Southern Water

# ANNEX 18A – HABITATS REGULATIONS ASSESSMENT ADDENDUM

## Addendum to Annex 18 (HRA) of the Revised Draft WRMP


from Southern Water

REF
JULY 2024

Southern Water

# ANNEX 18A – HABITATS REGULATIONS ASSESSMENT ADDENDUM

## Addendum to Annex 18 (HRA) of the Revised Draft WRMP

**TYPE OF DOCUMENT (VERSION) PUBLIC**

**PROJECT NO. PRO NO**

**OUR REF. NO. REF**

**DATE: JULY 2024**

WSP

Canon Court West
Abbey Lawn
Shrewsbury
SY2 5DE

Phone: +44 1743 342 000

WSP.com

# QUALITY CONTROL

# CONTENTS

## *TABLES*

## FIGURES

**No table of figures entries found.**

## APPENDICES

# 1 INTRODUCTION

## 1.1 SOUTHERN WATER'S WATER RESOURCES MANAGEMENT PLAN 2024

1.1.1. The Water Act 2003 requires that all water companies in England and Wales prepare and maintain Water Resources Management Plans (WRMPs). These plans set out how public water supply (PWS) will be maintained over a minimum of 25 years in a way that is economically, socially and environmentally sustainable. The WRMPs must be revised every five years.

1.1.2. Southern Water Services (SWS) is preparing its WRMP (WRMP24) for the period 2023 – 2075. SWS consulted on its draft WRMP (dWRMP) between 14 November 2022 and 20 February 2023, and submitted an amended version of this to the regulators in September 2023 (hereafter 'the Sept23 submission' or 'the Sept23 WRMP'). The Sept23 submission set out SWS's preferred resource and demand management options ('the preferred options') for meeting predicted deficits in the water available for PWS, and for ensuring security of supply.

1.1.3. The Sept23 submission was based on the Water Resources South East (WRSE) Best Value Plan with SWS-specific amendments, and it is SWS's intention to adopt the final regional plan prepared by WRSE into the final WRMP24. The Regional Plan for the period 2025 to 2075 will address long-term regional and inter-regional, multi-sectoral water resources management pressures and will draw on water resource options from the member water companies' WRMP24s, as well as the Strategic Resource Options (SROs) being taken forward by the companies.

1.1.4. SWS has taken account feedback from the public consultation on its dWRMP and the draft Regional Plan, and additional feedback from the Environment Agency's dWRMP Statement of Response, and its response to the Sept23 submission. **SWS is now publishing its 'revised draft WRMP' (rdWRMP) for consultation**.

## 1.2 HABITATS REGULATIONS ASSESSMENT

1.2.1. Water company WRMPs are subject to the provisions of the *Conservation of Habitats and Species Regulations 2017* (as amended) (the 'Habitats Regulations')[1].

1.2.2. Regulations 63 and 64 transpose the provisions of Articles 6(3) and 6(4) of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive') as they relate to plans or projects in England and Wales. Regulation 63 states that if a

[1] The 2017 Regulations have been amended by the *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* to reflect the UK's exit from the EU, although these largely carried forward the provisions and terminology of the 2017 Regulations and do not fundamentally alter their interpretation. This report therefore primarily refers to the 2017 Regulations and (where appropriate for clarity) the relevant provisions of the Habitats Directive.

land-use plan is "*(a) is likely to have a significant effect on a European site*[2] *or a European offshore marine site*[3] *(either alone or in combination with other plans or projects); and (b) is not directly connected with or necessary to the management of the site*" then the competent authority must "…*make an appropriate assessment of the implications for the site in view of that site's conservation objectives*" before giving consent or authorisation.

1.2.3. The plan can only be given effect if it can be concluded (following an 'appropriate assessment') that the plan "…*will not adversely affect the integrity*" of a site, unless the provisions of Regulation 64 are met.

1.2.4. This assessment process is known as Habitats Regulations Assessment (HRA)[4]. An HRA determines whether there will be any 'likely significant effects' (LSE) on any European site as a result of a plan's implementation (either on its own or 'in combination' with other plans or projects)[5] and, if so, whether there will be any 'adverse effects on site integrity'[6].

## 1.3 THIS REPORT

1.3.1. As noted, SWS is now publishing its rdWRMP for consultation following regulator comments on its Sept23 submission and associated re-runs of the WRSE model. In broad summary the amendments between the Sept23 submission and the rdWRMP include:

- the removal of options that are no longer required, or for clarity / consistency where bi-directional schemes are proposed;
- the addition of three new 'resilience options' comprising two new supply-side groundwater schemes and one new drought option;
- the inclusion of two WRMP19 options that were not explicitly noted previously;

[2] The term 'European site' is retained by the 2019 amendment and for all practical purposes the definition is essentially unchanged from the 2017 Regulations. European sites are therefore: any Special Area of Conservation (SAC) from the point at which the European Commission and the UK Government agreed the site as a 'Site of Community Importance' (SCI) (if this was before 31 Jan 2020); any classified Special Protection Area (SPA); and any candidate SAC (cSAC). However, the term is also commonly used when referring to potential SPAs (pSPAs), to which the provisions of Article 4(4) of Directive 2009/147/EC (the 'new wild birds directive') are applied; and to possible SACs (pSACs) and listed Ramsar Sites, to which the provisions of the Habitats Regulations are applied a matter of Government policy (NPPF para. 187) when considering development proposals that may affect them. "European site" is therefore used in this document in its broadest sense, as an umbrella term for all of the above designated sites. Note, it is likely that this term will be supplanted at some point in the future although an appropriate UK-wide alternative has not yet been established (e.g. the NPPF in England has adopted the term 'Habitats sites' to refer collectively to those sites defined by Regulation 8; the *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* replaces 'Natura 2000' with the 'National Site Network').

[3] 'European offshore marine sites' are defined by Regulation 18 of *The Conservation of Offshore Marine Habitats and Species Regulations 2017* (as amended); these regulations cover waters (and hence sites) over 12 nautical miles from the coast.

[4] The term 'Appropriate Assessment' has been historically used to describe the process of assessment; however, the process is more accurately termed 'Habitats Regulations Assessment' (HRA), with the term 'Appropriate Assessment' limited to the specific stage within the process.

[5] Also referred to as 'screening' or the 'test of significance'.

[6] Also referred to as the 'integrity test'.

- minor amendments to some supply-side network schemes (reflecting further engineering information);
- amendments to the first year and/or yield for some options; and
- other minor amendments to reflect consultation responses.

1.3.2. As the rdWRMP is substantively unchanged from the Sept23 submission, this report is intended as an addendum to the Sept23 HRA (**Annex 18 to the rdWRMP**) that

- summarises the key differences between the Sept23 submission and the rdWRMP to assist consultee review and interpretation;
- provides assessments (screening and appropriate assessment as required) for those new or additional options not assessed in the previous (Sept23) HRA (**Annex 18 to the rdWRMP**);
- reviews the amended options to determine whether the existing assessments and conclusions remain robust, and completing suitable new assessments where material changes in options are identified; and
- re-runs the 'in combination' assessment to reflect the amended plan.

1.3.3. In addition, comments from regulators on the resilience options received by SWS since September 2023 are addressed as required.

1.3.4. The caveats noted in **Section 1.3 of the Sept23 HRA (Annex 18)** remain relevant to this addendum, notably:

- The HRA draws on the environmental data and assessments undertaken within other assessments, particularly the Water Framework Directive (WFD) assessment, and the HRA should be read in conjunction with these.
- The conclusions remain necessarily preliminary (since the HRA is only finalised based on the plan intended for adoption), based on the available data and information on the options.
- The HRA and this addendum provide a strategic, plan-level assessment to support the WRMP and not application-specific ('project-level') assessments; it is therefore based on data and information that can be reasonably gathered at the plan-level and so does not include option-specific survey data or similar.
- More detailed, application-specific HRAs will be needed to support future planning applications and environmental permits/consents, irrespective of the conclusions of the plan-level HRA. The plan-level HRA does not prejudice the outcomes of any project level assessments.
- The HRA and this addendum do not address Stages 3 or 4 of the HRA process (i.e. Assessment of Alternative Solutions or Assessment Where No Alternative Solutions Exist and Where Adverse Impacts Remain); if required, these stages will be addressed subsequently at the plan-level.

1.3.5. We are not aware of any amendments to the preferred supply-side options of Thames Water, Affinity Water, Sutton and East Surrey Water, Portsmouth Water, Southeast Water, or Bournemouth Water, and so these companies' submitted rdWRMPs are used for the revised in combination assessment. Wessex Water has made very minor amendments to one option in the Bristol Avon catchment, which will not interact with any SWS options.

# 2 SOUTHERN WATER'S REVISED DRAFT WRMP24

## 2.1 OVERVIEW

2.1.1. The development process for the WRMP24 and its relationship with the WRSE Regional Plan is set out within the rdWRMP. This provides detail on:

- the water resource planning scenarios (rdWRMP Section 4.4);
- the demand forecast including population growth scenarios (rdWRMP Section 5.2); and
- the adaptive planning process (rdWRMP Section 5.5).

2.1.2. **Annex 9 of the rdWRMP** provides additional information relevant to the HRA, including on environmental destination. The preferred Best Value Plan (BVP) is then set out in **Section 7 of the rdWRMP**.

2.1.3. Most of the Sept23 preferred options have been retained in the rdWRMP, although some changes have been made to account for consultation responses and associated re-runs of the model. In broad summary these amendments comprise:

- the removal of options that are no longer required, or for clarity / consistency where bi-directional schemes are proposed;
- the addition of three new 'resilience options' comprising two new supply-side groundwater schemes and one new drought option;
- the inclusion of two WRMP19 options that were not explicitly noted previously;
- minor amendments to some supply-side network schemes (reflecting further engineering information);
- amendments to the first year and/or yield for some options;
- other minor amendments to reflect consultation responses.

2.1.4. The retained and changed options are summarised in the following sections, with further detail provided in **Appendix A to this document** (note, **Appendix A** and the sections below are structured as per Section 2.2 of the Sept23 HRA (i.e. rdWRMP Annex 18) for read-across clarity).

## 2.2 DEMAND-SIDE OPTIONS

2.2.1. The Sept23 WRMP included 16 types of demand-side / demand-management options that will be applied to each of the 14 WRZs. The 16 types of option are summarised in Appendix A. **There are no changes to the demand-side options in the rdWRMP**.

## 2.3 EXISTING TRANSFERS / CONTINUATION OF SERVICES

2.3.1. Existing transfer schemes or bulk supply agreements are identified as 'options' by WRSE and/or SWS (see **Appendix A**).

**2.3.2.** **Two 'additional' existing transfers are identified in the rdWRMP** (see **Table 2-1**). Note that as these are simply a continuation of existing supply agreements they were/are considered to be effectively part of the water resources baseline for HRA purposes and are not subject to option-specific assessment.

**Table 2-1 – Additional existing transfers identified in the rdWRMP**

| Option Name | Notes from rdWRMP |
|---|---|
| Interzonal transfer (HSE-HRZ): Abbotswood - existing (1.1Ml/d) | This is the transfer between HRZ and HSE at Abbotswood. |
| Interzonal transfer (HSW-IOW): Cross-Solent main existing (18Ml/d) | This is an existing transfer between HSW and IOW across the Solent. |

## 2.4 CATCHMENT MANAGEMENT OPTIONS

2.4.1. No specific catchment management options were proposed as 'preferred options' by the Sept23 WRMP; this is because an assumed quantum of catchment management measures is included as part of the baseline WINEP assumptions (see **rdWRMP Annex 9**). **There are no changes to this position in the rdWRMP**.

## 2.5 DROUGHT OPTIONS

### DEMAND-REDUCTION DROUGHT OPTIONS

2.5.1. Three demand-reduction drought options were proposed for all WRZs for the planning period (Temporary Use Bans (TUBs); Non-Essential Use Bans (NEUBs); and reductions in commercial supply). **There are no changes to these in the rdWRMP**.

### SUPPLY-SIDE DROUGHT OPTIONS

2.5.2. All 14 options proposed in SWS's draft Drought Plan 2022[7] (see **Appendix A**) were included in the strategy for WRMP24 although the utilisation of these options is determined by the investment model (some are not utilised under the various scenarios but theoretically remain available over the planning period). However, SWS has committed to not deploying some of these options after specific dates in the planning period due to concerns over their environmental impacts. Further information on the drought options is provided in **rdWRMP24 Annex 12.** All of these options are effectively retained by the rdWRMP.

2.5.3. SWS has identified **one new supply-side drought option** for the rdWRMP. This option is as follows:

[7] Southern Water (2021). *Draft Drought Plan 2022 Main report*. 31 March 2021, Version 1.0

**Table 2-2 – New supply-side drought options included in the rdWRMP**

| Option Name | Summary |
|---|---|
| Bulk import (HRZ): Sea Tankering (45Ml/d) | This option would require the delivery of water from a hydroelectric plant in Norway by sea tanker to Southampton Container Docks, where temporary infrastructure would be installed (dockside storage bladders, pumps etc.), and the transfer of this water to Test surface water Water Supply Works (WSW) lakes via a temporary above-ground pipeline; the scheme would be expected to operate for 12 weeks over the summer period, with approximately 6 weeks each for installation and decommissioning (i.e. installation would typically start in June, with operation from August to November, and decommissioning from November to January). Based on previous droughts, scheme initiation (i.e. preparation including potentially pipeline installation) would likely be required once every three years although the option would only be used around once in every ten years. 1 – 2 tanker deliveries per day would be required to maintain supply, depending on tanker capacity. This variation would provide 45Ml/d. |

## 2.6 SUPPLY-SIDE OPTIONS

### 'NEW' OPTIONS

2.6.1. The rdWRMP includes

- **two new supply-side groundwater options** (referred to informally as 'Chilbolton' and 'Kings Sombourne'); and
- **two supply-side WRMP19 groundwater options** ('Petersfield' and 'West Chiltington') that were previously considered part of the WRMP24 baseline (i.e. assumed to be delivered or nearly delivered, so not identified as options in the Sept23 WRMP or assessed in its HRA).

2.6.2. These options are summarised in **Table 2-3**.

**Table 2-3 – New / WRMP19 options included in the rdWRMP**

| Option Name | Summary |
|---|---|
| Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d) | This **new option** involves recommissioning the mothballed Chilbolton WSW, with the inclusion of a suitable nitrate removal plant. The generated waste stream will require removal by tanker for treatment at a local WwTW (typically less than one tanker movement per month). This would provide a DO benefit of 2.5Ml/d. Note, the earliest start date for this option is 2073. |
| Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d) | This **new option** involves the development of a new borehole and pump capacity at the Kings Sombourne site to increase the DO from 1.5Ml/d to the licenced 4Ml/d, giving a potential benefit of 2.5Ml/d. |
| Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) | This **WRMP19 option** involves the transfer excess water for enhanced treatment near Rotherfield (Nightsfield Midhurst high level WSR) with refurbishment of Midhurst and borehole rehabilitation. The scheme will require full refurbishment of the WSW, including boreholes and treatment. |

| Option Name | Summary |
|---|---|
| Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) | This **WRMP19 option** involves bringing the West Chiltington groundwater source back into service by constructing a new borehole, new treatment plant and flood resilience measures at the site. |

2.6.3. In addition, one option associated with the Thames to Southern Transfer (*Bulk Import (HKZ) T2ST to HKZ (5Ml/d)*) was not explicitly listed in the Sept23 HRA (Annex 18 to the rdWRMP); this option utilises the same infrastructure as *Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d)* and so was considered through the assessment of that option[8]. There are no additional effects and so the *Bulk Import (HKZ) T2ST to HKZ (5Ml/d)* option is not explicitly assessed in this report.

## AMENDED AND DESELECTED OPTIONS

2.6.4. Some Sept23 WRMP options have been amended for the rdWRMP, or deselected. The amendments are typically minor changes to reflect new engineering or asset information, or as a result of model re-runs.

2.6.5. The amended and deselected options are summarised in **Tables 2-4 – 2-6**. Note that deselected options are ~~crossed through~~ for clarity.

### Table 2-4 – Summary of amended or deselected options (western area)

| Sept23 Option Name | rdWRMP changes / summary |
|---|---|
| Bulk import (HAZ): T2ST to Andover | ■ Name amended to *Bulk import (HAZ): T2ST to Andover (20Mld)*;<br>■ Yield change (17.3 to 14.3; pipeline capacity remains the same although volume transferred may change). |
| Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d) | ■ Year change (2042 to 2031) |
| Groundwater (HSW): Test MAR (5.5Ml/d) | ■ Year change (2042 to 2036) |
| Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d) | ■ Year change (2040 to 2037) |

[8] Essentially, water from the main T2ST pipeline will be distributed within the SWS area by several other pipelines, including those associated with **Bulk import (HAZ): T2ST to Andover (20Mld)** and **Bulk Import (HKZ) T2ST to HKZ (5Ml/d)**. The option **Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d)** subsequently utilises these two pipelines bi-directionally to increase network resilience. The effects of pipeline construction for the **5Ml/d bulk transfer** component were considered under the Sept23 assessment for Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d).

| Sept23 Option Name | rdWRMP changes / summary |
|---|---|
| Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional | ■ Name amended to *Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d)*;<br>■ Yield change (2.4 to 6.8; pipeline capacity remains the same although volume transferred may change).<br>■ Year change (2040 to 2050) |
| ~~Interzonal transfer (HSE-HSW): Otterbourne WSW to River Test WSW potable bi-directional~~ | ■ Option replaced by *Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill WSW bi-directional (74Ml/d)*. |
| ~~Interzonal transfer (HSE-HSW): Woodside bi-directional (10Ml/d)~~ | ■ Option no longer selected |
| Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill bi-directional | ■ Name amended to '*Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill WSW bi-directional (74Ml/d)*'.<br>■ Option has been amended / upsized to replace *Interzonal transfer (HSE-HSW): Otterbourne WSW to River Test WSW potable bi-directional* (above)<br>■ This bi-directional transfer between from Otterbourne WSW in HSE to Yew Hill in HWZ is being developed as part of the Hampshire Grid. |
| Recycling (HSE): Recharge of Havant Thicket Reservoir from Budds Farm WTW (60Ml/d) | ■ Year change (2036 to 2035) |
| Recycling (IOW): Sandown WTW (8.5Ml/d) | ■ Year change (2028 to 2031) |

**Table 2-5 – Summary of amended or deselected options (central area)**

| Sept23 Option Name | rdWRMP changes / summary |
|---|---|
| ~~Bulk import (SBZ): SEW Barcombe to Rottingdean (20Ml/d)~~ | ■ Not in revised plan Situation 4 |
| Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d) | ■ Year change (2041 to 2041). |
| Desalination (SWZ): Tidal River Arun | ■ Name amended to Desalination (SWZ): Tidal River Arun (10Ml/d).<br>■ Yield change (29.8 to 10). |
| Groundwater (SNZ): New borehole at Petworth (4Ml/d) | ■ Year change (2045 to 2031). |

| Sept23 Option Name | rdWRMP changes / summary |
|---|---|
| Interzonal transfer (SBZ-SWZ): Brighton to Worthing | ■ Year change (2042 to 2041).<br>■ Yield change (4.2 to 16.7); pipeline capacity remains the same although volume transferred may change. |
| Interzonal transfer (SNZ-SWZ): Pulborough to Worthing | ■ Yield change (24 to 34.9). |
| Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d) | ■ Year change (2051 to 2041). |
| ~~Interzonal transfer (SWZ-SBZ): Worthing to Brighton~~ | ■ Bi-directional of Interzonal transfer (SBZ-SWZ): Brighton to Worthing; removed as a separate option for consistency with model outputs. |
| Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d) | ■ Year change (2068 to 2058). |
| Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d) | ■ Year change (2045 to 2046). |
| ~~Storage (SNZ): Western Rother licence and storage programme~~ | ■ Option no longer selected |
| Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d) | ■ Year change (2031 to 2041). |

**Table 2-6 – Summary of amended or deselected options (eastern area)**

| Sept23 Option Name | rdWRMP changes / summary |
|---|---|
| Bulk export (KTZ): Near Canterbury to Broad Oak | ■ Name amended to Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d);<br>■ Yield change (6.1 to 20; pipeline capacity remains the same although volume transferred may change.<br>■ Year change (2051 to 2050) |
| Bulk export (SHZ): Rye to SEW Kingsnorth | ■ Name amended to Bulk export (SHZ): Rye to SEW RZ8 |
| Bulk import (KTZ): Broad Oak to Near Canterbury (20Ml/d) | ■ Bi-directional of Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d);<br>■ Yield/year not previously noted in HRA (now 20Ml/d and 2050). |

| Sept23 Option Name | rdWRMP changes / summary |
|---|---|
| Bulk import (SHZ): SEW Kingsnorth to Rye (10Ml/d) | ▪ Option re-named to Bulk export (SHZ): SEW RZ8 to Rye<br>▪ Bi-directional of Bulk export (SHZ): Rye to SEW RZ8.<br>▪ Yield/year not previously noted in HRA (now 7Ml/d and 2050) |
| Desalination (KME): Isle of Sheppey | ▪ Year change (2046 to 2045) |
| Desalination (KTZ): East Thanet | ▪ Year change (2041 to 2040) |
| Interzonal transfer (KTZ-KME): KME-KTZ bi-directional<br>(WRMP19 option under investigation) | ▪ Yield change (1.5 to 15.75; pipeline capacity remains the same although volume transferred may change). |
| Interzonal transfer (KTZ-KME): Utilise full existing capacity | ▪ Yield change (1.0 to 3.3; pipeline capacity remains the same although volume transferred may change). |
| Recycling (SHZ): Tonbridge WTW to Bewl Reservoir (5.7Ml/d) | ▪ Yield/year not previously noted in HRA (now 5.7Ml/d and 2036) |

## THAMES TO SOUTHERN TRANSFER

2.6.6. The rdWRMP includes one SRO (the Thames to Southern Transfer (T2ST)) which is currently being assessed as part of RAPID's gated process for SROs; this includes environmental compliance. The environmental compliance assessments, and the supporting investigations, are ongoing with the outcomes available to inform the RAPID Gate 3 submission in 2024. This option was previously referred to as *Bulk import (HSE): T2ST to HSE (120Ml/d)* in the Sept23 HRA, and is now referred to as *Bulk import (HWZ): T2ST to Yew Hill (95Ml/d)*. There are no other changes from the scheme outlined in the Sept23 submission.

# 3 ASSESSMENT APPROACH

## 3.1 'NEW' OPTIONS

3.1.1. The assessment of the new options follows the approach detailed in Section 3 of the Sept23 HRA report (**Annex 18 to the rdWRMP**). In summary:

- An intentionally precautionary overarching assessment scope is used as a starting point for the assessment of each option; this includes:
  - All European sites that are within 10km of any operational facilities or new infrastructure required to deliver each option (including temporary infrastructure).
  - All European sites that are downstream of any operational facilities or new infrastructure required to deliver each option (including temporary infrastructure), or upstream sites that support migratory fish (no distance thresholds)[9].
- Data collection, including information on the options and the European site features and conservation objectives, is as per Section 3.3 of the Sept23 HRA.
- Options and European sites are 'screened' as per Section 3.3 of the Sept23 HRA (note, the 'low-bar' principle is used for the screening of the options[10]; in general, unless the possibility of significant effects can be simply and self-evidently excluded then an 'appropriate assessment' is completed (rather than a more detailed 'secondary screening' or similar). This applies to the options alone and in combination (i.e. unless it is evident that there will be 'no effects' from any options the possibility of 'in combination' effects is not excluded and these are taken forward to 'appropriate assessment'). This approach simplifies the overall assessment and ensures procedural clarity. The 'low bar' approach is consistent with the 'People Over Wind'[11] case law, which requires that mitigation not be considered at screening.
- Options where significant effects cannot be excluded are subject to an appropriate assessment as per Section 3.3 of the Sept23 HRA; appropriate assessments are 'appropriate' to the nature of the WRMP as a strategic plan, the option under consideration, and the scale and likelihood of any effects, and includes consideration of option-specific in combination effects.

3.1.2. Note, shared evidence applicable to multiple sites or features (for example, in relation to birds and construction noise) is provided in **Appendix B of the Sept23 HRA** to reduce repetition. Established best-practice avoidance and mitigation measures are noted in **Appendix C of the Sept23 HRA**).

---

[9] Note these parameters are used as a starting point for identifying potentially exposed sites. They do not comprise a 'hard buffer', and in some instances it may be appropriate to consider more distant sites; however, unless otherwise noted, sites over 10km from the options that are not hydrologically linked and which do not support wide-ranging mobile species are typically considered sufficiently remote such that any environmental changes will be effectively nil, and so there will be 'no effects' on sites beyond this distance (and so no possibility of 'in combination' effects). Note also that other water company HRAs have used slightly different criteria for framing the assessment scope; this is discussed in the 'in combination' section of **Annex 18**.

[10] The low-bar nature of the screening test is characterised in case-law (*C-258/11 - Sweetman and Others*) as '*should we bother to check?*' – i.e. is a closer examination of possible effects required (i.e. appropriate assessment) or can effects self-evidently be excluded as nil or entirely nugatory?

[11] Case *C 323/17 Court of Justice of the European Union: People Over Wind*

## 3.2 REVIEW OF AMENDED OPTIONS

3.2.1. The amendments noted in **Tables 2-4 – 2-6** are reviewed to identify the following:

- Potentially notable changes in the capital works required (e.g. substantial pipeline route or infrastructure amendments), recognising that many of these aspects (particularly pipeline routing) are indicative only at this point, and subject to detailed design at the project level.
- Potentially notable changes in proposed operation, including yield changes (recognising that for many schemes the yield is achieved through the integrated functioning of the WRMP and the existing consents regime, and cannot be directly attributed to 'a source').
- Changes in the date of delivery that may influence assessment requirements (schemes required in the next AMP may require more detail as there will not necessarily be another WRMP process prior to commencement, although it is recognised that all schemes would require consideration against the Habitats Regulations at the project stage irrespective of the WRMP HRA conclusions).

## 3.3 IN COMBINATION ASSESSMENT

3.3.1. Following from the above assessments, the 'in combination' assessments are re-run. As noted, we are not aware of any amendments to the preferred supply-side options of Thames Water, Affinity Water, Sutton and East Surrey Water, Portsmouth Water, Southeast Water, or Bournemouth Water (and so these companies' submitted rdWRMPs are used for the revised in combination assessment). Wessex Water has made very minor amendments to one option in the Bristol Avon catchment, which will not interact with any SWS options.

# 4 ASSESSMENT SUMMARIES

## 4.1 SCREENING OF NEW OPTIONS

4.1.1. The initial 'alone' screening assessments for the following options that were not assessed in the Sep23 HRA are set out in **Appendix B**.

- Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)
- Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)
- Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d)
- Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)
- Bulk import (HRZ): Sea Tankering (45Ml/d)

4.1.2. **Table 4-1** below summarises the outcomes of the 'alone' screening assessment for each of these options, identifying those European sites that have been screened out and screened in (i.e. subject to AA). For simplicity, detailed narratives for each site are not included in **Table 4-1** (as this would essentially involve replicating **Appendix B**).

