Water Resources Management Plan 2019

Annex 15: Habitats Regulations Assessment

Main Report

December 2019

Version 1

from Southern Water

Contents

1. Introduction

1.1 Background and purpose of report

Southern Water has prepared its Water Resources Management Plan (WRMP) 2019 (WRMP19) following public consultation in early 2018 and has undertaken a Habitats Regulations Assessment (HRA) to inform the development of the plan. Approval for Southern Water to publish its final plan was provided by the Secretary of State on Monday 4 November 2019.

Water companies in England and Wales are required to produce a WRMP every five years. The plan sets out how the company intends to maintain the balance between supply and demand for water over the long term planning horizon in order to ensure security of supply in each of the water resource zones (WRZs) making up its supply area.

A water company must ensure its WRMP meets the requirements of the Habitats Regulations before implementation. The requirement for a HRA is established through Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora, hereby referred to as the 'Habitats Directive', in Articles 6(3) and 6(4). The Habitats Directive is transposed into national legislation by the Conservation of Habitats and Species Regulations 2017 (as amended). Under Regulations 63 and 105, any plan or project which is likely to have a significant effect on a European site (either alone or in-combination with other plans or projects) and is not directly connected with, or necessary for the management of the site, must be subject to a HRA to determine the implications for the site in view of its conservation objectives.

Both the 'Strategic Environmental Assessment and Habitat Regulations Assessment - Guidance for Water Resources Management Plans and Drought Plans (UKWIR, 2012) and 'Water Resources Planning Guideline' (EA, NRW, Ofwat, Defra and the Welsh government, 2018) recommend that all WRMPs should be subject to the first stage of HRA, i.e. screening for likely significant effects (LSE).

Where the Stage 1 Screening showed that there are no LSEs from options included in the draft WRMP19 strategies for each of Southern Water's operational areas, either individually or in combination, then no further steps are required. Where the Stage 1 Screening was unable to conclude no LSEs for a particular option or combination of options, further Stage 2 information to inform an Appropriate Assessment has been provided.

This report documents the application of the HRA process to Southern Water's WRMP19 and the HRA conclusions.

1.2 Requirement for HRA

The responsibility for undertaking the HRA lies with Southern Water as the plan making authority.

HRA guidance for the appraisal of plans (Tyldesley and Chapman, 2015), summarises the Habitats Regulations. Regulation 63(5) states that the plan making authority (in this case Southern Water) shall adopt, or otherwise give effect to, the plan only after having ascertained that it will not adversely affect the integrity of a European site, subject to Regulation 63 or 105 of the Habitats Regulations.

Regulation 63 of the Habitats Regulations states:
(1) If the competent authority is satisfied that, there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest (which, subject to paragraph (2), may be of a social or economic nature), it may agree to the plan or project notwithstanding a negative assessment of the implications for the European site or the European offshore marine site (as the case may be).

(2) Where the site concerned hosts a priority natural habitat type or a priority species, the reasons referred to in paragraph (1) must be either—
(a)reasons relating to human health, public safety or beneficial consequences of primary importance to the environment; or
(b)any other reasons which the competent authority, having due regard to the opinion of the European Commission, considers to be imperative reasons of overriding public interest.

Regulation 105 of the Habitats Regulations states:
(1) Where a land use plan—
(a)is likely to have a significant effect on a European site or a European offshore marine site (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,
the plan-making authority for that plan must, before the plan is given effect, make an appropriate assessment of the implications for the site in view of that site's conservation objectives.

(2) The plan-making authority must for the purposes of the assessment consult the appropriate nature conservation body and have regard to any representations made by that body within such reasonable time as the authority specifies.

(3) The plan-making authority must also, if it considers it appropriate, take the opinion of the general public, and if it does so, it must take such steps for that purpose as it considers appropriate.

(4) In the light of the conclusions of the assessment, and subject to regulation 107, the plan-making authority must give effect to the land use plan only after having ascertained that it will not adversely affect the integrity of the European site or the European offshore marine site (as the case may be).

(5) A plan-making authority must provide such information as the appropriate authority may reasonably require for the purposes of the discharge by the appropriate authority of its obligations under this Chapter.

(6) This regulation does not apply in relation to a site which is—
(a)a European site by reason of regulation 8(1)(c), or
(b)a European offshore marine site by reason of regulation 18(c) of the Offshore Marine Conservation Regulations (site protected in accordance with Article 5(4) of the Habitats Directive).

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

6(3). Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.
6(4). If, in spite of a negative assessment of the implications for the site and in the absence of alternative solutions, a plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature, the Member State shall take all compensatory measures necessary to ensure that the overall coherence of Natura 2000 is protected. It shall inform the Commission of the compensatory measures adopted.

If there are no alternative solutions and if, in exceptional circumstances, it is proposed that a plan be adopted despite the fact that it may adversely affect the integrity of a European site, the HRA will need to address and explain the Imperative Reasons of Overriding Public Interest (IROPI) which the plan making authority considers to be sufficient to outweigh the potentially adverse effects on the European site(s).

1.3 Consultation

Natural England and the Environment Agency were consulted on the proposed HRA methodology in summer 2016 and feedback on the methodology was used to finalise the assessment approach. Additionally, a series of consultation meetings have been held with the Environment Agency and Natural England during 2016 to 2018 to discuss the development of Southern Water's draft and the revised draft WRMP19 and the options being considered, including identified potential risks to European sites either from construction and/or operational activities. Regular stakeholder meetings have also been held over the period 2015 to 2018 which have provided the opportunity to discuss emerging findings from the HRA process with a wide range of stakeholders and regulatory bodies.

