Ricardo
Energy & Environment

Bristol Water Drought Plan 2018

Habitats Regulations Assessment

Screening Report

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Non-Technical Summary

Water companies are required to prepare and maintain statutory Drought Plans and update them every five years. As part of the development of the Drought Plan, water companies must ensure that their Drought Plan meets the requirements of the Habitats Regulations.

Under Regulations 61 and 102, any plan or project which is likely to have a significant effect on a European site (either alone or in-combination with other plans or projects) and is not directly connected with, or necessary for the management of the site, must be subject to a Habitats Regulations Assessment (HRA) to determine the implications for the site in view of its conservation objectives. For the purposes of the HRA, a European site includes those site designated as Special Areas of Conservation (SAC) under the EU Habitats Directive, Special Protection Areas (SPA) under the Birds Directive and Ramsar sites under the international Ramsar Convention.

Bristol Water has completed the first stage (screening) of the HRA process for its Drought Plan 2017. This screening stage identifies whether any measures or activities contained within the Drought Plan have the potential for any Likely Significant Effects (LSE) on the integrity of any European site.

A summary of the conclusions of the HRA Screening is presented in **Table A**. This shows that no measures or activities contained within the Drought Plan 2017 are considered to have LSEs on any European sites, either alone or in combination.

In-combination effects of Bristol Water's Drought Plan 2017 with its Water Resources Management Plan (WRMP) 2014, the Environment Agency's regional Drought Plan, relevant River Basin Management Plans (RBMPs) and other water company WRMPs and Drought Plans are equally not considered to have LSEs on any European sites.

On the basis of the HRA screening results, an Appropriate Assessment of the Drought Plan 2017 is **not required**.

Table A: Summary Conclusions of HRA Screening of Bristol Water's Drought Plan 2018

Drought Plan Measure	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?	Appropriate Assessment Required?
Water Supply Augmentation				
Honeyhurst Well	No	No	No	No
Water Demand Management				
Appeals to customers for restraint	No	No	No	No
Temporary Use Ban	No	No	No	No
Non-Essential Use Ban	No	No	No	No
Emergency Drought Order	No	No	No	No
Drought Permit/ Orders	No	No	No	No
Blagdon Reservoir Reduced Compensation Flow	No	No	No	No
Cheddar Reservoir Reduced Prescribed Flow	No	No	No	No
Chew Reservoir Reduced Compensation Flow	No	No	No	No

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1 Introduction

1.1 Background and Purpose of Report

Under the Water Industry Act 1991, Bristol Water Plc is required to prepare and update a Drought Plan and make the draft plan available for public consultation. The Drought Plan provides a comprehensive statement of the actions Bristol Water will consider implementing during drought conditions to safeguard essential water supplies to customers and minimise environmental impact.

The Drought Plan 2017 contains several drought management measures which are in proximity to sites of European importance for nature conservation: as a competent authority under the Habitats Regulations, Bristol Water is required to undertake a Habitats Regulation Assessment (HRA) screening to identify whether these drought management measures could have any likely significant effects on European sites.

Regulation 9(5) of the Conservation of Habitats and Species Regulations 2010 (as amended in 2011 and 2012) (referred to as the Habitats Regulations) requires every competent authority, in the exercise of any of its functions, to have regard to the requirements of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna). Bristol Water is committed to fulfilling this role and ensuring that full consideration of the Habitats Directive is being given to the latest update of its Drought Plan.

Under Regulation 61 of the Habitats Regulations, any plan or project which is likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and is not directly connected with or necessary for the management of the site, must be subject to an assessment to determine the implications for the site in view of the site's conservation objectives. The responsibility for undertaking the assessment lies with Bristol Water as the Plan making authority.

Regulation 61(5) states that the Plan making authority (in this case Bristol Water) shall adopt, or otherwise give effect to, the Plan only after having ascertained that it will not adversely affect the integrity of a European site, subject to Regulation 62 of the Habitats Regulations.

Regulation 62 of the Habitats Regulations states:

62.— (1) If the competent authority is satisfied that, there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest (which, subject to paragraph (2), may be of a social or economic nature), they may agree to the plan or project notwithstanding a negative assessment of the implications for the European site or the European offshore marine site (as the case may be).

(2) Where the site concerned hosts a priority natural habitat type or a priority species, the reasons referred to in paragraph (1) must be either—

> *(a) reasons relating to human health, public safety or beneficial consequences of primary importance to the environment; or*
>
> *(b) any other reasons which the competent authority, having due regard to the opinion of the European Commission, consider to be imperative reasons of overriding public interest*

Article 6 of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna) states:

6(3). *Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan*

or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.

6(4). If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

Guidance[1] recommends that if there are no alternative solutions and if, in exceptional circumstances, it is proposed that a Plan be adopted despite the fact that it may adversely affect the integrity of a European site, the HRA will need to address and explain the imperative reasons of Overriding Public Interest which the Plan making authority considers to be sufficient to outweigh the potentially adverse effects on the European site(s).

1.2 HRA Stages

There are four stages of the HRA process, but this report only covers the first stage (screening):

1. Firstly, a screening process is undertaken to identify whether Bristol Water's Drought Plan 2017 (either alone or in combination with other plans or projects) is likely to have any significant effects on any European designated sites.

2. If the screening stage identifies that a significant effect is likely (noting the precautionary principle), an Appropriate Assessment will then need to be undertaken to determine whether the measures contained within Plan would adversely affect the integrity of the European site(s), either alone or in combination with other plans and projects, taking into account available mitigation measures.

3. Where significant adverse effects are identified at the Appropriate Assessment stage, alternative options would be examined to avoid any potential significant effects on the integrity of the European site as Stage 3 of the HRA.

4. Stage 4 comprises an assessment of compensatory measures where, in the light of an assessment of Imperative Reasons of Overriding Public Interest, it is deemed that the Plan should proceed.

The HRA has been undertaken in accordance with currently available guidance[2,3,4,5,6,7,8,9] and has been based on a precautionary approach as required under the Habitats Regulations. It has followed the staged HRA approach, commencing with the Stage 1 screening of all the measures contained within the Drought Plan.

[1] Defra (2012) The Habitats and Wild Birds Directives in England and its seas: Core guidance for developers, regulators & land/marine managers
[2] European Commission Environment DG (2001) Assessment of plans and projects significantly affecting European Sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.
[3] Department for Communities and Local Government (DCLG) (2006) Planning for the Protection of European Sites. Guidance for Regional Spatial Strategies and Local Development Documents.
[4] English Nature (1997) The Appropriate Assessment (Regulation 48) The Conservation (Natural Habitats &c) Regulations, 1994. Guidance Note HRGN1.
[5] English Nature (1997) The Determination of Likely Significant Effect under The Conservation (Natural Habitats &c.) Regulations 1994. Guidance Note HRGN3.
[6] Countryside Council for Wales (2012) Draft Guidance for Plan Making Authorities in Wales: The Appraisal of Plans Under the Habitats Regulation. Prepared by Tyldesley D.
[7] Tyldesley, D. (2011) Assessing projects under the Habitats Directive: guidance for competent authorities. Report to the Countryside Council for Wales, Bangor
[8] Defra (2012) The Habitats and Wild Birds Directives in England and its seas: Core guidance for developers, regulators & land/marine managers.
[9] Tyldesley, D. & Chapman, C. (2015) The Habitats Regulations Assessment Handbook. DTA Publications. Version 4.

1.3 Bristol Water's Water Supply System, Water Resource Management and Drought Planning

1.3.1 Introduction

Bristol Water provides water supplies to 1.18 million people and all the associated businesses in an area of 2,400 square kilometres centred on Bristol and the towns and villages within a 20-mile radius of the city. The water supply area stretches from Thornbury and Tetbury in the north, to Street and Glastonbury in the south, and from Weston-Super-Mare in the west to Frome in the east. Bristol Water relies on 68 water sources, including reservoirs, rivers, springs, wells and boreholes.

Around half of the water supplied within the Bristol Water supply area is sourced from within it, with the rest being transferred into the zone from outside the area. This water is sourced from the Gloucester & Sharpness canal to supply our largest northern treatment works. This source accounts for approximately 46% of their licensed resource. The Gloucester & Sharpness canal is owned and operated by the Canal & River Trust and is supplied by the River Severn and other local rivers, the Cam and the Frome. In dry periods, use of this source is maximised to conserve the water stored in our reservoirs. The Mendip Reservoirs and associated surface water abstractions, which account for approximately 42% of the available licensed resource. The remaining water sourced from within the water resource zone is derived from groundwater and accounts for approximately 12% of our available licensed resource. These sources are operated at their optimum output to meet the base-load demand for water. The Mendip Reservoirs and associated surface water abstractions account for approximately 42% of Bristol Water's available licensed resource.

1.3.2 Link to Water Resources Management Plan

Bristol Water published its last Water Resources Management Plan (WRMP) in 2014 which sets out Bristol Water's water supply and water demand forecasts over the period 2014 to 2040. It also describes the resulting supply-demand balance and the actions Bristol Water proposes to take to achieve water supply reliability standards for its customers. The WRMP is updated every 5 years, with the next plan due for publication in 2019.

The WRMP identifies the measures to be taken to maintain a supply-demand balance over the long term, and sets out the level of service that customers can expect in relation to water use restrictions. The aim of the Drought Plan is to identify the management measures that would need to be implemented during drought conditions to maintain essential water supplies. Bristol Water's Drought planning process is discussed further in the next section.

1.4 Bristol Water's Drought Planning Process

1.4.1 Overview and Timetable

Water companies in England and Wales are required to prepare and maintain Statutory Drought Plans under Sections 39B and 39C of the Water Industry Act 1991, as amended by the Water Act 2003 and subsequently Water Act 2014, which set out the sort of operational steps a company will take before, during and after a drought. The Water Industry Act 1991 defines a drought plan 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'.

The Drought Plan Direction 2016 requires that water companies update their plans every 5 years and issue a draft for public consultation. This document presents the HRA screening assessments of Bristol Water's Drought Plan 2017 following the public consultation. The period encompassed by the updated Plan is expected to be until 2022. Only those drought management measures which are relevant to the period encompassed by the Drought Plan 2017 are included for consideration as part of the HRA screening process.

