels, velocities	n/a	n/a	n/a	n/a	n/a	n/a	None	None
		wetted width and wetted perimeter beyond those experienced in the normal range of hydrological variation.								
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	The option is within the Surrey Hills AONB. The EAR reports that Law Brook forms part of the setting of this AONB. Changes in water levels in Law Brook (Reach 2) and a delay to recovery (Reach 1) are expected to be negligible, Landscape values are unlikely to be affected as there will be no construction, and flow reductions would not cause reductions in levels, velocities, wetted width and wetted perimeter beyond those experienced in the normal range of hydrological variation.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



Drought Plan option	Shalford Under no Tillingbo and remo Decembe from bot Tillingbo	: ormal cond oving licer oving the or inclusiv h the Cha urne just	ditions, th ice 28/39/3 licence ag e, althoug lk and Lov upstream	e abstract 30/319). Im Igregates. Ih it could ver Green of their co	tion comp plementa The bene be imple sand aqui pnfluence	rises 30M tion of the fit would l mented an fers. Shal	I/d from th e drought be 5MI/d. 1 ny time of ford Wate	ne River W permit wo The droug year. The r Treatme	/ey (licend ould involv ht permit River Wej nt Works	e number ve an incre may be in v is a mair (WTW) tre	28/39/30/ ease to the nplemente nly rural ca ats surfac	0066, aggr e existing d for up to atchment e water a	
Summary commentary of scheme adverse effects	Flow red impacts were ide	uctions as would be ntified, im	ssociated proportion pacts on g	with imple nally less geomorph	ementatio with flow ology, wa	n of the di contributi ter quality	rought pe ions comi / and othe	rmit on the ng from th r abstract	e River W ne River Ti ors are al	ey upstrea Illingbouri so expect	am of the l ne and Gu ed to be n	River Tilliı ildford ST egligible.	- 7
SEA Objectives Adverse Effects Assessment Summary		None	None	None	None		None		None		None	None	ſ
Summary commentary of scheme beneficial effects	Moderate minor be	e beneficia eneficial in	al impacts npacts as:	are expects	cted with i vith impro	respect to ving the r	ensuring esilience (supply of of water s	water to i upplies to	local popu drought.	llation and	1 other cu	S
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None	

egated wi surface w 6 consec f mixed g stracted	ith abstractivater abstractive molecular cutive moleculogy, w from both	ction from raction fro nths betwo vith basefl the River	the om the Riv een May a ow origin Wey and	ver Wey, nd ating River
gbourne V. Neglig	will be ne	gligible. D se hydrolo	ownstrea ogical imp	m bacts
		None	None	None
tomers/b	usinesses	s. There is	also likel	y to be
None	None		None	None

SI	EA topics and objectives				Assessment of option					
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographica &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigatior
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	Effects on designations within 500m are reported in the EAR as negligible for all sites. There is ancient woodland within 1km however as the hydrological impacts are reported in the EAR as negligible, effects on sites further from the permit area of influence are unlikely. Similarly designations beyond the 500m addressed in the EAR are unlikely to be affected.	Low (adverse)	High	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Given the negligible magnitude of impacts of the drought permit on hydrology and water quality, no impacts in invasive species are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	 The option will help to maintain essential public water supplies (provision of up to 5MI/d of water) during drought conditions and therefore help maintain public health. No construction is proposed, and therefore no effects on human health (e.g., noise and dust nuisance) are expected. 	Low (adverse)	High	Small	Moderate	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	There is no hydrological impact on surface water features as a result of drought permit implementation. Therefore, there no impacts on recreation, angling or navigation are expected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	 Given that there is no adverse surface water hydrological impact associated with the drought permit, there would be no impact on other surface water abstractions. The option will contribute to the maintenance of supply reliability in drought conditions (benefit of up to 5MI/d), ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. 	Low (beneficial)	High	Medium	Medium	Short-term	Permanent	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	An increase in abstraction is likely to result in a proportional increase in the use of energy and generation of waste. However, existing infrastructure would be used, minimising such increases.	Low (adverse)	Low	Medium	Medium	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	The reach of the River Wey from Shalford WTW to the River Tillingbourne confluence is approximately 1.73km. The reduction in flow at the River Wey is reported in the EAR as negligible, as are expected effects on habitats and navigation.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	Adverse hydrological impacts are expected to be negligible, thus no g effects on water quality are anticipated.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. However as negligible adverse hydrological impacts were identified, no impacts on other abstractors are anticipated. Effects on the WFD status for the Wey is are expected to be negligible.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	As negligible adverse hydrological impacts were identified, no impacts on geomorphology are anticipated. No construction is required for implementation of this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	No construction is required for implementation of this option, although increased abstraction would cause a small increase in energy use and associated air emissions. The site is not within an AQMA.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	No construction is required for implementation of this option, although increased abstraction would cause a small increase in energy use and associated greenhouse gas emissions.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (adverse)	High	Small	High	Short-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There is no construction proposed and negligible effects on hydrology are expected. St Catherine's Chapel scheduled ancient monument is within the area of influence, however is not expected to be affected by implementation of the option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	There will be no hydrological impact from drought permit implementation, therefore, there will be no impact on the amenity of Surrey Hills AONB.	n/a	n/a	n/a	n/a	n/a	n/a	None	None



SEA topics and objectives		Assessment of option								
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographica &/or population affected (small/medium/large)	Certainty of effect (low/moderate/h igh)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over- abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	The HRA concluded no LSEs on european designated sites as a result of operating the drought permit. There is some ancient woodland located in close proximity (<500m) to the impacted reaches which may be moderately impacted due to temporary altered hydrological functioning. The EAR identifies a moderate impact on NERC species (brown trout), including reduced habitat availability and loss of spawning areas, and increased mortality die to lack of flow. Moderate impacts on macroinvertebrates and fish are predicted, due to reduced habitat as a result of reduced flows, including loss of spawning habitat	Medium (adverse)	Medium	Small	Moderate	Short-term	Temporary	Moderate adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	Implementation of the drought permit may increase the abundance or range of some invasive flora and fauna species, although the level of impact beyond that of natural drought is uncertain. The EAR concluded negligible impacts on invasive fauna (e.g. signal crayfish, freshwater shrimp, Jenkin's spire snail and acute bladder snail). Affected flora includes Canadian pondweed and least duckweet. Nuttall's pondweed, an invasive flora, is assumed to be present in the impacted water body and has been assed in the EAR as having moderate impacts as a result of changes in distribution in the river, there is a significant degree of uncertainity associated with this assessment.	Medium (adverse)	Medium	Small	Low	Short-term	Temporary	Moderate adverse	None
Population and human health	2.1 To protect and enhance health and well-being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to 7.3Ml/d of water) during drought conditions and therefore help maintain public health. No construction is proposed, and therefore no effects on human health (e.g., noise and dust nuisance) are expected.	Low (beneficial)	High	Small	High	Short-term	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	The area is considered to be a built-up area with few trails and footpaths associated with the impacted reaches. Despite the major impact in Reach 2 and the moderate impact in Reach 3, the impact on recreation is considered to be negligible. The diversity of the fish community is limited within the River Wye and the Wycombe Marsh Brook. Trout is the most dominant species, but due to the built up nature of the area, angling will probably be limited.	Low (adverse)	Low	Small	Moderate	Short-term	Temporary	Negligible adverse	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	Option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment.	Low (beneficial)	High	Medium	Moderate	Short-term	Temporary	None	Moderate beneficial

Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction over and above what occurs under normal operation will typically result in proportional increases in energy use and waste generation. Existing infrastructure will be used to abstract water, maximising the resource efficiency of the drought option.	Low (adverse)	Low (adverse)	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources were identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when th impacts on habitats and/or navigation.	The implementation of the Pann Mill drought permit will is have a negligible impact on Reach 1 of the River Wye, a major impact on Reach 2 and a moderate impact on Reach 3. This is associated with flow in the river being at it's lowest with the drought permit implemented. It is therefore overall assessed as having a major adverse effect.	Low (adverse)	High	Small	Moderate	Short-term	Temporary	Major adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	The risk of the drought order to SRP has been assessed as moderate and dissolved oxygen saturation as minor in Reach 2 (River Wye from Pann Mill PS to Little Marlow STW discharge). There is a minor risk to SRP in Reach 3 (Wycombe Marsh Brook from 1km downstream of Pann Mill PS to its confluence wit the River Wye). Overall water quality is assessed as having moderate adverse impact.	Medium (adverse)	Medium	Small	Moderate	Short term	Temporary	Moderate adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Water resource availability is described as "water not available for licencing" by the EA. There are no significant surface water or groundwater abstractors (over 0.5Ml/day) within the area of influence.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	A moderate impact on geomorphology is expected in Reach 2, where variation in wetted width would occur in the limited shallower sections of the reach. Minor impacts are also identified for Reach 1 (River Wye from it culverted section in High Wycombe to Pann Mill PS) where the steep banks and managed nature of the reach limit the impact of flow.	Low (adverse)	Medium	Small	Moderate	Short-term	Temporary	Minor adverse	None
Air and Climate	6.1 To maintain and improve air quality.	The option will increase the emissions associated with the abstraction and treatment of water (up to 7.3 Ml/d). Wycombe AQMA is 1.4km due south of the site, however no construction is required.	Low (adverse)	Low	Low	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction.	Low (adverse)	Low	Medium	Moderate	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	High (beneficial)	small	High	Short term	Temporary	None	Minor beneficial

Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	The St John the Baptist's Hospital scheduled monument is in the area of influence, however it is unlikely to be impacted by drought permit implementation. Effects are considered negligible.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None		
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	No impacts on landscape and/or visual amenity have been identified. The area of influence is built-up area with few trails and footpaths associated with the impacted reaches.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None		
Drought Plan option	Pann Mil Water is average impleme	l: abstracted and peak a ntation wo	d from the abstractio ould see a	e South We n will dec n increase	est Chilter rease fron e from the	rns Chalk n 22.273 N revised li	WFD grou /II/d to 9.5 icence of §	ındwater l MI/d (revis 9.5 M/I up	body at Pa sed as a re to the old	nn Mill. F esult of th deployab	rom April e Restorii le output	2017, the ng Sustain of 16.8MI/c
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Summary commentary of scheme adverse effects	Major adverse effects have been identified in relation to a reduction in flow in the River Wye Reach 2 with moderate flow in the river being at its lowest level during drought permit operation. Moderate adverse effects relate to the im (including loss of habitat and spawning areas affecting Brown Trout), and water quality (with risks for SRP in Reacl also been identified in relation to non-native invasive species (low flows and loss of habitat), and geomorphology (e However, all adverse effects identified are short-term and temporary, and not expected to extend beyond six month											
SEA Objectives Adverse Effects Assessment Summary			None		None		None			None	None	
Summary commentary of scheme beneficial effects	Beneficial impacts include ensuring supply of water to local population and other customers/businesses. There is a with improving the resilience of water supplies to drought.											
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None



Drought Plan option	Harpsden/ Sheeplands: The Harpsden abstraction consists of three boreholes abstracting from the unconfined chalk aquifer (that is overlaid located about 750m east of the abstraction, with the settlement Lower Shiplake lying between the river and the abstr aggregate with the Sheeplands abstraction, a group of three boreholes, also abstracting from the Chalk. The Sheep Harpsden, on the other side of the River Thames to the Harpsden boreholes. The proposed drought option will be t abstraction licence and increase total abstraction from both locations to 27.9 Ml/d. Abstraction at Sheeplands will c within the boundaries of the normal operating license. Typically, 10.5 Ml/d of water is abstracted from the Harpsden therefore an increase of 6 Ml/d during drought would be taken, amounting to a total output of 16.5 Ml/d.											
Summary commentary of scheme adverse effects	Negligibi	le adverse	effects a	re predicte	ed for this	drought d	option and	l no consi	truction is	proposed	I.	
SEA Objectives Adverse Effects Assessment Summary			None	None	None		None			None	None	None
Summary commentary of scheme beneficial effects	Beneficia improvin	al effects i ng the resi	nclude ma lience of v	aintained o vater supp	of essenti olies to dr	al public v ought.	water supp	blies durir	ng times o	f drought.	There is	also likely
SEA Objectives Beneficial Effects Assessment Summary	None	None		None		None	None	None	None	None	None	None

by superficial gravels). The River Thames is action. The abstraction is licenced in ands boreholes are located 3km southeast of relax the aggregate condition of the current ntinue to be pumped at 11.4 MI/d which is boreholes under the normal operating license											
		None	None	None							
to be beneficial impacts associated with											
None	None		None	None							