4.1.3. The following should be noted when reviewing **Table 4-1**:

- European sites outside the scope (i.e. over 10km from an option and not downstream or otherwise hydrologically linked) are not identified as it is assumed that there will be essentially 'no effect' on these sites (see Section 3)[12].
- European sites are only screened out where there are considered to be no reasonable pathways for the anticipated environmental changes to affect a European site or feature – i.e. in most cases sites are only screened out where there will be 'no effect' (or occasionally 'no appreciable effect', where a hypothetical pathway exists) in the absence of mitigation[13] and hence no possibility of 'in combination' effects. This is to ensure a precautionary assessment, and to simplify the assessment process. The rationale for each site is explicitly set out in **Appendix B**.
- The 'screened in' column in **Table 4-1** provides an indication of whether the anticipated environmental changes relate to construction ('C'), operation ('O'), or both.
- For many options, particularly those involving construction only, the vast majority of potential effects can almost certainly be avoided or mitigated at the project-level through normal project controls, designed avoidance measures, and/or mitigation (see **Appendix C of the Sept23 HRA**). Sites to which this applies are identified with a 'C*' or 'O*' (i.e. indicating that potential effects are anticipated to be relatively minor and resolvable with established measures).

[12] Note, the 10km buffer may result in some apparent inconsistencies where nominally similar sites (e.g. New Forest SAC and New Forest SPA) do not have coincident boundaries.

[13] As opposed to the theoretically somewhat higher bar of 'no likely significant effect'.

**Table 4-1 – Screening summary for options not assessed in Sept23 HRA**

| Option Name | Key Outcomes / Pathways for Environmental change | Sites screened out (alone) | Sites screened in (alone) |
|---|---|---|---|
| Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d) | This new option involves recommissioning the mothballed Chilbolton WSW, with the inclusion of a suitable nitrate removal plant. There are no European sites within 10km although the European sites associated with Southampton Water are potential downstream receptors. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA). Operation will be within the terms of the existing licence, but will increase abstraction over recent actuals, although the European sites associated with Southampton Water cannot be affected through this mechanism due to the presence of HOF constraints at Test surface water WSW. | ■ None | ■ Solent and Southampton Water Ramsar (C*)<br>■ Solent and Southampton Water SPA (C*)<br>■ Solent Maritime SAC (C*)<br>■ Solent and Dorset Coast SPA (C*) |
| Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d) | This new option involves the development of a new borehole and pump capacity at the Kings Sombourne site to increase the DO from 1.5Ml/d to the licenced 4Ml/d, giving a potential benefit of 2.5Ml/d. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA). Operation will be within the terms of the existing licence, but will increase abstraction over recent actuals. Wetland habitats of Emer Bog SAC cannot be affected (distance from abstraction, plus the SAC is located on the confining London Clay); European sites associated with Southampton Water cannot be affected through operation due to the presence of HOF constraints at Test surface water WSW. | ■ Emer Bog SAC | ■ Mottisfont Bats SAC (C*)<br>■ Solent and Southampton Water Ramsar (C*)<br>■ Solent and Southampton Water SPA (C*)<br>■ Solent Maritime SAC (C*)<br>■ Solent and Dorset Coast SPA (C*) |

| Option Name | Key Outcomes / Pathways for Environmental change | Sites screened out (alone) | Sites screened in (alone) |
|---|---|---|---|
| Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) | This WRMP19 option involves the transfer excess water for enhanced treatment near Rotherfield with refurbishment of a WSW and borehole rehabilitation. No European sites or features are expected to be exposed to the environmental changes associated with construction irrespective of any mitigation, based on the distance to the sites and effect pathways. Operation will be within the terms of the existing licence, but will increase abstraction over recent actuals. The wetland features of the Arun Valley SAC, Arun Valley SPA and Arun Valley Ramsar may be affected if the abstraction affects flows in the River Rother (hence the River Arun as it passes the European sites) although the small scale of the increase in abstraction, the distance downstream, and the characteristics of the relationship between the River Arun and the European sites are likely to moderate any effects (albeit that it is reasonably to consider this through appropriate assessment, alone and in combination).<br><br>The Wealden Heaths SPA and Woolmer Forest SAC are approx. 5 – 7km (respectively) from the boreholes, and support some groundwater dependent terrestrial ecosystems (GWDTEs); however, these designated sites are separated from the boreholes by the River Rother, and are at a significantly greater elevation. The GWDTEs (essentially, habitats associated with peatlands and impeded drainage) are also not typically supported by deep groundwater from aquifers. Modelling currently being undertaken for this option (following from WRMP19) excludes these designated sites for these reasons (i.e. there is no reasonable pathway).<br><br>Note that the 2019 HRA concluded that this option would have no significant effects on any European sites, alone or in combination. | ■ Butser Hill SAC<br>■ East Hampshire Hangers SAC<br>■ Rook Clift SAC<br>■ Wealden Heaths Phase 2 SPA<br>■ Woolmer Forest SAC | ■ Arun Valley SAC (O)<br>■ Arun Valley SPA (O)<br>■ Arun Valley Ramsar (O) |

| Option Name | Key Outcomes / Pathways for Environmental change | Sites screened out (alone) | Sites screened in (alone) |
|---|---|---|---|
| Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) | This WRMP19 option involves bringing the West Chiltington groundwater source back into service by constructing a new borehole, new treatment plant and flood resilience measures at the site.<br><br>Operation will be within the terms of the existing licence, but will increase abstraction over recent actuals. The wetland features of the Arun Valley SAC, Arun Valley SPA and Arun Valley Ramsar may be affected if the abstraction affects flows in the River Stor and hence the River Arun as they pass these European sites. These sites may also be affected by site-derived pollutants from construction, in the absence of mitigation.<br><br>No other sites are potentially exposed to significant effects (any construction works will be relatively small-scale / localised at existing SWS assets, which are located substantially beyond the core sustenance zone (CSZ) of bat species associated with The Mens SAC. | ■ The Mens SAC | ■ Arun Valley SAC (C*,O)<br>■ Arun Valley SPA (C*,O)<br>■ Arun Valley Ramsar (C*,O) |

| Option Name | Key Outcomes / Pathways for Environmental change | Sites screened out (alone) | Sites screened in (alone) |
|---|---|---|---|
| Bulk import (HRZ): Sea Tankering (45Ml/d) | This option is essentially an inter-catchment raw water transfer, with a temporary pipeline constructed within or immediately adjacent to several European sites.<br>■ The terrestrial and estuarine habitats of Solent and Southampton Water SPA/Ramsar and Solent Maritime SAC (and potentially functional habitats associated with the SPA/Ramsar) will be exposed to direct and indirect effects from construction (habitat damage, potential exposure to site-derived pollutants).<br>■ The estuarine habitats of the Southampton Water component of the Solent and Dorset Coast SPA will be exposed to direct and indirect effects from construction (habitat damage, potential exposure to site-derived pollutants), with the mobile species of the site potentially exposed to disturbance or displacement.<br>■ Operation of the scheme has the risk of introducing INNS, which may affect all of the sites (although the most notable risk is thought to be to the Atlantic salmon feature of the River Itchen SAC from the salmon fluke *Gyrodactylus salaris*).<br>No other sites are potentially exposed to significant effects. | ■ Emer Bog SAC<br>■ New Forest SPA<br>■ The New Forest Ramsar<br>■ The New Forest SAC | ■ River Itchen SAC (C*,O)<br>■ Solent and Southampton Water Ramsar (C,O)<br>■ Solent and Southampton Water SPA (C,O)<br>■ Solent Maritime SAC (C,O)<br>■ Solent and Dorset Coast SPA (C,O) |

## 4.2 SCREENING NOTES – RIVER TEST / RIVER MEON

4.2.1. Areas secured as sites to provide compensatory measures for adverse effects on a European site are protected by UK government planning policy[14]; UK Government guidance on HRA[15] states that these areas should be subject to HRA when considering proposals that may affect them.

4.2.2. The current use of drought options in the Western Area to secure SWS' supply deficit was established in the 2018 Hampshire Public Inquiry (the Inquiry) and constitutes the 'interim abstraction scheme' within an agreement made under Section 20 of the Water Resources Act 1991 (the Section 20 Agreement). The Section 20 Agreement is due to expire in March 2030.

4.2.3. These drought options could, if implemented to meet demand during a drought, result in adverse effects on the River Itchen SAC[16]. As a result, retention of these options in SWS' 2019 Drought Plan required an 'imperative reasons of over-riding public importance' (IROPI) argument, and the identification of suitable compensation measures for the anticipated adverse effects. These compensation measures, which are included in the HRA of the Drought Plan and the Section 20 Agreement as well as project-level HRAs for the relevant individual drought options, include areas of the River Test and River Meon[17]

4.2.4. NE guidance for the River Itchen SAC[18] states that "*Targets for water quality and flows are determined for Natura 2000 sites by Natural England with reference to Common Standards Monitoring Guidance (CSMG)*" and that "…*where achievement of the targets based on CSMG is not possible in the next river basin planning cycle then interim progress goals have been agreed by Natural England and the Environment Agency*". As a result the current CSMG flow targets for the River Test SSSI may provide a reasonable proxy for the potential future requirements for the compensation habitats associated with the River Test. The River Meon is not a SSSI and so does not have CSMG targets associated with it, although it is possible that these could be applied to the compensation habitats associated with the River Meon in the future.

4.2.5. The rdWRMP options that may affect these watercourses have been reviewed and screened / re-screened as appropriate. In summary:

### RIVER MEON

4.2.6. No options are likely to have operational effects on the River Meon. Two options (Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW (90Ml/d); and Recycling (HSE): Recharge of Havant Thicket Reservoir from Budds Farm WTW (60Ml/d)) involve pipelines that may cross the river; these

[14] For example, under para. 187 of the National Planning Policy Framework (NPPF).

[15] Department for Environment, Food & Rural Affairs, Natural England, Welsh Government and Natural Resources Wales Joint Guidance (2021). Available at: https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site#European-sites.

[16] Although it should be noted that these options need to be available only until 2035, when the transfers and yield associated with Havant Thicket reservoir become fully available.

[17] The exact position is still to be finalised. The HRA of the drought plan indicated that the compensatory measures would be implemented in the event of a Drought Order being applied for (which may not happen); however, NE and SWS are discussing measures for specific sections of the River Test and River Meon, and a timetable for delivery.

[18] Available at: https://publications.naturalengland.org.uk/file/5976606933778432

would be ‘screened in’ although adverse effects would almost certainly be avoided with established best-practice measures (see **Section 4.3**).

### RIVER TEST

4.2.7. Several options may require construction works within the River Test catchment, notably:

- Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)
- Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)
- Interzonal transfer (HRZ-HSW): Romsey Town and Broadlands valve bi-directional
- Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d)
- Groundwater (HSW): Test MAR (5.5Ml/d)

4.2.8. These options are likely to rely on established project-level mitigation and avoidance measures, and so are considered through ‘appropriate assessment’ (see **Section 4.3**).

4.2.9. With regard to potential **operational effects**:

- The Interzonal transfer (HRZ-HSW): Romsey Town and Broadlands valve bi-directional option is a network solution only.
- The Groundwater (HSW): Test MAR (5.5Ml/d) option involves a confined aquifer that is isolated from the Test.
- The Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d), Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d) and Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d) all involve sources that have been part of SWS’s ‘no deterioration’ investigations for the Test, specifically considering the risk of Recent Actual to Fully Licensed abstraction increases. There is no expectation of significant increase in pumping because of the tightened flow constraints of the River Test SSSI, and modelling of the impacts of these sources and all other abstractions and discharges on flows in the Test has demonstrated that these are compliant with CSMG low flow (Q95) thresholds.

4.2.10. On this basis **operational effects on the compensatory habitats proposed for the River Test are screened out**.

## 4.3 APPROPRIATE ASSESSMENT – LOW IMPACT OPTIONS

4.3.1. This section should be read in conjunction with **Appendix E1 of the Sept23 HRA**, which sets out the basis for the assessment approach applied to ‘low impact’ options (i.e. those options with ‘construction only’ pathways that can self-evidently and reliably be avoided with established measures that might historically have been accounted for at screening prior to ‘People over Wind’). Note that this assessment takes account of the site conservation objectives. This assessment approach is applied to the following options, and is summarised in **Table 4-2**.

- Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)
- Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)

4.3.2. Note that additional WRMP options that may affect these designated sites ‘in combination’ are identified in **Appendix E1 (Table 3.1) of the Sept23 HRA**; these are considered ‘in combination’ with the new options in **Table 4-3** below. In summary, the potential ‘alone’ effects identified and assessed in **Table 4-2** are essentially of a scale and type that can be reliably avoided at the project-level using established design and mitigation measures, such that the magnitude of any residual environmental changes would make ‘in combination’ effects (either between options (assuming they

were delivered on a similar timescale) or with other plans and projects extremely unlikely (i.e. if effects from the options are entirely avoidable then 'in combination' effects cannot in theory occur).

4.3.3. It is possible that there will be 'in combination' project-specific construction effects associated with projects or plans that cannot be reasonably identified and assessed at the WRMP level, and which can only be assessed at the time of any application or delivery. This is consistent with the ACWG guidance on cumulative/in combination assessments.

4.3.4. In summary, it can be concluded that the above options will have no adverse effect on the integrity of any European sites, alone or in combination, through construction-related environmental changes (operational effects being screened out, alone and in combination, due to the nature of the option operation).

4.3.5. In addition, **Table 4-3** considers those options that may have construction-related effects on compensatory habitats that may be delivered within the River Test or River Meon (noting that no options will have operational effects on these watercourses (see **Section 4.2**).

**Table 4-2 – New options that only have potential effects that can be reliably avoided with established project-level measures**

| European Site(s) | Options | Pathways / Vulnerable features | Mitigation | Effectiveness | Conclusion with mitigation |
|---|---|---|---|---|---|
| Solent and Southampton Water Ramsar (C*)<br>Solent and Southampton Water SPA (C*)<br>Solent Maritime SAC (C*)<br>Solent and Dorset Coast SPA (C*) | ■ Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)<br>■ Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)<br>■ Note – additional options within the catchment of these sites are identified in Appendix E1, Table 3.1, of the Sept23 HRA; these are considered 'in combination'. | ■ Construction at SWS assets is likely to be required near minor tributaries of these sites.<br>■ Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (supporting habitats for qualifying features).<br>■ Breeding / wintering bird features within the site unlikely to be exposed to disturbance, although some may utilise non-designated functional land closer to the construction areas. | ■ Standard best-practice measures to prevent site-derived pollutants entering local watercourses.<br>■ Standard measures to avoid / minimise disturbance of bird interest features (e.g. pre-survey, timing of works, screening, etc.)<br>■ See Appendix C of the Sept23 HRA. | ■ Expected to be fully effective, such that 'no effects' on the site would occur through these pathways. | ■ No adverse effects alone.<br>■ In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects). |

| European Site(s) | Options | Pathways / Vulnerable features | Mitigation | Effectiveness | Conclusion with mitigation |
|---|---|---|---|---|---|
| Mottisfont Bats SAC | ■ Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)<br>■ Note – additional options near this European site are identified in Appendix E1, Table 3.1, of the Sept23 HRA; these are considered 'in combination'. | ■ Some construction for this option would be required in the 'Core Sustenance Zone' for the bat species associated with this site.<br>■ No permanent land-take within the CSZ required; effects on bat species possible through disruption of foraging / commuting routes (e.g. hedge removal, site lighting).<br>■ Exposure of features likely to be low based on habitat preferences of bat (principally woodland) and scale / nature / location of works at existing asset. | ■ Standard measures to avoid / minimise disturbance of bat species (e.g. pre-survey, habitat retention, lighting design, timing of works, etc.)<br>■ See Appendix C. | ■ Expected to be fully effective, such that 'no effects' on the site would occur through these pathways. | ■ No adverse effects alone<br>■ In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects) |

**Table 4-3 – Options that have potential construction-related effects on the River Test compensatory habitats or River Meon compensatory habitats that can be reliably avoided with established project-level measures**

| European Site(s) | Options | Pathways / Vulnerable features | Mitigation | Effectiveness | Conclusion with mitigation |
|---|---|---|---|---|---|
| River Test compensatory habitats | ■ Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)<br>■ Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)<br>■ Interzonal transfer (HRZ-HSW): Romsey Town and Broadlands valve bi-directional<br>■ Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d)<br>■ Groundwater (HSW): Test MAR (5.5Ml/d) | ■ Construction at SWS assets is likely to be required near minor tributaries of these sites.<br>■ Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (supporting habitats for qualifying features). | ■ Standard best-practice measures to prevent site-derived pollutants entering local watercourses.<br>■ See Appendix C of the Sept23 HRA. | ■ Expected to be fully effective, such that 'no effects' on the site would occur through these pathways. | ■ No adverse effects alone.<br>■ In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects). |

| European Site(s) | Options | Pathways / Vulnerable features | Mitigation | Effectiveness | Conclusion with mitigation |
|---|---|---|---|---|---|
| River Meon compensatory habitats | ■ Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW (90Ml/d); and<br>■ Recycling (HSE): Recharge of Havant Thicket Reservoir from Budds Farm WTW (60Ml/d). | ■ Pipeline crossings of Meon or tributaries likely to be required.<br>■ Site-derived pollutants from run off entering local watercourses hence designated site or functionally associated habitat (supporting habitats for qualifying features).<br>■ Atlantic salmon may be exposed to noise/vibration disturbance. | ■ Standard best-practice measures to prevent site-derived pollutants entering local watercourses.<br>■ Timing works to avoid key migration periods.<br>■ See Appendix C of the Sept23 HRA. | ■ Expected to be fully effective, such that 'no effects' on the site would occur through these pathways. | ■ No adverse effects alone.<br>■ In combination effects can only be assessed at the scheme level, but measures expected to be fully effective (therefore no risk of i/c effects). |

## 4.4 APPROPRIATE ASSESSMENT – GROUNDWATER (SNZ): PETERSFIELD REFURBISHMENT (1.6ML/D)

4.4.1. The appropriate assessment for this option is set out in Appendix C. In summary:

- The WRMP19 HRA concluded that this option would have 'no significant effect' on any European sites, alone or in combination, due principally to the separation distance from any sites and the operation of the option within the terms of the existing licence.
- A new screening (see above) has suggested that theoretical effect pathways exist for the Arun Valley SAC / SPA / Ramsar if abstraction from the boreholes impacts flows in the River Rother (hence the River Arun where it is hydrologically connected to the designated sites), and that this pathway should be examined through 'appropriate assessment'. Note that the Pulborough groundwater abstractions, and potential pathways of impact, are also being considered as part of the ongoing Pulborough Environmental WINEP study that is due to complete at the end of March 2025.
- The appropriate assessment has indicated that the effects of the abstraction in these sites 'alone' will be very limited, and will not adversely affect the integrity of the site; this is principally because:
  - the effect of the abstraction on flows in the River Arun would be nominal (less than 1% at all except the lowest flows), and only if it is assumed that the entirety of the abstraction is expressed in river flows; and
  - although water from the River Arun enters the Arun valley sites, they are not understood to be fundamentally reliant on flooding (etc.) from the River Arun for maintenance of favourable condition for a range of reasons, including the role played by active water level management within the site and inputs of freshwater water from other sources (this is consistent with the position from the Pulborough Environmental WINEP investigations).
- In combination effects with other WRMP24 options are arguably possible, including WRMP19 option West Chiltington (see Section 4.4 below), and "Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d)" and "Groundwater (SNZ): New borehole at Petworth (4Ml/d)" (see Sep23 HRA) as these will cumulatively have a potentially notable effect on the lowest flows within the River Arun. However, adverse effects are not considered an unavoidable consequence of these options as:
  - the arguments related to the relationship between the river and the designated sites noted above and in the Sep23 HRA remain relevant;
  - mitigation measures are likely to be available for any flow impacts (given the nature of the river / designated site relationship), should further evidence suggest these are likely to be adverse (e.g. those identified for the "Pulborough Surface Water - reduce Western Rother MRF"

drought option in SWS's revised draft Drought Plan 2022[19] would also be effective and potentially appropriate for the WRMP option)[20]; and

- the largest of these abstractions (Horsham WTW) would not be required until 2058, with Petworth not required until 2031 (i.e. post-conclusion of the current investigations) and so time is available within the WRMP and AMP cycles to identify alternative options should these not prove deliverable.

## 4.5 APPROPRIATE ASSESSMENT – GROUNDWATER (SNZ): REINSTATE WEST CHILTINGTON (3.1ML/D)

4.5.1. The appropriate assessment for this option is set out in Appendix C. In summary:

- The WRMP19 HRA concluded that this option would have 'no significant effect' on any European sites, alone or in combination, due principally to the operation of the option within the terms of the existing licence.
- A new screening (see above) has suggested that theoretical effect pathways exist for the Arun Valley SAC / SPA / Ramsar if abstraction from the boreholes impacts flows in the River Stor (hence the River Arun where it is hydrologically connected to the designated sites), and that this pathway should be examined through 'appropriate assessment'. Note that the Pulborough groundwater abstraction, and potential pathways of impact, are also being considered as part of the ongoing Pulborough Environmental WINEP study, that is due to complete at the end of March 2025.
- The appropriate assessment has indicated that the effects of the abstraction in these sites 'alone' will be negligible, and not adversely affect the integrity of the site; this is principally because

  - it is not considered possible for the abstraction to directly influence spring flows within the European sites and hence GWDTEs[21].
  - the effect of the abstraction on flows in the River Arun would be nominal (less than 1% at all except the lowest flows), and only if it is assumed that the entirety of the abstraction is expressed in river flows;
  - although water from the River Arun enters the Arun valley sites, they are not understood to be fundamentally reliant on flooding (etc.) from the River Arun for maintenance of favourable condition for a range of reasons, including the role played by active water level management within the site and inputs of freshwater water from other sources (this is consistent with the position from the Pulborough Basin WINEP investigations); and

[19] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

[20] These mitigation measures include partial removal of embankments to re-connect river to the floodplain sooner, creation of new ditches that connect the floodplain with the river at different water levels.

[21] Southern Water is currently undertaking WINEP investigations into the impact of groundwater abstractions from Pulborough on the GWDTEs of the Arun Valley sites, including the development of groundwater models. The consented abstraction from West Chiltington was initially considered during the scoping phases of this study, but was excluded as there is no pathway for groundwater abstractions from this source to directly affect GWTDEs within the Arun Valley sites due to the absence of connectivity (in summary, the Pulborough abstractions and the GWTDEs of the Arun Valley sites are associated with groundwater in the Folkestone Lower Greensand formations, whereas West Chiltington abstracts from the Hythe beds).

- there does not appear to be substantive connectivity between the River Stor and the designated sites (no sluices are noted in this section of the site based on the Pulborough Basin investigations).

- In combination effects with other WRMP24 options are arguably possible, including WRMP19 option "Petersfield Refurbishment" (see Section 4.3 above), "Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d)" and "Groundwater (SNZ): New borehole at Petworth (4Ml/d)" (see Sep23 HRA) as these will cumulatively have a potentially notable effect on the lowest flows within the River Arun. However, adverse effects are not considered an unavoidable consequence of these options as

  - the arguments related to the relationship between the river and the designated sites noted above and in the Sep23 HRA remain relevant;
  - mitigation measures are likely to be available for any flow impacts (given the nature of the river / designated site relationship), should further evidence suggest these are likely to be adverse (e.g. those identified for the "Pulborough Surface Water - reduce Western Rother MRF" drought option in SWS's revised draft Drought Plan 2022[22] would also be effective and potentially appropriate for the WRMP option)[23]; and
  - the largest of these abstractions (Horsham WTW) would not be required until 2058, with Petworth not required until 2031 (i.e. post-conclusion of the current investigations) and so time is available within the WRMP and AMP cycles to identify alternative options should these not prove deliverable.

## 4.6 APPROPRIATE ASSESSMENT – BULK IMPORT (HRZ): SEA TANKERING (45ML/D)

The appropriate assessment for this option is set out in Appendix D. In summary:

- The scheme will require construction works within and/or close to Southampton Water and hence the **Solent and Southampton Water SPA/Ramsar,** the **Solent Maritime SAC** and the **Solent and Dorset Coast SPA**. Areas of Southampton Water will also be used by mobile species associated with the **River Itchen SAC**. These works may result in:

  - direct physical impacts on the habitats of the **Solent and Southampton Water SPA/Ramsar,** the **Solent Maritime SAC** and the **Solent and Dorset Coast SPA** due to the installation of a temporary pipeline;
  - environmental changes that may indirectly affect the habitats and species of the above sites, or associated functional habitats (e.g. from site-derived pollution, or noise, vibration and movements of people and machinery).

- With regard to operation:

[22] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

[23] These mitigation measures include partial removal of embankments to re-connect river to the floodplain sooner, creation of new ditches that connect the floodplain with the river at different water levels.

- Sea-tanker movements and associated operational activities will take place within **Solent and Dorset Coast SPA** and close to **Solent and Southampton Water SPA/Ramsar** and **Solent Maritime SAC**.
- Raw water will be transferred from Norway to Test Little Lake, with associated the risk of INNS transfer that may affect the designated sites noted above, or mobile species associated with the **River Itchen SAC**.

- Indirect construction-related environmental changes are unlikely to be substantive relative to the baseline in Southampton Water, and consequent effects on habitats or species associated with the designated sites can almost certainly be mitigated or avoided with established measures (e.g. pollution controls, timing of works, monitoring, etc.).
- Direct construction-related effects on the habitats of the **Solent and Dorset Coast SPA** are likely to be limited due to the nature of the works (involving temporary support of a pipeline on barges) and the habitats (relatively dynamic estuarine habitats) in this location.
- Direct construction-related effects on the habitats of **Solent and Southampton Water SPA/Ramsar** and the **Solent Maritime SAC** (principally terrestrial saltmarsh habitats) due to installation of the temporary pipeline are possible, and these may adversely affect site integrity in the absence of mitigation. However, it is considered that the habitats affected are likely to be relatively resilient to short-term and temporary perturbations, and that the effects will be reversible in the short- to medium-term with appropriate mitigation and restoration/management, and so adverse effects on integrity that are unavoidable at the project level (irrespective of how the scheme is delivered) would not be expected.
- Environmental changes associated with sea-tanker movements and associated operational activities will not be substantive relative to the baseline in Southampton Water, and consequent effects on habitats or species associated with the designated sites can almost certainly be mitigated or avoided with established measures (e.g. pollution controls, monitoring, etc.).
- The principal operational risk relates to the potential for transfer of INNS from Norway, notably the salmon fluke *Gyrodactylus salaris* (although the catchment of the proposed source is understood to be free from this species). This may occur through transfer of water into Test Little Lake (although this operational reservoir is to some extent isolated from the surrounding environment) or incidental spills / discharges of raw water during pipeline disassembly. The transfer of INNS is not an unavoidable consequence of the scheme operation and so appropriate risk-management must be relied on to ensure that INNS transfer and hence adverse effects do not occur; measures could include pre-scheme monitoring, appropriate controls on discharges, and purging/treatment of residual raw water in the pipelines prior to decommissioning.