1.4.2 Requirement for HRA of Bristol Water's Drought Plan 2017

The Drought Plan includes several drought management measures which are located within or in close proximity to European sites, and therefore HRA is required. The Drought Plan Guideline published by the Environment Agency in 2015[10] also states that consideration is required by water companies to ensure that drought management actions meet the requirements of the Habitats Regulations. Water companies are advised to follow best practice guidance published by UKWIR[11] on HRA for drought plans.

HRA refers to the assessment of the potential effects of a plan or project on one or more European Sites (SACs and Special Protection Areas (SPAs)):

- **SACs** are designated under the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna) and target **particular habitats** (Annex 1) and/or **species** (Annex II) identified as being of European importance.

- **SPAs** are classified under the European Council Directive 'on the conservation of wild birds' (Directive 2009/147/EC; 'Birds Directive') for the protection of **wild birds and their habitats** (including particularly rare and vulnerable species listed in Annex 1 of the Birds Directive, and migratory species). Functional habitat beyond the SPA boundary must also be considered.

The Government also expects potential candidate SACs (cSACs), proposed SPAs (pSPAs) and any compensatory habitat associated with SACs or SPAs to be included within the assessment where relevant[8].

Ramsar sites (and any candidate Ramsar sites) are also expected to be considered within the HRA process:

- **Ramsar** sites support internationally **important wetland habitats** and are listed under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, 1971).

For ease of reference during HRA, these three designations are collectively referred to as **European sites**, despite Ramsar designations being related to international law.

1.4.3 Bristol Water's Drought Management Measures

Drought management measures may be applied either company-wide or to target a specific geographical area, depending on the nature of the drought conditions prevailing at the time. The Bristol Water Drought Plan contains a range of potential drought management measures, for example bringing contingency water supplies into use, implementation of drought permits and customer water use restrictions.

There are three overall categories of drought management measures:

- utilisation of existing licensed water sources to augment water supplies
- demand management (including temporary customer water use restrictions)
- drought permits: these give the water company the legal permission to modify the conditions of an existing abstraction licence.

[10] Environment Agency (2015) *Water Company Drought Plan Guideline*.
[11] UKWIR (2012) *Strategic Environmental Assessment and Habitats Regulation Assessment – Guidance for Water Resources Management Plans & Drought Plans* (12/WR/02/A). Prepared by Cascade Consulting

1.4.3.1 Supply Augmentation Measures

There is only one supply augmentation measure contained within the Drought Plan: Honeyhurst Well, which is a licensed water source that has not been in operation for approximately 20 years. This groundwater source would require recommissioning activities to bring it back into use during a drought. The activities required to bring Honeyhurst Well back into operation include the replacement of the pumps in the well to enable raw water to be pumped to Cheddar water treatment works and construction of a new 4.2km, 300mm diameter pipeline. The pipeline would need to traverse numerous drainage ditches and the Cheddar Yeo river. The proposed route of the pipeline is 605m away from the closest SSSI, Cheddar Reservoir. The pipeline crosses many roads and the felling of some trees may be required, although this will be minimised as far as possible.

1.4.3.2 Demand Management Measures

The demand management measures contained in the Drought Plan are set out in **Table 1.1**.

Table 1.1 Demand Management Measures in the Drought Plan 2017

Demand Management Measure	Description
Appeals for restraint	This measure would be enacted upon reservoir storage entering Drought Management Zone 3. The measure would help encourage customers to reduce their water usage via publicity campaigns and the media. The measure would be expected to reduce total household demand by 1%.
Temporary Use Ban (TUB)	This measure to restrict certain non-essential water uses would be enacted upon reservoir storage entering Drought Management Zone 4. The measure would be expected to reduce peak summer household demand by up to 9.5%. The restrictions in water use include: • Cleaning a private leisure boat using a hosepipe • Cleaning a private motor vehicle using a hosepipe • Filling or maintaining and ornamental fountain • Cleaning walls, or windows, of domestic premises using a hosepipe • Cleaning paths or patios using a hosepipe • Cleaning other artificial outdoor surfaces using a hosepipe • Drawing water using a hosepipe, for domestic recreational use • Filling or maintaining a domestic swimming or paddling pool • Watering a garden using a hosepipe • Watering plants on domestic or non-commercial premises using a hosepipe • Filling or maintaining a domestic pond using a hosepipe •
Non Essential Use Ban (NEUB)	This drought order to prohibit certain non-household water uses would be enacted upon reservoir storage entering Drought Management Zone 5. The measure would be expected to reduce of non-household demand by up to 2% across the year. The restrictions in water use include: • Watering outdoor plants on commercial premises • Filling or maintaining a non-domestic swimming or paddling pool • Filling or maintaining a pond • Operating cisterns(in unoccupied premises) • Cleaning industrial plant (except where required for health and hygiene) • Suppressing dust (except where controlled by health and safety regulations) • Operating a mechanical vehicle-washer • Cleaning a window of a non-domestic building • Cleaning any vehicle, boat, aircraft or railway rolling stock • Cleaning non-domestic premises
Emergency Drought Order	This measure would be enacted upon reservoir storage entering Drought Management Zone 6. The reduction in water usage is unknown but may possibly reduce water usage by an additional 8% of peak summer household demand (on top of the savings from the Temporary Use Bans).

1.4.3.3 Drought Permits

The drought permit option included in the Drought Plan are set out in **Table 1.2**.

Table 1.2 Drought Permit Options

Drought Permit Option	Description
Reduction of Blagdon Reservoir compensation flow	This drought permit would be considered if reservoir storage falls to the Drought Management Zone 5 trigger level. The compensation water flow discharge from Blagdon Reservoir would be reduced from 8.638 Ml/d to 4.038Ml/d between 15th May and 30th November. This would help to conserve water resources within Blagdon Reservoir.
Reduction of Chew Reservoir compensation flow	This drought permit would be considered if reservoir storage falls to the Drought Management Zone 5 trigger level. The compensation water flow discharge from Chew Reservoir would be reduced from 14.32Ml/d to 7Ml/d between 1st May and 31st July, or from 6.819Ml/d to 3.4Ml/d between 1st December to 30th April. This would help to conserve water resources within Chew Reservoir.
Reduction of Cheddar Yeo prescribed flow	This drought permit would be considered if reservoir storage falls to the Drought Management Zone 5 trigger level. The drought permit would reduce the prescribed flow in the Cheddar Yeo river from 6.8Ml/d to 3.4Ml/d between 1st December to 14th May. This would help to conserve water resources within Cheddar Reservoir.

None of these drought permit options have any construction requirements.

1.4.3.4 Defining the List of Drought Options and Alternatives

In the context of drought planning, individual options are taken to constitute alternatives. In revising its Drought Plan, Bristol Water has considered the findings of the HRA screening to help determine the relative priority and phasing of implementing the various drought management options, alongside other evidence including the findings from the Strategic Environmental Assessment of the Drought Plan.

1.4.3.5 Supporting Information

It is noted that some of the drought permit options may have different environmental effects depending on season of implementation (for example, a summer drought versus a winter drought). Overall impacts are assessed on a worst-case basis for the relevant time of year. A number of previous studies have been undertaken which have informed the HRA as detailed in **Table 1.3**.

Table 1.3: Previous studies used to inform the HRA screening

Report	Year
Bristol Water Drought Contingency Plan Environmental Monitoring Plan: Scoping Report	2006
Bristol Water Drought Contingency Plan Environmental Monitoring Plan	2007
Bristol Water Drought Contingency Plan- Baseline Environmental Monitoring	2011
Strategic Environmental Assessment of Draft Water Resources Management Plan: Environmental Report	2013

The 2007 Environmental Monitoring Plan[12] (EMP) was developed for the three drought permit options included in the 2017 Drought Plan. The EMPs have informed the HRA Screening, including the hydrological assessments which have helped to identify the hydrological zone of influence associated

[12] Bristol Water Plc (2007) Bristol Water Drought Contingency Plan Environmental Monitoring Plan. Report by Cascade Consulting, August 2007.

with each drought permit option. Maps identifying the zone of influence for each drought permit option are presented in **Appendix A**.

1.5 Consultation

Natural England and the Environment Agency were invited to comment on the HRA Screening Report alongside the consultation on Bristol Water's draft Drought Plan 2017. Comments received on the HRA Screening Report have been taken into account in finalising the Drought Plan and this final HRA Report.

The HRA has also informed the production of the Strategic Environmental Assessment (SEA) of the Drought Plan 2018, which was also published for public consultation.

1.6 Structure of HRA Screening Report

This HRA report comprises Stage 1 of the HRA process, i.e. screening. The remaining sections of this report are as follows:

Section 2 – Methodology

Section 3 – HRA Screening Findings for Drought Options

Section 4 – Conclusions and Recommendations

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2 Methodology

2.1 Approach to HRA Screening

The aim of HRA Screening is to establish whether implementation of any of the measures included in Bristol Water's Drought Plan (either alone or in-combination) are likely to have any likely significant effect on any European site(s). The HRA has been undertaken in accordance with currently available guidance[13] [14] [15] and is based on a precautionary approach as required under the Habitats Regulations. Where relevant, the Common Standards Monitoring Guidance has been considered in the assessment of potential impacts on designated sites.