During the summer and autumn of 2017, Natural England was informally consulted on the initial screening outputs of key options. Comments received from Natural England have been taken into account in preparing this HRA report. The draft WRMP19 was consulted on between March and May 2018. Comments from Natural England, Environment Agency and other stakeholders have been taken into account when preparing this updated HRA Report for the WRMP19.

1.4 Structure of the report

The remainder of this report is divided into the following sections:

- WRMP 2019
- Methodology
- HRA findings
- HRA conclusions and recommendations
- Appendix A: Stage 1 Screening Assessment
- Appendix B: Stage 2 Information to inform an Appropriate Assessment of Fawley Desalination (modular to 75Ml/d and 100Ml/d)

- Appendix C: Stage 2 Information to inform an Appropriate Assessment of import from Bournemouth
- Appendix D: Stage 2 Information to inform an Appropriate Assessment of additional import from Portsmouth Water (Havant Thicket reservoir development)
- Appendix E: Stage 2 Information to inform an Appropriate Assessment of Southampton Link Main
- Appendix F: Stage 2 Information to inform an Appropriate Assessment of Test Estuary Industrial Reuse
- Appendix G: Stage 2 Information to inform an Appropriate Assessment of Portsmouth Harbour WwTW & Fareham WwTW Combined Indirect Potable Reuse
- Appendix H: Stage 2 Information to inform an Appropriate Assessment of Woolston and Portswood WwTW Combined Indirect Potable Reuse
- Appendix I: Stage 2 Information to inform an Appropriate Assessment of Sittingbourne Industrial Reuse

2. Water Resources Management Plan 2019

2.1 Southern Water supply area

Southern Water provides water supplies to just over 2.4 million customers across an area of 4,450 square kilometres, extending from East Kent, through parts of Sussex, to Hampshire and the Isle of Wight in the west.

Water supplies are predominantly reliant on the transmission and storage of groundwater from the widespread chalk aquifer that underlies much of the region. This extends throughout parts of Kent, Sussex, Hampshire and the Isle of Wight and makes up 70% of the total water supply. River abstractions account for 23% of the water supplies, most notably: the Eastern Yar and Medina on the Isle of Wight; the Rivers Test and Itchen in Hampshire; the Western Rother and Arun in West Sussex; the River Eastern Rother and River Brede in East Sussex; and the River Teise, River Medway and Great Stour in Kent. Four surface water impounding reservoirs provide the remaining 7% of water supplies: Bewl Water, Darwell, Powdermill and Weir Wood. The total storage capacity of these four reservoirs amounts to 42,390 million litres. South East Water are entitled to 25% of the available supplies from the River Medway Scheme which incorporates the storage within Bewl Water reservoir.

Despite the South East being one of the driest regions in the UK, rainfall is integral to the maintenance of water supplies. During winter, when most of the effective rainfall occurs, groundwater reserves are recharged naturally through infiltration processes. Rain infiltrates through the soil to recharge the natural storage in the underlying groundwater to support river baseflows for the following year. Annual rainfall averages 730 millimetres across the Southern Water region. Rainfall experienced outside of winter is of less value to groundwater recharge as it is mostly lost to evaporation, plant transpiration or runs off directly into rivers from the land.

Water companies also prepare long-term Water Resources Management Plans that set out the forecasts of demand and reliable water supply availability, with forecasts calculated at the level of WRZs. The Southern Water region is divided into fourteen WRZs, some of which are interconnected, and these are also applicable to the Drought Plan (Figure 1). These fourteen WRZs are amalgamated into three larger, sub-regional areas:

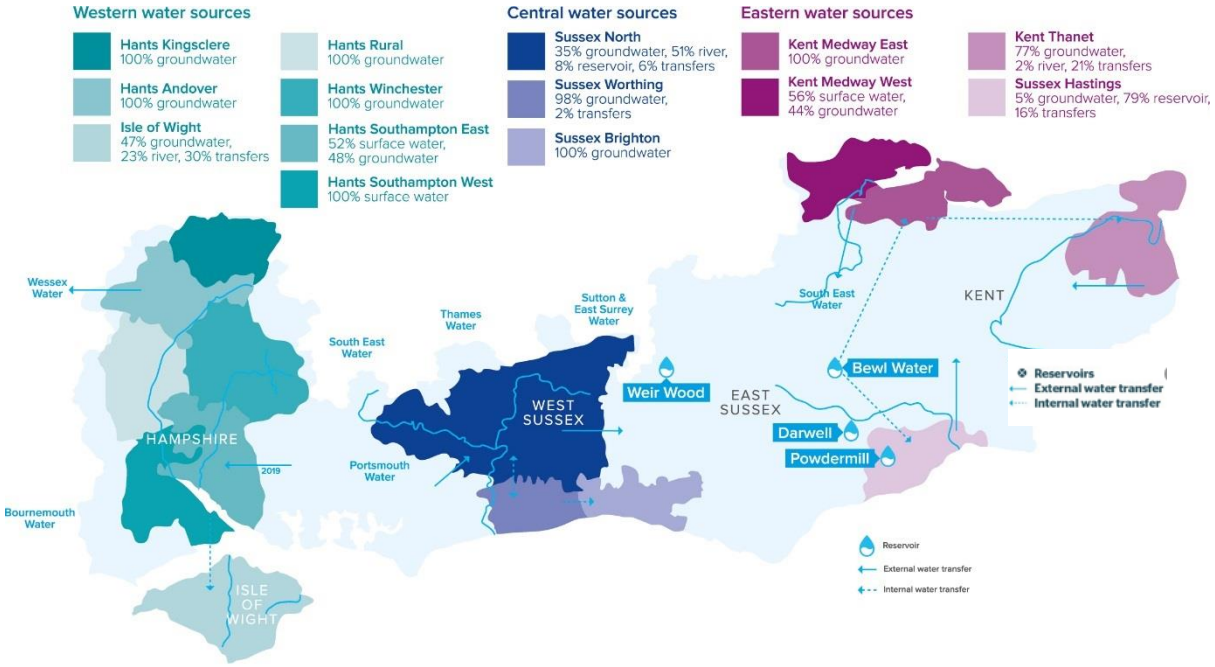
- Western area – comprising the following seven WRZs:
  - Hampshire Andover (HA)
  - Hampshire Kingsclere (HK)
  - Hampshire Winchester (HW)
  - Hampshire Rural (HR)
  - Hampshire Southampton East (HSE)
  - Hampshire Southampton West (HSW)
  - The Isle of Wight (IW)