SEA	topics and objectives	Assessment of option								
Торіс	Objective	Potential residual effect on sensitive receptors (assuming good practice construction methods) Commentary	Magnitude of effect (low/medium/high)	Value/ sensitivity of receptor (low/medium/ high)	Scale of effect: geographical &/or population affected (small/medium/large)	Certainty of effect (low/moderate/ high)	Duration of effect (short- term/medium- term/long-term)	Permanence of effect (permanent/ temporary)	Residual adverse effect significance (likely to remain after reasonable mitigation)	Residual beneficial effect significance (likely to remain after reasonable mitigation)
Biodiversity, flora and fauna	1.1 To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy.	Hydrological impacts associated with drought plan implementation are expected to be negligible, as are effects on the Harpsden Wood SSSI, Kilnpits ancient woodland and NERC species within the area of influence. There is no construction associated with this option and negligible effects on sites within proximity.	Low (adverse)	Low	Small	Moderate	Short	Temporary	Negligible adverse	None
Biodiversity, flora and fauna	1.2 To avoid introducing or spreading INNS.	The negligible hydrological impact of drought permit implementation is unlikely to result in any change to the potential spread or dispersal of invasive species.	Low (adverse)	Low	Small	Moderate	Short	Temporary	Negligible adverse	None
Population and human health	2.1 To protect and enhance health and well- being (including raising awareness of the importance and value of the water environment for health and well-being).	The option will help to maintain essential public water supplies (provision of up to an additional 6.5Ml/d of water) during drought conditions, and therefore help maintain public health. No construction is required, so no adverse effects associated with construction activities will occur.	Low (beneficial)	High	Small	Moderate	Short	Temporary	None	Moderate beneficial
Population and human health	2.2 To protect and enhance the water environment for other users including recreation, tourism, navigation, as well as terrestrial recreational resources (including National Trails and Public Rights of Way).	There will be no impact on navigation from drought permit implementation.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Population and human health	2.3 To promote a sustainable economy with good access to essential services, including a secure, affordable supply of water.	The option will contribute to the maintenance of supply reliability in drought conditions, ensuring a resilient supply for customers and economic activity with no permanent adverse effects on the environment. Hydrological impacts are negligible, so no impacts on other abstractors or businesses are expected.	Low (beneficial)	High	Medium	Moderate	Short	Temporary	None	Moderate beneficial
Material assets and resource use	3.1 To reduce, and make more efficient, the domestic, industrial and commercial consumption of resources, minimise the generation of waste, encourage its re-use and eliminate waste sent to landfill.	Increases in abstraction over and above what occurs under normal operation will typically result in proportional increases in energy use and waste generation.	Low (adverse)	Low	Medium	Medium	Short	Temporary	Negligible adverse	None
Material assets and resource use	3.2 To promote the sustainable management of natural resources including efficient water resource management and to ensure water supply for homes and industry in the area is maintained.	No opportunities to promote the sustainable management of natural resources have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Water	4.1 To avoid adverse impact on surface and groundwater levels and flows, including when this impacts on habitats and/or navigation.	Option involves groundwater abstraction of an additional 6 MI/d. The reach potentially affected is Reading gauging station to Newtown. The EAR reports that even if the full additional abstraction was assumed to be at the expense (via increased infiltration) of the River Thames around Harpsden, the impact on summer Q95 and summer Q99 as measured at the nearest upstream gauge at Reading would be 1.5% and 1.8% respectively, and therefore a negligible impact on the River Thames. During a dry period, water level in the river gravels would be maintained by the large and level-controlled River Thames. Surface water features would also be maintained by the river, and therefore, the drought permit would have a negligible impact.	Low (adverse)	Low	Small	Moderate	Short	Temporary	Negligible adverse	None
Water	4.2 To protect and enhance surface and groundwater quality and avoid adversely affecting water body status.	No water quality impacts or risks have been identified in the EAR. Negligible impacts on WFD status are identified in EAR.	Low (adverse)	Low	Small	Moderate	Short	Temporary	Negligible adverse	None
Water	4.3 To ensure appropriate and sustainable management of abstractions to maintain water supplies whilst protecting ecosystem functions that rely on water resources.	Local resource availability is described as 'water not available for licensing'. However, no impacts on other abstractions within the area of influence are expected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Water	4.4 To promote measures to enable and sustain long term improvement in water efficiency.	No opportunities to promote long-term improvement in water efficiency have been identified for this option.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Soil, geology and land use	5.1 To protect and enhance geology, the quality and quantity of soils and geodiversity and promote a catchment-wide approach to land management.	No specific soils or geological SSSIs are reported as being impacted in the EAR and no construction is proposed. Adverse hydrological effects are expected to be negligible, and no geomorphological risks have been identified.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Air and Climate	6.1 To maintain and improve air quality.	The option will result in small increases in air emissions associated with abstraction and treatment of water.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.2 To reduce greenhouse gas emissions.	Short-term increases in greenhouse gas emissions will occur due to increased abstraction. However, no construction activities are required for this option, and the use of existing infrastructure and treatment facilities will minimise increases in greenhouse gas emissions.	Low (adverse)	Low	Small	Low	Short-term	Temporary	Negligible adverse	None
Air and climate	6.3 To consider the need for adaptive measures for climate change.	Drought permits/orders are a key component of Thames Water's Drought Plan. The Plan aims to ensure resilience of water supplies to drought.	Low (beneficial)	Medium	Small	Moderate	Long-term	Temporary	None	Minor beneficial
Archaeology and Cultural Heritage	7.1 To conserve and enhance the historic environment, heritage assets and their settings and to protect archaeologically important sites.	There are no heritage assets within the area of influence, so no impacts on the historic environment are expected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None
Landscape and Visual Amenity	8.1 To protect, enhance the quality of and improve access to designated and undesignated landscapes, townscapes and the countryside.	There is no construction proposed and negligible effects on hydrology reported in the EAR. Therefore landscape would not be affected.	n/a	n/a	n/a	n/a	n/a	n/a	None	None

Appendix E Quality Assurance



E. Quality Assurance

ODPM Guidance⁹³ on SEA contains a Quality Assurance checklist to help ensure that the requirements of the SEA Directive are met. The checklist is reproduced in **Table E.1**, indicating where this Environmental Report meets the requirements.

Table E.1	Quality	Assurance	Checklist
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Checklist item	Comments
Objectives and context	
The plan's or programme's purpose and objectives are made clear.	The purpose of the final Drought Plan 2022 is set out in Sections 1.1-1.4.
Environmental issues and constraints, including international and EC environmental protection objectives, are considered in developing objectives and targets.	Objectives of other relevant plans and programmes are set out in Section 2.2 and Appendix B.
SEA objectives, where used, are clearly set out and linked to indicators and targets where appropriate.	Objectives are set out in Section 4.2.
Links with other related plans, programmes and policies are identified and explained.	Links are identified in Section 2.2 and Appendix B.
Conflicts that exist between SEA objectives, between SEA and plan objectives and between SEA objectives and other plan objectives are identified and described.	Cumulative effects such as those associated with the Final DP 2022 and other plans are addressed in Section 6.
Scoping	
Consultation Bodies are consulted in appropriate ways and at appropriate times on the content and scope of the Environmental Report.	This Scoping Report is a part of the consultation process required to meet the requirements of the SEA Directive and has been circulated to consultees. Further consultation has been undertaken on the Environmental Report and Drought Plan 2022. The consultation process is described in Section 1.9.
The assessment focuses on significant issues.	The scope of the assessment reflects the geographic extent of Thames Water's water resource zones, and provides a comprehensive approach to assessment (reflecting the large number of interactions dependent on the continued supply of water) which will enable the subsequent assessment to determine which impacts will be considered significant.
Technical, procedural and other difficulties encountered are discussed; assumptions and uncertainties are made explicit.	Difficulties and assumptions are set out in Sections 1.2, 3.2 and 4.3.2.

⁹³ Office of the Deputy Prime Minister (2005) A Practical Guide to the Strategic Environmental Assessment Directive.