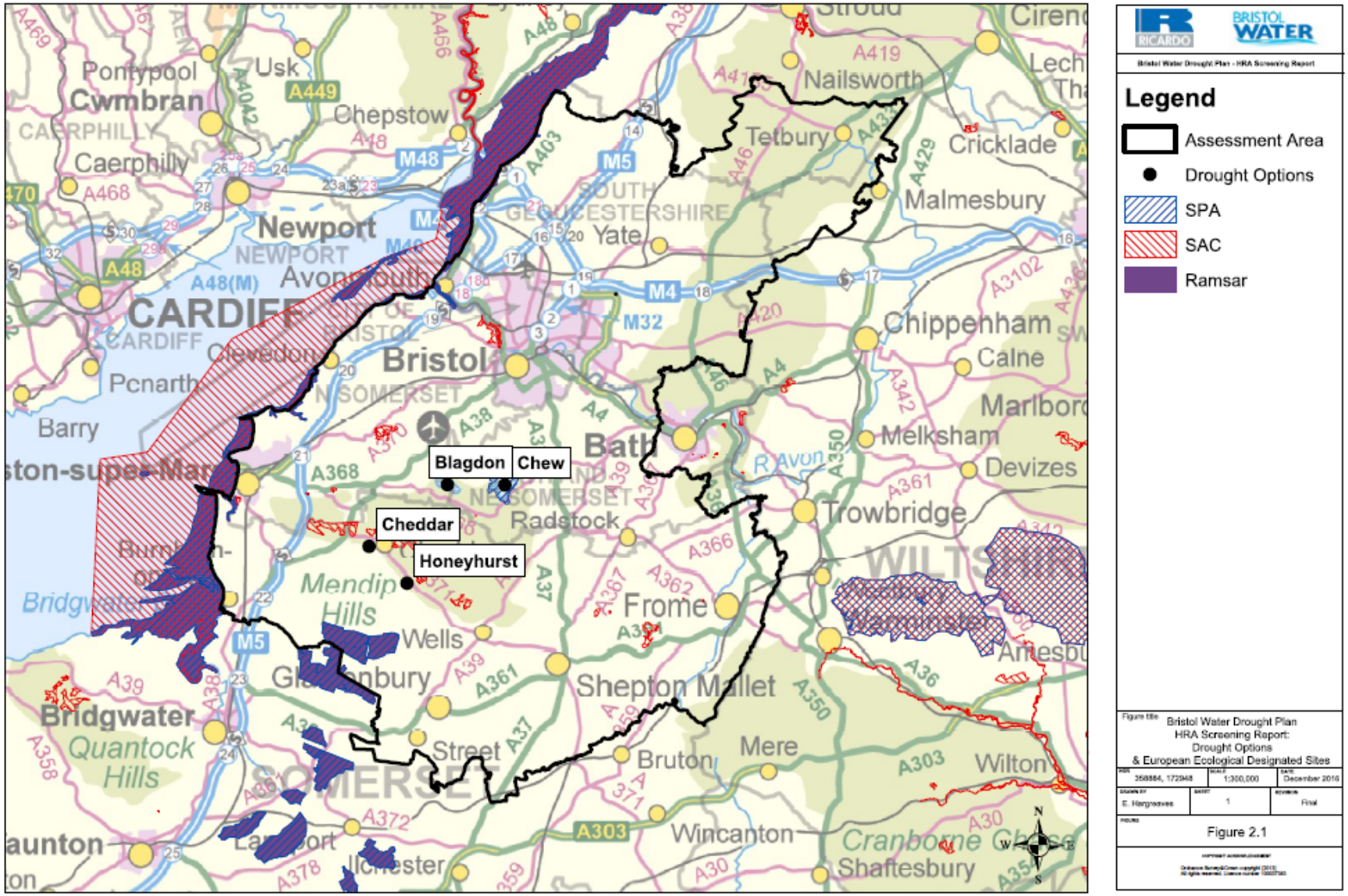
2.2 Identification of European Sites for Assessment

Geographic Information System (GIS) data were used to map the locations and boundaries of European sites within or adjacent to Bristol Water's water resource zone using publicly available data from Natural England. The European sites are shown in **Figures 2.1** along with the location of the Honeyhurst Well supply augmentation option and the three reservoir drought permit options in the Drought Plan.

The attributes of European sites, which contribute to and define their integrity, were considered with reference to Standard Data forms for SACs and SPAs and Information Sheets for Ramsar sites[16] An analysis of these information sources enabled the identification of European site qualifying features. Conservation objectives and site vulnerability assessments have been provided by Natural England. A summary of the information provided by these documents is provided in **Appendix B**. This information allows identification of those features of each site which determine site integrity and the specific sensitivities of the site, as well as an analysis of how potential impacts of the drought management measures may affect site integrity.

[13] European Commission Environment DG (2001) *Assessment of plans and projects significantly affecting European Sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*. November 2001.
[14] RSPB (2007) *The Appropriate Assessment of Spatial Plans in England. A guide to why, when and how to do it.* August 2007.
[15] English Nature (1997) *The Appropriate Assessment (Regulation 48) The Conservation (Natural Habitats &c) Regulations*, 1994 Guidance Note HRGN1.
[16] These were obtained from the Joint Nature Conservation Committee and Natural England websites (www.jncc.gov.uk and www.naturalengland.org.uk).

Figure 2.1 European Sites within the Bristol Water supply area and location of drought management options



2.3 Potential Impacts of Drought Plan Measures

The qualifying habitats and species of European sites are vulnerable to a wide range of impacts such as physical loss or damage of habitat, disturbance from noise, light, human presence, changes in hydrology (e.g. changes in water levels/flow, flooding), changes in water or air quality and biological disturbance (e.g. direct mortality, introduction of disease or non-native species). However, the drought management measures considered for inclusion in the Drought Plan only have the potential to give rise to some of these impacts.

The demand management measures are unlikely to have any significant adverse effects on European sites as they relate to measures which will not result in any new development and will help to reduce the amount of water abstracted from the environment.

The supply augmentation measure (Honeyhurst Well) and the three drought permit options have the potential to impact upon European sites that are in proximity to, or hydrologically connected to, the water sources. In determining the likelihood of significant effects on European sites from these measures, particular consideration has been given to the possible source-receptor pathways through which effects may be transmitted to features contributing to the integrity of the European site(s) (for example, groundwater or surface water catchments, atmospheric transmission, etc.). **Table 2.1** shows the type of impacts that these drought plan measures could have on European site qualifying features.

Table 2.1: Potential Impacts of Drought Plan Measures on European Sites

Broad categories of potential impacts on European sites	Examples of operations responsible for impacts (distance assumptions shown in italics)
Physical loss - Removal (including offsite effects, e.g. foraging habitat) - Smothering	Development of built infrastructure associated with scheme, e.g. pipelines, transport infrastructure, temporary weirs. Physical loss is only likely to be significant where the boundary of the scheme extends within the boundary of the European site, or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).
Physical damage - Sedimentation / silting - Prevention of natural processes - Habitat degradation - Erosion - Fragmentation - Severance/barrier effect - Edge effects	Development of built infrastructure associated with scheme, e.g. temporary weirs. Physical damage is only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).
Non-physical disturbance - Noise - Visual presence - Human presence - Light pollution	Noise from vehicular traffic during construction of scheme. Noise from construction traffic is only likely to be significant where the transport route to and from the scheme is within 3-5km of the boundary of the European site. Plant and personnel involved in construction and operation of schemes e.g. for maintenance, plus non-operational activities such as recreation associated with scheme e.g. reservoirs These effects (noise, visual/human presence) are only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting,

	breeding habitat (that supports species for which a European site is designated). Development of built infrastructure associated with scheme, which includes artificial lighting. Effects from light pollution are only likely to be significant where the boundary of the scheme is within 500 m of the boundary of the European site. From a review of Environment Agency internal guidance on HRA and various websites it is considered that effects of vibration and noise and light are more likely to be significant if development is within 500 metres of a European site.
Physical loss - Removal (including offsite effects, e.g. foraging habitat) - Smothering	Development of built infrastructure associated with scheme, e.g. pipelines, transport infrastructure, temporary weirs. Physical loss is only likely to be significant where the boundary of the scheme extends within the boundary of the European site, or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).
Physical damage - Sedimentation / silting - Prevention of natural processes - Habitat degradation - Erosion - Fragmentation - Severance/barrier effect - Edge effects	Development of built infrastructure associated with scheme, e.g. temporary weirs. Physical damage is only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).
Non-physical disturbance - Noise - Visual presence - Human presence - Light pollution	Noise from vehicular traffic during construction of scheme. Noise from construction traffic is only likely to be significant where the transport route to and from the scheme is within 3-5km of the boundary of the European site. Plant and personnel involved in construction and operation of schemes e.g. for maintenance, plus non-operational activities such as recreation associated with scheme e.g. reservoirs These effects (noise, visual/human presence) are only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated). Development of built infrastructure associated with scheme, which includes artificial lighting. Effects from light pollution are only likely to be significant where the boundary of the scheme is within 500 m of the boundary of the European site. From a review of Environment Agency internal guidance on HRA and various websites it is considered that effects of vibration and noise and light are more likely to be significant if development is within 500 metres of a European site.

Physical loss - Removal (including offsite effects, e.g. foraging habitat) - Smothering	Development of built infrastructure associated with scheme, e.g. pipelines, transport infrastructure, temporary weirs. Physical loss is only likely to be significant where the boundary of the scheme extends within the boundary of the European site, or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).
Physical damage - Sedimentation / silting - Prevention of natural processes - Habitat degradation - Erosion - Fragmentation - Severance/barrier effect - Edge effects	Development of built infrastructure associated with scheme, e.g. temporary weirs. Physical damage is only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).
Water table/availability - Drying - Flooding / storm water - Changes to surface water levels and flows - Changes in groundwater levels and flows - Changes to coastal water movement	Changes to water levels and flows due to water abstraction and storage. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Toxic contamination - Water pollution - Soil contamination - Air Pollution	Reduced dilution in downstream or receiving waterbodies due to changes in abstraction or reduced compensation flow. Air emissions associated with vehicular traffic during construction/operation of schemes. This effect is only likely to be significant where the transport route to and from the scheme is within 100m of the boundary of the European site.
Non-toxic contamination - Nutrient enrichment (e.g. of soils and water) - Algal blooms - Changes in salinity - Changes in thermal regime - Changes in turbidity - Changes in sedimentation/silting	Changes to water salinity, nutrient levels, turbidity, thermal regime due to water abstraction, storage, or inter-catchment transfers. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Biological disturbance - Direct mortality - Changes to habitat availability - Out-competition by non-native species	Potential for changes to habitat availability, for example reductions in wetted width of rivers leading to desiccation of macrophyte beds due to changes in abstraction or reduced compensation flow. This effect is only likely to be significant where the receiving water for the scheme is the European site or a tributary of the European site.