- Central area – comprising the following three WRZs:
  - Sussex North (SN)
  - Sussex Worthing (SW
  - Sussex Brighton (SB)
- Eastern area – comprising the following four WRZs:
  - Kent Medway West (KMW);
  - Kent Medway East (KME);
  - Kent Thanet (KT)
  - Sussex Hastings (SH).

Southern Water's supply area is bounded by eight other water companies (Thames Water; Wessex Water; Cholderton and District Water; South East Water; Affinity Water; SES Water; Bournemouth Water (part of South West Water); and Portsmouth Water). A number of bulk water supplies are made between Southern Water and several of these adjacent water companies.

The geographical area under consideration for the HRA covers all of Southern Water's WRZs as well as the river and/or groundwater catchments of those water source options that could serve these WRZs but which lie outside their boundaries.

Figure 1 Southern Water's supply area



2.2 Southern Water WRMP development

2.2.1 Overview and timetable

We published our last WRMP in 2014 (WRMP14). In accordance with the Water Resources Management Plan (England) Direction 2017, Southern Water was required to submit an updated draft WRMP19 to the Secretary of State by 1 December 2017. The draft WRMP19 was issued for public consultation along with the SEA Environmental Report and the HRA report in early 2018. Following feedback from the public consultation process, the plan (and associated Strategic Environmental Assessment (SEA), HRA and Water Framework Directive (WFD) assessments) was updated and re-submitted to the Secretary of State as the revised draft WRMP19. Following Defra's request for further information in response to the revised draft WRMP19 and Statement of Response in March 2019, an Addendum to the Statement of Response was published in June 2019. Following approval by the Secretary of State, permission to publish the final WRMP19 was granted on 4 November 2019.

2.2.2 WRMP statutory basis

Under section 37 of the Water Industry Act 1991 (as amended by the Water Act 2003), water companies are required to prepare and maintain statutory WRMPs. The WRMP sets out the measures the company intends to take over the selected planning period (minimum of 25 years) to maintain a supply-demand balance in our water supply operating area and meet the company's chosen level of service for water supply reliability. The plans are developed in accordance with national guidance issued by the Environment Agency, Natural Resources Wales, Ofwat, Defra and Welsh government which require a wide range of issues to be covered in the WRMP, including:

- Future demand for water
- Future reliability of water supplies from existing water sources
- Potential effects of future climate change on demand and water supply reliability
- Key uncertainties and risks – and the required planning 'margin' (headroom) to be maintained to cater for these issues
- The range of options considered to maintain a supply-demand balance over the planning period, including costs, benefits and environmental effects
- The factors used to reach a final decision on the 'best value' programme for each WRZ and the WRMP as a whole.

2.2.3 WRMP19 development and consultation

Southern Water has developed this plan over more than two years, including extensive consultation with regulatory bodies (particularly the Environment Agency and Natural England), customers and stakeholders. A very large number and wide range of options has been considered as part of the development of this plan, and customer research has been undertaken to gain insights into their preferences in respect of the different types of options; the customer research findings have been used to help inform the final 'best value' programme of options to maintain the supply-demand balance. Similarly, the environmental considerations have been considered from the outset as described earlier and used to help inform decision-making.

2.3 Southern Water's WRMP19

There are two broad categories of options considered in developing this plan: demand management measures and supply-side measures. These are described below.

2.3.1 Demand management measures

Demand management options can be effective in controlling what might otherwise be unrestricted growth in demand for water, which could consequently trigger investment in water resource developments earlier in the planning period than would otherwise be necessary. The implementation of demand management measures is therefore an important component of the Southern Water's approach to sustainable water resources planning. The range of options considered have been categorised according to the naming convention in Table 1.

Table 1 Demand management WRMP19 option types

Option group	Option group code	Option category	Option category code
Demand management	DM	Leakage management	LM
		Metering/tariffs	MET
		Water efficiency	WEF

2.3.2 Supply-side measures

Supply-side options are designed to provide more water and/or maintain existing reliability of water supplies over the longer term. A large number of supply-side options have been investigated for this plan. The range of options considered can be divided into the option categories shown in

.

Table 2 Supply-side options

Option group	Option group code	Option category	Option category code
Drought options	DO	Demand interventions	DI
		Supply interventions	SI
New water	NW	Desalination	DES
		Canal water abstraction	CWA
		Groundwater abstractions (new)	GWA
		Surface water abstractions	SWA
		New technologies	NT
Storing water	STR	Aquifer storage and recovery	ASR
		Reservoirs	RES
Water reuse	WR	Indirect potable water reuse	PWR
		Industrial water reuse	IWR
		Grey water reuse	GRE
Managing the water environment	ENV	Catchment management	CM
		Conjunctive use	CU
		Licence variation	LV
		Supporting river flows	SRF
Trading water	TW	Bulk supplies	BS
		Bulk export	BE
		Inter-zonal transfers (between Southern Water WRZs)	IZT
		Licence trading	LTR
Managing existing assets	ASS	Asset enhancement	AE
		Water treatment works enhancement	WTW
		Borehole rehabilitation	BR

All of these options have been subject to HRA screening at different levels of detail as the options have progressed through the WRMP19 development:

- Unconstrained list of options: high level HRA screening to remove options with clear likely significant effects on European sites where there were sufficient alternative options available to provide a reasonable choice of alternative measures to maintain a supply-demand balance
- Constrained list of options: screening exercise based on an outline scheme description to remove options with likely significant effects on European sites where there were sufficient alternative options available to provide a reasonable choice of alternative measures to maintain a supply-demand balance
- Feasible list of options: HRA Stage 1 screening applied to all options to assess if any likely significant effects on any European sites. Since the publication of the draft WRMP19, there was an important judgement in the Court of Justice of the European

Union (CJEU) in April 2018[1] (the “People over Wind” or “Sweetman” judgment) which ruled that Article 6(3) of the Habitats Directive must be interpreted as meaning that mitigation measures should be assessed within the framework of an Appropriate Assessment and that it is not permissible to take account of mitigation measures at the screening stage. In dialogue with Natural England, we reviewed the screening decisions that had been included in the draft WRMP19 and, where necessary, we amended the screening assessment to note the requirement to take the option through to Stage 2 Appropriate Assessment if it is considered for inclusion in the preferred programme. This was documented in the revised draft WRMP19, and remains the approach taken in the final WRMP19

- Preferred programme and strategic alternatives for WRMP19: where the HRA Stage 1 screening was not able to conclude no Likely Significant Effects, a Stage 2 Appropriate Assessment has been carried out for options included in the preferred programme (strategy) for each operational area, or for strategic alternative options

The findings from this HRA process have been used to inform decision-making on the ‘best value’ strategy for each of Southern Water’s operational areas.

[1] Court of Justice of the European Union Case C-323/17: People over Wind & Sweetman

3. Methodology

3.1 Overview

The objective of the HRA is to establish whether measures included in this plan are likely to have a significant effect on European sites (alone or in-combination with other supply schemes in the plan, or with other plans and projects), adopting the precautionary principle, and where likely significant effects cannot be ruled out, to determine through Appropriate Assessment whether the option would adversely affect the integrity of an European site(s).

The HRA has been undertaken in parallel with the SEA and WFD assessment to ensure an integrated approach to environmental assessment, and has been used to inform the development of the WRMP19 to ensure its overall compliance with relevant legislation. Figure 2 and Figure 3 show the overall process for integrating HRA into the development of the plan.

Figure 2 Integrating HRA into WRMP decision-making alongside SEA and WFD assessments

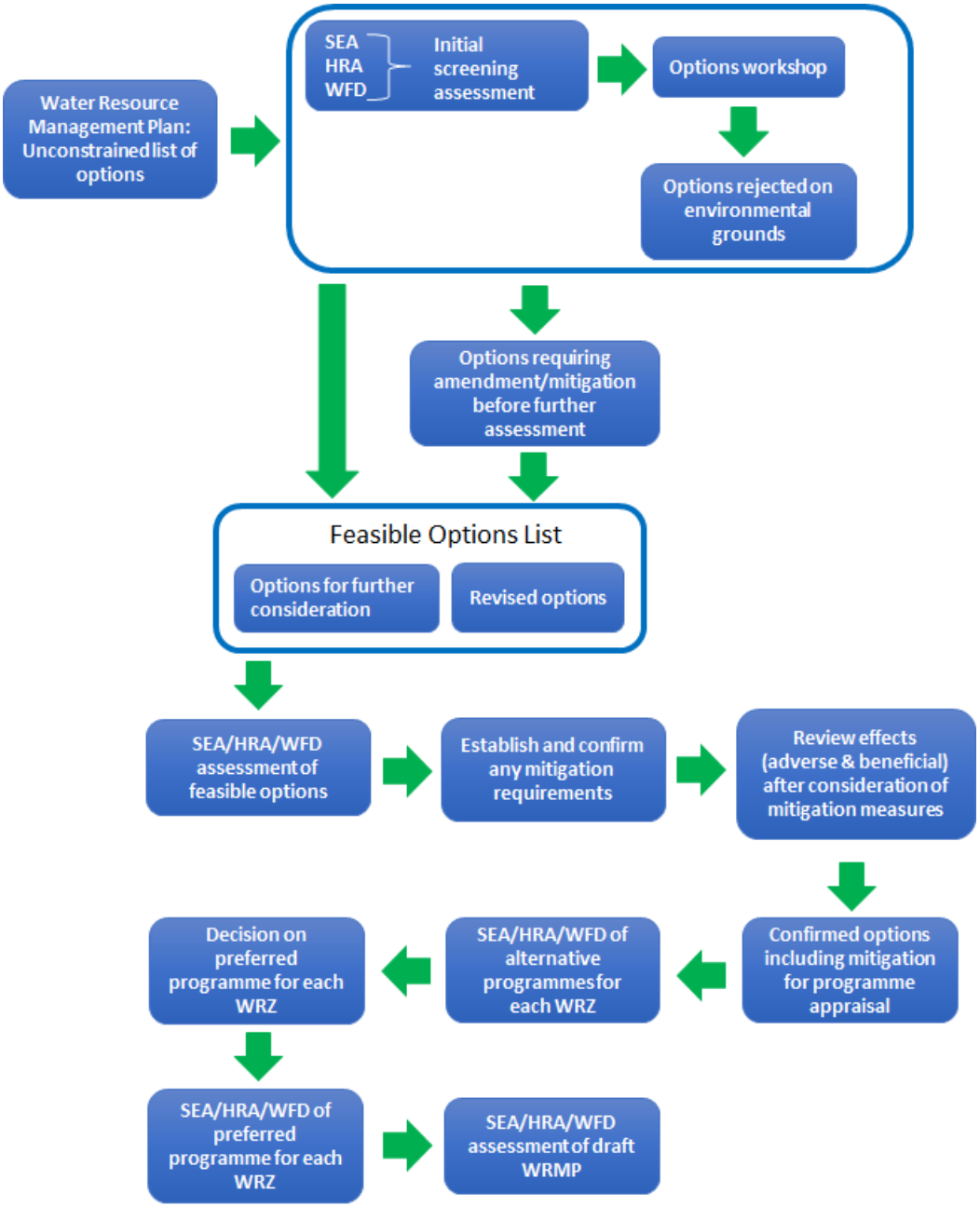


Figure 3 Integrating HRA into the WRMP development alongside SEA and WFD assessments