## 4.7 AMENDED OPTIONS REVIEW / ASSESSMENT (ALONE)

The review of the amended options is summarised in **Table 4-4** – **Table 4-6.** In summary, none of the amendments introduce potential effects that were not considered by the Sept23 HRA or additional assessment requirements, and so the conclusions of the Sept23 HRA (both with regard to screening and appropriate assessment) are carried forward to the relevant in combination assessments.

## Table 4-4 – Summary of amended or deselected options (western area)

| rdWRMP Option Name | rdWRMP changes / summary | Assessment review |
|---|---|---|
| Bulk import (HAZ): T2ST to Andover | ■ Name amended to Bulk import (HAZ): T2ST to Andover (20Mld);<br>■ Yield change (17.3 to 14.3; pipeline capacity remains the same although volume transferred may change. | Changes not considered material to previous 'alone' assessment conclusions. |
| Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d) | ■ Year change (2042 to 2031) | Changes not material to previous 'alone' assessment conclusions (option was 'no effect' option and change of date does not alter this). |
| Groundwater (HSW): Test MAR (5.5Ml/d) | ■ Year change (2042 to 2036) | Changes not material to previous 'alone' assessment conclusions; change of date arguably reduces time for additional studies but scheme not required until AMP10 so sufficient time to resolve uncertainties remains available. |
| Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d) | ■ Year change (2040 to 2037) | Changes not material to previous 'alone' assessment conclusions (option was 'no effect' option and change of date does not alter this). |
| Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional | ■ Name amended to *Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d)*;<br>■ Yield change (2.4 to 6.8; pipeline capacity remains the same although volume transferred may change.<br>■ Year change (2040 to 2050) | Changes not considered material to previous 'alone' assessment conclusions. |
| ~~Interzonal transfer (HSE-HSW): Otterbourne WSW to River Test WSW potable bi-directional~~ | ■ Option replaced by *Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill WSW bi-directional (74Ml/d)*. | Changes not considered material to previous assessment conclusions. |

| rdWRMP Option Name | rdWRMP changes / summary | Assessment review |
|---|---|---|
| ~~Interzonal transfer (HSE-HSW): Woodside bi-directional (10Ml/d)~~ | ■ Option no longer selected | Changes not considered material to previous assessment conclusions. |
| Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill bi-directional | ■ Name amended to '*Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill WSW bi-directional (74Ml/d)*'.<br>■ Option has been amended / upsized to replace *Interzonal transfer (HSE-HSW): Otterbourne WSW to River Test WSW potable bi-directional* (above)<br>■ Yield change; pipeline capacity remains the same although volume transferred may change | Changes not considered material to previous assessment conclusions. |
| Recycling (HSE): Recharge of Havant Thicket Reservoir from Budds Farm WTW (60Ml/d) | ■ Year change (2036 to 2035) | Changes not considered material to previous assessment conclusions. |
| Recycling (IOW): Sandown WTW (8.5Ml/d) | ■ Year change (2028 to 2031) | Changes not considered material to previous assessment conclusions. |

## Table 4-5 – Summary of amended or deselected options (central area)

| rdWRMP Option Name | rdWRMP changes / summary | Assessment review |
|---|---|---|
| ~~Bulk import (SBZ): SEW Barcombe to Rottingdean (20Ml/d)~~ | ■ Not in revised plan Situation 4 | Changes not considered material to previous 'alone' assessment conclusions. |
| Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d) | ■ Year change (2041 to 2041). | Changes not considered material to previous 'alone' assessment conclusions. |
| Desalination (SWZ): Tidal River Arun | ■ Name amended to Desalination (SWZ): Tidal River Arun (10Ml/d).<br>■ Yield change (29.8 to 10). | Changes not considered material to previous 'alone' assessment conclusions. |
| Groundwater (SNZ): New borehole at Petworth (4Ml/d) | ■ Year change (2045 to 2031). | Changes not material to previous 'alone' assessment conclusions; change of date arguably reduces time for additional studies but evidence indicates that this is a low risk option. |
| Interzonal transfer (SBZ-SWZ): Brighton to Worthing | ■ Year change (2042 to 2041).<br>■ Yield change (4.2 to 16.7); pipeline capacity remains the same although volume transferred may change. | Changes not considered material to previous 'alone' assessment conclusions. |
| Interzonal transfer (SNZ-SWZ): Pulborough to Worthing | ■ Yield change (24 to 34.9). | Changes not considered material to previous 'alone' assessment conclusions. |
| Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d) | ■ Year change (2051 to 2041). | Changes not considered material to previous 'alone' assessment conclusions. |
| ~~Interzonal transfer (SWZ-SBZ): Worthing to Brighton~~ | ■ Bi-directional component of Interzonal transfer (SBZ-SWZ): Brighton to Worthing; removed as a separate option for consistency with model outputs. | Changes not considered material to previous 'alone' assessment conclusions. |

| rdWRMP Option Name | rdWRMP changes / summary | Assessment review |
|---|---|---|
| Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d) | ■ Year change (2068 to 2058). | Changes not material to previous 'alone' assessment conclusions; change of date arguably reduces time for additional studies but scheme not required until late in the planning period so sufficient time to resolve uncertainties remains available. |
| Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d) | ■ Year change (2045 to 2046). | Changes not considered material to previous 'alone' assessment conclusions. |
| ~~Storage (SNZ): Western Rother licence and storage programme~~ | ■ Removed as a constrained option | Changes not considered material to previous 'alone' assessment conclusions. |
| Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d) | ■ Year change (2031 to 2041). | Changes not considered material to previous 'alone' assessment conclusions. |

## Table 4-6 – Summary of amended or deselected options (eastern area)

| rdWRMP Option Name | rdWRMP changes / summary | Assessment review |
|---|---|---|
| Bulk export (KTZ): Near Canterbury to Broad Oak | ■ Name amended to Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d);<br>■ Yield change (6.1 to 20; pipeline capacity remains the same although volume transferred may change.<br>■ Year change (2051 to 2050) | Changes not considered material to previous 'alone' assessment conclusions. |
| Bulk export (SHZ): Rye to SEW Kingsnorth | ■ Name amended to Bulk export (SHZ): Rye to SEW RZ8 | Changes not considered material to previous 'alone' assessment conclusions. |
| Bulk import (KTZ): Broad Oak to Near Canterbury (20Ml/d) | ■ Bi-directional of Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d);<br>■ Yield/year not previously noted in HRA (now 20Ml/d and 2050). | Changes not considered material to previous 'alone' assessment conclusions. |
| Bulk import (SHZ): SEW Kingsnorth to Rye (10Ml/d) | ■ Option re-named to Bulk export (SHZ): SEW RZ8 to Rye<br>■ Bi-directional of Bulk export (SHZ): Rye to SEW RZ8.<br>■ Yield/year not previously noted in HRA (now 7Ml/d and 2050) | Changes not considered material to previous 'alone' assessment conclusions. |
| Desalination (KME): Isle of Sheppey | ■ Year change (2046 to 2045) | Changes not considered material to previous 'alone' assessment conclusions. |
| Desalination (KTZ): East Thanet | ■ Year change (2041 to 2040) | Changes not considered material to previous 'alone' assessment conclusions. |
| Interzonal transfer (KTZ-KME): KME-KTZ bi-directional<br>(WRMP19 option under investigation) | ■ Yield change (1.5 to 15.75; pipeline capacity remains the same although volume transferred may change). | Changes not considered material to previous 'alone' assessment conclusions. |

| rdWRMP Option Name | rdWRMP changes / summary | Assessment review |
|---|---|---|
| Interzonal transfer (KTZ-KME): Utilise full existing capacity | ■ Yield change (1.0 to 3.3; pipeline capacity remains the same although volume transferred may change). | Changes not considered material to previous 'alone' assessment conclusions. |
| Recycling (SHZ): Tonbridge WTW to Bewl Reservoir (5.7Ml/d) | ■ Yield/year not previously noted in HRA (now 5.7Ml/d and 2036) | Changes not considered material to previous 'alone' assessment conclusions. |

## 4.8 REVISED IN COMBINATION ASSESSMENTS

### WITHIN-PLAN EFFECTS

4.8.1. **Appendix F of the Sept23 HRA** set out the 'within-plan' in combination assessment, identifying all SWS options that might interact to affect particular European sites. This has been reviewed taking account of the amendments proposed for the rdWRMP set out in Section 2, and the screening and appropriate assessments completed in **Appendices B – E** of this addendum report.

4.8.2. In summary:

- None of the new options proposed for the rdWRMP will interact with options retained or amended from the Sept23 submission to adversely affect any European sites, based on the available data.
- The changes made to the amended options will not alter the conclusions of Sept23 HRA in combination assessment, either because the potential interactions are construction x construction that can be reliably avoided with established measures (even where there is a theoretical risk of construction periods overlapping) or because operation x operation effects will not interact to adversely affect the sites (irrespective of timing or yield changes).

4.8.3. The assessment as it relates to the new options is summarised in **Table 4-7** (note that this should be read in conjunction with **Appendix F of the Sept23 HRA**).

### BETWEEN-PLAN EFFECTS

4.8.4. As noted, we are not aware of any amendments to the preferred supply-side options of Thames Water, Affinity Water, Sutton and East Surrey Water, Portsmouth Water, Southeast Water, or Bournemouth Water (and so these companies' submitted rdWRMPs are used for the revised in combination assessment). Wessex Water has made very minor amendments to one option in the Bristol Avon catchment, which will not interact with any SWS options.

4.8.5. The potential for the SWS rdWRMP to interact with the WRMPs of these water companies has been reviewed, taking account of the amendments proposed for the rdWRMP set out in Section 2. In summary, the option amendments introduced between the Sept23 submission and the rdWRMP do not alter the conclusions of the Sept23 'between-plan' in combination assessment (see Appendix G of the Sept23 HRA).

**Table 4-7 – European sites potentially exposed to environmental changes associated with new options and in combination summary**

| European site | New Option | Alone Summary | I/C Summary |
|---|---|---|---|
| Arun Valley Ramsar | Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d)<br>Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) | No adverse effects (nature of option / site characteristics – see Appx. C/D)<br>No adverse effects (nature of option / site characteristics – see Appx. C/D) | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| Arun Valley SAC | Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d)<br>Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) | No adverse effects (nature of option / site characteristics – see Appx. C/D)<br>No adverse effects (nature of option / site characteristics – see Appx. C/D) | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| Arun Valley SPA | Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d)<br>Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) | No adverse effects (nature of option / site characteristics – see Appx. C/D)<br>No adverse effects (nature of option / site characteristics – see Appx. C/D) | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| Butser Hill SAC | Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) | No effects (distance, absence of effect pathways). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| East Hampshire Hangers SAC | Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) | No effects (distance, absence of effect pathways). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| Emer Bog SAC | Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d) | No effects (wetland habitats of Emer Bog SAC cannot be affected (distance from abstraction, plus the SAC is located on the confining London Clay)). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |

| European site | New Option | Alone Summary | I/C Summary |
|---|---|---|---|
| Mottisfont Bats SAC | Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d) | No adverse effects (taking account of project-level measures). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| New Forest SPA | Bulk import (HRZ): Sea Tankering (45Ml/d) | No effects (distance, absence of effect pathways). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no LSE due to absence of pathways). |
| River Itchen SAC | Bulk import (HRZ): Sea Tankering (45Ml/d) | No adverse effects (taking account of project-level measures). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| Rook Clift SAC | Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) | No effects (distance, absence of effect pathways). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| Solent and Dorset Coast SPA | Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)<br>Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)<br>Bulk import (HRZ): Sea Tankering (45Ml/d) | No adverse effects (taking account of project-level measures).<br>No adverse effects (taking account of project-level measures).<br>No adverse effects (taking account of project-level measures). | Options will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects) |
| Solent and Southampton Water Ramsar | Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)<br>Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)<br>Bulk import (HRZ): Sea Tankering (45Ml/d) | No adverse effects (taking account of project-level measures).<br>No adverse effects (taking account of project-level measures).<br>No adverse effects (taking account of project-level measures). | Options will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |

| European site | New Option | Alone Summary | I/C Summary |
|---|---|---|---|
| Solent and Southampton Water SPA | Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)<br>Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)<br>Bulk import (HRZ): Sea Tankering (45Ml/d) | No adverse effects (taking account of project-level measures).<br>No adverse effects (taking account of project-level measures).<br>No adverse effects (taking account of project-level measures). | Options will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| Solent Maritime SAC | Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)<br>Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)<br>Bulk import (HRZ): Sea Tankering (45Ml/d) | No adverse effects (taking account of project-level measures).<br>No adverse effects (taking account of project-level measures).<br>No adverse effects (taking account of project-level measures). | Options will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| The Mens SAC | Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) | No effects (distance, absence of effect pathways). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |
| The New Forest Ramsar | Bulk import (HRZ): Sea Tankering (45Ml/d) | No effects (distance, absence of effect pathways). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no LSE due to absence of pathways). |
| The New Forest SAC | Bulk import (HRZ): Sea Tankering (45Ml/d) | No effects (distance, absence of effect pathways). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no LSE due to absence of pathways). |
| Wealden Heaths Phase 2 SPA | Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) | No effects (distance, absence of effect pathways). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |

| European site | New Option | Alone Summary | I/C Summary |
|---|---|---|---|
| Woolmer Forest SAC | Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) | No effects (distance, absence of effect pathways). | Option will not alter conclusions of the Sept23 I/C assessment (i.e. no adverse effects). |

# 5 SUMMARY

## 5.1 BACKGROUND

5.1.1. SWS is preparing its WRMP (WRMP24) for the period 2023 – 2075. SWS consulted on its draft WRMP (dWRMP) in autumn 2022, and submitted an amended version of this to the regulators in September 2023 ('the Sept23 submission' or 'the Sept23 WRMP') that set out SWS's preferred resource and demand management options ('the preferred options') for meeting predicted deficits and for ensuring security of supply. The Sept23 submission was accompanied by a Habitats Regulations Assessment (HRA) report (**Annex 20 to the Sept23 submission, Annex 18 to the rdWRMP – the 'Sept23 HRA'**).

5.1.2. Following regulator review of the Sept23 submission, SWS is now publishing its 'revised draft WRMP' (rdWRMP) for consultation.

5.1.3. The rdWRMP is substantively unchanged from the Sept23 submission, and this report is intended as an addendum to the Sept23 HRA that

- summarises the key differences between the Sept23 submission and the rdWRMP to assist consultee review and interpretation;
- provides assessments (screening and appropriate assessment as required) for those new or additional options not assessed in the Sept23 HRA;
- reviews the amended options to determine whether the existing assessments and conclusions remain robust, and completing suitable new assessments where material changes in options are identified; and
- re-runs the 'in combination' assessment to reflect the amended plan.

## 5.2 ASSESSMENT SUMMARY

### 'NEW OPTIONS'

5.2.1. The addendum HRA has focused on the following options that were not assessed in the Sep23 HRA.

- Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)
- Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)
- Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d)
- Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)
- Bulk import (HRZ): Sea Tankering (45Ml/d)

5.2.2. The outcomes of the screening and appropriate assessments of these options is summarised in **Table 5-1**. Note that an indication of whether the anticipated environmental changes relate to construction ('C'), operation ('O'), or both, is provided; an '*' indicates where effects are likely to be relatively trivial and almost certainly avoidable at the project-level through normal project controls, designed avoidance measures, and/or mitigation (see **Appendix C of the Sept23 HRA**).

**Table 5-1 – New option assessment summary**

| Option | Sites screened out | Screening notes | Sites subject to AA | AA notes |
|---|---|---|---|---|
| Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d) | ■ None | - | ■ Solent and Southampton Water Ramsar (C*)<br>■ Solent and Southampton Water SPA (C*)<br>■ Solent Maritime SAC (C*)<br>■ Solent and Dorset Coast SPA (C*) | Potential effects on all sites avoidable with established scheme-level measures (as per Appendix C of the Sept23 HRA). Note that European sites associated with Southampton Water cannot be affected through operation due to the presence of HOF constraints at Test surface water WSW. |
| Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d) | ■ Emer Bog SAC | Wetland habitats of Emer Bog SAC cannot be affected (distance from abstraction, plus the SAC is located on the confining London Clay). | ■ Mottisfont Bats SAC (C*)<br>■ Solent and Southampton Water Ramsar (C*)<br>■ Solent and Southampton Water SPA (C*)<br>■ Solent Maritime SAC (C*)<br>■ Solent and Dorset Coast SPA (C*) | Potential effects on all sites avoidable with established scheme-level measures (as per Appendix C of the Sept23 HRA). Note that European sites associated with Southampton Water cannot be affected through operation due to the presence of HOF constraints at Test surface water WSW. |

| Option | Sites screened out | Screening notes | Sites subject to AA | AA notes |
|---|---|---|---|---|
| Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) | ■ Butser Hill SAC<br>■ East Hampshire Hangers SAC<br>■ Rook Clift SAC<br>■ Wealden Heaths Phase 2 SPA<br>■ Woolmer Forest SAC | Sites excluded due to distance from option boreholes and absence of effect pathways, including hydrological pathways. | ■ Arun Valley SAC (O)<br>■ Arun Valley SPA (O)<br>■ Arun Valley Ramsar (O) | The hydrological impact of this option on the Arun Valley sites alone is considered to be negligible, particularly in relation to the dominant effect of groundwater supply to the designated sites and the active management of water levels within the sites; this is consistent with the conceptual understanding of the Arun Valley sites developed through Pulborough Basin model and WINEP investigations. The predicted flow reductions in the Arun will not be of sufficient magnitude to adversely affect the site alone either directly or through secondary mechanisms such as via impacts on water quality. In combination adverse effects are not expected for the same reasons. |
| Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) | ■ The Mens SAC | Site excluded due to distance and absence of reasonable effect pathways, including for mobile species. | ■ Arun Valley SAC (C*,O)<br>■ Arun Valley SPA (C*,O)<br>■ Arun Valley Ramsar (C*,O) | The hydrological impact of this option on the Arun Valley sites alone is considered to be negligible, particularly in relation to the dominant effect of groundwater supply to the designated sites and the active management of water levels within the sites; this is consistent with the conceptual understanding of the Arun Valley sites developed through Pulborough Basin model and WINEP investigations. The predicted flow reductions in the Arun will not be of sufficient magnitude to adversely affect the site alone either directly or through secondary mechanisms such as via impacts on water quality. In combination adverse effects are not expected for the same reasons. |

| Option | Sites screened out | Screening notes | Sites subject to AA | AA notes |
|---|---|---|---|---|
| Bulk import (HRZ): Sea Tankering (45Ml/d) | ■ Emer Bog SAC<br>■ New Forest SPA<br>■ The New Forest Ramsar<br>■ The New Forest SAC | Sites excluded due to distance and absence of reasonable effect pathways, including for mobile species. | ■ River Itchen SAC (C*,O)<br>■ Solent and Southampton Water Ramsar (C,O)<br>■ Solent and Southampton Water SPA (C,O)<br>■ Solent Maritime SAC (C,O)<br>■ Solent and Dorset Coast SPA (C,O) | The scheme will require construction works within and/or close **Solent and Southampton Water SPA/Ramsar,** the **Solent Maritime SAC** and the **Solent and Dorset Coast SPA**. Areas of Southampton Water will also be used by mobile species associated with the **River Itchen SAC**.<br><br>Indirect construction-related environmental changes are unlikely to be substantive relative to the baseline in Southampton Water, and consequent effects on habitats or species associated with the designated sites can almost certainly be mitigated or avoided with established measures (e.g. pollution controls, timing of works, monitoring, etc.).<br><br>Direct construction-related effects on the habitats of Solent and Southampton Water SPA/Ramsar and the Solent Maritime SAC (principally terrestrial saltmarsh habitats) due to installation of the temporary pipeline are possible. However, it is considered that the habitats affected are likely to be relatively resilient to short-term and temporary perturbations, and that the effects will be reversible in the short- to medium-term with appropriate mitigation and restoration/management, and so adverse effects on integrity that are unavoidable at the project level (irrespective of how the scheme is delivered) would not necessarily be expected.<br><br>The principal operational risk relates to the potential for transfer of INNS from Norway; this is not an unavoidable consequence of the scheme operation and so appropriate risk-management must be relied on to ensure that INNS transfer and hence adverse effects do not occur (e.g. pre-scheme monitoring, appropriate controls on discharges). |

## AMENDED OPTIONS

5.2.3. Some options in the Sept23 submission were amended for the rdWRMP, and reviewed to ensure that the Sept23 HRA conclusions remained valid. In summary, none of the amendments introduce potential effects that were not considered by the Sept23 HRA or additional assessment requirements, and so the conclusions of the Sept23 HRA (both with regard to screening and appropriate assessment) are carried forward.

## RIVER TEST / RIVER MEON

5.2.4. The current use of drought options in the Western Area to secure SWS' supply deficit was established in the 2018 Hampshire Public Inquiry (the Inquiry) and constitutes the "interim abstraction scheme" within an agreement made under Section 20 of the Water Resources Act 1991 (the Section 20 Agreement). The Section 20 Agreement is due to expire in March 2030.

5.2.5. These drought options could, if implemented, result in adverse effects on the River Itchen SAC[24]. As a result, retention of these options in SWS' 2019 Drought Plan required an 'imperative reasons of over-riding public importance' (IROPI) argument, and the identification of suitable compensation measures for the anticipated adverse effects. These compensation measures, which are included in the HRA of the Drought Plan and the Section 20 Agreement as well as project-level HRAs for the relevant individual drought options, included areas of the River Test and River Meon.

5.2.6. The potential for the rdWRMP to affect these compensatory habitats is considered. In summary:

- No options are likely to have operational effects on the River Meon. Two options (Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW (90Ml/d); and Recycling (HSE): Recharge of Havant Thicket Reservoir from Budds Farm WTW (60Ml/d)) involve pipelines that may cross the river; these are 'screened in' although adverse effects are considered avoidable with established measures.
- With regard to the River Test, several options including Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d), Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d), Interzonal transfer (HRZ-HSW): Romsey Town and Broadlands valve bi-directional, Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d), and Groundwater (HSW): Test MAR (5.5Ml/d) may affect the River Test catchment; in summary:
  - All construction-related adverse effects are considered avoidable with established project-level measures.
  - There are either no pathways for operation of these options to adversely affect these sites (Interzonal transfer (HRZ-HSW): Romsey Town and Broadlands valve bi-directional option is a network solution only; the Groundwater (HSW): Test MAR (5.5Ml/d) option involves a confined aquifer that is isolated from the Test), or the available evidence suggests that the likely conservation objectives for compensatory habitats on the River Test will not be undermined[25].

[24] These options need to be available only until 2035, when the transfers and yield associated with Havant Thicket reservoir become fully available.

[25] Groundwater options in the Test catchment all involve sources that have been part of SWS's 'no deterioration' investigations for the Test, specifically considering the risk of Recent Actual to Fully Licensed abstraction increases. There is no expectation of significant increase in pumping because of the tightened

## 5.3 CONCLUSION

5.3.1. With regard to the **Sept23 HRA** and the **rdWRMP**, the key conclusions remain the same:

- The HRA of the rdWRMP24 (i.e. **Annex 18**, **together with this addendum document (Annex 18A**) can conclude that, for virtually all options, there will be no adverse effects alone or in combination that cannot be reliably avoided through scheme design or mitigated with measures that are known to be available, achievable and likely to be effective at the project-level. These options are not of a scale or type that would suggest that adverse effects are unavoidable irrespective of how the option is delivered.
- There are minor residual uncertainties 'alone' for the **Sittingbourne industrial water reuse (7.5Ml/d)** option and its effects on The Swale SPA / Ramsar. This option is a WRMP19 scheme that was assessed as having No Adverse Effects at WRMP19 and there have been no substantive changes to in either the scheme or the environmental baseline to alter this conclusion. However, the discharges from the Sittingbourne WwTW that would be utilised are likely to form a significant component of the non-saline flows into Milton Creek, and although the creek is unlikely to be a notable 'functional habitat' resource (and the habitats will be dominated by tidal turnover) there are uncertainties over this aspect and the effect of reduced non-saline inputs to the Swale that cannot be easily resolved ahead of more detailed project-level field investigations and modelling. However, evidence from the UK Marine SACs Project[26] suggests that whilst alterations in non-saline inputs may locally alter intertidal mudflat biotopes, this does not necessarily translate into adverse effects on the bird qualifying features.
- There are minor residual uncertainties relating to the in combination impacts of some desalination schemes, notably the impact of **SWS's East Thanet scheme** with **SEW's Reculver scheme** which are in close proximity (hence have the potential to operate cumulatively at or near a single location within a European site) and which may, based on available scheme information, result in unavoidable environmental changes that have the potential to affect **Margate and Long Sands SAC** and the **Outer Thames Estuary SPA**. Based on available proxy data from similar schemes (both in terms of construction and operation) the effects of these environmental changes are considered unlikely to be adverse, but this cannot be definitively established at the plan-level with the available site data. There are minor residual in combination uncertainties in relation to the other SWS desalination plants (Thames, Isle of Sheppey) and **Thames Estuary and Marshes SPA/Ramsar** and **Medway Estuary and Marshes SPA/Ramsar**, although environmental changes associated with these options will not be spatially coincident in the European sites. Currently, alternatives to the desalination options are not available within the modelled BVP; however, there is sufficient time for these uncertainties to be investigated and the option(s) amended or abandoned given the 2040+ delivery periods. On this basis, it would be possible to adopt the plan with the support of a detailed investigation timetable for the resolution of these uncertainties.

5.3.2. With regard to the **new schemes assessed in this addendum**:

flow constraints of the River Test SSSI, and modelling of the impacts of these sources and all other abstractions and discharges on flows in the Test has demonstrated that these are compliant with CSMG low flow (Q95) thresholds.

[26] UK Marine SACs Project (2001). http://ukmpa.marinebiodiversity.org/uk_sacs/

- There is some uncertainty relating to the residual effects of the **Bulk import (HRZ): Sea Tankering (45Ml/d)** on the saltmarsh habitats of the Lower Test Valley SSSI component of the **Solent and Southampton Water SPA/Ramsar** and **Solent Maritime SAC**, which will be directly (but temporarily) affected by the implementation of the option. Measures to minimise effects on qualifying or supporting habitats in these sites will be available, and the nature of the habitats and short-term and reversible nature of the impacts would suggest that adverse effects on integrity are not an inevitable or unavoidable outcome, although this aspect can only be fully assessed at the project-level with the benefit of detailed design and field survey. There is a risk of INNS transfer during operation, although this is not an unavoidable consequence of operation. It should also be noted that the requirement for this option is not inevitable, and that the period over which it would need to be available is short.

# Appendix A

## RDWRMP REVISIONS

# APPENDIX A – SUMMARY OF RDWRMP OPTION AMENDMENTS

## OVERVIEW

The following sections provide a summary of the options included in the rdWRMP (and hence subject to the HRA at that time) and the subsequent amendments implemented for the rdWRMP. The sections are structured as per **Section 2.2** of the rdWRMP HRA for clarity.