- Selective extraction of species - Introduction of disease - Rapid population fluctuations - Natural succession	
Water table/availability - Drying - Flooding / storm water - Changes to surface water levels and flows - Changes in groundwater levels and flows - Changes to coastal water movement	Changes to water levels and flows due to water abstraction and storage. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Toxic contamination - Water pollution - Soil contamination - Air Pollution	Reduced dilution in downstream or receiving waterbodies due to changes in abstraction or reduced compensation flow. Air emissions associated with vehicular traffic during construction/operation of schemes. This effect is only likely to be significant where the transport route to and from the scheme is within 100m of the boundary of the European site.
Non-toxic contamination - Nutrient enrichment (e.g. of soils and water) - Algal blooms - Changes in salinity - Changes in thermal regime - Changes in turbidity - Changes in sedimentation/silting	Changes to water salinity, nutrient levels, turbidity, thermal regime due to water abstraction, storage, or inter-catchment transfers. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Biological disturbance - Direct mortality - Changes to habitat availability - Out-competition by non-native species - Selective extraction of species - Introduction of disease - Rapid population fluctuations - Natural succession	Potential for changes to habitat availability, for example reductions in wetted width of rivers leading to desiccation of macrophyte beds due to changes in abstraction or reduced compensation flow. This effect is only likely to be significant where the receiving water for the scheme is the European site or a tributary of the European site.

Screening for likely significant effects has been determined on a proximity basis, as well as consideration of any hydrological connectivity, including to any SPA functional habitat. Consideration has therefore been given to the relative locations of each drought management option sites and the European sites within the same surface and groundwater catchments to ensure that any connectivity over a longer distance than the 10km screening distance that might affect water-dependent sites was taken into account. For the drought permit options, this included reference to the hydrological

assessments undertaken as part of the 2007 Environmental Monitoring Plans (EMPs) that identify the hydrological zone of influence during drought permit implementation (see maps at **Appendix A)**. The available information on the hydrological influence of each option has been summarised as appropriate in the assessment table at **Table 3.3**.

Construction phase and operational phase impacts of each of the drought management measure were reviewed and assessed. The drought permit/order options comprise a change to an existing abstraction licence, with no requirement for additional infrastructure or construction works. Only the Honeyhurst Well supply augmentation option would necessitate any construction activities, as explained above in Section 1.

The HRA screening has been undertaken using professional judgement taking into account the potential extent, complexity, duration, frequency, reversibility and probability of impacts, and assuming the implementation of suitable mitigation measures, i.e. measures to limit the effect of an identified significant impact (or where feasible, to avoid the adverse impact altogether).

2.4 Review of Potential In-combination Effects

Article 6(3) of the Habitats Directive requires an Appropriate Assessment of '*Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plan or projects*'.

The potential for cumulative, or in-combination, effects has considered the following:

1. Potential cumulative impacts of the drought management measures with Bristol Water's existing abstraction licences that operate within the zone of influence of the drought option, and other abstraction and discharge consents where applicable.

2. Potential cumulative impacts with other Bristol Water Drought Plan measures.

3. Potential cumulative impacts with other Bristol Water activities, plans and programmes, including the Water Resource Management Plan 2014.

4. Potential cumulative impacts with other neighbouring water company activities, Drought Plans and Water Resource Management Plans, as well as Environment Agency and Canal & River Trust drought plans.

5. Potential cumulative impacts with other relevant third party activities, programmes and plans (where these are likely to arise and be implemented between 2017 and 2021 only, i.e. over the lifetime of the Bristol Water Drought Plan). HRA guidance states "*It should be possible to identify the other plans or projects in a targeted way; not trawling for every conceivable plan or project, whilst identifying all the relevant ones. To be relevant to the in combination effect, the residual effects of other plans or projects will need to either make the unlikely effects of the subject plan likely, or insignificant effects of the plan significant, or both.*"

National Policy Statements for Wastewater and Renewable Energy Infrastructure were also reviewed as part of the cumulative assessment.

Demand management measures serve to reduce pressure on water resources and will have a positive influence on the environment by reducing the demand for water and reducing abstraction from water sources. Therefore, demand management measures have not been included in the in-combination assessment.

It is noted that there may be cumulative, or in-combination, site-specific issues which may not be foreseen, for example, other future development projects at, or in the vicinity of specific sites. Such future projects are difficult to define at the time of undertaking HRA Screening of the Drought Plan due to the uncertainty or timing of implementation. For drought permit options, potential cumulative effects

will be reviewed again at the time of any drought permit application, as part of an application-specific HRA prepared in support of the application.

3 HRA Screening Findings

3.1 HRA Screening of Statutory Drought Plan

The HRA screening findings are presented in **Tables 3.1, 3.2** and **3.3** for the Honeyhurst Well supply augmentation measure, demand management measures and drought permit options, respectively. Potential mitigation measures available were taken into account in the screening process.

Table 3.1: Screening of Honeyhurst Well supply augmentation measure for impacts on European Sites

Option	European Site	Qualifying features	Potential for effects on qualifying features?	Is the scheme likely to have a negative effect on European Site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
Honeyhurst Well	Mendip Woodlands SAC (1.5km)	***Primary habitats and species*** **9180 Tilio-Acerion forests of slopes, screes and ravines** Mendip Woodlands in south-west England is a relatively extensive example of Tilio-Acerion forests on limestone. It is a cluster of three ash-dominated woods on Carboniferous limestone. A rich variety of other trees and shrubs are present, including elm Ulmus spp. and, locally, small-leaved lime Tilia cordata. At Ebbor Gorge elm rather than lime is mixed with ash Fraxinus excelsior in a steep-sided gorge; at both Rodney Stoke and Cheddar Wood lime and ash are found on rocky slopes with patches of deeper soil between the outcrops. Ferns characteristic of this woodland type, such as hart's-tongue Phyllitis scolopendrium and shield-ferns *Polystichum* spp., are common. The site is in the centre of the range of common dormouse *Muscardinus avellanarius* and holds a large population of this species.	Construction This option would involve the construction of a new pumping station at the Honeyhurst site and the construction of a new 300mm diameter pipeline spanning 4.2km North west to Cheddar water treatment works. The Mendip Woodlands SAC site is approximately 1.5km from the construction area and the Draycote road runs between the construction area and the site. Direct or indirect construction effects are considered unlikely and would be avoided / mitigated by normal construction best-practice. Operation Features not water resource dependent.	No	No	No
	North Somerset and Mendip Bats SAC (2.9km)	***Primary habitats and species*** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates –** The Cheddar complex and Wookey Hole areas support a wide range of semi-natural habitats including semi-natural dry grasslands. **9180 Tilio-Acerion forests of slopes, screes and ravines –** The main block of *Tilio-Acerion* forest at Kings and Urchin's Wood has developed over limestone which outcrops in parts of the site and forms a steep scarp to the south-east. **1303 Lesser horseshoe bat *Rhinolophus hipposideros* –** The limestone caves of the Mendips provide a range of important hibernation sites for lesser horseshoe bat *Rhinolophus hipposideros* and 1,304 greater horseshoe bat *Rhinolophus ferrumequinum*. **1304 Greater horseshoe bat *Rhinolophus ferrumequinum* –** This site in south-west England is selected on the basis of the size of population represented (3% of the UK greater horseshoe bat *Rhinolophus ferrumequinum* population) and its good conservation of structure and function, having both maternity and hibernation sites. This site contains an exceptionally good range of the sites used by the population, comprising two maternity sites in lowland north Somerset and a variety of cave and mine hibernation sites in the Mendip Hills. ***Qualifying features*** **8310 Caves not open to the public**	Construction The site is approximately 2.9km from likely construction area but direct or indirect construction effects are unlikely and easily avoided / mitigated by normal construction best-practice. The horseshoe bat species are potentially vulnerable to construction impacts associated with the pipeline element of the option. This relates to habitat fragmentation resulting from the removal of sections of linear features that bats use for navigation and commuting between roosting and foraging areas, and also loss of foraging habitat during construction. In addition to standard construction best practice the following bat mitigation measures should be implemented to ensure no LSE: • Minimise working area when passing through hedgerows. • At key commuting routes, the impact will be further mitigated by maintaining linear features during the construction period. • Replant hedgerows with mature/semi-mature plants to reduce impact time. • Avoid night-time working, maximise the distance of noisy activities from known roosts, and avoid artificial lighting near sensitive woodlands, roosts, watercourses and hedgerows. Operation Features not water resource dependent.	No	No	No
	Mendip Limestone Grasslands SAC (6.8km)	***Primary habitats and species*** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) – T**his site comprises coastal and inland sections of the Carboniferous Limestone outcrops of the Mendips. ***Qualifying features*** **1304 Greater horseshoe bat Rhinolophus *ferrumequinum***	Construction The site is approximately 6.8km from the likely construction area. Direct or indirect construction effects are very unlikely and easily avoided / mitigated by normal construction best-practice. Greater horseshoe bat species are potentially vulnerable to construction. This relates to habitat fragmentation resulting from the removal of sections of linear features that bats use for navigation and commuting between roosting and foraging areas, and also loss of foraging habitat during construction. In addition to standard construction best practice the following bat mitigation measures should be implemented to ensure no LSE: • Minimise working area when passing through hedgerows.	No	No	No