Checklist item	Comments
Reasons are given for eliminating issues from further consideration.	The SEA objectives provide a comprehensive basis for assessment and no issues were eliminated at the Scoping stage.
Alternatives	
Realistic alternatives are considered for key issues, and the reasons for choosing them are documented.	The appraisal framework has been used to assess the drought options.
Alternatives include 'do minimum' and/or 'business as usual' scenarios wherever relevant.	Assessment of alternatives (the drought options) have been considered in the Environmental Report.
The environmental effects (both adverse and beneficial) of each alternative are identified and compared.	Assessment of alternatives (the drought options) have been considered in the Environmental Report.
Inconsistencies between the alternatives and other relevant plans, programmes or policies are identified and explained.	Assessment of alternatives (the drought options) have been considered in the Environmental Report.
Reasons are given for selection or elimination of alternatives.	Assessment of alternatives (the drought options) have been considered in the Environmental Report.
Baseline information	
Relevant aspects of the current state of the environment and their likely evolution without the plan or programme are described.	The current state of the environment and predicted future baseline is set out in Section 3 and Appendix C for each SEA topic.
Environmental characteristics of areas likely to be significantly affected are described, including areas wider than the physical boundary of the plan area where it is likely to be affected by the plan.	The environmental characteristics of Thames Water's water supply area, and bordering regions where appropriate, are described in Section 1.3.
Difficulties such as deficiencies in information or methods are explained.	Difficulties and limitations are set out in Section 3.2 (and Section 4.3.2 for the wider methodology).
Prediction and evaluation of likely significant en	vironmental effects
Effects identified include the types listed in the Directive (biodiversity, population, human health, fauna, flora, soil, water, air, climate factors, material assets, cultural heritage and landscape), as relevant; other likely environmental effects are also covered, as appropriate.	Potential effects have been set out in Section 5, Section 6 and Appendix D.
Both positive and negative effects are considered, and the duration of effects (short, medium or long- term) is addressed.	The nature and duration of potential effects have been set out in the Environmental Report, using an appraisal framework set out in Section 4. Effects are assessed in Sections 5 and 6 and Appendix D.
Likely secondary, cumulative and synergistic effects are identified where practicable.	These effects have been identified in Section 6.



Checklist item	Comments
Inter-relationships between effects are considered where practicable.	These effects have been considered within the assessment in Section 5 and Appendix D and also in Section 6 of this Environmental Report where practicable.
The prediction and evaluation of effects makes use of relevant accepted standards, regulations, and thresholds.	Relevant standards have been used where appropriate in undertaking the assessment in the Environmental Report.
Methods used to evaluate the effects are described.	The Environmental Report includes information on the methods used for evaluation of potential effects in Section 4.
Mitigation measures	
Measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the plan or programme are indicated.	Mitigation measures for potential negative effects have been incorporated into the assessment undertaken in preparing the Environmental Report, and are described in Section 7.2.
Issues to be taken into account in project consents are identified.	Such mitigating measures, if required, will be highlighted against the drought options. It is noted that Environmental Reports which include Environmental Management Plans have been prepared for most of the Drought Permit sites (see Section 1.5).
The Environmental Report	
Is clear and concise in its layout and presentation.	The Environmental Report is clear and concise. See Sections 1.7 and 1.8.
Uses simple, clear language and avoids or explains technical terms.	The Environmental Report uses simple, clear language, and explains technical terms, as appropriate.
Uses maps and other illustrations where appropriate.	The Environmental Report has used maps and illustrations where appropriate.
Explains the methodology used.	SEA methodology has been described in Sections 1.7 and 4.
Explains who was consulted and what methods of consultation were used.	The consultation strategy, including organisations and dates of consultation is included in Section 1.9.
Identifies sources of information, including expert judgement and matters of opinion.	Sources of information have been detailed in various sections of the Environmental Report.
Contains a non-technical summary covering the overall approach to the SEA, the objectives of the plan, the main options considered, and any changes to the plan resulting from the SEA.	The Environmental Report includes a Non-Technical Summary.
Consultation	



Checklist item	Comments
The SEA is consulted on as an integral part of the plan-making process.	The Scoping Report and Environmental Report are part of the consultation process required to meet the requirements of the SEA Directive. Both have been circulated to consultees.
	The consultation process is described in Section 1.9.
Consultation Bodies and the public likely to be affected by, or having an interest in, the plan or programme are consulted in ways and at times which give them an early and effective opportunity within appropriate time frames to express their opinions on the draft plan and Environmental Report.	The Scoping Report and Environmental Report are part of the consultation process required to meet the requirements of the SEA Directive. Both have been circulated to consultees. The consultation process is described in Section 1.9.
Decision-making and information on the decisio	n
	Consultation responses from the Scoping stage have been incorporated into the Environmental Report.
The environmental report and the opinions of those	Responses from consultation on the draft Environmental Report have been incorporated in the development of the final Environmental Report.
consulted are taken into account in finalising and adopting the plan or programme.	After finalisation of the Drought Plan, a statement will be published describing how the SEA and the responses to consultation have been taken into account during the preparation of the Drought Plan.
	The consultation process is described in Section 1.9.
	Consultation responses from the Scoping stage have been incorporated into the draft Environmental Report.
An explanation is given of how they have been	Responses from consultation on the draft Environmental Report have been incorporated in the development of the final Environmental Report.
taken into account.	After finalisation of the DP, a statement will be published describing how the SEA and the responses to consultation have been taken into account during the preparation of the DP.
	The consultation process is described in Section 1.9.
Reasons are given for choosing the plan or programme as adopted, in the light of other reasonable alternatives considered.	This has been set out in the Final DP following consultation on the Draft Drought Plan 2022 and Environmental Report.
Monitoring measures	
Measures proposed for monitoring are clear, practicable and linked to the indicators and objectives used in the SEA.	Section 7.3 provides an overview of proposals for monitoring.



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Checklist item	Comments
Monitoring is used, where appropriate, during implementation of the plan or programme to make good deficiencies in baseline information in the SEA.	Suggestions for monitoring are made in Section 7.3, with monitoring taking place following implementation of the Drought Plan, further to consultation with regulatory authorities including the Environment Agency and Natural England.
Monitoring enables unforeseen adverse effects to be identified at an early stage. (These effects may include predictions which prove to be incorrect.)	Suggestions for monitoring are made in Section 7.3, with monitoring taking place following implementation of the Drought Plan, further to consultation with regulatory authorities including the Environment Agency and Natural England.
Proposals are made for action in response to significant adverse effects.	Mitigation measures for adverse effects are suggested in Section 7.2.



F. Consultation Responses received through the draft DP 2022 public consultation process

This Appendix sets out the consultation responses received through the draft DP 2022 public consultation process held from 7 June 2021- 30 July 2021. Thames Water's response issued in its Statement of Response (SoR) is provided, together with the particular sections of the Environmental Report and accompanying Appendices where the comments are addressed.