In each table:

- 'new' options (i.e. not identified in the rdWRMP or assessed by its HRA) are identified in **bold red**;
- amended options or notes on the rdWRMP are in **bold green**; and
- deselected options are ~~crossed through~~.

## DEMAND-SIDE OPTIONS

**There are no changes to the demand-side options in the rdWRMP.** The rdWRMP24 included 16 types of demand-side / demand-management options that will be applied to each of the 14 WRZs. The 16 types of option are summarised in **Table A-1**.

### Table A-1 - Demand-management options proposed for each WRZ in the rdWRMP/rdWRMP

| Option Name | Summary |
|---|---|
| Advanced Find & Fix | Leakage reduction - Active Leakage Control |
| Advanced Pressure Management | Leakage reduction - Pressure reduction programmes |
| Comms Pipe Replacement | Comm pipe leakage reduction |
| Digitalisation/Smart Networks | Leakage reduction - Active Leakage Control |
| Enabler Activities | Awareness campaigns - Targeted water conservation information (advice on appliance water usage) |
| Enabler Activities (Non households) | Awareness campaigns - Targeted water conservation information (advice on appliance water usage) |
| Home Visits | Water use audit and inspection - Household |
| Mains Replacement (Net of NRR) | Distribution Main Replacement |
| NHH Smart Metering | Enhanced metering - Non-household |
| NHH Tariffs | Changes to existing measured tariffs - Volumetric charges |
| Smart Metering USPL | Customer supply pipe leakage reduction |
| Smart Metering | Enhanced metering - Household |
| Smart Metering Unmeasured Households | Compulsory metering - Household |

| Option Name | Summary |
|---|---|
| Tariffs | Changes to existing measured tariffs - Volumetric charges |
| Water Audits (Non households) | Water use audit and inspection - Non-household |
| Water Efficiency Partnership Fund | Sponsoring Water efficiency enabling activities by others |

## EXISTING TRANSFERS / CONTINUATION OF SERVICES

Some existing transfer schemes or bulk supply agreements are identified as 'options' by WRSE and/or SWS. **Two 'additional' existing transfers are identified in the rdWRMP.** Note that as these are simply a continuation of existing supply agreements they are considered to be effectively part of the water resources baseline for HRA purposes and are not subject to option-specific assessment.

### Table A-2 - Existing transfers identified in the rdWRMP24 / rdWRMP

| Existing transfer name in rdWRMP24 | Notes | Area |
|---|---|---|
| Bulk export (HSW): Existing supply to industrial user (10Ml/d | This an existing bulk supply that is include at maximum capacity throughout the planning period. | Western |
| Bulk import (HSE): PWC Source A to Eastleigh WSR (30Ml/d) | This is an existing bulk import that is selected in all situations from 2026 with a maximum output of 15Ml/d. However, beyond 2039, it is consistently used across all situations under 1:500 DYCP conditions only (see Annex 15 of the rdWRMP). | Western |
| Interzonal transfer (HSW-HSE): Existing transfers | Existing bulk import | Western |
| Interzonal transfer (HWZ-HSE): Existing transfer (7.5Ml/d) | Existing bulk import | Western |
| Bulk export (SNZ): Weir Wood to SEW (5.4Ml/d) | This is an existing bulk export to South East Water and is fully utilised in all situations and all planning scenarios from 2026 up to 2031. It is not used thereafter up to 2040 and only used sporadically under 1:100 DYAA and 1:500 DYCP scenarios in some situations (see Annex 15 of the rdWRMP). | Central |
| Bulk import (SNZ): PWC to Pulborough (15Ml/d) | This is an existing bulk import that continues to be selected in most situations under all planning scenarios throughout the planning period (see Annex 15 of the rdWRMP). | Central |
| Interzonal transfer (SNZ-SWZ): Rock Road bi-directional (15Ml/d) | This is an existing transfer, selected from 2026, that continues to be used in all planning scenarios and in all situations (see Annex 15 of the rdWRMP). | Central |

| Existing transfer name in rdWRMP24 | Notes | Area |
|---|---|---|
| Interzonal transfer (SWZ-SBZ): Trunk main at v6 valve (17Ml/d) | This is an existing transfer that continues to be used in most situations under all planning scenarios except 1:500 DYCP scenario where it is not used at all (see Annex 15 of the rdWRMP). | Central |
| Bulk export (KME): SWS Potable water from Hartlip (7.4Ml/d) | This existing bulk supply to South East Water is not used after 2030 until 2041. Thereafter it is only sporadically used under 1:100 DYAA, 1:500 DYAA and 1:500 DYCP scenarios (see Annex 15 of the rdWRMP). | Eastern |
| Bulk export (KMW): SWS Potable water from SEW RZ6 (0.5Ml/d) | This existing bulk export to South East Water is not utilised between 2031 and 2040. After 2040 is only used sporadically 1:100 DYAA, 1:500 DYAA and 1:500 DYCP scenarios (see Annex 15 of the rdWRMP). | Eastern |
| Bulk export (KMW): SWS Raw water / Darwell Replacement / Treatment at Bewl - Existing (8Ml/d) | This is an existing bulk export to South East Water and it utilised at maximum capacity in all situations under all planning scenarios throughout the planning period (see Annex 15 of the rdWRMP). | Eastern |
| Bulk export (KTZ): Southern to AZ7 (Deal) - Existing (4Ml/d) | This existing bulk export to South East Water is utilised in all situations under all planning scenarios throughout the planning period (see Annex 15 of the rdWRMP). | Eastern |
| Bulk import (KTZ): AFW at Napchester (0.1Ml/d) | This existing bulk import from Affinity Water is utilised in all situations under all planning scenarios throughout the planning period (see Annex 15 of the rdWRMP). | Eastern |
| Interzonal transfer (KMW-KME): Existing transfer KMW-KME (45Ml/d) | This existing transfer between KME and KME is selected in all situations and planning scenarios from 2026 and is utilised throughout the planning period but with much lower utilisation under the 1:500 DYCP conditions (see Annex 15 of the rdWRMP). | Eastern |
| Interzonal transfer (KTZ-KME): Existing KME-KTZ transfer (14Ml/d) | This transfer is selected from 2026 under 1:500 DYCP scenario but is consistently used in all situations under NYAA, 1:100 DYAA and 1:500 DYAA scenarios from 2031 to 2050. After 2050, it is not utilised in some situations (see Annex 15 of the rdWRMP). | Eastern |
| Interzonal transfer (SHZ): Bewl-SHZ transfer capacity (17Ml/d) | This existing transfer is used from 2026 throughout the planning period under 1:500 DYCP scenario. Under other planning scenarios, it is not needed in some situations after 2040 (see Annex 15 of the rdWRMP). | Eastern |
| **Interzonal transfer (HSE-HRZ): Abbotswood - existing (1.1Ml/d)** | This is the transfer between HRZ and HSE at Sandy Lane Abbotswood. | |
| **Interzonal transfer (HSW-IOW): Cross-Solent main existing (18Ml/d)** | This is an existing transfer between HSW and IOW across the Solent. | |

## CATCHMENT MANAGEMENT OPTIONS

No specific catchment management options were proposed as 'preferred options' by the rdWRMP24; this is because an assumed quantum of catchment management measures is included as part of the baseline WINEP assumptions (see **rdWRMP Annex 9**). **There are no changes to this position in the rdWRMP**.

## DROUGHT OPTIONS

### Demand-Reduction Drought Options

Three demand-reduction drought options were proposed for all WRZs for the planning period (Temporary Use Bans (TUBs); Non-Essential Use Bans (NEUBs); and reductions in commercial supply). **There are no changes to these in the rdWRMP**.

### Supply-Side Drought Options

All 14 options proposed in SWS's Drought Plan 2022[27] were included in the strategy for WRMP24 although the utilisation of these options is determined by the investment model (some are not utilised under the various scenarios but theoretically remain available over the planning period). However, SWS has committed to not deploying some of these options after specific dates in the planning period due to concerns over their environmental impacts. Further information on the drought options is provided in **rdWRMP24 Annex 12**. All of these options are effectively retained by the rdWRMP.

SWS has identified **one new supply-side drought option** for the rdWRMP (**Sea Tankering**).

### Table A-3 – Supply-side drought options

| Option Name | Donor zone | Recipient zone | Available until* |
|---|---|---|---|
| Bewl Water Reservoir Stages 1-4 | - | Kent Medway West | 2040-41 |
| Candover - River Itchen Augmentation Scheme | Hampshire Southampton East | Hampshire Southampton East | 2034-35 |
| Caul Bourne Groundwater Source | Isle of Wight | Isle of Wight | 2040-41 |
| Darwell - reduce Eastern Rother HoF, June to September | - | Sussex Hastings | n/a |
| Darwell - reduce Eastern Rother HoF, March to May | - | Sussex Hastings | n/a |
| East Worthing Groundwater - Increase Abstraction (Northbrook) | - | Sussex Worthing | 2041-42 |
| Eastern Yar Augmentation Scheme Surface Water Source | - | Isle of Wight | n/a |

[27] Southern Water (2021). *Draft Drought Plan 2022 Main report*. 31 March 2021, Version 1.0

| Option Name | Donor zone | Recipient zone | Available until* |
|---|---|---|---|
| Faversham Remove Abstraction Limit | - | Kent Medway East | n/a |
| Pulborough Surface Water - reduce Western Rother MRF | Sussex North | Sussex North | 2041-42 |
| Lukely Brook Groundwater Source (Bowcombe) | Isle of Wight | Isle of Wight | n/a |
| North Arundel Groundwater Increase Abstraction | - | Sussex Worthing | n/a |
| North Deal Increase Daily Peak Abstraction | - | Kent | n/a |
| Reduce Compensation Flow from Weir Wood to Medway | - | Sussex North | 2041-42 |
| Reduce the Flow condition control of Otterbourne and Twyford | Hampshire Southampton East | Hampshire Southampton East | 2029-30 |
| Reduce the flow condition controlling Portsmouth's Abstraction | Hampshire Southampton East | Hampshire Southampton East | 2029-30 |
| River Test Surface Water Source | Hampshire Southampton West | Hampshire Southampton West | 2040-41 |
| **Bulk import (HSW): Sea Tankering (45Ml/d)** | **-** | **Hampshire Southampton West** | **2035** |

* n/a = Options that are available in the planning period but not utilised by the investment model.

## SUPPLY-SIDE OPTIONS

SWS identified a range of supply-side options in the rdWRMP, some of which were WRMP19 schemes due for implementation early in the next AMP period (these are included in rdWRMP24 for completeness although most are already in the project-design or approval phase[28]). The rdWRMP also includes one SRO (the Thames to Southern Transfer (T2ST)) which is currently being assessed as part of RAPID's gated process for SROs.

Note, the option names in **Tables A-4 – A-6** are as per those in the equivalent tables in the **Sept23 HRA** (and not necessarily in the order they appear in the rdWRMP); however, some names have been amended for the rdWRMP and these amendments are noted where possible, although there are some differences (and also between the rdWRMP24 and the WRSE naming) that may affect read-across between documents (this is due to changes in SWS's preferences for the SEMD

[28] Note, the WRMP19 options have been subject to plan-level HRA previously (i.e. for WRMP19) but not a formal assessment of the project against Regulation 63 as part of any planning and / or licence applications; data for these assessments are being collected independently of the WRMP HRA process, and project-level HRA may (for some options) be completed before publication of the final WRMP.

naming in the rdWRMP24 and variations in option yields). If there are uncertainties over option names then SWS should be contacted to provide the most recent option-mapping spreadsheet.

The options in **Tables A-4 – A-6** are arranged alphabetically by the full name.

## Table A-1 - Western Area Supply-Side Options (excludes existing imports / transfer arrangements)

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Bulk import (HAZ): T2ST to Andover<br>**Bulk import (HAZ): T2ST to Andover (20Mld)** | This is a spur from the main T2ST transfer main.<br>**(Option essentially unchanged from rdWRMP; pipeline capacity remains the same although volume transferred may change)** | ~~17.3~~<br>**14.3** | 2048 |
| **Bulk Import (HKZ) T2ST to HKZ (5Ml/d)** | **This option transfers water from T2ST to Kingsclere. Note that this option was not explicitly separated out in the Sep23 HRA (Annex 18), but is effectively part of the pipeline associated with Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d) (below), which was assessed (i.e. there are no additional effects from this option). Essentially, two pipelines will be required to deliver Bulk import (HAZ): T2ST to Andover (20Mld) and Bulk Import (HKZ) T2ST to HKZ (5Ml/d) (this option), with Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d) then utilising both of these for bi-directional distribution.** | **3.1** | **2049** |
| Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW (90Ml/d) | A new raw water transfer (Pumping Station, Pipeline & Break Pressure tank) between Havant Thicket Reservoir and Otterbourne WSW. The capacity of the first section is for 90Ml/d to the mid point and a possible connection to Portsmouth Water. 22h/d operation is assumed. | 90.0 | 2036 |
| Bulk import (HSE): PWC Source A to Otterbourne WSW (21Ml/d) | A new additional potable water transfer of 21Ml/d capacity using a new pipeline from Portsmouth Water Source A to Otterbourne. This scheme is dependent on development of Havant Thicket reservoir to provide the water. 22 h/d operation assumed. | 21.0 | 2032 |
| ~~Bulk import (HSE): T2ST to HSE (120Ml/d)~~<br>**Bulk import (HWZ): T2ST to Yew Hill (95Ml/d)** | ~~Bulk transfer of water from Thames Water, essentially derived through delivery of SESRO~~<br>**This is the main pipeline for the bulk transfer of water from Thames Water (the Thames to Southern Transfer scheme (T2ST)), with volumes essentially derived through delivery of the South East Strategic Reservoir Option (SESRO) by Thames Water.** | 66.0 | 2040 |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Groundwater (HKZ): Remove constraints at Newbury to increase yield (1.2Ml/d) | The scheme is located within the Hampshire Kingsclere resource group (which consists of and is served by Kingsclere and Newbury WSWs). The scheme will increase the yield of the Newbury source within the existing licence by removing the present constraint imposed by mains leaving the site. This option will involve the construction of a dedicated, 7.1 km 300mm DN300 pipe from Newbury water supply works (WSW) and additional pumps and treatment facilities to increase the supply to Beacon Hill WSR. Additional high-lift pumping capacity would be required at Newbury. Newbury WSW abstracts water from the underlying chalk aquifer. It is considered that the River Enbourne will not be affected by the increased abstractions due to its perched nature above the London Clay. | 1.2 | 2028 |
| Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d) | The existing boreholes and well/adits that supply Romsey WSW are either out of service or operating below their full capacity due to water quality issues. This option proposes 3 replacement boreholes to increase and recover DO on site. Total source output on delivery of the scheme would be 13.7Ml/d. No additional treatment is required. Replacement borehole locations are distant from existing borehole locations and require new pipelines to connect to the WSW.<br>**(Note, year change for rdWRMP)** | 4.8 | ~~2042~~<br>**2031** |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Groundwater (HSW): Test MAR (5.5Ml/d) | This option is a Managed Aquifer Recharge (MAR) scheme. It would provide recharge of the confined chalk aquifer from mains water in winter months, with subsequent onsite abstraction from the same aquifer in summer/autumn critical low flow periods.<br><br>Treatment is available on site and it is assumed that there is sufficient treatment capacity for the abstracted water. The scheme assumes an extended pilot trial period to prove the viability of yield and water quality, with subsequent development of the MAR scheme.<br><br>Expected DO from the developed scheme is ~5Ml/d. The pilot scheme assumes 1 No. abstraction/recharge borehole and 1No. monitoring borehole, each 250m deep. For the duration of the trial, abstracted water will run to waste (River Test). The developed scheme will comprise a total of 5No. boreholes at 250m depth; 3No. abstraction/recharge boreholes and 2No. monitoring boreholes, inclusive of those used in the pilot scheme. Abstracted water from the developed scheme will be treated onsite as required, before entering supply. The suggested WTW site boundary may not support a DO of 5Ml/d. It is understood that SWS own adjacent land to the north of the River Test, and it is proposed that 1 No. abstraction/recharge borehole and 1 No. monitoring borehole be located on this land in order to achieve the desired scheme DO. Groundwater from the confined chalk aquifer is expected to be under artesian pressure and therefore gate valves would be required on all boreholes. Pumped recharge from mains water supply would also be required to overcome artesian pressure.<br><br>**(Note, year change for rdWRMP)** | 5.5 | ~~2042~~<br>**2036** |
| Groundwater (IOW): New borehole at Eastern Yar3 (1.5Ml/d) | The option is to drill a new replacement borehole, 100m deep, for Eastern Yar3 Augmentation well on the Isle of Wight. The existing borehole has experienced around a 90%+ loss in performance, and previous well rehabilitation and cleaning has not provided a notable improvement. A replacement well is required to regain resilience within the well field for the river augmentation scheme.<br><br>**(Note, yield / year not previously stated)** | ~~0.0~~<br>**1.5** | ~~0~~<br>**2040** |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d) | This option proposes replacing all 3 Lower Greensand boreholes on site so that the source can operate to its licenced capacity. Currently BH4 is non-operational, BH1 and BH2 are operational but at reduced capacity due to screen-dewatering. No additional treatment is proposed. Total Scheme output would be 4.5Ml/d.<br>**(Note, year change for rdWRMP)** | 2.0 | ~~2040~~<br>**2037** |
| Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional<br>**Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d)** | Transfer from Otterbourne to Andover to Kingsclere. This scheme is designed to support network improvements needed for UTMRD transfer to Hampshire and/or the strategic scheme from IoW/South Hampshire.<br>**(Option essentially unchanged from rdWRMP; pipeline capacity remains the same although volume transferred may change)** | ~~2.4~~<br>**6.8** | ~~2040~~<br>**2050** |
| Interzonal transfer (HRZ-HSW): Romsey Town and Broadlands valve bi-directional<br>(WRMP19 option under investigation) | Development and upgrade of existing transfer between Romsey Town & Broadlands valve (HSW-HRZ). This option involves installing a new booster station with 5Ml/d flow capacity to an existing transfer to allow bi-directional flow. | 5.9 | 2026 |
| ~~Interzonal transfer (HSE-HSW): Otterbourne WSW to River Test WSW potable bi-directional~~ | ~~The scheme is a potable 90Ml/d bi-directional transfer from Test Surface Water WSW to Otterbourne WSW. 22h/d operation assumed.~~<br>**(Option replaced by 'Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill WSW bi-directional (74Ml/d) – see below).** | ~~42.3~~ | ~~2031~~ |
| ~~Interzonal transfer (HSE-HSW): Woodside bi-directional (10Ml/d)~~ | ~~A new booster station at the existing Woodside Transfer Valve with a flow-rate of 10Ml/d to enable bi-directional transfers between HSE and HSW. Present network only allows transfer from HSW to HSE.~~ | ~~0.0~~ | ~~0~~ |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill bi-directional<br>**Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill WSW bi-directional (74Ml/d)** | Transfer from Otterbourne to Andover to Kingsclere WRZs. This scheme is designed to support network improvements needed for UTMRD transfer to Hampshire and/or the strategic scheme from IoW/South Hampshire.<br>**This bi-directional transfer between from Otterbourne WSW in HSE to Yew Hill in HWZ is being developed as part of the Hampshire Grid.** | ~~18.9~~<br>**74** | 2031 |
| Interzonal transfer (HWZ-HAZ): Crabwood to Andover uni-directional | Transfer from Otterbourne to Andover to Kingsclere. This scheme is designed to support network improvements and/or the strategic scheme from IoW/South Hampshire<br>**(Note, yield / year not previously stated)** | ~~0.0~~<br>**10.6** | ~~0~~<br>**2031** |
| Recycling (HSE): Recharge of Havant Thicket Reservoir from Budds Farm WTW (60Ml/d)<br>(WRMP19 option under investigation) | 60Ml/d of recycled water will be sent to Otterbourne via Havant Thicket Reservoir. Budds Farm WWTW transfer to new Water Recycling Plant then transfer to Havant Thicket. Direct raw water transfer from Havant Thicket to Otterbourne for treatment. | 60.0 | ~~2036~~<br>**2035** |
| Recycling (IOW): Sandown WTW (8.5Ml/d)<br>(WRMP19 option under investigation) | This option proposes the transfer of treated effluent from Sandown WwTW (currently discharged to sea), to support flows in the Eastern River Yar upstream of the Sandown WSW abstraction at Burnt House. Treated water in excess of the local demand will be transferred through a new transfer pipeline to a service reservoir near Newport, for supply to much of the island. This option is reliant on the WSR enlargements carried out in IZT_CSM Cross-Solent upgrade. (2) Option 2 also includes upgrades to Sandown WSW to achieve the extra flow. | 8.5 | ~~2028~~<br>**2031** |
| **Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)** | **This new option involves recommissioning the mothballed Chilbolton WSW, with the inclusion of a suitable nitrate removal plant. The generated waste stream will require removal by tanker for treatment at a local WwTW (typically less than one tanker movement per month). This would provide a DO benefit of 2.5Ml/d.** | **0.5** | **2073** |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| **Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)** | **This new option involves the development of a new borehole and pump capacity at the Kings Sombourne site to increase the DO from 1.5Ml/d to the licenced 4Ml/d, giving a potential benefit of 2.5Ml/d.** | **2.5** | **2031** |
| **Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d)** | **This WRMP19 option involves the transfer excess water for enhanced treatment near Rotherfield (Nightsfield Midhurst high level WSR) with refurbishment of Midhurst and borehole rehabilitation. The scheme will require full refurbishment of the WSW, including boreholes and treatment.** | **1.96** | **2029** |
| **Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)** | **This WRMP19 option involves bringing the West Chiltington groundwater source back into service by constructing a new borehole, new treatment plant and flood resilience measures at the site.** | **3.12** | **2029** |

## Table A-2 - Central Area Supply-Side Options (excludes existing imports / transfer arrangements)

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| ~~Bulk import (SBZ): SEW Barcombe to Rottingdean (20Ml/d)~~ | ~~This option is for a pipeline to transfer flow from SEW Barcombe WSW to SWS Balsdean WSR 25Ml/d with 22h/d operation.~~<br>**(Not in revised plan Situation 4).** | ~~0.0~~ | ~~0~~ |
| Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d) | This is a pipeline to represent reverse flow from Havant Thicket Reservoir to Pulborough through a bidirectional raw water transfer from Pulborough to Havant Thicket. INNS treatment will be provided at Pulborough.<br>**(Note, year change for rdWRMP)** | 40.0 | ~~2041~~<br>**2040** |
| Bulk import (SNZ): SES re-zoning (4Ml/d)<br>(WRMP19 option under investigation) | Extension of current re-zoning of supplies to SES water in SNZ beyond 2025 for up to 4Ml/d. | 4.0 | 2026 |
| Bulk import (SNZ): SES to SNZ (10Ml/d) | Proposed new bi-directional transfer from SES Outwood To SWS Buchen Hill, Crawley. 10Ml/d transfer flow rate. | 10.0 | 2034 |
| Bulk import (SNZ): SEW RZ5 to Pulborough | A transfer between SEW RZ5 and Pulborough (possible gravity transfer from SEW RZ5 to Pulborough). | 10.0 | 2040 |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| ~~Desalination (SWZ): Tidal River Arun~~<br>**Desalination (SWZ): Tidal River Arun (10Ml/d)** | This option proposes a ~~20Ml/d~~ **10Ml/d** desalination plant to treat estuarine water from the tidal River Arun to supply treated water to the Sussex Worthing WRZ. It is assumed that the water could be used during drought conditions to meet demand in Sussex Worthing WRZ. There is an existing bi-directional transfer between Sussex Worthing WRZ and Sussex North WRZ which means this option could have result in additional benefit to Sussex North WRZ. An investigation in AMP4 indicated that land adjacent to Littlehampton WwTW showed the greatest potential for a new desalination site because of the existing land use, the availability of services (access roads, power, etc.) and the potential savings if it is possible to use Littlehampton WwTWs existing long-sea outfall.<br>**(Note, yield change for rdWRMP)** | ~~29.8~~<br>**10** | 2046 |
| Groundwater (SBZ): Lewes Road (3.5Ml/d) | Lewes Road is a is a well and adit system that has been out of supply for over 10 years due to poor water quality. The scheme would refurbish the water supply works and add additional water treatment. It would also increase pump capacity and WSR connectivity so that Lewes Road groundwater source works can pump to its Middle or High WSR (output to the Low WSR is currently constrained by the header tanks at Hove). The current demand constraint is approximately 2.3Ml/d (PDO). If the scheme is introduced, the constraint becomes pump capacity; scheme output is approximately 3.9Ml/d under severe drought conditions. | 3.5 | 2031 |
| Groundwater (SNZ): New borehole at Petworth (4Ml/d) | This scheme would return an existing WSW (Petworth) to service. The site has been out of supply due to poor water quality. The scheme would be to drill a new borehole in the Hythe Formation approximately 700m south of the existing WSW. Borehole to be minimum c. 300mm dia ID, and c. 80m depth. Connection to the treatment works and refurbishment of the treatment works would be required.<br>**(Note, year change for rdWRMP)** | 4.0 | ~~2045~~<br>**2031** |
| Interzonal transfer (SBZ-SWZ): Brighton to Worthing | New bi-directional transfer between Sussex Worthing and Sussex Brighton Water Resource Zones.<br>**(Note, year/yield change for rdWRMP)** | ~~4.2~~<br>**16.7** | ~~2042~~<br>**2041** |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Interzonal transfer (SNZ-SWZ): Pulborough to Worthing | Additional pipeline to provide extra capacity along the existing transfer route between Sussex North and Sussex Worthing.<br>**(Note, yield change for rdWRMP)** | ~~24.0~~<br>**34.9** | 2040 |
| Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d) | During the winter there is surplus surface water within the River Rother. This scheme would allow the surplus to be used at Pulborough WSW (within licence constraints) which in turn would allow coastal groundwater sources to be rested. This increase in groundwater can be utilised through new transfer mains from SWZ-SBZ to Pulborough winter transfer stage 2 WSR via Shoreham WSW, providing the additional 2Ml/d of water to Brighton WRZ during the summer and autumn of a drought year.<br><br>This is Phase 2, which is to provide a transfer from Pulborough surface water abstraction to Sussex Brighton WRZ (Shoreham WSR) to allow groundwater sources in SBZ to be rested.<br>**(Note, year change for rdWRMP)** | 3.0 | ~~2051~~<br>**2041** |
| ~~Interzonal transfer (SWZ-SBZ): Worthing to Brighton~~ | ~~New bi-directional transfer between Sussex Worthing and Sussex Brighton Water Resource Zones.~~<br>**(Note, bi-directional of Interzonal transfer (SBZ-SWZ): Brighton to Worthing; removed for consistency)** | ~~0.1~~ | ~~2074~~ |
| Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d) | New resource. This option is a new 9.5Ml/d water recycling plant producing a DO of 6.8Ml/d near Horsham WwTW and a transfer of the treated effluent to storage at Pulborough reservoir, which feeds into Pulborough WSW. Process losses have been included. | 6.8 | ~~2068~~<br>**2058** |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d)<br>(WRMP19 option under investigation) | This scheme proposes the transfer of treated effluent from Littlehampton WwTW to a new discharge point on the western River Rother upstream of the Pulborough Surface Water abstraction. This would support flows over the weir as the MRF is approached, therefore prolong production at Pulborough during a drought. 20Ml/d represents the upper end of the reliable flow that could be expected from Ford WwTW. Once abstracted at Pulborough WSW this water would be used to meet demand in the Sussex North WRZ. | 15.0 | 2031 |
| Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d) | The option involves the construction of an earth embankment reservoir near Blackstone with a proposed storage capacity of up to 4,600 Ml. The option will allow treated water to enter the distribution network to supply either the Sussex coastal block or the Pulborough area. The reservoir will be filled with water pumped from the eastern branch of the River Adur. The abstraction of raw water from the river to the reservoir would have a maximum flow of 30Ml/d.<br>**(Note, year change for rdWRMP)** | 19.5 | ~~2045~~<br>**2046** |
| ~~Storage (SNZ): Western Rother licence and storage programme~~ | ~~This option provides improved overall abstraction management in the Western Rother catchment, so that it will provide mutual benefit to the provision and resilience of public water supply, the interests of other abstractors, and the river environment. The option would involve development of additional winter storage reservoirs for agricultural irrigation. Analysis of various reservoir sizes showed that adding a modest additional 136 ML of winter storage in the catchment (10% of existing agricultural abstraction licences) helps to smooth out the peak demand, with reservoirs being filled throughout the year as water becomes available and then used to supplement direct abstraction for irrigation during the summer months. Further opportunities for unused allocation trading of licence quantities may also be available with the clear majority of trades likely to be between agricultural abstractors.~~<br>**(Removed from rdWRMP)** | ~~0.2~~ | ~~2040~~ |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d) | During the winter there is surplus surface water within the River Rother. This scheme would allow the surplus to be used at Pulborough WSW (within licence constraints) which in turn would allow coastal groundwater sources to be rested. This increase in groundwater can be utilised through new transfer mains from Sussex Worthing WRZ to Sussex Brighton WRZ via Shoreham WSW, providing the additional 2Ml/d of water to Brighton WRZ during the summer and autumn of a drought year. This is Phase 1, which is to provide a permanent sludge treatment facility at Pulborough WSW.<br>**(Note, year change for rdWRMP)** | 2.0 | ~~2031~~<br>**2041** |