			• At key commuting routes, the impact will be further mitigated by maintaining linear features during the construction period. • Replant hedgerows with mature/semi-mature plants to reduce impact time. • Avoid night-time working, maximise the distance of noisy activities from known roosts, and avoid artificial lighting near sensitive woodlands, roosts, watercourses and hedgerows. Operation Features not water resource dependent.			
	Somerset Levels and Moors SPA and Ramsar (12km)	**Article 4.1** **Over winter the area supports:** Bewick's Swan *Cygnus columbianus bewickii,* Golden Plover *Pluvialis apricaria.* **Article 4.2** **Over winter the area supports:** Shoveler *Anas clypeata,* Teal *Anas crecca,* Wigeon *Anas Penelope,* Snipe *Gallinago gallinago*, Lapwing *Vanellus vanellus*, Pintail *Anas acuta*, Gadwall *Anas strepera*, Shoveler *Anas clypeata*, Teal *Anas crecca*, Wigeon *Anas penelope*, Golden Plover *Pluvialis apricaria*, Bewick's Swan *Cygnus columbianus bewickii*, Whimbrel *Numenius phaeopus*. **Ramsar Criterion 2** Supports 17 species of British Red Data Book invertebrates. **Ramsar Criterion 5** Assemblages of international importance – species with peak counts in winter: 97,155 waterfowl (5-year peak mean) **Ramsar Criterion 6** Species/populations occurring at levels of international Importance: Tundra swan, *Cygnus columbianus bewickii* – 112 individuals, representing an average of 1.3% of the GB population (5-year peak mean)	Construction Distance from site (12km) makes it very unlikely that construction effects will have a significant direct effect on this site, although some the interest features (including teal and shoveler) are known to roost on the Cheddar reservoir but feed elsewhere on the Somerset Levels, and other migrant waders (e.g. golden plover, lapwing) are known to use the reservoir as a feeding station when on passage. It is therefore possible that the construction of the new pipeline may affect the SPA species when using the reservoir. However, the pipeline is constructed between Honeyhurst Well and Cheddar Water Treatment Works which is 600m from the Cheddar Reservoir. Good site management and best practice construction methods will be used to minimise potential impacts. Any short term noise or visual impacts from the construction will be screened, noise baffles will be used and all impulsive noise would be limited. Operation Site not hydrologically linked to the source or its tributaries / distributaries and therefore LSE due to operation are unlikely.	No	No	No

Table 3.2: Screening of Demand Side Drought Options for Impacts on European Sites

Option	Description	Further HRA Assessment Required?
Appeals for restraint	None – appeals for constraint includes increased water efficiency messages via increased customer communications. No impacts on designated sites are anticipated, other than to acknowledge that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No
Temporary Use Bans	None – the restrictions on consumer water use are demand management measures and as such, are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites, due to reduced pressure on water resources and reduced abstraction at source.	No
Non-Essential Use	None – a non-essential use ban and its components are demand management measures and as such are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No
Emergency Drought Order	None – an emergency drought order includes extreme demand management measures and as such are not anticipated to have impacts on European sites. It is acknowledged that decreased consumer demand will have a net positive effect in combination with existing abstraction and/or drought option sites that have the potential to impact European sites due to reduced pressure on water resources and reduced abstraction at source.	No

Table 3.3: Screening of Drought Permit/ Drought Order Options for Impacts on European Sites

Option	European Site	Qualifying features	Potential for effects on qualifying features?	Is the scheme likely to have a negative effect on European Site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?
Blagdon Reservoir Reduced Compensation Flow	North Somerset and Mendip Bats SAC (6.2km)	***Primary habitats and species*** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates –** The Cheddar complex and Wookey Hole areas support a wide range of semi-natural habitats including semi-natural dry grasslands. **9180 Tilio-Acerion forests of slopes, screes and ravines –** The main block of *Tilio-Acerion* forest at Kings and Urchin's Wood has developed over limestone which outcrops in parts of the site and forms a steep scarp to the south-east. **1303 Lesser horseshoe bat *Rhinolophus hipposideros* –** The limestone caves of the Mendips provide a range of important hibernation sites for lesser horseshoe bat *Rhinolophus hipposideros* and 1,304 greater horseshoe bat *Rhinolophus ferrumequinum*. **1304 Greater horseshoe bat *Rhinolophus ferrumequinum* –** This site in south-west England is selected on the basis of the size of population represented (3% of the UK greater horseshoe bat *Rhinolophus ferrumequinum* population) and its good conservation of structure and function, having both maternity and hibernation sites. ***Qualifying features*** **8310 Caves not open to the public**	Construction There is no construction phase associated with this drought permit. Operation Features not water-resource sensitive and site will not be directly or indirectly affected by operation.	No	No	No
	Chew Valley Lake SPA (8km)	**Article 4.2** **Over winter the area supports:** Shoveler *Anas clypeata*, 503 individuals representing up to 1.3% of the wintering Northwestern/Central Europe population (5 year peak mean)	Construction There is no construction phase associated with this drought permit. Operation The option involves a reduction in the compensation flow release from Blagdon Reservoir. The Chew Valley Lake SPA, although relatively close, is within a different catchment with no hydrological connectivity.	No	No	No
	Severn Estuary SAC, SPA, Ramsar (22km)	***Primary habitats and species*** **1130 Estuaries** Habitat occurrence description not yet available. **1140 Mudflats and sandflats not covered by seawater at low tide.** Habitat occurrence description not yet available. **1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)** Habitat occurrence description not yet available. **1110 Sandbanks which are slightly covered by sea water all the time** **1170 Reefs** **1095 Sea lamprey** *Petromyzon marinus* Species occurrence description not yet available. **1099 River lamprey** Lampetra *fluviatilis* Species occurrence description not yet available. **1103 Twaite shad** *Alosa fallax* Species occurrence description not yet available. **Article 4.1** Over winter the area supports**:** Bewick's Swan *Cygnus columbianus bewickii*, **Article 4.2** Over winter the area supports approximately 84,300 of birds with gadwall, greater white-fronted goose, dunlin, common shelduck and common redshank present. **Criterion 1** Due to immense tidal range affecting both the physical environment and biological communities. **Criterion 3** Due to unusual estuarine communities, reduced diversity and high productivity.	Construction There is no construction phase associated with this drought permit. Operation The option involves a reduction in the compensation flow release from Blagdon Reservoir to the Congresbury Yeo. There would be an associated impact on the flow/level regime in the Congresbury Yeo downstream of the Reservoir. The zone of hydrological influence (see **Appendix A)** includes 6km of the Congresbury Yeo from Blagdon Reservoir outfall to Iwood gauging station. The hydrological assessment presented in the 2007 EMP[17] identified that at Iwood gauging station low flow (Q95) was recorded as 17.0Ml/d and that a 4Ml/d reduction would be a loss of 24% of flow (to a value similar to Q99). In moderate and high flow periods, the hydrology impacts would be negligible. Downstream of the Iwood gauging station, the Congresbury Yeo is level controlled and therefore any potential hydrology impacts during low flow periods would be restricted to potential minor changes in water velocity (wetted depth and wetted width are controlled by local structures), and this potential effect could extend downstream to the confluence with the Severn Estuary (12km downstream of Iwood gauging station). In the reach from Iwood to the Severn Estuary, the river gradient is very low, the water level managed and the channel significantly modified by weirs, bridges and local bank engineering	No	No	No

[17] Bristol Water Plc (2007) Bristol Water Drought Contingency Plan Environmental Monitoring Plan. Report by Cascade Consulting, August 2007

		Criterion 4 Migratory fish Including Salmon *Salmo salar*, sea trout *S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax*, and eel *Anguilla Anguilla*. **Criterion 8** The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. **Criterion 5** Assemblages of international importance – Species with peak counts in winter: 70919 waterfowl (5 year peak mean) **Criterion 6** Species/populations occurring at levels of international importance as listed in Article 4.2.	Available baseline data for the Congresbury Yeo upstream of Iwood flow gauge has not identified the presence of migratory fish species such as Sea trout and Atlantic salmon. Eels are known to be present downstream of Blagdon Reservoir which suggest they are capable of mitigation upstream of the flow gauge. However, the migration of fish species during a period of drought is expected to be low. Considering the identified flow impacts downstream of Iwood, the characteristics of the reach and presence of barriers to fish migration the potential for potential for adverse effects to the interest features such as migratory fish is considered unlikely. No LSEs are anticipated from the operation of the Blagdon Reservoir Reduced Compensation Flow drought permit on the Severn Estuary SAC, SPA, Ramsar, either alone, or in combination with other licences and consents.			
Chew Reservoir Reduced Compensation Flow	North Somerset and Mendip Bats SAC (9km)	***Primary habitats and species*** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates –** The Cheddar complex and Wookey Hole areas support a wide range of semi-natural habitats including semi-natural dry grasslands. **9180 Tilio-Acerion forests of slopes, screes and ravines –** The main block of *Tilio-Acerion* forest at Kings and Urchin's Wood has developed over limestone which outcrops in parts of the site and forms a steep scarp to the south-east. **1303 Lesser horseshoe bat *Rhinolophus hipposideros* –** The limestone caves of the Mendips provide a range of important hibernation sites for lesser horseshoe bat *Rhinolophus hipposideros* and 1,304 greater horseshoe bat *Rhinolophus ferrumequinum*. **1304 Greater horseshoe bat *Rhinolophus ferrumequinum* –** This site in south-west England is selected on the basis of the size of population represented (3% of the UK greater horseshoe bat *Rhinolophus ferrumequinum* population) and its good conservation of structure and function, having both maternity and hibernation sites. ***Qualifying features*** **8310 Caves not open to the public**	Construction There is no construction phase associated with this drought permit. Operation Features not water-resource sensitive and site will not be directly or indirectly affected by operation.	No	No	No
	Chew Valley Lake SPA (at location)	**Article 4.2** **Over winter the area supports:** Shoveler *Anas clypeata*, 503 individuals representing up to 1.3% of the wintering North-western/Central Europe population (5 year peak mean)	Construction There is no construction phase associated with this drought permit. Operation The drought permit will result water levels in Chew Reservoir (also known as Chew Valley Lake) being maintained for longer than would have been the case in drought conditions without the drought permit in place. In operation, any effects on the interest features resulting from the drought permit would be beneficial.	No	No	No
Cheddar Ponds Reservoir Reduced Prescribed Flow in Cheddar Yeo	Mendip Woodlands SAC (2km)	***Primary habitats and species*** **9180 Tilio-Acerion forests of slopes, screes and ravines –** Mendip Woodlands in south-west England is a relatively extensive example of ***Tilio-Acerion* forests** on limestone. It is a cluster of three ash-dominated woods on Carboniferous limestone.	Construction There is no construction phase associated with this drought permit. Operation Features not water-resource sensitive and site will not be directly or indirectly affected by operation.	No	No	No
	North Somerset and Mendip Bats SAC (2.5)	***Primary habitats and species*** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates** **9180 Tilio-Acerion forests of slopes, screes and ravines** **1303 Lesser horseshoe bat *Rhinolophus hipposideros*** **1304 Greater horseshoe bat *Rhinolophus ferrumequinum***	Construction There is no construction phase associated with this drought permit. Operation Features not water-resource sensitive and site will not be directly or indirectly affected by operation.	No	No	No
	Mendip Limestone Grasslands SAC (3.5km)	**6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) – T**his site comprises coastal and inland sections of the Carboniferous Limestone outcrops of the Mendips. The	Construction There is no construction phase associated with this drought permit.	No	No	No