Two stages of the HRA process have been required for the WRMP19:

Stage 1 Screening*: *draft WRMP19
For the draft WRMP19, a screening process was undertaken to identify whether each option considered for potential inclusion in Southern Water's draft WRMP19 (either alone or in combination) is likely to have any significant effects on European sites (LSEs – likely significant effects). Initially, a high level screening process was carried out on the unconstrained list of options (Figure 2) to rule out options with likely significant adverse effects on European sites. Further screening of the constrained list of options was carried out, resulting in several options being rejected due to likely significant adverse effects on European sites. All of the remaining feasible options were then subject to more detailed HRA Stage 1 Screening as set out in this report.

The HRA Stage 1 Screening findings were actively used by Southern Water in determining the 'best value' strategic programme of options for each of its three operational areas. In particular, all options selected for initial consideration were subject to further HRA review to make decisions on whether any options should be removed from the strategy based on the screening findings where this was feasible given the scale of the supply deficit challenges faced by Southern Water.

Options selected for inclusion in the WRMP19 strategies were also subject to cumulative, in-combination assessment with other options and other projects, programmes and plans.

Stage 1 Screening: Revised draft WRMP
Following consultation comments on the draft WRMP, a significant amount of work was undertaken to review those options with long pipeline routes that may impact on European sites (and other environmentally sensitive features) to establish whether the routes can be further optimised at this strategic planning stage to reduce environmental impacts. We also reviewed some other asset site locations and design assumptions (e.g. for the Fawley desalination plant option, reuse scheme options affecting the River Itchen) in order to reduce environmental impacts. These options were re-screened for any likely significant effects in light of the revisions made to the scheme design.

The screening for the revised draft WRMP19 was undertaken in accordance with the CJEU "People over Wind" ruling on excluding mitigation measures from the assessment. This remains the approach taken for the final WRMP19.

Stage 2 Appropriate Assessment
Where a likely significant effect could not be ruled out (noting the precautionary principle and the "People over Wind" ruling on excluding mitigation measures) for an option included in the preferred strategies (or identified as a strategic alternative option) for a particular operational area (either alone or in combination with other options), information to inform an Appropriate Assessment was provided and the findings included in this HRA report. The Stage 2 assessments have considered any potential cumulative, or in-combination, effects with other projects, programmes or plans.

Assessment approach
The HRA has been undertaken in accordance with the latest available guidance for England as at November 2019 and based on a precautionary approach. It follows the staged HRA approach, as discussed above.

The WRMP19 proposes a range of demand management and supply augmentation options which the company plans to take forward for further investigation in order to maintain a supply-demand balance over the long-term planning period. The HRA (alongside the SEA and WFD assessment of the WRMP19) has helped to inform the development of the plan as described in this report.

For each option, the HRA has considered whether there are any likely significant effects (LSE) arising from construction or implementation activities and/or operation of the measure on one or more European sites, including Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) (also known as Natura 2000 sites) and Ramsar sites:

- SPAs are classified under the European Council Directive 'on the conservation of wild birds' (2009/147/EC; 'Birds Directive') for the protection of **wild birds and their habitats** (including particularly rare and vulnerable species listed in Annex 1 of the Birds Directive, and migratory species)
- SACs are designated under the Habitats Directive (92/43/EEC) and target particular **habitats** (Annex 1) **and/or species** (Annex II) identified as being of European importance
- The Government also expects potential SPAs (pSPAs), candidate SACs (cSACs), compensation habitat and Ramsar sites to be included within the assessment, along with any 'functional' habitat associated with SPAs
- Ramsar sites support **internationally important wetland habitats** and are listed under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention, 1971)

For ease of reference throughout this HRA report, these designations are collectively referred to as "European sites", despite Ramsar designations being made at the international level rather than EU level.

The HRA Stage 1 Screening process identified whether each potential option considered for inclusion in the plan is likely to have any significant effects on European designated sites. The purpose of the screening stage was to determine whether any part of the plan is likely to have a significant effect on any European site (including areas of compensation habitat, areas of functional land, and the ability for any abstractions to be maintained for the active management of designated sites). This has been judged in terms of the implications of the plan for the conservation objectives of the site, its 'qualifying features' (i.e. those Annex I habitats, Annex II species, and Annex I bird populations for which it has been designated[2], and Ramsar criterion), and any Site Improvement Plan measures. Significantly, HRA is based on a rigorous application of the precautionary principle: where uncertainty or doubt remains, an impact has been assumed, triggering the requirement for Appropriate Assessment of that option if it is included in the preferred programme or as a strategic alternative for the WRMP19.

The screening stage also included assessment of any in-combination effects that might result from the concurrent implementation of different management measures within the plan itself, or in-combination with other plans, activities and projects, and whether these would adversely affect the integrity of a European site, either alone or in combination with other plans and projects.

[2] Annexes are contained within the relevant EC Directive.

3.2 Potential impacts of the WRMP19 options

To provide an indication of those measures that may have likely significant effects on a European site(s), all options were initially reviewed to establish whether there were any European sites within 10km of the option location. Consideration was also been given to the relative spatial locations of the option and designated sites within the same surface water and groundwater catchments and/or estuarine system to ensure that any hydrological connectivity over a longer distance than 10km that might affect water-dependent sites, qualifying features and designated mobile species has been taken into account. GIS data has been used to map the locations and boundaries of each of the European sites in relation to the different options.