## Table A-3 - Eastern Area Supply-Side Options (excludes existing imports / transfer arrangements)

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Asset enhancement (KMW): Remove network constraint in KMW (13Ml/d) | System simulation modelling has identified that the KMW Water Resource Zone Deployable Output appears to constrained due to a network capacity issue between Nursted and SEW RZ6 Service Reservoirs. There is also a flow limitation between Cobham and Singlewell Service Reservoirs which restricts the movement of water from the River Medway Scheme. This scheme would undertake further network modelling to remove these network constraints to allow currently locked-in deployable output to be used to support the restricted parts of the network. The potential solutions would be to:<br>• Validate the network constraint through updated and further exploration and validation of the Pywr System model to determine the optimal solution<br>• If required, upgrade new transfer valve and/or booster (Northfleet Nurstead WBS) station Between Northfleet WSW and Nurstead Meopham WSR.<br>• If required, upgrade water treatment process at Longfield WSW (upgrade to Amazon FiltratIon) to allow source to produce higher output up to licence and historical limit (~7Ml/d)<br>• Increase capacity water main and, if required, an upgraded Booster station at Singlewell or Cobham WSRs | 13.3 | 2026 |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| ~~Bulk export (KTZ): Near Canterbury to SEW Canterbury~~<br>**Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d)** | Bi-directional transfer between South East Water RZ8 and Kent Thanet WRZ in the vicinity of Southern Water's Canterbury WS. Indirectly supplied from SEW Canterbury Reservoir. Maximum capacity of 20Ml/d.<br>**(Option essentially unchanged from rdWRMP; pipeline capacity remains the same although volume transferred may change)** | ~~6.1~~<br>**20** | ~~2051~~<br>**2050** |
| ~~Bulk export (SHZ): Rye to SEW Kingsnorth~~<br>**Bulk export (SHZ): Rye to SEW RZ8** | A new bi-directional Transfer between SEW Kingsnorth and Southern Water Rye WSW with a capacity of 10Ml/d.<br>**(Name change only)** | 10.0 | 2050 |
| Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d) | Bi-directional transfer between South East Water RZ8 and Kent Thanet WRZ in the vicinity of Southern Water's Canterbury WS. Indirectly supplied from SEW Canterbury Reservoir. Maximum capacity of 20Ml/d.<br>**(Bidirectional of Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d); Yield/year not previously noted in HRA in HRA)** | ~~0.0~~<br>**20** | ~~0~~<br>**2050** |
| Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d) | A 2Ml/d import from SEW Kingston SWS to SWS Canterbury WSW. | 2.0 | 2026 |
| ~~Bulk import (SHZ): SEW Kingsnorth to Rye (10Ml/d)~~<br>**Bulk export (SHZ): SEW RZ8 to Rye** | A new bi-directional Transfer between SEW Kingsnorth and Southern Water Rye WSW with a capacity of 10Ml/d.<br>**(Option re-named; bidirectional of Bulk export (SHZ): Rye to SEW RZ8; Yield/year not previously noted in HRA)** | ~~0.0~~<br>**7.0** | ~~0~~<br>**2050** |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Desalination (KME): Isle of Sheppey | The Isle of Sheppey Desalination options comprise a suite of modular options that represent different sizes of desalination plant that could be developed in one or more phases.<br><br>Locating a desalination plant on the Isle of Sheppey has a clear advantage: it would meet local demand while significantly reducing the need for transfers along the main from Deans Hill BPT. This option could be enhanced to transfer treated water from the Isle of Sheppey to the wider Kent-Meday WRZ. A number of sites for a desalination plant were investigated and the most suitable would be located on land south of Sheerness Docks, currently used for storage of car imports. Water treated at this site would then be pumped to Southdown WSR and Kins Borough WSR on the island for distribution to customers. This site will be investigated further in the feasibility appraisal.<br><br>**(Note, this variant comprises a 20Ml/d plant by 2045/46 and an additional 10Ml/d plant by 2064/65)** | **30** | ~~2046~~<br>**2045** |
| Desalination (KMW): Thames Estuary | The Thames Estuary Desalination Options are a modular suite of options to develop a desalination plant of differing capacities that could be developed in one or more phases. The plant would be developed adjacent to Britannia Refined Metal on the Swanscombe Peninsula. Treated water would be transferred to Singlewell WSR for distribution to the Kent Medway WRZ and the plant would combine discharge with Swanscombe WwTW's existing outfall.<br><br>~~This option represents a potential first phase development of a 20Ml/d capacity desalination plant.~~<br><br>**(No change; note, this variant comprises 2No. 20Ml/d plants (40Ml/d total) by 2040)** | 40.0 | 2040 |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Desalination (KTZ): East Thanet | The East Thanet Desalination Options are a modular suite of options to develop a desalination plant of differing capacities near to the North Thanet Coast and could be developed in one or more phases. The plant would supply potable desalinated water to the Kent Thanet WRZ.<br><br>~~This option represents a potential first phase development of a 20Ml/d capacity desalination plant~~.<br>**(Minor change in year)** | 20.0 | ~~2041~~<br>**2040** |
| Groundwater (KME): Recommission Gravesend (2.7Ml/d) | Gravesend source is a well and adit system that was decommissioned in 2007 due to high nitrate levels. A new nitrate treatment plant was constructed on site in 2006. A Source Investigation & Optimisation Study (SIOS) suggested that the nitrate problem was likely to be a faulty nitrate monitor. The report recommended the source could be recommissioned through a) Undertaking a long-term step test with steps of seven days duration at rates of 3.0Ml/d, 3.3Ml/d and maximum pump capacity (approximately 3.66Ml/d) subject to stabilisation of pumping water levels during each step b) Recalibration or repair of the online raw water nitrate monitor, c) Modify the headworks to the satellite well chamber to facilitate improved access. Refurbishment of the existing nitrate plant will also be required. Scheme Output: 5Ml/d | 2.7 | 2031 |
| Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d) | Rye groundwater source is a well & adit system that is over 100 years old, and has reached the end of its asset life. It abstracts from the Ashdown Beds. Operational wells 1 and 3 are to be replaced by boreholes. Additional land may be required for at least one of the boreholes due to space constraints on site. Wells 2 and 4 are out of service and do not require replacement. Scheme output is 1.5Ml/d. There is an existing surface water WSW on site and no further treatment is required. | 1.5 | 2036 |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Interzonal transfer (KTZ-KME): KME-KTZ bi-directional<br>(WRMP19 option under investigation) | Conditioning of existing Selling-Fleete main to enable bi-directional transfers (and specifically from Kent Thanet to Kent Medway). It is not thought that any additional pipeline would be required, although this is dependent on the existing main being structurally sound. 22 h/d operation assumed.<br>**(Note, yield change for rdWRMP)** | ~~1.5~~<br>**15.75** | 2026 |
| Interzonal transfer (KTZ-KME): Utilise full existing capacity | The current operational transfer from Kent Medway East to Kent Thanet is limited to the output from Faversham4 WSW. This option enables flows from the Faversham3 groundwater source to be directed, via an existing main, towards Selling WSW. A soakaway is installed at Selling to allow for reconditioning of the existing main and the addition of UV treatment at Selling permits disinfection of the Throwley flows.<br>**(Option essentially unchanged from rdWRMP; pipeline capacity remains the same although volume transferred may change)** | ~~1.0~~<br>**3.3** | 2040 |
| Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d)<br>(WRMP19 option not yet under investigation) | This option is to use a water recycling scheme to unlock additional volume in an existing industrial borehole licence to increase the scope of the licence trading. The existing industrial user currently utilises the groundwater in its paper/board making processes. It has been assumed at this stage that the reverse osmosis wastewater can be discharged through Sittingbourne WwTW existing outfall. | 7.5 | 2031 |
| Recycling (KMW): Medway WTW to lake (14Ml/d)<br>(WRMP19 option under investigation) | This option involves the transfer of 18Ml/d of treated effluent from Aylesford WWTW to near Rochester WSW's raw water storage reservoir Eccles Lake. | 14.0 | 2031 |
| Recycling (SHZ): Hastings WTW to Darwell Reservoir (15.3Ml/d) | This option is a new 21.5Ml/d water recycling plant producing a DO of 15.3Ml/d near Bexhill and Hastings WwTW and a transfer of the treated effluent to Darwell reservoir, which feeds into the Hastings Area. Process losses have been included. | 15.3 | 2051 |

| Option Name | Option Description / Summary | Yield | Earliest year |
|---|---|---|---|
| Recycling (SHZ): Tonbridge WTW to Bewl Reservoir (5.7Ml/d) | New resource. This option is a new 8Ml/d water recycling plant producing a DO of 5.7Ml/d near Tonbridge WwTW and a transfer of the treated water to Bewl reservoir, which feeds into Darwell reservoir. Process losses have been included.<br>**(Yield/year not previously noted in HRA)** | ~~0.0~~<br>**5.7** | ~~0~~<br>**2036** |
| Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d) | The scheme involves the raising of Bewl Water, by 0.4m to increase storage and yield. The major works for raising Bewl to higher TWL levels will include: Raising the dam crest and building a new wave wall; Raising the overflow and valve chamber shafts and many ancillary works around the perimeter of the reservoir. | 3.0 | 2061 |

# Appendix B

## NEW OPTIONS SCREENING

# APPENDIX B – NEW OPTIONS SCREENING

# Appendix C

## APPROPRIATE ASSESSMENT: GROUNDWATER (SNZ): PETERSFIELD REFURBISHMENT (1.6ML/D)

# APPENDIX C – APPROPRIATE ASSESSMENT: GROUNDWATER (SNZ): PETERSFIELD REFURBISHMENT (1.6ML/D)

## OPTION SUMMARY

### OVERVIEW AND EUROPEAN SITE CONTEXT

This WRMP19 option involves the transfer excess water for enhanced treatment near Rotherfield with refurbishment of a WSW and borehole rehabilitation. Works are likely to be located within existing SWS operational land.

The proposed option and pipeline location are in close proximity to (within 10km) of the following sites.

- Butser Hill SAC
- East Hampshire Hangers SAC
- Rook Clift SAC
- Wealden Heaths Phase 2 SPA
- Woolmer Forest SAC

The following sites are potential downstream receptors via the River Rother.

- Arun Valley SAC
- Arun Valley SPA
- Arun Valley Ramsar

### ENVIRONMENTAL CHANGES AND OPTION ASSUMPTIONS / UNCERTAINTIES

#### Potential construction-related environmental changes

'Generic' environmental risks typically associated with the construction of new infrastructure may be realised (e.g. site-derived pollutants; additional noise or lighting; visual disturbance; etc.) although these cannot be reliably scoped or assessed at the plan-level as they are entirely dependent on the detailed design; however, such risks can almost certainly be avoided through scheme-design and/or the established best-practice measures noted in Appendix C.

However:

- the works will require construction of a new borehole and WSW refurbishment, which may generate site-derived pollutants of local water courses (and hence downstream sites) i.e. Arun Valley Ramsar, Arun Valley SPA.

#### Potential operation-related environmental changes

'Generic' environmental risks typically associated with the operation of new infrastructure may be realised (e.g. additional noise or lighting, albeit minor in this instance) although these cannot be reliably scoped or assessed at the plan-level as they are entirely dependent on the detailed design; however, the operational plant required is not inherently high-impact in this regard, and potentially notable environmental changes can almost certainly be avoided through scheme-design.

The principal environmental changes from operation will therefore relate to:

- Abstraction from the underlying Hythe beds (Lower Greensand) and potential localised drawdown of the water table, hence potential effects on flows in the River Rother upstream of the Arun Valley Ramsar, Arun Valley SPA, and Arun Valley SAC.

### Assumptions and uncertainties

It is assumed that the borehole and WSW will be designed according to best practice to minimise the effects on the environment; and that reduced-disturbance construction techniques are achievable if required. It is also assumed that the scheme will operate on a full-time basis for energy-efficiency reasons.

## SCREENING SUMMARY

The screening assessment is outlined in **Appendix B**. In summary, significant effects cannot be self-evidently excluded for the following sites:

- Arun Valley Ramsar (operation)
- Arun Valley SPA (operation)
- Arun Valley SAC (operation)

## ASSESSMENT: ARUN VALLEY SPA, ARUN VALLEY RAMSAR, ARUN VALLEY SAC

### CORE DESIGNATION INFORMATION

Note, the **Arun Valley SPA, Arun Valley Ramsar** and **Arun Valley SAC** (collectively, the Arun Valley sites) are addressed together in the following sections as the mechanisms by which the sites might be affected by this option are largely the same (although mobile species associated with the SPA and Ramsar may be affected if using habitats outside the site boundaries).

The Arun Valley is located just north of the South Downs escarpment about 15 km inland from the south coast of England. It consists of low-lying grazing marsh, largely on alluvial soils, but with an area of peat derived from a relict raised bog. Southern parts of the Arun Valley are fed by calcareous springs, while to the north, where the underlying geology is Greensand, the water is more acidic. The history of management of fields, and their water levels, determines the plant communities present. The wet neutral grassland is subject to winter and occasional summer flooding. The site is dissected by a network of wet ditches which support a rich aquatic flora and invertebrate fauna. Variation in the chemical status of the water has resulted in an exceptionally high diversity of aquatic plant species in some of the ditches.

The core information relating to the designation (i.e. qualifying features, conservation objectives, supplementary advice documents, information on typical species, supporting habitats and known functional land) is available online and so not replicated here in detail, to minimise repetition and over-simplification of freely available data; **Table B-1** provides links to the key documents and information relating to the designation. Specific information that may be relevant to the assessment of effects is noted as necessary in the assessment sections below (e.g. known areas of functional land identified in the SACO documentation).

## Table C-1 – Core Site Information

| Aspect | Site Data |
|---|---|
| Site Name | Arun Valley SAC |
| Site Code | UK0030366 |
| Qualifying features | - S4056: Ramshorn snail *Anisus vorticulus** |
| Standard Data Form | Available at: https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0030366.pdf |
| Conservation Objectives | Available at: http://publications.naturalengland.org.uk/publication/4924283725807616?category=6528471664689152 |
| Site Improvement Plan | Available at: http://publications.naturalengland.org.uk/publication/4924283725807616?category=6528471664689152 |
| Supplementary advice | Available at: http://publications.naturalengland.org.uk/publication/4924283725807616?category=6528471664689152 |
| Associated SSSIs | Available at: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK0030366 |
| Functional land | None noted; interest features confined to site. |

*Water resource sensitive features, based on Environment Agency (EA) guidance

## Table C-2 – Core Site Information

| Aspect | Site Data |
|---|---|
| Site Name | Arun Valley SPA |
| Site Code | UK9020281 |
| Qualifying features | - A037w: Tundra swan *Cygnus columbianus bewickii** <br> - WATR: Waterbird assemblage* |
| Standard Data Form | Available at: https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0030366.pdf |
| Conservation Objectives | Available at: http://publications.naturalengland.org.uk/publication/4924283725807616?category=6528471664689152 |
| Site Improvement Plan | Available at: http://publications.naturalengland.org.uk/publication/4924283725807616?category=6528471664689152 |
| Supplementary advice | Available at: http://publications.naturalengland.org.uk/publication/4924283725807616?category=6528471664689152 |

| Aspect | Site Data |
|---|---|
| Associated SSSIs | Available at: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK9020281 |
| Functional land | Some bird features may utilise habitats outside the site boundary including farmland for foraging. |

*Water resource sensitive features, based on Environment Agency (EA) guidance

### Table C-3 – Core Site Information

| Aspect | Site Data |
|---|---|
| Site Name | Arun Valley Ramsar |
| Site Code | UK11004 |
| Qualifying features | - Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. Communities (seven RDB wetland invertebrate species; four rare / scarce plant species)*<br>- Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity (ditch flora)*<br>- Crit. 5 - regularly supports 20,000 or more waterbirds (wintering bird assemblage)* |
| Standard Data Form | Available at: https://jncc.gov.uk/jncc-assets/RIS/UK11004.pdf |
| Conservation Objectives | As per associated SAC / SPA, or underpinning SSSI(s) |
| Site Improvement Plan | As per associated SAC / SPA, or underpinning SSSI(s) |
| Supplementary advice | As per associated SAC / SPA, or underpinning SSSI(s) |
| Associated SSSIs | Available at: https://designatedsites.naturalengland.org.uk/SiteGeneralDetail.aspx?SiteCode=UK11004 |
| Functional land | Some bird features may utilise habitats outside the site boundary including farmland for foraging. |

*Water resource sensitive features, based on Environment Agency (EA) guidance

## MITIGATION ASSUMPTIONS

### Standard Measures / Best-practice

**Appendix C of the Sept23 HRA** identifies standard and established measures that are known to be available, achievable and likely to be effective in avoiding or mitigating potentially adverse effects on European sites and interest features. These are based on best- and case-practice from similar schemes, and so there can be high confidence in their deliverability and effectiveness. These measures would be applied unless project-level HRAs or project-specific environmental studies demonstrate that they are not required (i.e. the anticipated effect will not occur), not appropriate, or that alternative or additional measures are necessary or more appropriate.

### Bespoke measures

Site- or feature-specific mitigation that may be required for specific atypical effects are identified in the assessment sections.

## ASSESSMENT – CONSTRUCTION

The habitats of the Arun Valley sites will not be directly affected by construction due to the distance from the construction area; this also applies to the mobile qualifying features of the site, based on the distance plus the scale and location of the works (i.e. within small existing SWS assets). Works will be required relatively close to the River Rother, which joins the River Arun at Pulborough and ultimately flows past these sites, providing a potential pathway for site-derived pollutants.

However, these effect pathways will not be realised or can be avoided for the following reasons:

- Established best-practice construction measures (including normal design practice) can reliably safeguard receptors (e.g. through pollution prevention measures; scheduling works to avoid wintering periods, if required; route design to minimise risks; controls on noise / visual disturbance etc.);

## ASSESSMENT – OPERATION

Operation of the scheme may affect the River Rother, which ultimately flows past the Arun Valley sites below its confluence with the River Arun near Pulborough.

The sites are functionally linked to the River Arun (and Rother), being a series of wet meadows which are periodically flooded/ inundated. However, evidence from ongoing studies (i.e. conceptual models and monitoring developed as part of the Pulborough Basin Environmental Studies (HBES) being undertaken by SWS in conjunction with the EA and NE) indicates that the majority of the wetlands are not fundamentally supported fluvially (i.e. they are not reliant / dependent on (for example) winter flooding from the Arun to maintain water levels), and whilst there are inputs from the river where sluices etc. are not operating correctly (typically as part of the tidal cycle), the vast majority of the site is not supported by inward freshwater inputs from the Arun but by groundwater or other surface water inputs from the catchment (i.e. the dominant direction of non-saline flow is from the wetlands to the river). High flows or tidal locking in the river may impede discharges from the wetlands, but the hydrology of the wetlands is largely determined by groundwater inputs and subsequent interventionist management of the water levels in the ditch network.

The possible exception to this is a small part of Waltham Brooks SSSI (approximately 0.4ha) that is in direct connectivity with the river as it lies riverwards of the flood bank. According to the Sussex Wildlife Trust management plan the water levels on the Waltham Brooks reserve are maintained by a manually-operated steel lifting gate sluice positioned on the internal boundary of the site in front of the tidal flap. The lake is an important constituent of the Brooks and has become an area important for winter wildfowl. For the SPA interest features (wintering and passage waterfowl and waders) the Sussex Wildlife Trust Management Plan for Waltham Brooks Reserve 2012-2022 indicates the key hydrological factor to be large expanses of floodwater, no less than 50cm in depth, in Compartment C between November and February inclusive.

The Arun Valley sites are currently subject to sustainability studies, exploring the impact of abstractions on the designated sites; it should be noted that the abstraction licence at Petersfield has not been scoped into this assessment, as direct effects on the designated sites due to drawdown from this source are not considered likely due to the distance and geology.

NE has noted that "*The Arun Valley Habitats sites have deteriorated in condition where there is a current known adverse effect on integrity from groundwater abstraction, and other water-related impacts which are all likely to be significantly contributing towards this decline. Designated site condition, risk to resilience and supporting long-term environmental improvement / restoration (rather than inhibiting) must be considered in the assessment of any options that could affect these sites*".

With regard to the effects of the Petersfield abstraction, the degree of connection between the aquifer and the River Rother is not known. The worst-case scenario (i.e. the entirety of the additional groundwater abstraction (1.6 M/d) impacts river flows in the Rother and hence the Arun at Pulborough) is therefore assumed.

The approximate impact on flows in the Arun at Pulborough is summarised in **Table B-1** using data from the closest upstream gauging stations (Rother at Pulborough, Station No. 41009; and Arun at Pallingham, Station No. 41014); note, this is conservative as there are other flow inputs to the Arun below Pallingham.

**Table C-1 - Approximate flows in the River Arun at Pulborough**

| Flow percentile | Gauged flows (Ml/d) | | | Max. % impact on cumulative flows (1.6Ml/d abstr.) |
|---|---|---|---|---|
| | Rother at Pulborough | Arun at Pallingham | Cumulative | |
| Mean | 386.6 | 484.5 | 871.2 | 0.18 |
| Q95 | 94.2 | 23.5 | 117.7 | 1.36 |
| Q70 | 174.5 | 48.7 | 223.3 | 0.72 |
| Q50 | 249.7 | 97.9 | 347.6 | 0.46 |
| Q10 | 907.2 | 1339.2 | 2246.4 | 0.07 |
| Q5 | 1304.6 | 2531.5 | 3836.2 | 0.04 |

Based on this:

- Under the worst-case scenario (i.e. assuming the entirety of the groundwater abstraction (1.6 Ml/d) impacts river flows) the maximum impact on very low flows in the Arun adjacent to the designated sites would be approximately 1.36%. However, the potential impact of the abstraction on low flows in the Arun arguably has limited relevance to the condition of the European site, as at very low flows the river is not directly supporting the adjacent wetlands (either through direct supply or by impeding drainage).
- At high / flood flows the estimated impact is <0.1% (0.07 – 0.04% at Q10 and Q5 respectively). It is therefore arguable that the effect of the abstraction on high / flood flows in the Arun will be inconsequential (essentially within normal variability) and will not meaningfully affect the volume of water entering the sites or its residence time within the site.
- The Waltham Brooks SSSI unit of the SPA/Ramsar has greater connectivity to the river and is partially reliant on winter flooding; the option will not substantively affect this (flooding will still occur, and water will be retained by the existing management regime) although mitigation

measures proposed for the Pulborough Surface Water - reduce Western Rother MRF drought option in SWS's revised draft Drought Plan 2022[29] would also be effective and potentially appropriate for the WRMP option (these mitigation measures include partial removal of embankments to re-connect river to the floodplain sooner, creation of new ditches that connect the floodplain with the river at different water levels).

- Consequently, the hydrological impact of the abstraction on the Arun Valley sites alone is considered to be negligible, particularly in relation to the dominant effect of groundwater supply to the designated sites and the active management of water levels within the sites, and in relation to the tidal cycle and inputs associated with this. The predicted flow reductions in the Arun will not be of sufficient magnitude to adversely affect the site alone either directly or through secondary mechanisms such as via impacts on water quality; and the anticipated magnitude of effects can almost certainly be mitigated with the mitigation interventions identified for the Drought Plan, if required.
- It is recognised that the existing groundwater abstractions from Pulborough and other sources may be adversely affecting the Arun Valley sites. It is assumed that these sources will be subject to sustainability reductions (this underpins the modelling of the supply demand balance for the WRMP) and that these reductions will be made before this option is required. As a result, this option will not operate in combination with the existing abstraction regime; the nature of the option and magnitude of impacts from the option will ensure that it will not affect the future recovery and achievement of Favourable Conservation Status (FCS) at the Arun Valley sites.

## IN COMBINATION EFFECTS

Plans, programmes and projects that have been considered within the in-combination assessment are detailed below.