		coastal headland and inland hills support the largest area of CG1 *Festuca ovina – Carlina vulgaris* grassland in England, including two sub-types (CG1a *Carex humilis* and CG1c *Trinia glauca* sub-communities) known from no other site in the UK. Areas of short-turf CG2 *Festuca ovina – Avenula pratensis* grassland also occur inland. The site is exceptional in that it supports a number of rare and scarce vascular plants typical of the oceanic southern temperate and Mediterranean elements of the British flora. These include white rock-rose *Helianthemum apenninum*, Somerset hair-grass *Koeleria vallesiana* and honewort *Trinia glauca*.	Operation Features not water-resource sensitive and site will not be directly or indirectly affected by operation.			
	Severn Estuary SAC, SPA, Ramsar	***Primary habitats and species*** **1130 Estuaries** Habitat occurrence description not yet available. **1140 Mudflats and sandflats not covered by seawater at low tide.** Habitat occurrence description not yet available. **1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)** Habitat occurrence description not yet available. **1110 Sandbanks which are slightly covered by sea water all the time** **1170 Reefs** **1095 Sea lamprey** *Petromyzon marinus* Species occurrence description not yet available. **1099 River lamprey** Lampetra *fluviatilis* Species occurrence description not yet available. **1103 Twaite shad** *Alosa fallax* Species occurrence description not yet available. **Article 4.1** Over winter the area supports**:** Bewick's Swan *Cygnus columbianus bewickii*, **Article 4.2** Over winter the area supports approximately 84,300 of birds with gadwall, greater white-fronted goose, dunlin, common shelduck and common redshank present. **Criterion 1** Due to immense tidal range affecting both the physical environment and biological communities. **Criterion 3** Due to unusual estuarine communities, reduced diversity and high productivity. **Criterion 4** Migratory fish Including Salmon *Salmo salar*, sea trout *S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax*, and eel *Anguilla Anguilla*. **Criterion 8** The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. **Criterion 5** Assemblages of international importance – Species with peak counts in winter: 70919 waterfowl (5 year peak mean) **Criterion 6** Species/populations occurring at levels of international importance as listed in Article 4.2.	Construction There is no construction phase associated with this drought permit. Operation The drought permit would involve a 50% reduction in the prescribed flow discharged to the Cheddar Yeo (reduced to 3.4Ml/d) during the period 1 December to 14 May. There would be an associated impact on the flow/level regime in the Cheddar Yeo downstream. The zone of hydrological influence (see **Appendix A)** includes 3km of the Cheddar Yeo from Cheddar Reservoir intake, with reducing scale downstream to around Hythe where the effects would be largely ameliorated. Available baseline data shows the absence of migratory fish species in the zone of influence. Much of the Cheddar Yeo and the wider catchment is water level controlled which is likely to form a permanent barrier to fish mitigation. Downstream of Hythe, the river is level-controlled, although there may be the potential for some effects (water velocity) to extend downstream to the confluence of the Cheddar Yeo and the River Axe. The River Axe is a significantly larger, level-controlled river at its confluence with the Cheddar Yeo, where the hydrological zone of influence is considered to end. The Severn Estuary SAC, SPA and Ramsar is 14km downstream from this point. Considering the extent and magnitude of potential flow impacts and the characteristics of the impacted reaches, the potential for adverse effects to the interest features such as migratory fish is considered unlikely. No LSEs are anticipated from the operation of the Cheddar Reservoir Reduced Compensation Flow drought option on the Severn Estuary SAC, SPA, Ramsar, either alone, or in combination with other licences and consents.	No	No	No

3.2 Potential In-combination Effects of the Plan

3.2.1 In-combination Effects with other Drought Plan Measures

Individually, the measures contained within Bristol Water's Drought Plan were identified as having no likely significant effects on European sites. However, a number of the drought management measures could be implemented at the same time and therefore an assessment has been completed to determine the potential for cumulative, in-combination effects.

Blagdon Reservoir, and the associated drought permit option to reduce the compensation water flow release to the Congresbury Yeo, is in a different river catchment to any of the other supply augmentation and drought permit measures. Similarly, Chew Reservoir, and the associated compensation water flow releases to the River Chew, is also in a different catchment to the other Drought Plan measures.

The Honeyhurst Well supply augmentation measure would involve abstraction from the Wells WFD groundwater body. It has been identified that there is low risk of the re-instated abstraction having any adverse impacts on the groundwater-dependent surface water body, the River Axe. The Cheddar Reservoir drought permit option to reduce the prescribed flows in the Cheddar Yeo is anticipated to result in hydrological effects in this river that would extend only to the confluence with the River Axe. Considering this, the potential for cumulative effects on the River Axe is unlikely and no in-combination effects on the Severn Estuary SAC, SPA and Ramsar site (located some 14km further downstream from the confluence of the Cheddar Yeo with the River Axe) are anticipated.

3.3 Potential In-Combination Effects with Other Plans and Projects

3.3.1 Bristol Water's Water Resource Management Plan (2014)

Potential in-combination effects have been considered with reference to Bristol Water's Water Resources Management Plan (WRMP) that was published in 2014. There are no water supply schemes identified within Bristol Water's WRMP 2014 that are due to be implemented and operational within the time period of the Drought Plan (to 2022). The only options that are identified that cover the period of the Drought Plan are demand management schemes or reductions in bulk water transfers out of the Bristol Water supply area. Consequently, no in-combination effects are anticipated.

3.3.2 Environment Agency Drought Plans

Assessment of the potential for in-combination effects of Bristol Water's Drought Plan measures with the Environment Agency's local area drought plans has been undertaken. The following Environment Agency Drought Plan documents were reviewed:

- Wessex Drought Action Plan (Final Draft) (January 2016)
- Shropshire Herefordshire Worcestershire and Gloucestershire Drought Action Plan (Draft) (June 2016)
- River Severn Drought Order Environmental Report (Working Draft) (December 2013)

Drought actions and triggers are given in the Environment Agency Drought Plans. Actions described in the Plans include communications (internal and external), monitoring and drought orders. Of these actions, those which are applicable for in-combination assessment with Bristol Water's drought options are the latter group. The other actions in the Plans relate to drought planning, monitoring and communications and are not direct actions which would physically result in cumulative effects.

The Environment Agency can apply to the Secretary of State for drought orders for environmental reasons, e.g. if low flow is posing a risk to the aquatic environment. Environmental drought orders can be used to vary the compensation flow discharged from reservoirs in to the receiving rivers, provide measures to lower the controlled flow to conserve resources, or provide measures to reduce abstractions to ease demand on rivers and minimise the environmental effect of reduced support to

river flow. The Environment Agency currently have no plans to apply for drought orders in the Shropshire Herefordshire Worcestershire and Gloucestershire area or the Wessex Area. However, these Drought Plans identify that it is not always possible to know in advance where such actions might be required. The Environment Agency do know from past experience that the River Severn is vulnerable to environmental impacts during a severe drought, due to the large abstraction pressures. In particular, the Severn estuary and associated European designated sites needs additional protection. In an exceptional drought situation, the Environment Agency may need to apply to the Secretary of State for environment, food and rural affairs, and the Welsh Government, for an environmental drought order on the River Severn to prolong regulation support for as long as possible. The Shropshire Herefordshire Worcestershire and Gloucestershire Area Drought Manager is accountable for managing the process for applying for a River Severn order.

The River Severn Drought Order is the Environment Agencies final option for managing the impact of a severe drought in the catchment. It aims to protect public water supply and the environment along the river. It includes a number of measures, such as reducing the target prescribed flows for the River Severn.

HRA Screening was undertaken by the Environment Agency and the in-combination assessment identified that migratory fish could be at risk of negative impacts under extreme conditions. To satisfy the Habitat's Directive and reduce the risk to the Severn Estuary, during River Severn Drought Order operation an abstraction cap of 300Ml/d (figure subject to change) will be imposed on the Canal & River Trust when flows drop below 1200Ml/d at Deerhurst[18]. While there are implications of this with respect to Bristol Water's reliance on abstraction associated with the Gloucester and Sharpness Canal, no in-combination effects are considered likely with regard to Bristol Water's Drought Plan options (none of which are hydrologically connected to the River Severn).

In summary, no cumulative impacts of options in Environment Agency Drought Plans and Bristol Water's Drought Plan options are anticipated; however, due to the uncertainties of potential locations and potential revisions to the Environment Agency's Drought Plans, this should be considered further at the time of any potential application for drought permits by Bristol Water.

3.3.3 Other Neighbouring Water Company Drought Plans

Assessment of the potential for cumulative impacts with measures included in neighbouring water companies' drought plans has been undertaken. It should be noted that all water company Drought Plans are subject to review on timescales that may not be aligned with the timescale of Bristol Water's Drought Plan revision. The information used to carry out these assessments is based on the latest versions of the Drought Plans available at June 2017, but the assessments should be reviewed at the time of implementation of any of the drought plan measures to ensure that no changes to the neighbouring water company drought options have been made in the intervening period, and that the cumulative assessment remains valid. The cumulative assessment has been informed by mapping of locations of drought management options, surface water and groundwater catchments.