The attributes of the European sites, which contribute to and define their integrity, have been considered with reference to Standard Data forms for SACs and SPAs and Information Sheets for Ramsar sites. An analysis of these information sources has enabled the identification of the site's qualifying features. This information, as well as Article 17 reporting, site conservation objectives, supplementary guidance, Site Improvement Plans and the supporting Site of Special Scientific Interest's favourable condition tables, has been used to identify those features of each site which determine current conservation status, site integrity and the specific sensitivities of the site. Analysis of how potential impacts of each option may affect a European site has been undertaken using this information.

The qualifying habitats and species of European sites are vulnerable to a wide range of impacts such as physical loss or damage of habitat, disturbance from noise, light, human presence, changes in hydrology (e.g. changes in water levels/flow, flooding), changes in water or air quality and biological disturbance (e.g. direct mortality, introduction of disease or non-native species). The assessment has considered both construction effects (where applicable) and operational effects of each measure and any post operational (decommissioning) effects.

In determining likely significant effects on European sites from any option, particular consideration has been given to the possible source-receptor pathways through which effects may be transmitted from activities associated with the option to features contributing to the integrity of the European sites (e.g. groundwater or surface water catchments, air-borne impacts, etc.).

Table 3 provides examples of the types of impacts the measures might have on European site qualifying features.

Screening for likely significant effects has been determined on a proximity basis for many of the types of impacts, based on the proximity of the potential location of each measure to each European site. However, there are many uncertainties associated with using set distances as there are very few standards available as a guide to how far impacts will extend. Different types of impacts can occur over different distances, and the assumptions and distances used in the HRA and justification for them are shown in

Table 3.

Table 3 Example impacts of water resource options on European sites

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
Physical habitat loss: • Removal (including offsite effects, e.g. foraging habitat) • Smothering	Development of infrastructure associated with scheme, e.g. new or temporary pipelines, transport infrastructure, temporary weirs. Indirect effects from a reduction in flows e.g. drying out marginal habitat. *Physical loss is mostly likely to be significant where the boundary of the scheme extends within the boundary of the European site, or within an offsite area of known foraging, roosting, breeding habitat (that supports the species population for which a European site is designated).*
Physical damage: • Sedimentation / silting • Prevention of natural processes • Habitat degradation • Erosion • Fragmentation • Severance/barrier effect • Edge effects	Impacts of construction and maintenance activities e.g. trampling, vegetation clearance, sedimentation/siltation. *Physical damage is likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated, or where natural processes link the scheme to the site, such as through hydrological connectivity downstream of a scheme, long shore drift along the coast, or the scheme impacts the linking habitat).*
Non-physical disturbance: • Noise • Visual presence • Human presence • Light pollution	Noise from temporary construction or temporary pumping activities. *Taking into consideration the noise level generated from general building activity[3] (c. 122dB(A)) and considering the lowest noise level identified in appropriate guidance as likely to cause disturbance to bird species, it is concluded that noise impacts could be significant up to 1km from the boundary of the European site[4].* Noise from vehicular traffic during operation of a scheme. *Noise from construction traffic is only likely to be significant where the transport route to and from the scheme is within 3-5km of the boundary of the European site[5].* Plant and personnel involved in in operation of the scheme. *These effects (noise, visual/human presence) are only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports the species population for which a European site is designated).* Schemes which might include artificial lighting, e.g. for security around a temporary pumping station.

[3] British Standards Institute (BSI) (2009) BS5228 - Noise and Vibration Control on Construction and Open Sites. BSI, London.

[4] Environment Agency (2013) Bird Disturbance from Flood and Coastal Risk Management Construction Activities. Overarching Interpretive Summary Report. Prepared by Cascade Consulting and Institute of Estuarine and Coastal Studies,

[5] A series of studies carried out in the Netherlands have shown that road noise levels above 42-43dB and 47dB results in a rapid fall in population of woodland and grassland breeding bird species, with disturbance distances varying between species from 20 to 1700 metres from the road (at 5000 cars a day) and up to 3.53 kilometres at 50,000 cars a day. The most recent study is: Reijnen, R.; Foppen, R.; Veenbaas, G. (1997) *Disturbance by traffic of breeding birds: evaluation of the effect and considerations in planning and managing road corridors.* Biodiversity and Conservation 6 (4), 567-581.

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
	Effects from light pollution are only likely to be significant where the boundary of the scheme is within 500m of the boundary of the European site. *From a review of Environment Agency internal guidance on HRA and various websites, it is considered that effects of vibration and noise and light are more likely to be significant if development is within 500m of a European site.*
Water table/availability: • Drying • Flooding / stormwater • Changes to surface water levels and flows • Changes in groundwater levels and flows • Changes to coastal water movement	Changes to water levels and flows due to increased water abstraction, reduced storage or reduced flow releases from reservoirs to river systems. *These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.*
Toxic contamination: • Water pollution • Soil contamination • Air pollution	Reduced dilution in downstream or receiving waterbodies due to changes in abstraction or reduced compensation flow releases to river systems. *These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.* Air emissions associated with plant and vehicular traffic during construction and operation of schemes. *The effect of dust is only likely to be significant where site is within or in proximity to the boundary of the European site [6,7]. Without mitigation, dust and dirt from the construction site may be transported onto the public road network and then deposited/spread by vehicles on roads up to 500m from large sites, 200m from medium sites, and 50m from small sites as measured from the site exit.* *Effects of road traffic emissions from the transport route to be taken by the project traffic are only likely to be significant where the protected site falls within 200 metres of the edge of a road affected[8].*
Non-toxic contamination: • Nutrient enrichment (e.g. of soils and water) • Algal blooms • Changes in salinity • Changes in thermal regime • Changes in turbidity • Changes in sedimentation/silting	Changes to water salinity, nutrient levels, turbidity, thermal regime due to increased water abstraction, storage, or reduced compensation flow releases to river systems. *These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European Site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.*
Biological disturbance: • Direct mortality • Changes to habitat availability	Creation of new pathway of non-native invasive species. *This effect is only likely to be significant where the scheme is situated within the European site or an upstream tributary of the*