### Other WRMP options

No other water company options will affect these sites. With regard to other SWS options, the principal in combination risk will relate to the operation of the following options (note, no unavoidable in alone or in combination effects are anticipated from construction of any options):

- Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d) option
- Groundwater (SNZ): New borehole at Petworth (4Ml/d)
- Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)

The cumulative impact of these options on flows in the Arun would be as follows:

[29] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

**Table C-2 - Cumulative Impact of Horsham Recycling (~9.5Ml/d), Petworth (4Ml/d), West Chiltington (see Appendix C) and Petersfield (this option) on flows in the River Arun at Pulborough**

| Flow percentile | Gauged flows (Ml/d) | | | Max. % impact on cumulative flows (18.2Ml/d abstr.) |
|---|---|---|---|---|
| | Rother at Pulborough | Arun at Pallingham | Cumulative | |
| Mean | 386.6 | 484.5 | 871.2 | 2.09 |
| Q95 | 94.2 | 23.5 | 117.7 | 15.46 |
| Q70 | 174.5 | 48.7 | 223.3 | 8.15 |
| Q50 | 249.7 | 97.9 | 347.6 | 5.24 |
| Q10 | 907.2 | 1339.2 | 2246.4 | 0.81 |
| Q5 | 1304.6 | 2531.5 | 3836.2 | 0.47 |

Low (Q95) flows in the river will be reduced by up to 15.46%, although as noted the integrity of the SPA/Ramsar is not influenced by the lowest flows in the river. As with the alone assessment, although the Waltham Brooks SSSI unit of the SPA/Ramsar has greater connectivity to the river and is partially reliant on winter flooding the cumulative operation of the options will not substantively affect this (flooding will still occur, and water will be retained by the existing management regime) although mitigation measures proposed for the **Pulborough Surface Water - reduce Western Rother MRF** drought option in SWS's revised draft **Drought Plan 2022**[30] would also be effective and potentially appropriate for the WRMP option (these mitigation measures include partial removal of embankments to re-connect river to the floodplain sooner, creation of new ditches that connect the floodplain with the river at different water levels). In summary, no unavoidable adverse in combination effects are anticipated.

### Other Water Company Plans

*Drought Plans*

The Drought Plan will be revised several times before this WRMP option is implemented, and following option delivery, and so a meaningful in combination assessment arguably cannot be undertaken at this point. Furthermore, a future Drought Plan will necessarily reflect the abstraction baseline at that point (i.e. it will account for options implemented at that point in time) and be subject to HRA when revised, which provides a mechanism to ensure that in combination effects do not occur.

One drought option identified in SWS's revised draft **Drought Plan 2022**[31], or the plans of neighbouring water companies, has the potential to affect these sites (**Pulborough Surface Water - reduce Western Rother MRF**). The HRA of the Drought Plan concluded that this drought option

[30] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

[31] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

would have no adverse effects on these sites (absence of pathways for the SAC; with the benefit of interventionist mitigation to support water levels in some drains for particular units of the SPA/Ramsar). The mitigation proposed for the drought option is in the process of being finalised, although the measures proposed will also effectively mitigate any residual effects that may result from the WRMP option implementation. Adverse in combination effects would not therefore be expected.

*Drainage and Wastewater Management Plans*

The interaction of the WRMP options with specific schemes derived from the emerging Drainage and Wastewater Management Plan (DWMP) can only be assessed at the project level due to the generic nature of the DWMP options.

### Other projects 'in combination'

*Minor projects*

It has not been possible to produce a definitive list of existing (minor) planning applications near this option's zone of influence, and generating a list at this stage would be of little value given the lead times for the option. It is possible that there will be 'in combination' project-specific construction effects associated with future planning applications, although this can only be assessed at the time of any application. This is consistent with the ACWG guidance on cumulative/in combination assessments.

*Major Projects*

Reference has been made to the Planning Inspectorate's National Infrastructure Projects database[32] which includes major projects; no major projects are identified that are likely to affect these European sites.

## CONCLUSION: ARUN VALLEY SPA, ARUN VALLEY RAMSAR, ARUN VALLEY SAC

The hydrological impact of this option on the Arun Valley sites alone is considered to be negligible, particularly in relation to the dominant effect of groundwater supply to the designated sites and the active management of water levels within the sites; the predicted flow reductions in the Arun will not be of sufficient magnitude to adversely affect the site alone either directly or through secondary mechanisms such as via impacts on water quality.

It is considered that there is sufficient confidence to enable a conclusion of no adverse effect on the integrity of the Arun Valley SPA, Arun Valley Ramsar and Arun Valley SAC to be drawn for the WRMP HRA in relation to this option, alone and in combination.

[32] Available at: https://infrastructure.planninginspectorate.gov.uk/projects/

# Appendix D

## APPROPRIATE ASSESSMENT: GROUNDWATER (SNZ): REINSTATE WEST CHILTINGTON (3.1ML/D)

# APPENDIX D - APPROPRIATE ASSESSMENT: GROUNDWATER (SNZ): REINSTATE WEST CHILTINGTON (3.1ML/D)

## OPTION SUMMARY

### OVERVIEW AND EUROPEAN SITE CONTEXT

This WRMP19 option involves bringing the West Chiltington groundwater source back into service by constructing a new borehole, new treatment plant and flood resilience measures at the site. Works are likely to be located within existing SWS operational land.

The scheme will require:

- construction of a new stainless-steel borehole;
- replace Rapid Gravity Filters with new pressure filtration plant;
- decommissioning of the old RGF plant; and
- flood resilience measures.

The proposed option is in close proximity to (within 10km) of the following sites.

- The Mens SAC
- Arun Valley SAC
- Arun Valley SPA
- Arun Valley Ramsar

### ENVIRONMENTAL CHANGES AND OPTION ASSUMPTIONS / UNCERTAINTIES

#### Potential construction-related environmental changes

'Generic' environmental risks typically associated with the construction of new infrastructure may be realised (e.g. site-derived pollutants; additional noise or lighting; visual disturbance; etc.) although these cannot be reliably scoped or assessed at the plan-level as they are entirely dependent on the detailed design; however, such risks can almost certainly be avoided through scheme-design and/or the established best-practice measures noted in **Appendix C of the Sept23 HRA**.

However:

- The works will require construction of a new borehole and WSW refurbishment, which may generate site-derived pollutants of local water courses (and hence downstream sites) i.e. Arun Valley Ramsar, Arun Valley SPA.
- The works will involve construction works near agricultural land at West Chiltington, which will likely result in increased noise (etc); theoretically the nearby agricultural land could be functionally associated with some species from **Arun Valley Ramsar** and **Arun Valley SPA** given the proximity to these sites, although the risk of this is very low (operational site is surrounded by woodland).

#### Potential operation-related environmental changes

'Generic' environmental risks typically associated with the operation of new infrastructure may be realised (e.g. additional noise or lighting, albeit minor in this instance) although these cannot be reliably scoped or assessed at the plan-level as they are entirely dependent on the detailed design;

however, the operational plant required is not inherently high-impact in this regard, and potentially notable environmental changes can almost certainly be avoided through scheme-design.

The principal environmental changes from operation will therefore relate to:

- Abstraction from the aquifer and possible localised drawdown of the water table, hence potential impacts on flows in the River Chilt and hence the River Stor and River Arun where these watercourses flow adjacent to the Arun Valley Ramsar, Arun Valley SPA, and Arun Valley SAC.
- Abstraction from the aquifer and potential localised drawdown of the water table directly affecting springs / upwellings within the Arun Valley Ramsar, Arun Valley SPA, and Arun Valley SAC themselves

### Assumptions and uncertainties

It is assumed that the borehole and WSW will be designed according to best practice to minimise the effects on the environment; and that reduced-disturbance construction techniques are achievable if required. It is also assumed that the scheme will operate on a full-time basis for energy-efficiency reasons.

## SCREENING SUMMARY

The screening assessment is outlined in **Appendix B**. In summary, significant effects cannot be self-evidently excluded for the following sites:

- Arun Valley Ramsar (construction / operation)
- Arun Valley SPA (construction / operation)
- Arun Valley SAC (construction / operation)

## ASSESSMENT: ARUN VALLEY SPA, ARUN VALLEY RAMSAR, ARUN VALLEY SAC

### CORE DESIGNATION INFORMATION

The information on these sites is as per **Tables C-1 – C-3** (**Appendix C**) and is not replicated here.

### MITIGATION ASSUMPTIONS

#### Standard Measures / Best-practice

**Appendix C of the Sept23 HRA** identifies standard and established measures that are known to be available, achievable and likely to be effective in avoiding or mitigating potentially adverse effects on European sites and interest features. These are based on best- and case-practice from similar schemes, and so there can be high confidence in their deliverability and effectiveness. These measures would be applied unless project-level HRAs or project-specific environmental studies demonstrate that they are not required (i.e. the anticipated effect will not occur), not appropriate, or that alternative or additional measures are necessary or more appropriate.

#### Bespoke measures

Site- or feature-specific mitigation that may be required for specific atypical effects are identified in the assessment sections.

## ASSESSMENT – CONSTRUCTION

The habitats of the Arun Valley sites will not be directly affected by construction due to the distance from the construction area; this also applies to the mobile qualifying features of the site, based on the distance plus the scale and location of the works (i.e. within small existing SWS assets). Works will be required relatively close to a tributary of the River Stor, which flows past the northern boundary of these designated sites before joining the River Arun at Pulborough, providing a potential pathway for site-derived pollutants. In addition the works will involve construction works near agricultural land at West Chiltington, which will likely result in increased noise (etc) that may affect nearby agricultural land.

However, these effect pathways will not be realised or can be avoided for the following reasons:

- Established best-practice construction measures (including normal design practice) can reliably safeguard receptors (e.g. through pollution prevention measures; scheduling works to avoid wintering periods, if required; design to minimise risks; controls on noise / visual disturbance etc.).
- The habitats close to the site will be indirectly affected only, and are not (based on aerial photographs) likely to be particularly attractive to the qualifying features of the European site (WSW site is surrounded by woodland and urban edge habitats; fields are small with sightlines affected by hedges and treelines along field boundaries).

On this basis there are unlikely to be any effects that cannot be avoided with normal best practice measures, and so adverse effects from construction would not be expected.

## ASSESSMENT – OPERATION

The operation of the scheme may affect flows in the River Chilt and hence the River Stor, which runs along the northern boundary of the designated sites, and the River Arun below its confluence with the Stor. Note that these reaches are tidal. However, it is not considered possible for the abstraction to directly influence spring flows within the European sites and hence GWDTEs[33].

### Flows in the River Arun (alone and in combination)

The baseline position and assessment of effects via changes to flows in the River Arun is essentially as per that set out in Appendix B. Tables C-1 and C-2 indicate the anticipated impact on flows in the Arun assuming a worst-case (i.e. the entirety of the additional groundwater abstraction (3.1 M/d) affects river flows in the Stor and hence the Arun at Pulborough), alone and in combination; however it should be noted that the table below does not account for any flows from the Stor (as there is no CEH gauging station data available) and so over-estimates the impact on flows in the Arun.

[33] Southern Water is currently undertaking WINEP investigations into the impact of groundwater abstractions from Pulborough on the GWDTEs of the Arun Valley sites, including the development of groundwater models. The consented abstraction from West Chiltington was initially considered during the scoping phases of this study, but was excluded as there is no pathway for groundwater abstractions from this source to directly affect GWTDEs within the Arun Valley sites due to the absence of connectivity (in summary, the Pulborough abstractions and the GWTDEs of the Arun Valley sites are associated with groundwater in the Folkestone Lower Greensand formations, whereas West Chiltington abstracts from the Hythe beds).

### Table D-1 - Approximate flows in the River Arun at Pulborough

| Flow percentile | Gauged flows (Ml/d) | | | Max. % impact on cumulative flows (3.1Ml/d abstr.) |
|---|---|---|---|---|
| | Rother at Pulborough | Arun at Pallingham | Cumulative | |
| Mean | 386.6 | 484.5 | 871.2 | 0.36 |
| Q95 | 94.2 | 23.5 | 117.7 | 2.63 |
| Q70 | 174.5 | 48.7 | 223.3 | 1.39 |
| Q50 | 249.7 | 97.9 | 347.6 | 0.89 |
| Q10 | 907.2 | 1339.2 | 2246.4 | 0.14 |
| Q5 | 1304.6 | 2531.5 | 3836.2 | 0.08 |

### Table D-2 - Cumulative Impact of Horsham Recycling (~9.5Ml/d), Petworth (4Ml/d), West Chiltington (this option) and Petersfield (see Appendix B) on flows in the River Arun at Pulborough

| Flow percentile | Gauged flows (Ml/d) | | | Max. % impact on cumulative flows (18.2Ml/d abstr.) |
|---|---|---|---|---|
| | Rother at Pulborough | Arun at Pallingham | Cumulative | |
| Mean | 386.6 | 484.5 | 871.2 | 2.09 |
| Q95 | 94.2 | 23.5 | 117.7 | 15.46 |
| Q70 | 174.5 | 48.7 | 223.3 | 8.15 |
| Q50 | 249.7 | 97.9 | 347.6 | 5.24 |
| Q10 | 907.2 | 1339.2 | 2246.4 | 0.81 |
| Q5 | 1304.6 | 2531.5 | 3836.2 | 0.47 |

The assessment, alone and in combination, is therefore as per the Petersfield option (Appendix B), i.e. flows in the Arun will be affected, but this will be marginal and will not adversely affect the European sites.

### Flows in the River Stor

The option may affect flows in the River Chilt and hence the River Stor as it passes the northern boundary of the designated sites. The potential for non-saline flows in the Stor to support habitats within the Arun Valley sites has been considered as part of the HBES investigation, with conceptual models of this developed. In summary, hydrological connectivity between the designated sites and the River Stor is limited, separated by flood embankments and with no sluices noted in this section; consequently, the wetlands adjacent to the Stor are not fundamentally support by non-saline inputs from the river, and impacts on flows in the Stor due to this option will not adversely affect the integrity of the SPA/Ramsar.

## IN COMBINATION EFFECTS

Plans, programmes and projects that have been considered within the in-combination assessment are detailed below.

### Other WRMP options

No other water company options will affect these sites. With regard to other SWS options, the potential 'in combination' effects of these on flows in the Arun are outlined in **Table C-2** above and **Appendix B**.

These options will not combine to affect the River Stor, and so there will be no spatially coincident cumulative changes to flows that might affect the SAC/SPA/Ramsar where these are adjacent to the Stor. Non-coincident synergistic effects would not be expected (i.e. 'not adverse' effects on two different areas of the site nevertheless combining to affect the site features which considered holistically) given the nature and scale of the potential environmental changes, and the role of active water level management in the maintenance of the site. Note that mitigation measures proposed for the **Pulborough Surface Water - reduce Western Rother MRF** drought option in SWS's revised draft **Drought Plan 2022**[34] would also be effective and potentially appropriate for the WRMP option (these mitigation measures include partial removal of embankments to re-connect river to the floodplain sooner, creation of new ditches that connect the floodplain with the river at different water levels).

### Other Water Company Plans

*Drought Plans*

A future Drought Plan will necessarily reflect the abstraction baseline at that point (i.e. it will account for options implemented at that point in time) and be subject to HRA when revised, which provides a mechanism to ensure that in combination effects do not occur.

One drought option identified in SWS's revised draft **Drought Plan 2022**[35], or the plans of neighbouring water companies, has the potential to affect these sites (**Pulborough Surface Water - reduce Western Rother MRF**). The HRA of the Drought Plan concluded that this drought option would have no adverse effects on these sites (absence of pathways for the SAC; with the benefit of interventionist mitigation to support water levels in some drains for particular units of the SPA/Ramsar). The mitigation proposed for the drought option is in the process of being finalised, although the measures proposed will also effectively mitigate any residual effects that may result from the WRMP option implementation. Adverse in combination effects would not therefore be expected.

*Drainage and Wastewater Management Plans*

The interaction of the WRMP options with specific schemes derived from the emerging Drainage and Wastewater Management Plan (DWMP) can only be assessed at the project level due to the generic nature of the DWMP options.

[34] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

[35] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

### Other projects 'in combination'

*Minor projects*

It has not been possible to produce a definitive list of existing (minor) planning applications near this option's zone of influence, and generating a list at this stage would be of little value given the lead times for the option. It is possible that there will be 'in combination' project-specific construction effects associated with future planning applications, although this can only be assessed at the time of any application. This is consistent with the ACWG guidance on cumulative/in combination assessments.

*Major Projects*

Reference has been made to the Planning Inspectorate's National Infrastructure Projects database[36] which includes major projects; no major projects are identified that are likely to affect these European sites.

## CONCLUSION: ARUN VALLEY SPA, ARUN VALLEY RAMSAR, ARUN VALLEY SAC

The hydrological impact of this option on the Arun Valley sites alone is considered to be negligible, particularly in relation to the dominant effect of groundwater supply to the designated sites and the active management of water levels within the sites; the predicted flow reductions in the Arun will not be of sufficient magnitude to adversely affect the site alone either directly or through secondary mechanisms such as via impacts on water quality.

It is considered that there is sufficient confidence to enable a conclusion of no adverse effect on the integrity of the Arun Valley SPA, Arun Valley Ramsar and Arun Valley SAC to be drawn for the WRMP HRA in relation to this option, alone and in combination.

[36] Available at: https://infrastructure.planninginspectorate.gov.uk/projects/

# Appendix E

## APPROPRIATE ASSESSMENT: SEA TANKERING (45ML/D)

# APPENDIX E - APPROPRIATE ASSESSMENT: SEA TANKERING (45ML/D)

## OPTION SUMMARY

### OVERVIEW AND EUROPEAN SITE CONTEXT

This option would require the delivery of water from a hydroelectric plant in Norway by sea tanker to Southampton Container Docks, where temporary infrastructure would be installed including dockside storage bladders and pumps. Water would then be transferred to Test surface water WSW lakes via a temporary above-ground pipeline[37] with short floating sections; the precise route of the pipeline cannot be finalised at this point although it is almost certain that sections will be located within the European sites associated with Southampton Water. Preliminary engineering designs indicate that the scheme would likely require:

- dockside storage and pumping facilities located within the Prince Charles Container Port;
- approximately 1.2km of temporary above-ground pipeline through the container port (adjacent to the Redbridge Channel) and Redbridge Wharf Park;
- a short (~250m) section of temporary floating pipeline (supported by barges) within Redbridge Channel from Redbridge Wharf Park to the area around the Old Red Bridge / Redbridge Causeway (i.e. within the Solent and Dorset Coast SPA);
- approximately 1.4km of temporary above-ground pipeline located immediately adjacent to or within the saltmarshes associated with The Furlongs at Totton (i.e. within or immediately adjacent to the Solent and Southampton Water SPA/Ramsar and the Solent Maritime SAC); and
- approximately 2km of temporary above-ground pipeline through non-designated greenspace and light industrial areas between The Furlongs and Test surface water WSW.

Raw water would be sourced from a hydroelectric plant located around 1000m above sea level, with water abstracted from below the turbines (i.e. there is a theoretical risk of minor contamination with oils from the turbines, although this would be more of an issue for drinking water quality than the receiving environment), and transported in food-grade sea tankers. The raw water would be pumped to one of the storage lakes at Test surface water WSW before being passed to the WSW for treatment.

The scheme would be expected to operate for 12 weeks over the summer period, with approximately 6 – 8 weeks each for installation and decommissioning (i.e. installation would typically start in June, with operation from August to November, and then decommissioning from November to January). Based on previous droughts, scheme initiation (i.e. preparation, potentially including pipeline installation) would likely be required once every three years although the option would only be used around once in every ten years. 1 – 2 tanker deliveries per day would be required to maintain supply, depending on tanker capacity. However the option would only need to be available for 4 – 5 years in AMP9 (2030 – 2035), until the Havant Thicket transfer is available.

[37] The pipeline would likely comprise a bundle of four or five 300mm dia. pipes rather than a single large pipe to ensure an appropriate balance of pump size / head loss etc.

The proposed option and pipeline location are in close proximity to (within 10km) of the following sites.

- Emer Bog SAC
- New Forest SPA
- The New Forest Ramsar
- The New Forest SAC
- River Itchen SAC
- Solent and Southampton Water Ramsar
- Solent and Dorset Coast SPA
- Solent and Southampton Water SPA
- Solent Maritime SAC

There are no additional 'downstream' receptors.

## ENVIRONMENTAL CHANGES AND OPTION ASSUMPTIONS / UNCERTAINTIES

### Potential construction-related environmental changes

Construction works will be required within or in very close proximity to the European sites associated with the upper estuary of Southampton Water (Southampton Water SPA/Ramsar, Solent and Dorset Coast SPA, Solent Maritime SAC). These sites, and potentially areas of nearby functionally-linked land, are likely to be vulnerable (i.e. both exposed and sensitive) to all of the environmental risks typically associated with the construction of new infrastructure (e.g. direct impacts on site habitats; exposure to site-derived pollutants; additional noise or lighting; increases in visual disturbance; etc.); due to the proximity there is likely to be very little natural attenuation of any environmental changes and so specific mitigation measures will be relied on.

### Potential operation-related environmental changes

The scheme is essentially an inter-catchment raw water transfer, although the raw water will have little or no interaction with the natural environment in normal operation with appropriate control mechanisms in place (the water is transported directly to a clay-lined operational reservoir at Test surface water WSW WSW (known as 'Test Little Lake') before treatment and supply, which is effectively isolated from downstream hydrological receptors (i.e. water only exits the lake via the WSW[38])). The imported water will therefore alter the physio-chemical characteristics of the reservoir water although this is principally an issue for the treatment process and there is no realistic pathway for these changes to be reflected in local water courses. There will be a risk of INNS transfer to the reservoir, however, which may not necessarily be contained by the reservoir depending on the INNS characteristics (although the absence of hydrological pathways for release to the wider environment would minimise dispersal risk). Decommissioning is likely to involve some minor discharges of water to ground when the pipeline sections are separated, if the ground topography results in pooling of water in the pipe.

Other operational environmental changes will be associated with the pumping infrastructure (i.e. noise, vibration, lighting) located at the container port.

[38] The lake does have an overflow but levels are controlled by the pumped supply from the River Test rather than through this, and the overflow would not be exceeded in drought conditions in any case.

### Assumptions and uncertainties

It is assumed that the pipeline and enabling works will be designed according to best practice to minimise the effects on the environment; and that reduced-disturbance construction techniques are achievable if required. It is also assumed that the scheme will operate on a full-time basis for energy-efficiency reasons.

With regard to deployment frequency and duration, a worst-case from a construction perspective is assumed, i.e. that the pipeline will be fully installed and decommissioned once every two to three years in the 4 – 5 year period in which it is required (i.e. twice). Note, it is possible that a semi-permanent installation (i.e. in place for the 4 – 5 year period, followed by restoration and management) may have lower environmental impacts than repeated deployment / decommissioning.

It should also be noted that the judgement of the court in Case C-258/11 (Sweetman v An Bord Pleanála and others) states that that "*a plan or project…will adversely affect the integrity of that site if it is liable to prevent the lasting preservation of the constitutive characteristics of the site that are connected to the presence of a priority natural habitat whose conservation was the objective justifying the designation of the site in the list of SCIs, in accordance with the directive. The precautionary principle should be applied for the purposes of that appraisal*". This would suggest that 'temporary effects' that are reversible in a reasonable timescale are less likely to be considered 'adverse', which has some relevance for this option.

## SCREENING SUMMARY

The screening assessment is outlined in **Appendix B**. In summary, significant effects cannot be self-evidently excluded for the following sites:

- Solent and Southampton Water Ramsar (construction / operation).
- Solent and Southampton Water SPA (construction / operation).
- Solent Maritime SAC (construction / operation).
- Solent and Dorset Coast SPA (construction / operation).
- River Itchen SAC (effects from construction / operation on mobile species using Southampton Water).

## ASSESSMENT: SOLENT AND DORSET COAST SPA

### CORE DESIGNATION INFORMATION

The Solent and Dorset Coast SPA runs covers most of the coastline and adjacent offshore areas from Worbarrow Bay in Dorset to Littlehampton in West Sussex. It is designated principally for the important offshore foraging areas it provides for breeding tern populations associated with adjacent SPAs (notably Poole Harbour SPA, Solent and Southampton Water SPA, Chichester and Langstone Harbours SPA and Pagham Harbour SPA), so essentially covers marine habitats that would (prior to designation) have previously been considered as 'functionally linked' to the existing SPAs.

The core information relating to the designation (i.e. qualifying features, conservation objectives, supplementary advice documents, information on typical species, supporting habitats and known functional land) is available online and so not replicated here in detail, to minimise repetition and over-simplification of freely available data; **Table E-1** provides links to the key documents and

information relating to the designation. Specific information that may be relevant to the assessment of effects is noted as necessary in the assessment sections below (e.g. known areas of functional land identified in the SACO documentation).

### Table E-1 – Core Site Information

| Aspect | Site Data |
|---|---|
| Site Name | Solent and Dorset Coast SPA |
| Site Code | UK9020330 |
| Qualifying features | - A191r: Sandwich tern *Sterna sandvicensis*<br>- A193r: Common tern *Sterna hirundo*<br>- A195r: Little tern *Sterna albifrons* |
| Standard Data Form | Available at: https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9020330.pdf |
| Conservation Objectives | Available at: http://publications.naturalengland.org.uk/publication/5294923917033472?category=6528471664689152 |
| Site Improvement Plan | Available at: http://publications.naturalengland.org.uk/publication/5294923917033472?category=6528471664689152 |
| Supplementary advice | Available at: https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK9020330 |
| Associated SSSIs | Avon Valley (Bickton to Christchurch) SSSI; Bembridge Down SSSI; Bognor Reef SSSI; Bouldnor and Hamstead Cliffs SSSI; Bracklesham Bay SSSI; Brading Marshes to St. Helen's Ledges SSSI; Browndown SSSI; Christchurch Harbour SSSI; Colwell Bay SSSI; Compton Chine to Steephill Cove SSSI; Compton Down SSSI; Eling and Bury Marshes SSSI; Felpham SSSI; Headon Warren and West High Down SSSI; Highcliffe to Milford Cliffs SSSI; Lee-on-The Solent to Itchen Estuary SSSI; Lincegrove and Hackett's Marshes SSSI; Newtown Harbour SSSI; North Solent SSSI; Pagham Harbour SSSI; Portsmouth Harbour SSSI; Purbeck Ridge (East) SSSI; River Avon System SSSI; Selsey, East Beach SSSI; Sinah Common SSSI; South Dorset Coast SSSI; Studland & Godlingston Heaths SSSI; Studland Cliffs SSSI; Thorness Bay SSSI; Whitecliff Bay and Bembridge Ledges SSSI; Yar Estuary SSSI |
| Functional land | None noted. |

*Water resource sensitive features, based on Environment Agency (EA) guidance

## MITIGATION ASSUMPTIONS

### Standard Measures / Best-practice

**Appendix C of the Sept23 HRA** identifies standard and established measures that are known to be available, achievable and likely to be effective in avoiding or mitigating potentially adverse effects on European sites and interest features. These are based on best- and case-practice from similar schemes, and so there can be high confidence in their deliverability and effectiveness. These

measures would be applied unless project-level HRAs or project-specific environmental studies demonstrate that they are not required (i.e. the anticipated effect will not occur), not appropriate, or that alternative or additional measures are necessary or more appropriate.

### Bespoke measures

Site- or feature-specific mitigation that may be required for specific atypical effects are identified in the assessment sections.

## ASSESSMENT – CONSTRUCTION

### Site-derived pollutants

Substantive excavation is unlikely to be required for installation of temporary infrastructure and so the risk of site-derived pollutants affecting habitats or species associated with the site is generally low; however, this can only be accurately characterised at the project-stage, when the construction requirements (including access tracks or similar) are established in detail. However, exposure can almost certainly be managed or avoided through scheme-design and/or the established best-practice measures noted in Appendix C of the 2023 HRA, and the anticipated magnitude of change in respect of any particular pollutant would be low when mitigation is considered. Following from this, it should also be noted that the sensitivity of the SPA supporting habitats/species and the qualifying features to the anticipated magnitude of change is likely to also be low given the industrial nature of the environment around the Prince Charles container port. Consequently, there is a high degree of confidence that site-derived pollutants will not result in unavoidable adverse effects on the integrity of this SPA.