3.3.4.1 Wessex Water

Wessex Water's current (2013) Drought Plan indicates that it would deploy demand management measures including water efficiency campaigns to both domestic and business customers, increased leakage reduction, and temporary water use restrictions. These measures would complement the demand management actions included in Bristol Water's Drought Plan and any cumulative effects are likely to be beneficial.

Wessex Water provides five small bulk water exports to Bristol Water which supply discrete areas within the Bristol Water supply area. In its 2013 Drought Plan, Wessex Water identifies that it does not envisage the need to restrict these transfers during a drought.

[18] The Canal & River Trust has raised concerns that 300 Ml/d could pose a risk to their operation of the Gloucester and Sharpness Canal and the Bristol Water abstraction it supports, which the Trust are investigating. If sufficient evidence is provided to show a higher abstraction is justified then the 300Ml/d limit will be reviewed.

No potential for in-combination or cumulative effects have been identified from the supply augmentation options in Wessex Water's 2013 Drought Plan. The standby water sources that Wessex Water may bring into use in a drought is limited to a source near Bath that the company. The abstraction licence permits up to 7 Ml/d to be abstracted from the River Avon. The River Axe defines the end of the hydrological zone of influence with respect to Bristol Water's Cheddar Reservoir drought permit option and the operation of Wessex Water's source near Bath is not considered likely to change this.

Wessex Water's Drought Plan identifies a number of drought permits/orders that could be used in drought. These include additional abstraction from the Bridgwater and Taunton Canal to augment reservoir storage which could reduce flows into the tidal River Parratt. The Clatworthy compensation flow reduction and Hele Bridge additional abstraction drought permit measures would affect flows in the River Tone, which flows into the River Parrett. The Sutton Bingham compensation flow reduction and Clifton Maybank additional abstraction drought permit options could affect flows in the River Yeo (not the Cheddar Yeo or the Congresbury Yeo) which flows into the River Parrett. None of Bristol Water's drought management measures are hydrologically linked to the Parrett catchment, which flows into the Severn Estuary. Equally, none of the Bristol Water drought management measures are identified as affecting freshwater flows to the Severn Estuary. Therefore, no LSEs are anticipated in combination with Wessex Water's Drought Plan.

3.3.4.2 Thames Water

The boundary of the Thames Water supply area is over 40km away from Bristol Water's most northern supply augmentation and drought permit options. There is no potential for hydrological connectivity and no cumulative effects between the drought management options in Bristol Water's Drought Plan and the measures included in the Thames Water Drought Plan (October 2016) are anticipated.

3.3.4.3 Severn Trent Water

The boundary of the Severn Trent Water's supply area is over 50km away from Bristol Water's supply augmentation and drought permit options. There is no potential for hydrological connectivity and no in-combination effects between the drought management options in Bristol Water's Drought Plan and Severn Trent Water's Drought Plan (2014) which would have the potential to impact on any European sites.

3.3.4 Other Water Company Water Resource Management Plans

3.3.4.4 Wessex Water

The Wessex Water WRMP 2014 proposes no supply augmentation options. No cumulative or in-combination effects are therefore likely to occur with Bristol Water's Drought Plan.

3.3.4.5 Thames Water

There are no options that form part of the Thames Water WRMP14 preferred programme of options with the potential to result in cumulative effects with the drought options in Bristol Water's Drought Plan.

3.3.4.6 Severn Trent Water

The boundary of the Severn Trent Water supply area is over 50km away from Bristol Water's Drought Plan options. There is no potential for hydrological connectivity and no in-combination effects between the drought management options in Bristol Water's Drought Plan and Severn Trent Water's WRMP 2014 which would have potential for impact on any European sites.

3.3.5 Other Plans and Projects

3.3.4.7 River Basin Management Plans

Most of Bristol Water's supply areas falls within the Severn river basin district River Basin Management Plan (RBMP). Part of the supply area (including Cheddar Reservoir) falls within the South West river basin district RBMP.

However, the HRA of each RBMP concluded that none of the measures identified would have significant negative effects on any European site, as the locations where the measures would be implemented is not constrained. The measures would also be implemented in such a way that there would be no in-combination effects within the RBMP. No cumulative effects are considered likely with the Bristol Water drought plan options.

3.3.4.8 National Policy Statements

National planning policy guidance (for developers and planning inspectors) is set out in National Policy Statements (NPSs). A number of these NPSs have been published and set out the definition, and in some cases, the location, of Nationally Significant Infrastructure Projects (NSIPs). Of the twelve NPS only two detail locations (Waste Water Treatment (England only) and Nuclear Power EN-6). The National Policy Statement for Wastewater[19] states the policy is to reduce demand for wastewater infrastructure by reducing domestic and industrial wastewater production and by implementation of Sustainable Urban Drainage Systems. Only two major infrastructure projects are put forward, both in the south east of the UK and therefore distant from the Bristol Water supply area.

The Nuclear Power NPS (EN-6) sets out eight potentially suitable sites for the deployment of new nuclear power stations in England and Wales before the end of 2025. Of these sites, one site (Oldbury) is located within the Bristol Water supply area, whilst a second site (Hinkley Point) is located approximately 10km to the south-west of the Bristol Water supply area. The remaining sites are considered too distant from the Bristol Water supply area for any in-combination effects to occur. Information from the NIP website[20] indicates that proposals for the Oldbury new nuclear power station are currently at the Pre-Application stage. The project timings are uncertain as the shareholders of the promoter (Horizon) are seeking new owners. It is considered unlikely that this site will be developed in the time-frame of the Bristol Water Drought Plan. The proposals for the Hinkley Point C new nuclear power stations are more advanced and are described further below.

3.3.4.9 Hinkley Point C

Hinkley Point C Connection (National Grid) will involve construction work that would mainly follow the M5 (10km -18km from drought options). European Sites that fall within the zone of influence with potential for effects include North Somerset and Mendip Bats SAC and Mendip Limestone Grasslands SAC for which mitigation measures have been proposed with regard to Honeyhurst Well option regarding bat interest features. However, the Hinkley Point C Connection project lies to west of these sites and the Honeyhurst Well option lies to the south and east. The Secretary of State has determined that the Hinkley Point C Connection, with mitigation in place, will not have an adverse effect on integrity of any European site either alone or in combination with other plans or projects. Considering this outcome and the distances between projects and European Sites, in-combination construction effects are considered unlikely.

3.3.6 Summary

No cumulative impacts on European sites have been identified between Bristol Water's Drought Plan measures and activities, projects or plans contained within relevant local Environment Agency Drought Plans, other water company Drought Plans or WRMPs, key National Policy Statements and known projects or plans that will be implemented during the lifetime of the Drought Plan (to 2021).

[19] Defra (2012) *National Policy Statement for Wastewater*. March 2012.
[20] https://infrastructure.planninginspectorate.gov.uk/

4 Conclusions

4.1 Summary of HRA Screening Conclusions

Bristol Water has undertaken the first stage in the HRA process – screening - of its Drought Plan 2017. The HRA screening stage establishes whether the measures contained in the Plan have the potential for a LSE on the integrity of any European site.

A summary of the conclusions of HRA Screening is presented in **Table 4.1**. This shows that none of the measures included in the Drought Plan 2017 are considered to have LSEs on European sites, either alone or in combination with any other drought management measures in the plan.

In-combination effects of Bristol Water's Drought Plan 2017 with its WRMP14, the Environment Agency's regional Drought Plan, the Severn River Basin District RBMP 2015, and other water company WRMPs and Drought Plans, are not considered likely to have significant adverse effects on any European site. No in-combination effects with other plans, projects or programmes have been identified.

On the basis of the screening results in **Table 4.1**, Appropriate Assessment of the Drought Plan is **not required**.

Table 4.1 Summary of HRA Screening Conclusions

Drought Option	Is scheme likely to have a significant effect on European site(s) alone?	Effect in combination with existing consents?	Effect in combination with other drought options?	Appropriate Assessment Required?
Supply Options				
Honeyhurst Well	No	No	No	No
Demand Options				
Appeals for restraint	No	No	No	No
Temporary Use Bans	No	No	No	No
Non-Essential Use Ban	No	No	No	No
Emergency Drought Order	No	No	No	No
Blagdon Reservoir Reduced Compensation Flow	No	No	No	No
Cheddar Reservoir Reduced Prescribed Flow	No	No	No	No
Chew Reservoir Reduced Compensation Flow	No	No	No	No

Appendices

Appendix A Hydrological Zone of Influence of Drought Permit Options

Appendix B European Designation Summaries

Appendix A – Hydrological Zone of Influence of Drought Permit Options

Appendix A provides the hydrological zone of influence for the Blagdon, Chew and Cheddar Reservoir drought permit options as presented within the Environmental Monitoring Report (EMP) undertaken in 2007. The figures have subsequently been updated in 2017.