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
1	Port of London Authority	Table C.15 - Other potential impacts of climate change on the water environment and water related infrastructure includes more intense rainfall can lead to faster river flows, impact on water quality, e.g. increase water temperature, change in salinity, change in the level of dissolved oxygen; flood management might include establishing new flood defences	No response required	Table C.15 updated
2	Port of London Authority	Both reduction in residual flows at Teddington options have moderate or minor adverse impacts to biodiversity. Major and moderate impacts to biodiversity from Lower Thames drought permit.	No response required	No action required
3	Port of London Authority	Page 92 – fragmentation of fish community mitigation to incorporate physically moving migrating fish upstream or downstream of barriers. If this a feasible option? Is this intended to be by individual? Capture and release on mass? Has the potential distance of the movement been considered?	Where habitat fragmentation occurs, fish passes could temporarily be modified to maintain passage (where possible). For other barriers, we will consider 'Trap & Transport' of concentrated abundances of migrating fish accumulated below impassable barrier/s to spawning grounds upstream of the impacted reach (where environmental parameters such as dissolved oxygen and temperature allow). This will include large population and will not be limited to single individuals.	No action required
4	Port of London Authority	Page 94 – Not sure that INNS surveys could be classed as a mitigation?	The mitigation measures for INNS will be reviewed to consider measures that are practical to reduce the distribution of INNS.	No action required
5	Natural England	The dDP has complied with policy and legislation set out in Annex 2 relating to protected landscapes. The SEA Environmental Baseline Review (SEA Appendix C, section C.8) discusses policies relating to	This comment is noted. We will make a minor amendment to the SEA to correct that some long-distance trails are incorrectly referred to as National Trails in the	Assessment Tables (Appendix E) have been reviewed and



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		landscape and visual amenity and identifies relevant protected landscapes and their key characteristics including Areas of Outstanding Natural Beauty (AONBs) and National Parks. Information about Natural Character Areas (NCAs) is also presented. A SEA objective relating to landscape and visual amenity is included, and assessment against this objective appears sufficient at this strategic level. Minor or pedigible adverse impacts have been	assessment tables (the Darent Valley Path, Oxford Canal Walk and Downs Link).	updated where applicable
		identified for some drought options, mostly relating to visual impacts of lower water levels in rivers and streams.		
		Some of the visual impacts concern views from public rights of way, including National Trails. The National Trails relevant to Thames Water's area are correctly mapped in the SEA Environmental Baseline Review. However, some additional long-distance trails are incorrectly referred to as National Trails in the assessment tables (the Darent Valley Path, Oxford Canal Walk and Downs Link).		
6	Natural England	Impacts on SSSIs are assessed against the biodiversity SEA objective. The importance of SSSIs is discussed in the SEA Environmental Baseline Review, although sites within Thames Water's area are not listed (except where they overlap with Habitats sites). Natural England recommends that the SEA should include a list of SSSIs which have been considered in the assessment, and explain how potential impacts on interest features have been identified and screened.	We will include in the SEA a list of SSSIs that have been considered and explain how potential impacts on interest features have been identified and screened. We will include more detailed commentary in relation to the SEA objectives in instances where SSSI impacts have been assessed.	Section C.1.1 - Table C2 has been added to this section to list SSSIs considered in assessment Assessment Tables have been reviewed and updated where applicable
		impacts on SSSIs where they have been identified,	We have provided our EAR methodology to Natural England and we will outline the	



Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
	but it is not always clear how this relates to the interest features of the site, or whether any mitigation is proposed. There is generally no information about what sites have been screened out. This is presumably because the SEA is highlighting key impacts which have been identified in the EARs. However, Natural England would like to see more detailed commentary in relation to the SEA objectives. In many cases against the biodiversity objective where impacts on SSSIs have been identified, the value of the receptor has been marked as medium. SSSIs are of national importance and should have a high value rating. It is not clear how SSSIs have been identified for further assessment in the EARs. There is reference to an Environmental Assessment Methodology, but Natural England could not find this amongst the documents provided. It would seem that for surface water permits, sites which are connected to or within 100 metres of the zone of influence have been screened. No detail on the distance used for groundwater permits is provided, and in some cases the cone of depression or zone of influence is not clear, with no map provided. In the EAR for the Sundridge 2 drought permit, the screening has not included Darenth Wood SSSI, despite being adjacent to reach 2. Also, Natural England would like to see West Thurrock Lagoon and Marshes SSSI being considered in the assessment, as the study reach stops just shy of this site. Generally, the interest features of SSSIs have been identified in the EARs, but the current site condition is	details in relation to SSSI assessment in summary in the SEA. We will provide more information to justify the assessment of potential SSSI impacts for Sundridge, Baunton and the Lower Thames. We will clarify how the drawdown impacts have been screened, this is included in the EAR methodology but we will summarise it briefly in the SEA. This methodology provides a detailed approach for screening protected sites (including SSSIs) and the justification for omission of certain sites/habitats/features	



Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
	not taken into account. Thames Water should check that the latest designated site information has been used in the SEA and EARs, including Supplementary Advice to the Conservation Objectives (SACOs) and any recent condition assessments. This could provide vital information about the likely resilience or vulnerability of a site during drought, how it might recover, and the potential mitigation measures that might be needed. In many cases, there is insufficient detail about how		
	the degree of impact has been identified. For example, in the EAR for Baunton 2, most impacts on SSSIs have been deemed negligible, some based on not being hydrologically connected. There is not always sufficient evidence to support this conclusion, and where hydrological connectivity is uncertain (e.g. Whelford Meadows SSSI) monitoring should be identified to verify the conclusions. In the Lower Thames EAR, fens and reedbeds in Barn Elms Wetland Centre SSSI are screened out for further assessment under the assumption that the site is manmade and therefore has no direct connection to the estuary. Natural England suggests further review to verify these claims.		
	It is also unclear about how drawdown impacts have been screened, and the reasoning behind what levels of drawdown exclude further assessment needs to be explained. For example in the EARs for Sundridge 1 and 2, Woldingham and Oxted Downs SSSI haven't been assessed further as drawdown is expected to be less than 5 cm.		
	Our concerns about the limitations of the mitigation plans for SSSIs are discussed in section 1.2.8 below.		



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
7	Natural England	The SEA includes information about carbon emissions, climate change impacts and national policy in the Environmental Baseline Review, and has SEA objectives to reduce greenhouse gas emissions', and to consider the need for adaptive measures for climate change'. The assessment relating to greenhouse gas emissions relates to the carbon footprint/energy consumption associated with the drought permit. Most drought options are marked as beneficial against the adaptive measures' objective, as they increase the resilience of water supplies in drought. Natural England doesn't consider the use of unsustainable abstractions and drought permits to be adapting to climate change, rather they are a short- term response to climate change impacts. So we do not think this beneficial effect significance category is appropriate. The SEA assessments go some way to consider adaptation and resilience of wildlife to climate change, in so far as they consider how environmental changes will impact certain species and habitats where they can't adapt or become constrained. But there is little in the way of identifying solutions that support adaptation. The SEA and EARs could be used to identify environmental receptors which are particularly vulnerable to drought (and therefore climate change), and to identify mitigation measures that could be put in place now, to improve their resilience when a drought occurs. This could support Thames Water's general duty to conserve biodiversity (see section 2.2.2), for example by increasing habitat quality and connectivity.	We will update the SEA to reflect that the use of Drought Permits is to ensure continuity of supply is beneficial for maintain water supply under climate change but recognise that that is preferable not to have to use potentially damaging drought permit options. This will be addressed through developing greater resilience to more severe droughts through our statutory WRMP process. We will review the assessment of environmental receptors which are particularly vulnerable to drought (and therefore climate change), and to identify whether further mitigation plan. We will clarify in our plan that we are developing a programme of potential options to provide resilience to the impacts of drought permits options and that this will be implemented in AMP8. The Drought Plan is in place for 2022-2027 and the impacts of climate change are addressed through our WRMP. We are working through our WRMP to improve our resilience to drought, so that we are less reliant on the use of drought permits in future and this increased resilience will take into account climate change impacts.	Section C.6



Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		The SEA findings relating to Objective 6.3 "to consider the need for adaptive measures for climate change" (which relate to the indicator question associated with each option "will it improve resilience/adaptability to likely effects of climate change, e.g. by increasing water storage capacity, or transferring water from areas with surplus?") are deemed to be positive for all options due to the beneficial effects associated with the maintenance of essential public water supplies and improved resilience of water supplies to drought, and so we consider that the findings here are valid.	
		Climate change is addressed in the following indicator question under biodiversity, flora and fauna: "Will it contribute to the sustainable management of natural habitats and ecosystems, i.e. within their limits and capacities taking into account climate change adaptability?" which informs the objective 1.1 "To conserve and enhance biodiversity, including designated sites of nature conservation interest and protected habitats and species (with particular regard to avoiding the effects of over-abstraction on sensitive sites, habitats and species) and to protect and enhance natural capital and the biodiversity and ecosystem services that contribute to the economy"	
		The climate change impact on water resilience has also been covered in the	



Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		Water topic (see objective 4.3 "To ensure appropriate and sustainable management of abstractions (or compensation flow) to maintain water supplies whilst protecting ecosystem functions that rely on water resources".	
		In the context of drought planning, individual drought options are taken to constitute "alternatives". Each of these "alternatives" were therefore assessed using the appraisal framework set out in Table 4.2 of the Environmental Report, based on the methodology proposed and consulted on in the SEA Scoping Report. The SEA is therefore intended to provide information on the relative environmental performance of alternatives, in order to make the decision- making process more transparent. Detailed assessment is not an SEA requirement - this is undertaken for each drought option and is documented in the EARs which are used to help inform the SEA.	
		The EARs identify environmentally sensitive features that have the potential to be impacted by the implementation of the drought options and set out mitigation and monitoring that could be implemented to alleviate any impacts. We will work to identify where possible mitigation measures that could be implemented prior to drought. We are currently working to identify options to	



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
			introduce mitigation in relation to drought permits and we will describe this in our revised draft Drought Plan. This work is designed to identify options that could then be implemented in AMP8 and in following AMPs. The extent, location and type of mitigation measures will also be informed by walkovers that are completed at the onset of drought.	
8	Natural England	The dDP has not complied with policy and legislation set out in Annex 2 relating to Marine Conservation Zones (MCZs). MCZs are mentioned in the SEA Environmental Baseline Review (one sentence explaining what they are), but no sites have been identified as relevant to the Drought Plan. The Thames Estuary MCZ is also mentioned in the assessment table for the Lower Thames Drought Permit (SEA Appendix D), but with no discussion of how features of the site might be affected. There appears to be no further reference to MCZs anywhere in the dDP, SEA or EARs. The Thames Estuary became a recommended MCZ (an rMCZ) in 2012. In 2018 the rMCZ was revised and split into two sites comprising the Upper Thames Estuary rMCZ and Swanscombe rMCZ. Swanscombe MCZ was designated in 2019, and its features are the tentacled lagoon worm Alkmaria romijni and intertidal mud6. The Upper Thames Estuary rMCZ was not designated. Thames Water must consider whether any of its drought plan options might impact Swanscombe MCZ and its interest features, alone or in combination with any other plans or projects (e.g. the London Resort	We have no drought sources that have an impact on the Swanscombe MCZ. The only drought option that would affect the Upper Thames Estuary is the Lower Thames Drought Option. The Upper Thames Estuary MCZ was not designated. We will clarify the lack of potential impacts on MCZs from our drought options in the SEA alone and in combination. We will clarify the evidence for the impact of the Lower Thames Drought Permit option only having impact as far as London Bridge.	Section C.1.1



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		and Lower Thames Crossing). The MCZ should be mentioned in the SEA Environmental Baseline Review and screened for potential impacts in the EARs and SEA for the Lower Thames Drought Permit option, and for any other relevant schemes. Currently, the Lower Thames EAR has only assessed impacts as far as London Bridge, but no clear evidence is presented to suggest that impacts will stop at that point.		
9	Natural England	The SEA identified some in combination and cumulative impacts associated with some combinations of drought plan options. Where potential impacts are identified, it would be helpful to assess the impacts against the SEA objectives and appraisal framework, to aid decision-making about option prioritisation. For example, the assessments for some combinations of options identified cumulative flow and water quality impacts on the River Kennet, but there is no mention (in this section) of the fact this river is a SSSI and is, therefore, a high value receptor. The assessment for Ogbourne 1 and the Ogbourne Emergency Boreholes options concludes that cumulative impacts on the River Kennet are minor, despite lower flows (of up to 10%) and a delayed recovery time. The assessment should consider impacts on SSSI interest features and current SSSI condition, and the SSSI status should be reflected in the significance category. Natural England notes that in combination and cumulative assessments have not yet been completed for the Baunton 2 option (in combination with Latton, Mersey Hampton and Bibury). These will	 We will clarify in the SEA against the SEA objectives and appraisal framework where in combination and cumulative impacts have been identified. We will update the Ogbourne assessment to address the River Kennet SSSI interest features and clarify why this is considered minor. We have agreed an approach to the potential need for implementation of drought permits if a situation arose where drought permits are needed for more than 6 months. We will clarify this process in the SEA. The in-combination assessment within the SEA will be reviewed and updated (where required) in view of the comments provided. 	Section 6.3



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		 be completed and submitted with the final drought plan. We also note that the assessments in the SEA and EARs only consider the cumulative and in combination effects of drought options being used concurrently, and not if a second drought permit were needed directly afterwards. If a situation arose where successive drought permits were needed for more than six months, cumulative impacts would need to be considered in further detail at the time of application. Natural England advises that further assessment of such impacts is needed to ensure the EARs are application ready. There are numerous permits that influence the same catchment with an overlapping zone of influence, e.g. Fobney Direct, Fobney Emergency Boreholes and possibly Pangbourne. An assessment of in combination and cumulative impacts with other plans and projects has also been undertaken, and no such impacts have been identified. 		
10	Natural England	Table 7.1 (in the SEA) provides examples of the type of monitoring and information-gathering that will be undertaken before, during and after drought, but for many of the potential impacts identified (including impacts on SSSIs, macrophytes, invertebrates and priority habitats) mitigation measures during a drought situation are not suggested or are deemed not possible. For example, the EARs for Sundridge 1 and 2 identified an impact on the bird assemblage feature of Sevenoaks Gravel Pits SSSI but stated that —Maintaining water levels in the main lake and therefore wetland habitat for wintering birds is not	We are currently developing a programme of potential mitigation measures for our drought permit options in advance of drought. This programme is being developed now with the plan to start implementing measures over the coming AMPs. We have added the following text to Section 6.1.4 'We are currently working to identify potential options to improve environmental resilience of our rivers to improve their robustness in times of Drought. This project is reviewing all potentially impacted reaches identified in our	Section C.1.1 - Table C2 has been added to this section to list SSSIs considered in assessment Section 7.1 of SEA has been reviewed and amended to reflect revisions that



Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
	feasible in drought conditions. As such mitigation may focus on post drought habitat improvements to benefit the wintering bird population of the site. For the Baunton 2 permit, Whelford Meadows SSSI is not mentioned in the mitigation plan, despite impacts being identified. Given the significant risks to wildlife that have been identified for many drought options, Thames Water should consider whether there are habitat improvement or enhancement measures that could be implemented now, to increase the resilience of habitats and species during drought. Such mitigation, in advance of a drought, is not discussed in the SEA. One of the mitigation measures suggested to manage the impact of increased predation on fish communities is the use of bird scarers at significant locations. This method should be used with caution, taking account of the resulting impacts on bird communities which might also be under stress during a drought. There would need to be confidence that birds would have sufficient good quality adjacent habitat to move to and alternative food sources. At sites that are designated for relevant bird features, this is unlikely to be an acceptable option.	EARs and assessing what river restoration options might improve the environmental resilience in the area should there be a drought and / or a need to implement Drought Permits. This work is ongoing at the moment and will feed into PR24 and therefore the results will not be available to include in our plan until the next round of updates to our Drought Plan." We will update the mitigation plan to confirm that bird scarers would only be used where it is possible for birds to safely move to alternative habitats. We will review and confirm whether the Whelford Meadows SSSI was included and screened out for assessment and add further justification (if required). Winter flooding of meadows should not be impacted as the drought option will not be in place during winter months.	have been undertaken in the EARs
	Post-drought monitoring does not constitute mitigation (as is implied in some parts of this table), although it may inform decisions about suitable mitigation or compensation measures that will support ecological recovery. Post-drought mitigation measures are not suggested. This is also the case in some EARs. For example, in the EAR for Baunton 2, a moderate adverse impact on the fine-lined pea mussel is identified. The EAR states that mitigation	The EARs identify environmentally sensitive features that have the potential to be impacted by the implementation of the drought options and set out mitigation and monitoring that could be implemented to alleviate any impacts. We will work to identify where possible mitigation measures that could be implemented prior to drought. We are currently working to identify options to	



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		for this species during a drought is not possible and that post-drought mitigation measures should be triggered by population assessments. It goes on to describe how the population will be assessed but does not explain what mitigation might be possible if the surveys show the population to be impacted.	introduce mitigation in relation to drought permits and we will describe this in our revised draft Drought Plan. This work is designed to identify options that could then be implemented in AMP8. The extent, location and type of mitigation measures will also be informed by walkovers that are completed at the onset of drought.	
11	Natural England	Section 7.3 of the SEA (Monitoring) states that monitoring would occur at the following three stages, and examples of what this might consist of are provided in Table 7.1: 1) At the on-set of environmental drought 2) During implementation of the drought permit/order 3) After the drought. Monitoring may also be required in advance of a drought, and this is discussed in the EARs. For example, the Kennet Valley and SWA EARs confirm that recent monitoring (up to 2018/19) has been done for the key permits which have impacts, and more monitoring is proposed between 2020-2024. This is good. Having good baseline data about environmental quality, species distribution and hydrology is important to use as a comparison during drought, to assess the severity of environmental impact and to identify when and where mitigation is required. Baseline data can also help inform the assessment of risks and potential mitigation requirements, for example in understanding locations that are important for particular species (e.g. dragonfly breeding habitat). Pre-drought monitoring may also be required to validate assumptions made	We will amend our monitoring plan to set out the monitoring sites we will use in a drought. The sites we will use will be those that we have used for the drought permit baseline monitoring as this will provide a basis for comparison with the long-term record, we are building up through the ongoing monitoring that has been put in place and agreed with the EA. This monitoring is designed to identify the adverse effects of drought options and to assess recovery after the implementation of drought options. We will set out the proposed monitoring timings to address the period of recovery from a drought. We will continue to review our drought permit baseline monitoring to ensure it is up to date to support our drought permit options.	See EARs



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		in the assessments, where robust data and evidence are lacking. EARs should identify where there are data gaps that need to be filled, and Thames Water should take steps to gather such data as soon as they can, and to update their assessments and mitigation plans accordingly.		
		For some options, information about what monitoring will involve is fairly generic and needs more detail. For example, the monitoring plan for the Kennet Valley EARs only provides a detailed monitoring plan for one reach affected by the Fobney Direct permit, whereas three reaches have been identified with a moderate hydrological impact. No detailed monitoring information is provided for the other three drought permits in the Kennet Valley WRZ. A detailed environmental monitoring plan is needed for all options if the EARs are to be application ready.		
12	Environment Agency	It is not clear how the findings of the Environmental Report have been incorporated into the draft drought plan to reduce environmental impact and/or enhance environmental benefit. We expect the company to clarify how the SEA findings have been incorporated into the plan to reduce environmental impact and/or enhance the environmental benefit.	The findings of the SEA have been incorporated into the priority use of our Drought Options during a drought. The outcomes have allowed us to prioritise the least environmentally damaging sources first, leaving the ones likely to have the most significant environmental impacts as lowest priority, We have updated the plan to add the following text to This will be clarified in section 1.5.3 of our Drought Plan. 'We have set out a priority order of use for our Drought Permit options in Appendix C for each Water Resource Zone (WRZ). This priority order was based on a combination of assessment, for each DP option, of the volume provided, the lead time to bring it on-line and the potential environmental impact of the option.	See Post-Adoption Statement



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
			We have used the information from the SEA to confirm the priority order of the DP options in relation to the environmental impact of the options. In each case the priority order has been confirmed based on the assessed environmental impact.'	
13	Historic England	As the plan may seek to modify the water environment the Thames Water Drought Plan has the potential to affect waterlogged archaeological deposits that currently survive in adjacent areas; and may also involve construction activities that may remove floodplain/ coastal/estuarine deposits, which could contain as yet unrecorded and non-designated archaeology (often deeply buried within the sequence of 'natural' deposits and potentially waterlogged) that may potentially be of national significance. The Thames Water Drought Plan, consequently, should consider the following matters:	We acknowledge Historic England's concerns regarding the consideration of impacts on the historic environment but would note that the effects related to the Drought Plan are considerably different to those related to other plans such as Water Resource Management Plans. Drought options generally involve a change to operational conditions associated with a change in abstraction arrangements at existing intakes and consequent changes to flow conditions and therefore there is no construction phase associated with these options. The drought permit/orders would only be implemented in a severe drought and therefore the operational effects would be experienced against a baseline of a naturally occurring drought. In the EARs, the assessment of impacts on the historic environment has considered the sensitivity of each feature to changes in the water environment. Therefore, where no water dependent sites have been identified in relation to a drought option, then no further assessment has been undertaken as the effects of drought permit/order implementation are primarily related to changes in river flow and level changes. For	No action