### Direct effects on habitats

The scheme will require barges to support a short section of pipeline within the Redbridge Channel; this may also require localised enabling works at the entry / exit points (it is conceivable that some semi-permanent infrastructure may be appropriate at these locations to facilitate pipeline deployment when required).

The precise nature of any direct impacts on the habitats of this SPA can only be determined through detailed design, when the exact locations are known. Notwithstanding this, it is anticipated that any effects on site habitats due to implementation will be localised, short-term and temporary; and it is recognised that the marine and intertidal habitats of the SPA in this area are, by their nature, likely to be fairly resilient to such impacts given the natural variance in physio-chemical parameters within the upper estuary (e.g. tidal cycle salinity changes, seasonal variations in freshwater and sediment inputs, etc.). The periodicity of the impacts (potentially every three years for the lifetime of the option) may theoretically create a recovery pressure, although studies of estuarine benthic habitats following invasive pipeline construction[39] have generally shown that these recover relatively quickly, and effects from the deployment of a temporary pipeline on barges would be substantially lower. Furthermore, it is likely to be possible to minimise the exposure of particularly sensitive habitats through detailed design. Consequently, there is a high degree of confidence that direct impacts on

[39] e.g. Lewis L, Davenport J, & Kelly TC (2003). A study of the impact of a pipeline construction on estuarine benthic invertebrate communities - Part 2. Recolonization by benthic invertebrates after 1 year and response of estuarine birds. *Estuarine Coastal and Shelf Science 57 pp 201 – 208*.

the habitats associated with the SPA will not result in unavoidable adverse effects on the integrity of this SPA.

### Disturbance / Displacement

The implementation phase is likely to coincide with the breeding periods of tern species associated with this SPA. Construction work has the potential to disturb or displace terns utilising nearby habitats (i.e. within around 500m[40]) through increases in noise, vibration, or personnel and plant movements over the baseline. However, it is unlikely that this will substantively affect the use of these areas by tern species, or result in effects on populations that might undermine site integrity, for the following reasons:

- The area around Southampton port is and will remain an inherently high-disturbance environment irrespective of this scheme, through movements of vessels on the water and normal harbourside activities. It is very unlikely that the works required for the pipeline installation will significantly increase the exposure of tern species to disturbing activities (i.e. there will not be a significant increase in activity levels locally over baseline, or potentially notable variations in the type of activity that might increase disturbance).
- Evidence from assessments and surveys undertaken to inform designation of this SPA (e.g. NE (2016). *Departmental Brief: Solent and Dorset Coast potential Special Protection Area (pSPA)*[41]) does not suggest that the northern-most areas of Southampton Water (i.e. around the mouth of the River Test) are particularly critical for tern species in the context of the SPA as a whole; the area is included in the SPA boundary principally on the basis of the modelled predictions of tern foraging and usage rather than direct observation studies, and whilst tern species will periodically utilise these areas they appear relatively less important that areas closer to the nesting colonies.
- Further to this, the SACO for the site notes that, for all of the tern species, "*foraging mainly occurs offshore and there is no evidence to suggest that foraging behaviours are impacted by movement of watercrafts*"; it also notes that terns are more sensitive to disturbance at their nesting colonies, which are not located close to the likely area of impact (the key nesting colonies for the tern species are located on the Solent coast or within the harbours to the east, rather than in Southampton Water). Specifically, the SACO identifies the following important foraging areas:
  - for common tern, "*Langstone and Chichester Harbours, Poole Harbour and Bay, Hurst to Lymington, Brading Marshes, Cowes and Medina estuary and into the offshore Solent area*";
  - for sandwich tern, "*throughout Poole, Chichester and Langstone Harbours, the harbour mouths, and offshore*"; and
  - for little tern, "*Hurst Point to Pitts Deep, the Medina estuary, Pagham Harbour, Langstone and Chichester Harbours and into the wider offshore Solent area*".

[40] This is a generic threshold, but generally considered robust. The effects of most potentially disturbing activities are inherently local, naturally attenuating with distance – for example, construction noise will typically be indistinguishable from background within around 500m of source due to natural attenuation alone.

[41] NE (2016). Departmental Brief: Solent and Dorset Coast potential Special Protection Area (pSPA) [online]. Available at: https://assets.publishing.service.gov.uk/media/5a749a99ed915d0e8bf19a64/solent-dorset-departmental-brief.pdf

- The area likely to be exposed to changes in disturbance factors is a very small proportion of the whole site, and any disturbance or displacement would be temporary and short-term; there is unlikely to be a potentially notable reduction in foraging habitat availability.

Consequently, it is considered that the exposure of tern species to disturbance will be low (due the location of the works relatively to the nesting colonies and the likelihood of incidental rather than consistent use of the habitats in this area), with the sensitivity to disturbance also likely to be low (due to the nature of the environment in this location and the inherently high-disturbance baseline). This would require confirmation through scheme-specific surveys prior to implementation, but there can be a high-degree of confidence based on the available evidence for the SPA. Adverse effects would not therefore be expected.

## ASSESSMENT – OPERATION

### Site-derived pollutants

Potential pollutants associated with operation (e.g. fuels from pumping units) can be managed using established measures. No adverse effects would therefore occur, assuming normal best-practice.

### Raw water discharges and water quality

No discharges to waterbodies (other than Test Little Lake) would be expected as part of normal operation, although localised discharges of raw water to ground may occur as residual water is drained from the pipe on decommissioning.

The physio-chemical changes associated with discharges to the Test Little Lake would not affect any other local waterbodies, and so effects on this SPA would not occur. Discharges of residual water to ground during decommissioning would be volumetrically inconsequential and insufficient to alter the water quality of Southampton Water due to attenuation by ground, and dilution by flows within the river or tidal turnover in the estuary. No adverse effects would therefore occur.

### Raw water discharges and INNS

The handling and transfer of raw water from Norway may present a risk of INNS entering Southampton Water, although it should be noted that water will be obtained from a freshwater location approximately 1000m AOD (and so the risk of the brackish / marine habitats and species of Southampton Water[42] being affected will be low for the vast majority of potential INNS).

The principal species of concern is likely to be the salmon fluke *Gyrodactylus salaris* which is endemic in the Baltic Sea but pathogenic to salmonids associated with the Atlantic, and which is present in some river systems in Norway. It is understood that this species is not currently present in the catchment from which the raw water will be obtained, however, and it is generally accepted that the ability of salmon fluke to survive or disperse in saline or brackish water is nil or low[43]. On this

[42] A conceptual model of the estuary (EA (2024) *Estuary Guide* [online]. Available at https://www.estuary-guide.net/pdfs/southampton_water_case_study.pdf) notes that "…*the estuary is essentially marine in nature with salinities in inner parts of Southampton Water rarely falling below 20 psu at the surface and between 30-33 psu at depth*"

[43] The GB Non-Native Species Secretariat suggests that the species typically survives in salinities below 7 psu (practical salinity units; seawater is around 35 psu), although it may reproduce and transmit in estuaries up to 7.5 ppt (~7.5 psu) (Harris PD, Bachmann L & Bakke TA (2011). The Parasites and Pathogens of the Atlantic

basis the risk of direct transfer via Southampton Water is likely to be low, and measures are likely to be available to reduce this further (e.g. pre-transfer monitoring of the donor catchment, appropriate management and controls of the transfer process). In terms of the SPA sensitivity, salmonids are not a key prey species for UK tern species[44] so direct effects on the supporting habitats or species associated with this SPA would not be expected if transfer did occur (although indirect complex or synergistic effects cannot obviously be excluded)[45]. However, adverse effects on this site would not be expected.

### Disturbance / Displacement

Operational activities that might result in disturbance or displacement of tern species will be limited, and local to the Southampton port area only (e.g. noise etc. associated with vessel movements and dockside activities). These activities would not be exceptional for this area, and adverse effects relating to disturbance or displacement would not be anticipated for the reasons noted under 'Construction', above.

### Habitat modification

The presence of the pipeline barges within the Redbridge Channel for several months may result in localised habitat changes within the SPA. For example:

- the barges may have superficial effects on benthic habitats at low-tide (consistent with other grounded vessels), depending on the precise location of the barges relative to mean high-water spring (MHWS); or
- the barges may likely to collect floating debris and may alter water flows locally, which may result in local changes to sediment deposition or erosion.

The precise nature of any impacts on the habitats of this SPA can only be determined through detailed design, when the exact locations are known. However, they are unlikely to adversely affect the integrity of the site for many of the same reasons noted under 'construction', i.e.

- it is anticipated that any effects on site habitats due to the presence of the floating pipe will be localised, short-term and temporary;
- the marine and intertidal habitats of the SPA in this area are, by their nature, likely to be fairly resilient to physical change given the natural variance in physio-chemical parameters within the upper estuary, and recovery is likely to be relatively quick;
- it is likely to be possible to minimise the exposure of particularly sensitive habitats through detailed design; and
- operational maintenance measures (e.g. debris clearance) can moderate many of the potential impacts.

---

Salmon: Lessons from *Gyrodactylus salaris*. In Aas Ø, Einum S, Klemetsen A, Skurdal J (Eds.) 2011. *Atlantic Samon Ecology* [online]. Available at https://onlinelibrary.wiley.com/doi/10.1002/9781444327755.ch9 .

[44] Green A (2017). Tern diet in the UK and Ireland: a review of key prey species and potential impacts of climate change [online]. RSPB. Available at https://www.researchgate.net/publication/323916668_Tern_diet_in_the_UK_and_Ireland_a_review_of_key_prey_species_and_potential_impacts_of_climate_change#pf5

[45] Note that initial literature searches have not identified any examples of impacts on seabird colonies that might be ascribed to salmon fluke, including in Norway where salmon and tern species are endemic and research into the effects of salmon fluke have been substantial.

Consequently, there is a high degree of confidence that any incidental modifications to the SPA habitats due to the presence of the pipe barges in the water will be localised and small-scale only, and will not result in unavoidable adverse effects on the integrity of this SPA.

## IN COMBINATION EFFECTS

Plans, programmes and projects that have been considered within the in-combination assessment are detailed below.

### Other WRMP options

With regard to other SWS options, the other options with the potential to affect this site are identified in Appendix F of the Sep23 HRA. The Sep23 in combination assessment concluded that there would be no adverse effects on the integrity of this SPA. The inclusion of the Sea Tankering option does not alter this conclusion.

With regard to other water company WRMPs and effects on this site:

- **Portsmouth Water:** The Solent and Dorset Coast SPA in Portsmouth Harbour is close to the 'Increased Treatment Capacity at PWC Reservoir C' PW option, although the PW HRA concludes no LSE for the PWC Reservoir C scheme, and there is no risk of spatially coincident environmental changes with the Sea Tankering option. Other cumulative effects are unlikely (e.g. terns displaced simultaneously from the area around PWC Reservoir C and around Prince Charles container port) as construction works are unlikely to coincide and displacement effects on terns are likely to be very weak. **Conclusion: no adverse effects in combination**.
- **Wessex Water:** The Wessex Water options involve minor construction near up-catchment tributaries of the Dorset section of this SPA, and will have 'no effect' on this site due to their distance from the site boundary (so no possibility of 'in combination' effects). **Conclusion: no adverse effects in combination.**
- **Bournemouth Water**: There is only one option that has the potential for in combination effects with SWS options (option BNW1, a groundwater abstraction that may affect Solent and Southampton Water SPA / Ramsar around Lymington SSSI); this would have no risk of spatially coincident environmental changes with the Sea Tankering option, and other cumulative effects are unlikely (e.g. terns displaced simultaneously from the area around PWC Reservoir C and around Prince Charles container port) as construction works are unlikely to coincide and displacement effects on terns are likely to be very weak. **Conclusion: no adverse effects in combination**.

### Other Water Company Plans

*Drought Plans*

No drought options identified in SWS's revised draft **Drought Plan 2022**[46], or the plans of neighbouring water companies, have the potential to affect this site based on the HRAs of these documents; in reality, any effects associated with drought options will be too localised and short-

[46] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

lived to affect the predominantly marine habitats of this site. Adverse in combination effects would not therefore be expected.

*Drainage and Wastewater Management Plans*

The interaction of the WRMP options with specific schemes derived from the emerging Drainage and Wastewater Management Plan (DWMP) can only be assessed at the project level due to the generic nature of the DWMP options.

### Other projects 'in combination'

*Minor projects*

It has not been possible to produce a definitive list of existing (minor) planning applications near this option's zone of influence, and generating a list at this stage would be of little value given the lead times for the option. It is possible that there will be 'in combination' project-specific construction effects associated with future planning applications, although this can only be assessed at the time of any application. This is consistent with the ACWG guidance on cumulative/in combination assessments.

*Major Projects*

Reference has been made to the Planning Inspectorate's National Infrastructure Projects database[47] which includes major projects; no major projects are identified that are likely to affect this European site and in reality such in combination effects can only be assessed at the project-level.

### CONCLUSION: SOLENT AND DORSET COAST SPA

Pathways are present for implementation and decommissioning to affect this site and its features. However, the likely environmental changes are likely to be too limited (in magnitude, particularly in relation to the baseline in this location, or duration), taking available mitigation and avoidance measures into account, to adversely affect the integrity of this site. It is considered that there is sufficient confidence to enable a conclusion of no adverse effect on the integrity of the Solent and Dorset Coast SPA to be drawn for the rdWRMP HRA in relation to this option, alone and in combination.

## ASSESSMENT: SOLENT AND SOUTHAMPTON WATER SPA / SOLENT AND SOUTHAMPTON WATER RAMSAR / SOLENT MARITIME SAC

### CORE DESIGNATION INFORMATION

Note, **Southampton Water SPA**, **Southampton Water Ramsar** and **Solent Maritime SAC** (collectively, the Southampton Water sites) are addressed together in the following sections as the mechanisms by which the sites might be affected by this option are largely the same (although mobile species associated with the SPA and Ramsar may also be affected if using habitats outside the site boundaries).

**Solent and Southampton Water SPA**, **Solent and Southampton Water Ramsar** and **Solent Maritime SAC** are large and complex sites encompassing a series of estuarine systems on the south coast of England and Isle of Wight. The sites broadly stretch from the western end of the

[47] Available at: https://infrastructure.planninginspectorate.gov.uk/projects/

Solent at Lymington / Yarmouth to Pagham Harbour in the east (although it should be noted that the sites are not entirely coincident).

This assessment focuses on those site units associated with the upper Test estuary that are likely to be exposed to environmental changes associated with the scheme i.e.

- **Eling and Bury Marshes SSSI** on the western side of the Test channel, which is immediately adjacent to the Redbridge Channel and hence the container port; and
- the **Lower Test Valley SSSI**, upstream of the Redbridge Causeway / A35, which is likely to be directly affected by pipeline installation between Redbridge Causeway and the Test Way footpath at the northern end of The Furlongs.

**Eling to Bury Marshes SSSI** essentially comprises two saltmarshes and associated intertidal mudflats that are used for feeding and roosting by the wintering birds associated with the Ramsar and SPA. The **Lower Test Valley SSSI** (which overlaps with the Lower Test Valley NNR) is generally more terrestrial in character, grading from saltmarsh to brackish and freshwater marsh, with extensive areas of reedbed and unimproved grassland that may be periodically flooded on high water spring tides; this site is more typically used as a high-tide roost by the wintering species associated with the Ramsar and SPA.

The core information relating to the designation (i.e. qualifying features, conservation objectives, supplementary advice documents, information on typical species, supporting habitats and known functional land) is available online and so not replicated here in detail, to minimise repetition and over-simplification of freely available data; **Table E-2 – E-4** provide links to the key documents and information relating to the designations. Specific information that may be relevant to the assessment of effects is noted as necessary in the assessment sections below (e.g. known areas of functional land identified in the SACO documentation).

### Table E-2 – Core Site Information

| Aspect | Site Data |
|---|---|
| Site Name | Solent and Southampton Water SPA |
| Site Code | UK9011061 |
| Qualifying features | - A052w: Eurasian teal *Anas crecca*<br>- A137w: Ringed plover *Charadrius hiaticula*<br>- A176r: Mediterranean gull *Larus melanocephalus*<br>- A191r: Sandwich tern *Sterna sandvicensis*<br>- A192r: Roseate tern *Sterna dougallii*<br>- A193r: Common tern *Sterna hirundo*<br>- A195r: Little tern *Sterna albifrons*<br>- A616w: Black-tailed godwit *Limosa limosa islandica*<br>- A675w: Dark-bellied brent goose *Branta bernicla bernicla*<br>- WATR: Waterbird assemblage |
| Standard Data Form | Available at: https://jncc.gov.uk/jncc-assets/SPA-N2K/UK9011061.pdf |
| Conservation Objectives | Available at: http://publications.naturalengland.org.uk/publication/6567218288525312?category=6528471664689152 |

| Aspect | Site Data |
|---|---|
| Site Improvement Plan | Available at: http://publications.naturalengland.org.uk/publication/6567218288525312?category=6528471664689152 |
| Supplementary advice | Available at: https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK9011061 |
| Associated SSSIs | Brading Marshes to St. Helen's Ledges SSSI; Eling and Bury Marshes SSSI; Hurst Castle and Lymington River Estuary SSSI; Hythe to Calshot Marshes SSSI; King's Quay Shore SSSI; Lee-on-The Solent to Itchen Estuary SSSI; Lincegrove and Hackett's Marshes SSSI; Lower Test Valley SSSI; Lymington River Reedbeds SSSI; Lymington River SSSI; Medina Estuary SSSI; Newtown Harbour SSSI; North Solent SSSI; River Test SSSI; Ryde Sands and Wootton Creek SSSI; Sowley Pond SSSI; The New Forest SSSI; Thorness Bay SSSI; Titchfield Haven SSSI; Upper Hamble Estuary and Woods SSSI; Whitecliff Bay and Bembridge Ledges SSSI; Yar Estuary SSSI |
| Functional land | Functional land is identified by the Solent Waders and Brent Goose Strategy 2020 (Available at: https://hiwwt.maps.arcgis.com/apps/instant/minimalist/index.html?appid=f4bbd6fe517647cba8bf0f3b8cfb7c1b |

*Water resource sensitive features, based on Environment Agency (EA) guidance

### Table E-3 – Core Site Information

| Aspect | Site Data |
|---|---|
| Site Name | Solent and Southampton Water Ramsar |
| Site Code | UK11063 |
| Qualifying features | - Crit. 1 - sites containing representative, rare or unique wetland types<br>- Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities<br>- Crit. 5 - regularly supports 20,000 or more waterbirds<br>- Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds" |
| Standard Data Form | Available at: https://jncc.gov.uk/jncc-assets/RIS/UK11063.pdf |
| Conservation Objectives | As per associated SAC / SPA, or underpinning SSSI(s) |
| Site Improvement Plan | As per associated SAC / SPA, or underpinning SSSI(s) |
| Supplementary advice | As per associated SAC / SPA, or underpinning SSSI(s) |

| Aspect | Site Data |
|---|---|
| Associated SSSIs | Brading Marshes to St. Helen's Ledges SSSI; Eling and Bury Marshes SSSI; Gilkicker Lagoon SSSI; Hurst Castle and Lymington River Estuary SSSI; Hythe to Calshot Marshes SSSI; King's Quay Shore SSSI; Lee-on-The Solent to Itchen Estuary SSSI; Lincegrove and Hackett's Marshes SSSI; Lower Test Valley SSSI; Lymington River Reedbeds SSSI; Lymington River SSSI; Medina Estuary SSSI; Newtown Harbour SSSI; North Solent SSSI; River Test SSSI; Ryde Sands and Wootton Creek SSSI; Sowley Pond SSSI; The New Forest SSSI; Thorness Bay SSSI; Titchfield Haven SSSI; Upper Hamble Estuary and Woods SSSI; Whitecliff Bay and Bembridge Ledges SSSI; Yar Estuary SSSI. |
| Functional land | Functional land is identified by the Solent Waders and Brent Goose Strategy 2020 (Available at: https://hiwwt.maps.arcgis.com/apps/instant/minimalist/index.html?appid=f4bbd6fe517647cba8bf0f3b8cfb7c1b |

*Water resource sensitive features, based on Environment Agency (EA) guidance

### Table E-4 – Core Site Information

| Aspect | Site Data |
|---|---|
| Site Name | Solent Maritime SAC |
| Site Code | UK11063 |
| Qualifying features | - H1110: Sandbanks which are slightly covered by sea water all the time<br>- H1130: Estuaries<br>- H1140: Mudflats and sandflats not covered by seawater at low tide<br>- H1150: Coastal lagoons<br>- H1210: Annual vegetation of drift lines<br>- H1220: Perennial vegetation of stony banks<br>- H1310: *Salicornia* and other annuals colonizing mud and sand<br>- H1320: *Spartina* swards (*Spartinion maritimae*)<br>- H1330: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)<br>- H2120: Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes")<br>- S1016: Desmoulin`s whorl snail *Vertigo moulinsiana* |
| Standard Data Form | Available at: https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0030059.pdf |
| Conservation Objectives | Available at: http://publications.naturalengland.org.uk/publication/5762436174970880?category=6528471664689152 |
| Site Improvement Plan | Available at: http://publications.naturalengland.org.uk/publication/5762436174970880?category=6528471664689152 |
| Supplementary advice | Available at: https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0030059 |

| Aspect | Site Data |
|---|---|
| Associated SSSIs | Bouldnor and Hamstead Cliffs SSSI; Chichester Harbour SSSI; Eling and Bury Marshes SSSI; Hurst Castle and Lymington River Estuary SSSI; Hythe to Calshot Marshes SSSI; King's Quay Shore SSSI; Langstone Harbour SSSI; Lee-on-The Solent to Itchen Estuary SSSI; Lincegrove and Hackett's Marshes SSSI; Lower Test Valley SSSI; Medina Estuary SSSI; Newtown Harbour SSSI; North Solent SSSI; Thorness Bay SSSI; Upper Hamble Estuary and Woods SSSI; Yar Estuary SSSI. |
| Functional land | None noted; mobile features of the site unlikely to be substantively dependent on habitats outside the site boundary. |

*Water resource sensitive features, based on Environment Agency (EA) guidance

## MITIGATION ASSUMPTIONS

### Standard Measures / Best-practice

**Appendix C of the Sept23 HRA** identifies standard and established measures that are known to be available, achievable and likely to be effective in avoiding or mitigating potentially adverse effects on European sites and interest features. These are based on best- and case-practice from similar schemes, and so there can be high confidence in their deliverability and effectiveness. These measures would be applied unless project-level HRAs or project-specific environmental studies demonstrate that they are not required (i.e. the anticipated effect will not occur), not appropriate, or that alternative or additional measures are necessary or more appropriate.

### Bespoke measures

Site- or feature-specific mitigation that may be required for specific atypical effects are identified in the assessment sections.

## ASSESSMENT – CONSTRUCTION

### Site-derived pollutants

Substantive excavation is unlikely to be required for installation of temporary infrastructure and so the risk of site-derived pollutants affecting habitats or species associated with these sites is generally low; however, this can only be accurately characterised at the project-stage, when the construction requirements (including access tracks or similar) are established in detail. However, exposure can almost certainly be managed or avoided through scheme-design and/or the established best-practice measures noted in Appendix C of the 2023 HRA, and the anticipated magnitude of change in respect of any particular pollutant would be low when mitigation is considered. Consequently, there is a high degree of confidence that site-derived pollutants will not result in unavoidable adverse effects on the integrity of this SPA.

### Direct effects on habitats

*Baseline summary*

The scheme will require installation of a section of pipeline through the **Lower Test Valley SSSI** unit of these sites adjacent to the built-up areas of Totton, between the Redbridge Causeway and the Test Way footpath at the northern end of The Furlongs. The habitats in these areas (based on aerial

photographs and NE data for the relevant units of the **Lower Test Valley SSSI**[48]) comprise the grazed saltmarsh margins above MHW that are likely to contribute to the **Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)** SAC feature, although other saltmarsh habitats may be present where there are creeks or rhynes (e.g. ***Spartina* swards (*Spartinion maritimae*)**, ***Salicornia* and other annuals colonizing mud and sand**). NE data for the relevant units of the **Lower Test Valley SSSI** indicate that these units, and their SAC features, are all in 'favourable' condition. These areas are likely to have some transitional elements to grassland or scrub, however, based on their location relative to MHW, and there are other areas of grassland (likely unimproved) with casual footpaths (i.e. not PRoWs, but evidently well-used by local walkers) along the potential pipeline route. The other habitats of the SAC will not be directly affected[49].

These saltmarsh grasslands will provide 'supporting habitat' for some of the SPA/Ramsar features, although local factors (for example nearby trees and scrub, and correspondingly restricted sight-lines; or relatively high levels of recreational usage, based on the presence of informal paths) are likely to militate against the saltmarsh areas directly affected by the pipeline being a significant foraging resource for the SPA/Ramsar qualifying features.

*Assessment*

The exact route of the pipeline (and hence requirements for installation) cannot be determined at this point as it is likely to rely on access permissions and scheme design. It is anticipated that works would likely require some localised scrub or ruderal vegetation clearance to enable the installation of a temporary running track of some form (potentially using ground-protection track-mats) and hence installation of the temporary pipeline. However, substantive excavation or vegetation clearance would not be expected, and there is clearly scope for existing access tracks and paths to be used to minimise impacts on site habitats (either for the pipe itself, or by plant working from those existing tracks).

The theoretical worst-case scenario would see the pipeline in place within the units of the SAC/SPA/Ramsar associated with the **Lower Test Valley SSSI** for around 12 weeks once in every three years (assuming this section is the first to be installed and last to be removed), and around 36 weeks once every 10 years (although the option would only need to be available for 4 – 5 years in AMP9). This would result in short-term effects (e.g. clearance or die-back of vegetation under and around the pipe and trackway; possible local changes in plant communities due to perturbation, such as increases in ruderal species), although recovery from this would occur relatively quickly (within 1 – 2 years) as the fundamental physical processes influencing plant communities here (i.e. periodic saline inundation) would remain unchanged. Having said that, the theoretical maximum frequency of deployment (once every three years) could create a longer-term pressures on plant communities in this area due to repeated disturbance, potentially resulting in vegetation communities that are less representative or poorer-quality examples of the **Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)** SAC feature.

48 https://designatedsites.naturalengland.org.uk/SiteSACFeaturesMatrix.aspx?SiteCode=UK0030059&SiteName=Solent%20Maritime%20SAC

49 This includes the **Estuaries** and **Mudflats and sandflats not covered by seawater at low tide** features, which are not located in the parts of the SAC directly affected by the pipeline.

In practice, the duration of any impacts on the habitats of the European sites can be minimised through programming (e.g. installing these sections last and removing first). It is also likely to be possible to micro-site the pipeline to either (a) avoid higher-quality vegetation communities or (b) ensure that different areas are impacted in a given deployment year. Furthermore, the relatively modest effects on habitats can be minimised through post-deployment reinstatement and/or habitat management measures.