[6] Highways Agency (2003) Design Manual for Roads and Bridges (DMRB), Volume 11.
[7] Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction v1.1.
[8] NE Internal Guidance – Approach to Advising Competent Authorities on Road Traffic Emissions and HRAs V1.4 Final - June 2018

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
• Out-competition by non-native species • Selective extraction of species • Introduction of disease • Rapid population fluctuations • Natural succession	*European site. However, the construction of pipelines can act as conveyancing routes without suitable mitigation, and other forms of dispersal (e.g. via birds) also need to be considered.*

3.3 Habitats Directive review of consents process

The Environment Agency's review of consents (i.e. including all of Southern Water's abstraction licences for our existing water sources) was undertaken by considering all European sites within Southern Water's supply area. The European sites were initially screened to identify all sites with water-dependent habitat within Southern Water's supply area. Those sites that contained water-dependent habitat were then reviewed to assess whether Southern Water abstractions were located within the same groundwater or surface water catchment and therefore could have potential to affect the hydrogeological or hydrological regime of the sites.

Any sites that were in the same catchment as a Southern Water licensed abstraction source were assessed in more detail to determine whether the abstraction would be likely to have a significant effect. The Environment Agency looked in more detail at the sensitivities of the European site to water supply, and at the local hydrology. For example, a European site may be fed by surface water and the abstraction may be downstream, or the abstraction may be from a confined aquifer which could not impact the water supply at the protected site.

A summary of the results of the Review of Consents process, and the licence variations that are being sought following this process, is provided in Table 4. The conclusions have been used to help inform consideration of the effects of existing water sources and potential in-combination effects with proposed new water source developments as part of the HRA of this plan. This table has been updated since the draft WRMP19 following the conclusions of the Public Inquiry held in March 2018 into the Southern Water lower Itchen abstraction licences.

3.4 Managed wetlands

Currently, many existing abstractions are exempt from requiring an abstraction licence. These include abstractions that are made for conservation purposes such as for managed wetlands. Natural England has indicated that, following the implementation of the relevant provisions contained in the Water Act of 2003, such exemptions will no longer be in place (anticipated to be implemented during 2018). Any abstraction after this period will require a licence, and there is a two year timetable to implement this with the Environment Agency.

The potential impacts of the implementation of a WRMP19 option has included (where appropriate) consideration of the effects on any abstraction of water required for the conservation of designated sites such as managed wetlands. Any existing abstractions for conservation purposes will have been considered as part of the baseline measured hydrology flow data used in the assessments.

Table 4 Habitats Regulations Review of Consents: High Priority Sites Stage 4 Decisions

Permission Type	Licence	Sites affected by Abstraction Licences						FINAL STAGE 4 PROPOSED REQUIREMENTS
		River Itchen SAC	Solent Maritime SAC	Solent & Southampton Water SPA	Portsmouth Harbour SPA	Chichester & Langstone Harbours SPA	Solent & Isle of Wight Lagoons SAC	
	Candover Augmentation Scheme - Environment Agency asset and licence	**Yes**						Reduce daily abstraction limit from 36Ml/d to 5Ml/d (proposed to Secretary of State) between May and August (inclusive). EA to carry out habitat improvements under Regulation 51(3).
	Alre Augmentation Scheme - Environment Agency asset and licence	**Yes**						EA carry out habitat improvements under Regulation 51(3).
	Itchen SW - Southern Water PWS 11/42/22.7/94	**Yes**						Itchen SW - Add monthly abstraction limits for June, July, August and September; Apply a Hands Off Flow condition. Proposed to Secretary of State.
	Itchen GW - Southern Water PWS 11/42/22.6/93	**Yes**						GW - Add monthly abstraction limits for June, July, August and September; Apply a Hands Off Flow condition. Proposed to Secretary of State.
	Blackwater Intake - Southern Water Augmentation Scheme 11/42/22.6/92		**Yes**	**Yes**				Increase MRF from 2.7Ml/d to 6Ml/d at Shide
	Caul Bourne - Southern Water PWS 12/101/4/G/8		**Yes**	**Yes**				Time limit licence for 12 years and link to IoW CAMS
	Shalcombe PWS (Caulbourne) 12/101/4/G/9		**Yes**	**Yes**				Time limit licence for 12 years and link to IoW CAMS

3.5 Review of potential in-combination effects

In accordance with the requirements of the Habitats Directive, the HRA has considered the in-combination effects with other activities, programmes, plans and projects that could have an impact on the European sites identified within the HRA. These have included schemes identified in other Southern Water plans (including our Drought Plan 2019), neighbouring water company revised draft and final 2019 WRMPs (as at November 2019) and Drought Plans, Environment Agency Drought Plans, other major projects being brought forward by Southern Water, other neighbouring abstractions, discharges and land use, and relevant activities and projects in land use and infrastructure plans.