Blagdon Reservoir Drought Permit (Figure A.1)

[This figure has been redacted for security reasons]

Chew Reservoir Drought Permit (Figure A.2)

[This figure has been redacted for security reasons]

Cheddar Reservoir Drought permit (Figure A.3)

[This figure has been redacted for security reasons]

Appendix B – European Sites: Designation Summaries

European Site	Qualifying features
Mendip Woodlands SAC	***Primary habitats and species*** **9180 Tilio-Acerion forests of slopes, screes and ravines –** Mendip Woodlands in south-west England is a relatively extensive example of ***Tilio-Acerion* forests** on limestone. It is a cluster of three ash-dominated woods on Carboniferous limestone. A rich variety of other trees and shrubs are present, including elm *Ulmus* spp. and, locally, small-leaved lime *Tilia cordata*. At Ebbor Gorge elm rather than lime is mixed with ash *Fraxinus excelsior* in a steep-sided gorge; at both Rodney Stoke and Cheddar Wood lime and ash are found on rocky slopes with patches of deeper soil between the outcrops. Ferns characteristic of this woodland type, such as hart's-tongue *Phyllitis scolopendrium* and shield-ferns *Polystichum* spp., are common. The site is in the centre of the range of common dormouse *Muscardinus avellanarius* and holds a large population of this species.
North Somerset and Mendip Bats SAC	***Primary habitats and species*** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates –** The Cheddar complex and Wookey Hole areas support a wide range of semi-natural habitats including semi-natural dry grasslands. The principal community present is CG2 *Festuca ovina – Avenula pratensis* grassland which occurs on rock ledges and on steep slopes with shallow limestone soil, especially in the dry valleys and gorges and on the south-facing scarp of the Mendips. The site is also important for the large number of rare plants which are associated with Carboniferous limestone habitats. These include dwarf mouse-ear *Cerastium pumilum*, Cheddar pink *Dianthus gratianopolitanus* and rock stonecrop *Sedum forsterianum*, which occur on rocks, screes, cliffs and in open grassland. Transitions to and mosaics with limestone heath, calcareous screes, scrub and 9180 *Tilio-Acerion* forests are a particular feature of the Cheddar complex part of the site. **9180 Tilio-Acerion forests of slopes, screes and ravines –** The main block of *Tilio-Acerion* forest at Kings and Urchin's Wood has developed over limestone which outcrops in parts of the site and forms a steep scarp to the south-east. Ash *Fraxinus excelsior* predominates in the canopy with small-leaved lime *Tilia cordata*, yew *Taxus baccata* and elm *Ulmus* spp., mostly formerly coppiced, but including some pollard limes. There is a rich ground flora including lily-of-the-valley *Convallaria majalis*, columbine *Aquilegia vulgaris*, angular Solomon's-seal *Polygonatum odoratum* and purple gromwell *Lithospermum purpureocaeruleum*. **1303 Lesser horseshoe bat *Rhinolophus hipposideros* –** The limestone caves of the Mendips provide a range of important hibernation sites for lesser horseshoe bat *Rhinolophus hipposideros* and 1,304 greater horseshoe bat *Rhinolophus ferrumequinum*. **1304 Greater horseshoe bat *Rhinolophus ferrumequinum* –** This site in south-west England is selected on the basis of the size of population represented (3% of the UK greater horseshoe bat *Rhinolophus ferrumequinum* population) and its good conservation of structure and function, having both maternity and hibernation sites. This site contains an exceptionally good range of the sites used by the population, comprising two maternity sites in lowland north Somerset and a variety of cave and mine hibernation sites in the Mendip Hills.

Mendip Limestone Grasslands SAC	**6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) – T**his site comprises coastal and inland sections of the Carboniferous Limestone outcrops of the Mendips. The coastal headland and inland hills support the largest area of CG1 *Festuca ovina – Carlina vulgaris* grassland in England, including two sub-types (CG1a *Carex humilis* and CG1c *Trinia glauca* sub-communities) known from no other site in the UK. Areas of short-turf CG2 *Festuca ovina – Avenula pratensis* grassland also occur inland. The site is exceptional in that it supports a number of rare and scarce vascular plants typical of the oceanic southern temperate and Mediterranean elements of the British flora. These include white rock-rose *Helianthemum apenninum*, Somerset hair-grass *Koeleria vallesiana* and honewort *Trinia glauca*.
Somerset Levels and Moors SPA	**Article 4.1** Over winter the area supports: Bewick's Swan *Cygnus columbianus bewickii,* Golden Plover *Pluvialis apricaria.* **Article 4.2** Over winter the area supports: Shoveler *Anas clypeata,* Teal *Anas crecca,* Wigeon *Anas Penelope,* Snipe *Gallinago gallinago*, Lapwing *Vanellus vanellus*, Pintail *Anas acuta*, Gadwall *Anas strepera*, Shoveler *Anas clypeata*, Teal *Anas crecca*, Wigeon *Anas penelope*, Golden Plover *Pluvialis apricaria*, Bewick's Swan *Cygnus columbianus bewickii*, Whimbrel *Numenius phaeopus*.
Somerset Levels and Moors Ramsar	**Ramsar Criterion 2** Supports 17 species of British Red Data Book invertebrates. **Ramsar Criterion 5** Assemblages of international importance – species with peak counts in winter: 97,155 waterfowl (5-year peak mean) **Ramsar Criterion 6** Species/populations occurring at levels of international Importance: Tundra swan, *Cygnus columbianus bewickii* – 112 individuals, representing an average of 1.3% of the GB population (5-year peak mean) Eurasian teal, *Anas crecca* – 21,231 individuals, representing an average of 5.3% of the population (5 year peak mean) Northern lapwing, *Vanellus vanellus* – 36,580 individuals, representing an average of 1% of the population (5 year peak mean)
Severn Estuary SPA	**Article 4.1** Over winter the area supports: Bewick's Swan *Cygnus columbianus bewickii*, 280 individuals representing at least 4.0% of the wintering population in Great Britain (5 year peak mean). **Article 4.2** Over winter the area supports: Curlew *Numenius arquata*, 3,903 individuals representing at least 1.1% of the wintering Europe - breeding population (5 year peak mean). Dunlin *Calidris alpina alpina*, 44,624 individuals representing at least 3.2% of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean). Pintail *Anas acuta*, 599 individuals representing at least 1.0% of the wintering Northwestern Europe population (5 year peak mean). Redshank *Tringa totanus*, 2,330 individuals representing at least 1.6% of the wintering Eastern Atlantic - wintering population (5 year peak mean). Shelduck *Tadorna tadorna*, 3,330 individuals representing at least 1.1% of the wintering Northwestern Europe population (5 year peak mean) On Passage the area supports: Ringed Plover *Charadrius hiaticula*, 655 individuals representing at least 1.3% of the Europe/Northern Africa - wintering population (5 year peak mean).

Severn Estuary SAC	***Primary habitats and species*** Estuaries, sandbanks which are slightly covered by sea water all the time. (Subtidal sandbanks), Mudflats and sandflats not covered by seawater at low tide (Intertidal mudflats and sandflats), Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*), Reefs. Sea Lamprey (*Petromyzon marinus),* River Lamprey (*Lampetra fluviatilis),* Twaite Shad (*Alosa fallax).*
Severn Estuary Ramsar	**Criterion 1** Due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities. Habitats Directive Annex I features present on the include: Sandbanks which are slightly covered by sea water all the time, Estuaries, Mudflats and sandflats not covered by seawater at low tide, Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) **Criterion 3** Due to unusual estuarine communities, reduced diversity and high productivity. **Criterion 4** This site is important for the run of migratory fish between sea and river via estuary. Species include Salmon *Salmo salar*, sea trout *S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax*, and eel *Anguilla Anguilla*. **Criterion 8** The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Salmon *Salmo salar*, sea *trout S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax* and eel *Anguilla anguillause* the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary. The site is important as a feeding and nursery ground for many fish species particularly allis shad *Alosa alosa* and twaite shad *A. fallaxwhich* feed on mysid shrimps in the salt wedge. **Criterion 5** Assemblages of international importance – Species with peak counts in winter: 70919 waterfowl (5 year peak mean) **Criterion 6** Species/populations occurring at levels of international importance. Qualifying Species/populations – Species with peak counts in winter: Tundra swan, *Cygnus columbianus bewickii*, 229 individuals, representing an average of 2.8% of the GB population (5 year peak mean), Greater white-fronted goose, *Anser albifrons albifrons* 2076 individuals, representing an average of 35.8% of the GB population (5 year peak mean), Common shelduck, *Tadorna tadorna*, 3223 individuals, representing an average of 1% of the population (5 year peak mean) Gadwall, *Anas strepera strepera,* 241 individuals, representing an average of 1.4% of the GB population (5 year peak mean), Dunlin, *Calidris alpina alpine*, 25082 individuals, representing an average of 1.8% of the population (5 year peak mean), Common redshank, *Tringa totanus totanus*, 2616 individuals, representing an average of 1% of the population (5 year peak mean).
North Somerset and Mendip Bats SAC	***Primary habitats and species*** **6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates –** The Cheddar complex and Wookey Hole areas support a wide range of semi-natural habitats including semi-natural dry grasslands. The principal community present is CG2 *Festuca ovina – Avenula pratensis* grassland which occurs on rock ledges and on steep slopes with shallow limestone soil, especially in the dry valleys and gorges and on the south-facing scarp of the Mendips. The site is also important for the large

	number of rare plants which are associated with Carboniferous limestone habitats. These include dwarf mouse-ear *Cerastium pumilum*, Cheddar pink *Dianthus gratianopolitanus* and rock stonecrop *Sedum forsterianum*, which occur on rocks, screes, cliffs and in open grassland. Transitions to and mosaics with limestone heath, calcareous screes, scrub and 9180 *Tilio-Acerion* forests are a particular feature of the Cheddar complex part of the site. **9180 Tilio-Acerion forests of slopes, screes and ravines –** The main block of *Tilio-Acerion* forest at Kings and Urchin's Wood has developed over limestone which outcrops in parts of the site and forms a steep scarp to the south-east. Ash *Fraxinus excelsior* predominates in the canopy with small-leaved lime *Tilia cordata*, yew *Taxus baccata* and elm *Ulmus* spp., mostly formerly coppiced, but including some pollard limes. There is a rich ground flora including lily-of-the-valley *Convallaria majalis*, columbine *Aquilegia vulgaris*, angular Solomon's-seal *Polygonatum odoratum* and purple gromwell *Lithospermum purpureocaeruleum*. **1303 Lesser horseshoe bat *Rhinolophus hipposideros* –** The limestone caves of the Mendips provide a range of important hibernation sites for lesser horseshoe bat *Rhinolophus hipposideros* and 1304 greater horseshoe bat *Rhinolophus ferrumequinum*. **1304 Greater horseshoe bat *Rhinolophus ferrumequinum* –** This site in south-west England is selected on the basis of the size of population represented (3% of the UK greater horseshoe bat *Rhinolophus ferrumequinum* population) and its good conservation of structure and function, having both maternity and hibernation sites. This site contains an exceptionally good range of the sites used by the population, comprising two maternity sites in lowland north Somerset and a variety of cave and mine hibernation sites in the Mendip Hills.
Chew Valley Lake SPA	**Article 4.2** Over winter, the area supports: Shoveler *Anas clypeata*: 503 individuals representing up to 1.3% of the wintering North-western/Central Europe population (5 year peak mean)

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