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		those options which involve a construction phase, the assessment also considers any effects related to construction activity.	
		Guidance on the objectives and content of Drought Plan Environmental Monitoring Plans (EMP) is set out in Section 4 and 5 of the Environment Agency "Environmental assessment for water company drought planning supplementary guidance (DPG)".	
		The DPG indicates that any drought plan should be accompanied by an EMP that sets out:	
		 on-going baseline monitoring to inform sensitivity and impact assessments. 	
		• the monitoring that will be implemented to reduce uncertainty identified in the assessment of either the sensitivity of the environment or impacts on features considered in the detailed assessment.	
		 the in-drought and post-drought (recovery) monitoring that will be carried out to understand the actual impact of drought options. 	
		The DPG also requires Thames Water to set out a mitigation plan following the assessments of potential impacts associated with each drought management action. In particular, the DPG indicates that any drought plan should be accompanied by an EMP that sets out:	



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
			 mitigation measures to reduce adverse impacts on the environment of supply side drought options; and 	
			 compensation measures for adverse effects that remain after mitigation measures have been applied. 	
			Based on this assessment it should be noted that no significant impacts on archaeological or palaeoenvironmental remains have been identified in relation to our Drought Plan options, and consequently, no monitoring is considered to be required to support our Drought Plan.	
14	Historic England	The potential impact of water catchment and abstraction measures on heritage assets and their settings, including impacts on water-related or water dependent heritage assets;	See overall response.	No action
15	Historic England	The potential impact of changes in groundwater flows and chemistry on preserved organic and palaeoenvironmental remains: where ground water levels are lowered as a result of measures to reduce drought, this may result in the possible degradation of remains through de-watering, whilst increasing groundwater levels and the effects of re- wetting/changes in salinity brought about by coastline modification could also be harmful;	See overall response. We have no Drought Plan options that would bring about changes in salinity through coastline modification and therefore no changes are required.	No action
16	Historic England	The potential impact of hydro-morphological adaptations on heritage assets: this can include the modification/removal of historic in-channel structures, such as weirs/coastal and estuarine features such as historic sea defences; as well as physical changes to	We have no Drought Plan options that would include the modification/removal of historic in-channel structures, such as weirs/coastal and estuarine features such as historic sea defences; nor do we have options that would	No action



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		rivers/the coastline with the potential to impact on archaeological and palaeoenvironmental remains;	result in significant physical changes to rivers/the coastline with the potential to impact on archaeological and palaeoenvironmental remains; No changes required.	
17	Historic England	The potential for unrecorded deeply buried and waterlogged archaeology within the 'natural' floodplain/estuarine/coastal deposit sequence;	See overall response, no changes required.	No action
18	Historic England	The opportunities for conserving and enhancing heritage assets as part of an integrated approach to drought management, this includes sustaining and enhancing the local character and distinctiveness of historic townscapes and landscapes;	Our Drought Plan options would not have any impact on the distinctiveness of historic townscapes and landscapes. No changes required.	No action
19	Historic England	The opportunity for increasing public awareness and understanding of appropriate responses for heritage assets in dealing with the effec ts of drought as well as the design of measures for improving resilience	The focus of our Drought Plan is to ensure continuity of supply during drought periods, through a combination of demand and supply side measures. and the educational and engagement focus in our Drought Plan is necessarily on water conservation rather than increasing awareness of heritage assets. Our plan also addresses the impact on the environment of drought permit options through our EAR assessments and also where relevant will include assessment of risk to underground heritage assets although as stated above the potential for impact on these assets is considered very low. Therefore, we do not consider any changes to our plan are necessary to address this comment. No changes required.	No action
20	Historic England	The opportunities for improving access, understanding or enjoyment of the historic	The focus of our Drought Plan is to ensure continuity of supply during drought periods	No action



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		environment and heritage assets as part of the design and implementation of flood risk management measures.	through a combination of demand and supply side measures and the educational and engagement focus in our Drought Plan is necessarily on water conservation rather than increasing awareness of heritage assets. Our plan also addresses the impact on the environment of drought permit options through our EAR assessments and also where relevant will include assessment of risk to underground heritage assets although as stated above the potential for impact on these assets is considered very low. Therefore, we do not consider any changes to our plan are necessary to address this comment. No changes required.	
21	Historic England	Historic England recommends the collection and assessment of specific baseline information which could include identifying the potential for buried, waterlogged archaeological and palaeoenvironmental remains of significant interest and fragility that can be associated with river valleys, floodplains, estuaries, coastal and wetland areas. In particular, this exercise should take account of areas of archaeological importance and the potential for unrecorded archaeology (NPPF para.l92) and seek to establish the following: *the significance of the archaeological remains? *its condition, the burial environment and state of preservation? * the likely impact of development activity (e.g. potential removal or dewatering from the proposed	Our Drought Plan includes assessment of impact of Drought Permit options that could affect groundwater levels through our EARs. These EARs take into account scheduled buried heritage assets where relevant although as stated above the potential for impact on such assets is very unlikely and very few have been identified which may be at risk. In view of the nature of the drought options and their impact as outlined above we do not consider that it would be beneficial to undertake further collection and assessment of specific baseline information which could include identifying the potential for buried, waterlogged archaeological and palaeoenvironmental remains of significant interest and fragility that can be associated with river valleys, floodplains, estuaries, coastal and wetland areas.	No action



	Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
		scheme) on that significance and state of preservation?		
22	Historic England	Baseline information in such environments archaeological remains can be: * deeply buried archaeological remains, which means that they are unlikely to be identified by standard approaches; * waterlogged archaeological remains, which would mean they are likely to be rare and potentially important but might require greater resources to excavate and subsequently deal with. * Indirectly impacted archaeological remains: currently well-preserved known and unrecorded, designated a nd non-designated buried archaeology in the vicinity which may be adversely affected by changes to the water environment.	Our Drought Plan includes assessment of impact of Drought Permit options that could affect groundwater levels through our EARs. These EARs take into account scheduled buried heritage assets where relevant although as stated above the potential for impact on such assets is very unlikely and very few have been identified which may be at risk. In view of the nature of the drought options and their impact as outlined above we do not consider that it would be beneficial to undertake further collection and assessment of specific baseline information which could include identifying the potential for buried, waterlogged archaeological and palaeoenvironmental remains of significant interest and fragility that can be associated with river valleys, floodplains, estuaries, coastal and wetland areas. No changes required.	No action
23	Historic England	In accordance with the NPPF where nationally important archaeology owes its significance to waterlogging and is in proximity to the scheme, to conserve its significance and avoid harm, changes in the water environment should be avoided which may be cause harm.	We note this requirement to avoid harm in cases where nationally important archaeology is in proximity to a scheme. However, our assessments have not identified any such archaeology that would be affected by our Drought Plan options. No changes required.	No action
24	Historic England	Waterlogged archaeology may be nationally important if it is well preserved, rare, of exceptional significance and evidence exists for it to be	Noted.	No action



Consultee	Comment	Thames Water Response (in the SoR)	How addressed in SEA Environmental Report
	understood in terms of its contemporary landscape context.		





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