With regard to the value of these vegetation communities as supporting habitats for the SPA and Ramsar bird interest, this is considered unlikely to change substantively as

- structural changes will not be notable (i.e. the areas potentially affected are periodically-grazed grasslands and will remain so – there will not be a shift from (for example) reedbed to grassland); and
- whilst the composition and sward characteristics of grassland communities can influence foraging by some species (notably, for the Solent, Dark-bellied brent goose) the impact of the scheme on these characteristics is likely to be too limited (both in terms or extent and forage quality) to fundamentally alter foraging behaviour or availability.

It should also be noted that other factors (for example nearby trees and scrub, and correspondingly restricted sight-lines; or relatively high levels of recreational usage, based on the presence of informal paths) are likely to militate against the saltmarsh area directly affected by the pipeline being a significant foraging resource for the SPA/Ramsar qualifying features.

There are several aspects that can only be determined at the scheme level, following field survey; however, there is a high degree of confidence that the impacts on the habitats of these European sites will (with appropriate avoidance and mitigation) be minor and reversible in the short-term, and will not result in unavoidable adverse effects on the integrity of the SAC/SPA/Ramsar.

### Disturbance / Displacement of SPA/Ramsar bird features

*Baseline*

**Eling and Bury Marshes SSSI** has areas of intertidal mudflat that are around 200 – 250m from the Prince Charles container port (i.e. where decommissioning activities will take place) on the far side of the Redbridge Channel. These intertidal areas are used for foraging by the qualifying species of the SPA and Ramsar, of which **Dark-bellied Brent goose** is likely to be the most sensitive to disturbance.

The habitats of the **Lower Test Valley SSSI** are also utilised by the qualifying species, particularly for roosting at high tide, and a reasonable proportion (~30%) of the European sites in this location will be within 300m of the pipeline. Baseline disturbance levels are likely to be lower in this area than near the container port, although some high-disturbance activities (e.g. dog walking) are still likely to take place frequently here, and there will be a high-level of background noise from the A35 Redbridge Causeway.

No non-designated functionally-linked habitat areas are present along the pipeline route, based on the Solent Waders and Brent Goose Network mapping data[50].

[50] Available at: https://hiwwt.maps.arcgis.com/apps/instant/minimalist/index.html?appid=f4bbd6fe517647cba8bf0f3b8cfb7c1b

*Assessment*

The implementation phase is likely to coincide with the breeding periods of tern species associated with the SPA, although these species do not nest within the relevant SSSIs and will not be exposed to activities that might result in disturbance or displacement of nesting birds (impacts on foraging areas are considered in relation to the Solent and Dorset Coast SPA, above, but are not expected to adversely affect site integrity).

The implementation phase will not coincide with the wintering period for wildfowl and waders associated with the SPA/Ramsar, although decommissioning is likely to take place between November and January whenever the scheme is used (approximately once every 10 years)[51]. Wintering birds may therefore be exposed to activities that might result in disturbance or displacement from the SPA/Ramsar or nearby functionally-linked habitats (although note that no non-designated functionally-linked habitat areas are present along the pipeline route, based on the Solent Waders and Brent Goose Network mapping data[52]).

Technical information regarding birds and disturbance is summarised in Appendix B of the Sep23 HRA, including summaries of studies into the effects of construction on wintering wildfowl and waders; substantive additional information on bird responses is available from the TIDE waterbird disturbance and mitigation toolkit[53]. In broad summary, effects from noise and visual disturbance during construction typically have a limited range and duration, are usually reversible, and do not usually result in long-term adjustments in bird behaviours (such that they might constitute an adverse effect)[54]; however some species (including **Dark-bellied Brent goose**) are particularly sensitive to disturbance. Evidence from the TIDE toolkit and other studies suggests that visual disturbance 'tolerance distances' for this species when foraging are relatively small (average of ~105m), with distances increasing to around 205m when loafing or roosting. Noise disturbance can operate over greater distances (e.g. 300m for plant or machinery with sound power level of ~120 – 125 dB(A)) although in practice this is unlikely to be met for this scheme (a typical long-reach excavator has sound power level of ~109 dB(A)), which the TIDE toolkit suggests may require minimum stand-offs of over 100m).

**Eling and Bury Marshes SSSI** has areas of intertidal mudflat that are around 200 – 250m from the Prince Charles container port (i.e. where decommissioning activities will take place) on the far side of the Redbridge Channel. These intertidal areas are used for foraging by the qualifying species of the SPA and Ramsar, including **Dark-bellied Brent goose**. Temporary disturbance or displacement from the Eling and Bury Marshes SSSI is therefore possible during periods of the decommissioning, although this is likely to be very localised and would not substantively affect the availability of foraging or roosting habitats locally or more widely within the SPA/Ramsar, considering the distance and the relatively high baseline for potentially disturbing activities in this

[51] If the scheme is not used then decommissioning would likely take place in August – September, or potentially earlier depending on the nature of the drought.

[52] Available at: https://hiwwt.maps.arcgis.com/apps/instant/minimalist/index.html?appid=f4bbd6fe517647cba8bf0f3b8cfb7c1b

[53] Available at: https://www.tide-toolbox.eu/tidetools/waterbird_disturbance_mitigation_toolkit/

[54] For example, six years of bird monitoring associated with the construction of the Humber International Terminal (HIT) concluded that most disturbance only caused birds to move over a small area, and that the HIT development did not have a significant effect on usage of the area by birds.

area.  Furthermore, mitigation will almost certainly be available (e.g. screening; avoiding works when large aggregations of birds are present; avoiding works at low-tide; or even delaying parts of the decommissioning until the summer period, in extremis).

The habitats of the **Lower Test Valley SSSI** are also utilised by the qualifying species, particularly for roosting at high tide. Baseline disturbance levels are likely to be lower in this area than near the container port, although some high-disturbance activities (e.g. dog walking) are still likely to take place frequently here. As above, disturbance or displacement from the **Lower Test Valley SSSI** is possible as a result of decommissioning activities; however, activities in this area are likely to be relatively short duration, and similar mitigation to that noted above will almost certainly be available.

On this basis, whilst disturbance or displacement of wintering birds whilst foraging or roosting is possible, there is a high degree of confidence that the effect of this will be marginal (given the short-term nature of the impact and availability of habitats elsewhere) and generally avoidable with established measures for working in or near estuarine SPA/Ramsar sites in the winter period (e.g. screening, monitoring, timing, etc.); the option is not expected to result in unavoidable adverse effects on the integrity of this SPA/Ramsar due to disturbance or displacement of qualifying features. It should be noted that construction works and/or objectively similar operational activities in or near estuarine SPAs/Ramsar sites are common across the UK, and rarely result in adverse effects on integrity.

## ASSESSMENT – OPERATION

### Site-derived pollutants

Potential pollutants associated with operation (e.g. fuels from pumping units) can be managed using established measures.  No adverse effects would therefore occur, assuming normal best-practice.

### Raw water discharges and water quality

No discharges to waterbodies (other than Test Little Lake) would be expected as part of normal operation, although localised discharges of raw water to ground may occur as residual water is drained from the pipe on decommissioning.

The physio-chemical changes associated with discharges to the Test Little Lake would not affect any other local waterbodies, and so effects on this SPA/Ramsar would not occur. Discharges of residual water to ground during decommissioning would be volumetrically inconsequential and insufficient to substantively alter water quality due to attenuation by ground, and dilution by flows within the river or tidal turnover in the estuary.  No adverse effects would therefore occur.

### Raw water discharges and INNS

As noted, the handling and transfer of raw water from Norway may present a risk of INNS (see ‘Solent and Dorset Coast SPA’, above) with the principal species of concern is likely to be the salmon fluke *Gyrodactylus salaris* (although this species is not currently present in the catchment from which the raw water will be obtained; and, in terms of the SAC/SPA/Ramsar sensitivity, salmonids are not interest features of these sites (i.e. qualifying or supporting features, or typical species) and so adverse effects on the integrity of these sites would not necessarily be inevitable if transfer of this species did occur (although indirect complex or synergistic effects cannot obviously be excluded)).

The principal risk points for INNS will be the temporary storage of water in Test Little Lake (although as noted this is effectively isolated from downstream hydrological receptors), and incidental discharges to ground of pooled water in the pipelines when they are disassembled (which may then enter local watercourses as via surface flow). Measures to manage these risks are likely to be available, potentially including passing raw water to temporary sealed storage at Test surface water WSW (rather than to the lake[55]), appropriate pipeline management and maintenance, appropriate disinfecting and transportation strategies, treatment/purging of residual pipeline water prior to pipe disassembly, or capture of residual pipeline water using techniques commonly used for fuel pipelines. On this basis it is considered that adverse effects in the integrity of these sites is not an unavoidable consequence of the scheme operation, although this can only be confirmed at the project-level once all of the risks and control measures are fully characterised.

### Disturbance / Displacement

Operational activities that might result in disturbance or displacement of tern species will be limited, and local to the Southampton port area only (e.g. noise etc. associated with vessel movements and dockside activities). These activities would not be exceptional for this area, and adverse effects relating to disturbance or displacement would not be anticipated for the reasons noted under 'Construction', above. Similarly, operations within the Redbridge Channel (e.g. for removal of litter / flotsam from around the pipe) have the potential to disturb birds using the **Eling and Bury Marshes SSSI** mudflats, although this can be avoided with normal measures (e.g. working at high-tide).

Once the pipeline is in place operational activities in the **Lower Test Valley SSSI** are likely to be minimal (periodic inspections only) and unlikely to result in potentially notable disturbance or displacement that cannot be avoided with normal best-practice measures.

### Effects on habitats

None of the anticipated activities associated with operation are likely to affect habitats of these European sites (the direct effects of the pipeline installation / removal / duration in situ are considered in 'Construction', above).

## IN COMBINATION EFFECTS

Plans, programmes and projects that have been considered within the in-combination assessment are detailed below.

### Other WRMP options

With regard to other SWS options, the other options with the potential to affect these sites are identified in Appendix F of the Sep23 HRA. The Sep23 in combination assessment concluded that there would be no adverse effects on the integrity of this SPA. The inclusion of the Sea Tankering option does not alter this conclusion.

With regard to other water company WRMPs and effects on this site:

- **Portsmouth Water:** Birds associated with the Solent and Southampton Water SPA/Ramsar will also use the other south coast harbours (e.g. Portsmouth Harbour SPA/Ramsar or Chichester

[55] Although note that this would require additional land-take and more substantive groundworks, which may introduce other environmental risk factors that are not commensurate with the INNS risk.

and Langstone Harbour SPA/Ramsar) that may be affected by the 'Increased Treatment Capacity at PWC Reservoir C' PW option, although the PW HRA concludes no LSE for the PWC Reservoir C scheme, and there is no risk of spatially coincident environmental changes with the Sea Tankering option. Other cumulative effects are unlikely (e.g. SPA/Ramsar birds displaced simultaneously from the area around PWC Reservoir C and around Prince Charles container port) as construction works are unlikely to coincide and displacement effects on SPA/Ramsar birds are likely to be very weak. **Conclusion: no adverse effects in combination**.

- **Bournemouth Water**: There is only one option that has the potential for in combination effects with SWS options (option BNW1, a groundwater abstraction that may affect Solent and Southampton Water SPA / Ramsar around Lymington SSSI); this would have no risk of spatially coincident environmental changes with the Sea Tankering option, and other cumulative effects are unlikely (e.g. terns displaced simultaneously from the area around PWC Reservoir C and around Prince Charles container port) as construction works are unlikely to coincide and displacement effects on terns are likely to be very weak. **Conclusion: no adverse effects in combination**.

### Other Water Company Plans

*Drought Plans*

No drought options identified in SWS's revised draft **Drought Plan 2022**[56], or the plans of neighbouring water companies, have the potential to affect this site based on the HRAs of these documents; in reality, any effects associated with drought options will be too localised and short-lived to affect the predominantly marine habitats of this site. Adverse in combination effects would not therefore be expected.

*Drainage and Wastewater Management Plans*

The interaction of the WRMP options with specific schemes derived from the emerging Drainage and Wastewater Management Plan (DWMP) can only be assessed at the project level due to the generic nature of the DWMP options.

### Other projects 'in combination'

*Minor projects*

It has not been possible to produce a definitive list of existing (minor) planning applications near this option's zone of influence, and generating a list at this stage would be of little value given the lead times for the option. It is possible that there will be 'in combination' project-specific construction effects associated with future planning applications, although this can only be assessed at the time of any application. This is consistent with the ACWG guidance on cumulative/in combination assessments.

[56] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

*Major Projects*

Reference has been made to the Planning Inspectorate's National Infrastructure Projects database[57] which includes major projects; no major projects are identified that are likely to affect this European site and in reality such in combination effects can only be assessed at the project-level.

### CONCLUSION: SOLENT AND SOUTHAMPTON WATER SPA / SOLENT AND SOUTHAMPTON WATER RAMSAR / SOLENT MARITIME SAC

Pathways are present for implementation and decommissioning to affect these sites and their features. In particular, construction works will be required within the saltmarsh habitats of the Lower Test Valley SSSI. Indirect effects on the site habitats or mobile species (e.g. from site derived pollutants or disturbing activities) can be minimised or avoided with established measures that are known to be available, achievable and effective. Direct effects on site habitats cannot be avoided but can be minimised; the habitats affected are likely to be relatively resilient to the short-term and temporary perturbations expected, and the effects are likely to be reversible in the short- to medium-term with appropriate mitigation and restoration/management. As a result, adverse effects on integrity that are unavoidable at the project level (irrespective of how the scheme is delivered) would not be expected as a result of construction, although this can only be confirmed with project-level assessments including field survey, and detailed scheme design.

The principal operational risk relates to the potential for transfer of INNS from Norway, notably the salmon fluke *Gyrodactylus salaris* (although the catchment of the proposed source is understood to be free from this species). This may occur through transfer of water into Test Little Lake (although this operational reservoir is to some extent isolated from the surrounding environment) or incidental spills / discharges of raw water during pipeline disassembly. The transfer of INNS is not an unavoidable consequence of the scheme operation and so appropriate risk-management must be relied on to ensure that INNS transfer and hence adverse effects do not occur; measures could include pre-scheme monitoring, appropriate controls on discharges, and purging/treatment of residual raw water in the pipelines prior to decommissioning.

## ASSESSMENT: RIVER ITCHEN SAC

### CORE DESIGNATION INFORMATION

The core information relating to the designation (i.e. qualifying features, conservation objectives, supplementary advice documents, information on typical species, supporting habitats and known functional land) is available online and so not replicated here in detail, to minimise repetition and over-simplification of freely available data; **Table E-5** provides links to the key documents and information relating to the designation. Specific information that may be relevant to the assessment of effects is noted as necessary in the assessment sections below (e.g. known areas of functional land identified in the SACO documentation).

**Table E-5 – Core Site Information**

[57] Available at: https://infrastructure.planninginspectorate.gov.uk/projects/

| Aspect | Site Data |
|---|---|
| Site Name | River Itchen SAC |
| Site Code | UK0012599 |
| Qualifying features | - H3260: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation*<br>- S1044: Southern damselfly *Coenagrion* mercurial*<br>- S1092: White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes**<br>- S1096: Brook lamprey *Lampetra planeri**<br>- S1106: Atlantic salmon *Salmo salar**<br>- S1163: Bullhead *Cottus gobio**<br>- S1355: Otter *Lutra lutra** |
| Standard Data Form | Available at: https://jncc.gov.uk/jncc-assets/SAC-N2K/UK0012599.pdf |
| Conservation Objectives | Available at: http://publications.naturalengland.org.uk/publication/5130124110331904?category=6528471664689152 |
| Site Improvement Plan | Available at: http://publications.naturalengland.org.uk/publication/5130124110331904?category=6528471664689152 |
| Supplementary advice | Available at: https://designatedsites.naturalengland.org.uk/TerrestrialAdvicePDFs/UK0012599.pdf |
| Associated SSSIs | River Itchen - 2000227 SSSI |
| Functional land | No specific areas noted, although the importance of the river corridor is noted. |

*Water resource sensitive features, based on Environment Agency (EA) guidance

## MITIGATION ASSUMPTIONS

### Standard Measures / Best-practice

**Appendix C of the Sept23 HRA** identifies standard and established measures that are known to be available, achievable and likely to be effective in avoiding or mitigating potentially adverse effects on European sites and interest features. These are based on best- and case-practice from similar schemes, and so there can be high confidence in their deliverability and effectiveness. These measures would be applied unless project-level HRAs or project-specific environmental studies demonstrate that they are not required (i.e. the anticipated effect will not occur), not appropriate, or that alternative or additional measures are necessary or more appropriate.

### Bespoke measures

Site- or feature-specific mitigation that may be required for specific atypical effects are identified in the assessment sections.

## ASSESSMENT – CONSTRUCTION

The only pathway for effects on this site is via environmental changes that may affect **Atlantic salmon** when using or migrating through Southampton Water; however, it should be noted that the

area within which such environmental changes may be measurable is some distance up-estuary from the mouth of the Itchen, and so whilst it is possible that **Atlantic salmon** associated with the Itchen will use these areas of Southampton Water the risk of exposure is clearly low relative to other areas of Southampton Water. The assessment is made in this context.

### Site-derived pollutants

Substantive excavation is unlikely to be required for installation of temporary infrastructure and so the risk of site-derived pollutants affecting Atlantic salmon or functionally-associated estuarine habitats is generally low; however, this can only be accurately characterised at the project-stage, when the construction requirements (including access tracks or similar) are established in detail. However, exposure can almost certainly be managed or avoided through scheme-design and/or the established best-practice measures noted in Appendix C of the 2023 HRA, and the anticipated magnitude of change in respect of any particular pollutant would be low when mitigation is considered. Consequently, there is a high degree of confidence that site-derived pollutants will not result in unavoidable adverse effects on the population of Atlantic salmon associated with this SAC.

### Direct effects on supporting estuarine habitats

Potential direct effects on estuarine habitats are discussed in the assessment for the 'Solent and Dorset Coast SPA,' above. The scheme will require barges to support a short section of pipeline within the Redbridge Channel; this may also require localised enabling works at the entry / exit points (it is conceivable that some semi-permanent infrastructure may be appropriate at these locations to facilitate pipeline deployment when required).

The precise nature of any direct impacts on the habitats of Southampton Water can only be determined through detailed design, when the exact locations are known. Notwithstanding this, it is anticipated that any effects on site habitats due to implementation will be localised, short-term and temporary; and it is recognised that the marine and intertidal habitats of the SPA in this area are, by their nature, likely to be fairly resilient to such impacts given the natural variance in physio-chemical parameters within the upper estuary (e.g. tidal cycle salinity changes, seasonal variations in freshwater and sediment inputs, etc.). Furthermore, the sensitivity of Atlantic salmon to localised changes is likely to be low, and consequently, there is a high degree of confidence that direct effects on the habitats of Southampton Water will not result in unavoidable adverse effects on the integrity of the River Itchen SAC Atlantic salmon population.

### Disturbance / Displacement

Part of the implementation phase may coincide with the upstream migration of adult salmon in late summer / early autumn[58]. Atlantic salmon are sensitive to noise and vibration, particularly where this is in the water column, and so may be vulnerable to activities associated with pipeline installation, including dockside activities if these are intrusive.

[58] Smolts migrating to the sea in spring are not thought to spend a substantial amount of time in estuarine environments (e.g. research suggests that survival rates of smolts decreases with increased distance and time in estuarine environments (Artero C, Gregory SD, Beaumont WA, Josset Q and others (2023) Survival of Atlantic salmon and sea trout smolts in transitional waters. *Mar Ecol Prog Ser* 709:91-108). Significant and prolonged movements up-estuary from the mouth of the Itchen would not therefore be expected as the smolts coincide their migration with the tidal cycle and seek to reach the sea as soon as possible.

However, it is considered unlikely that this will substantively affect the use of these areas by Atlantic salmon, or result in effects on populations that might undermine site integrity, for the following reasons:

- The closest source of any noise/vibration is within the container port, over 6km up-estuary from the confluence of the Itchen with Southampton Water; it is unlikely that this area is a critical habitat resource for Atlantic salmon associated with the Itchen (such that displacement from this area might affect their survival), or that noise/vibration will be detectable in the lower sections of Southampton Water (particularly given the baseline noise environment).
- The area around Southampton port is and will remain an inherently high-disturbance environment irrespective of this scheme, through movements of vessels on the water and normal harbourside activities. It is very unlikely that the works required for the pipeline installation will significantly increase the exposure of Atlantic salmon to disturbing activities (i.e. there will not be a significant increase in activity levels locally over baseline, or potentially notable variations in the type of activity that might increase disturbance).
- The area likely to be exposed to changes in disturbance factors is a very small proportion of Southampton Water, and any disturbance or displacement would be temporary and short-term.

Consequently, it is considered that the exposure of Atlantic salmon to disturbance will be low (due the location of the works relatively to the Itchen and the likelihood of incidental rather than consistent use of the habitats in this area), with the sensitivity to disturbance also likely to be low (due to the nature of the environment in this location and the inherently high-disturbance baseline). Adverse effects would not therefore be expected through this mechanism.

## ASSESSMENT – OPERATION

### Site-derived pollutants

Potential pollutants associated with operation (e.g. fuels from pumping units) can be managed using established measures. No adverse effects would therefore occur, assuming normal best-practice.

### Disturbance / Displacement

Operational activities that might result in disturbance or displacement of Atlantic salmon will be limited, and local to the Southampton port area only (e.g. noise etc. associated with vessel movements and dockside activities). These activities would not be exceptional for this area, and adverse effects relating to disturbance or displacement would not be anticipated for the reasons noted under ‘Construction’, above.

### Raw water discharges and water quality

No discharges to waterbodies (other than Test Little Lake) would be expected as part of normal operation, although localised discharges of raw water to may occur as residual water is drained from the pipe on decommissioning or at the docks during unloading. However, discharges of residual water to into Southampton Water during operation or decommissioning would be volumetrically inconsequential and insufficient to alter the water quality of Southampton Water due to attenuation. No adverse effects would therefore occur.

### Raw water discharges and INNS

The handling and transfer of raw water from Norway may present a risk of INNS entering Southampton Water, although it should be noted that water will be obtained from a freshwater location approximately 1000m AOD (and so the risk of the brackish / marine habitats and species of Southampton Water[59] being affected will be low for the vast majority of potential INNS).

The principal species of concern is likely to be the salmon fluke *Gyrodactylus salaris* which is endemic in the Baltic Sea but pathogenic to salmonids associated with the Atlantic, and which is present in some river systems in Norway. It is understood that this species is not currently present in the catchment from which the raw water will be obtained, however, and it is generally accepted that the ability of salmon fluke to survive or disperse in saline or brackish water is nil or low[60] depending on the salinity. On this basis the risk of direct transfer via Southampton Water is likely to be low, and measures are likely to be available to reduce this further (e.g. pre-transfer monitoring of the donor catchment; appropriate management and controls of the transfer process; appropriate purge of pipelines prior to disassembly).

## IN COMBINATION EFFECTS

Plans, programmes and projects that have been considered within the in-combination assessment are detailed below.

### Other WRMP options

With regard to other SWS options, the other options with the potential to affect this site are identified in Appendix F of the Sep23 HRA. The Sep23 in combination assessment concluded that there would be no adverse effects on the integrity of this SAC. The inclusion of the Sea Tankering option does not alter this conclusion.

No other water company WRMPs will affect the River Itchen SAC or its mobile species.

### Other Water Company Plans

*Drought Plans*

No drought options identified in SWS's revised draft **Drought Plan 2022**[61], or the plans of neighbouring water companies, have the potential to affect this site based on the HRAs of these documents. Adverse in combination effects would not therefore be expected.

[59] A conceptual model of the estuary (EA (2024) *Estuary Guide* [online]. Available at https://www.estuary-guide.net/pdfs/southampton_water_case_study.pdf) notes that "…*the estuary is essentially marine in nature with salinities in inner parts of Southampton Water rarely falling below 20 psu at the surface and between 30-33 psu at depth*"

[60] The GB Non-Native Species Secretariat suggests that the species typically survives in salinities below 7 psu (practical salinity units; seawater is around 35 psu), although it may reproduce and transmit in estuaries up to 7.5 ppt (~7.5 psu) (Harris PD, Bachmann L & Bakke TA (2011). The Parasites and Pathogens of the Atlantic Salmon: Lessons from *Gyrodactylus salaris*. In Aas Ø, Einum S, Klemetsen A, Skurdal J (Eds.) 2011. *Atlantic Samon Ecology* [online]. Available at https://onlinelibrary.wiley.com/doi/10.1002/9781444327755.ch9 .

[61] Southern Water (2021). Draft Drought Plan 2022 Main report. 31 March 2021, Version 1.0.

*Drainage and Wastewater Management Plans*

The interaction of the WRMP options with specific schemes derived from the emerging Drainage and Wastewater Management Plan (DWMP) can only be assessed at the project level due to the generic nature of the DWMP options.

### Other projects 'in combination'

*Minor projects*

It has not been possible to produce a definitive list of existing (minor) planning applications near this option's zone of influence, and generating a list at this stage would be of little value given the lead times for the option. It is possible that there will be 'in combination' project-specific construction effects associated with future planning applications, although this can only be assessed at the time of any application. This is consistent with the ACWG guidance on cumulative/in combination assessments.

*Major Projects*

Reference has been made to the Planning Inspectorate's National Infrastructure Projects database[62] which includes major projects; no major projects are identified that are likely to affect this European site and in reality such in combination effects can only be assessed at the project-level.

## CONCLUSION: RIVER ITCHEN SAC

This SAC is only potentially exposed to the outcomes of the scheme via its population of Atlantic salmon, which transit Southampton Water on migration. This species is sensitive to environmental changes that may occur as a result of construction or operation, including site-derived pollutants, increased noise or vibration, or the transfer of INNS.

The exposure of salmon to these changes is likely to be low, given the location of the container port and pipeline to the mouth of the Itchen, and the low likelihood that the area potentially affected by the works will be an important or otherwise notable habitat resource for Atlantic salmon associated with the River Itchen SAC. The area potentially affected is also an inherently high-disturbance environment, and potentially notable construction-related environmental changes can be avoided with established measures.

With regard to the INNS risk, the key risk for the River Itchen SAC would likely be salmon fluke. It is arguable that the exposure and sensitivity of Atlantic salmon moving through the brackish and saline water of Southampton Water is relatively low due to the biology of the salmon fluke, although infection is not impossible based on the literature. Consequently, avoiding adverse effects from this aspect relies entirely on prevention of transfer and colonisation through pre-scheme monitoring and the design and implementation of appropriate control measures. These are likely to be challenging, but achievable based on established protocols, although this can only be finalised through the detailed design process.

[62] Available at: https://infrastructure.planninginspectorate.gov.uk/projects/

Canon Court West
Abbey Lawn
Shrewsbury
SY2 5DE

**wsp.com**