The following plans and projects have therefore been considered in the HRA:

- Inter-option effects within the Southern Water WRMP19
- Southern Water Drought Plan 2019
- Other water company revised draft and final 2019 WRMPs (as at November 2019) and currently published Drought Plans:
    - Affinity Water
    - Bournemouth Water (now part of South West Water)
    - Cholderton and District Water
    - Portsmouth Water
    - South East Water
    - SES Water
    - Thames Water
    - Wessex Water
- Environment Agency National Drought Action Plan
- River Basin Management Plans – Thames River Basin District and South East River Basin District
- Canal and River Trust *Putting Water into Waterways* Water Resources Strategy 2015-2020
- Lower Tidal River Arun Flood Management Strategy
- River Medway Flood Storage Areas project

The assessment has used all publicly available information as at November 2019. Consequently, further updates may be required to the HRA cumulative assessment as information becomes available as the plan is taken forward into implementation.

4. Stage 1: Screening of WRMP19 options

4.1 Potentially affected European sites

The assessment area covered by Southern Water's WRMP19, and the SACs, SPAs and Ramsar sites within it, are shown on Figure 4.

The initial review was undertaken on all of the 'constrained' list of options considered for each of Southern Water's operational areas and a 'red', 'amber' or 'green' status was applied based on the following initial review conclusions:

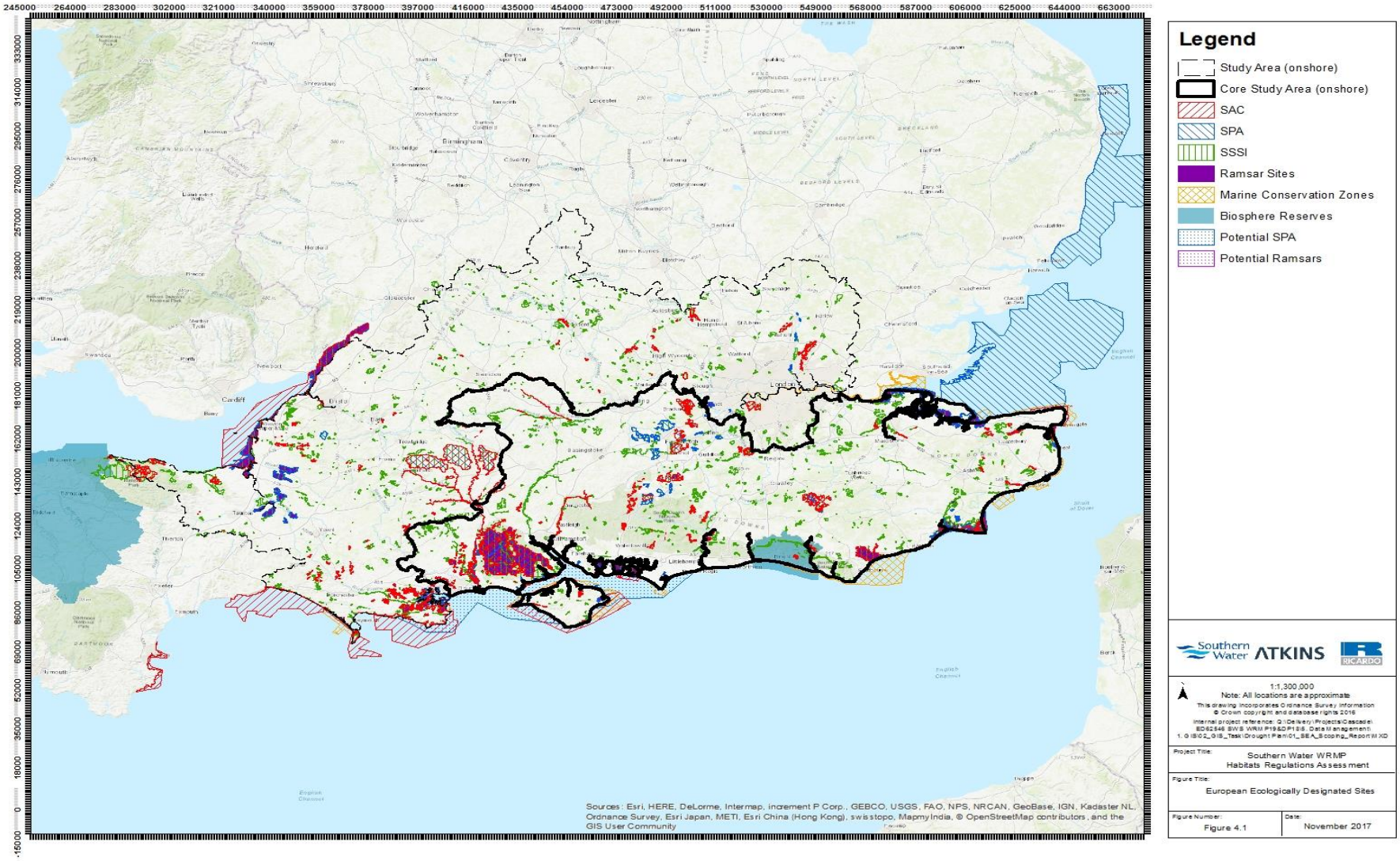
Potential adverse impact on European Designated site considered likely

Potential adverse impacts on European designated sites considered possible

No risk to European designated sites.

The outcome of this initial HRA review, in consideration with other factors (e.g. planning and technical risks, other environmental impacts and the effectiveness of option), led to removal of some options and the identification of a ***feasible list*** of WRMP19 options (see also Annex 6 and Annex 14 for details of the overall process). For example, a desalination option for the Stour estuary was removed from the constrained list due to concerns about effects on several European sites. The following sections set out the potential European sites that might be affected by construction and / or operation of each of the feasible list options.

Figure 4 European sites within the study area

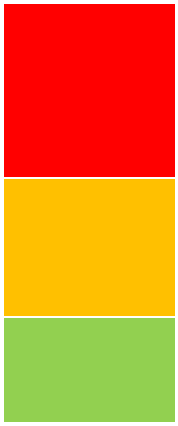


4.2 Likely significant effects (LSEs) of WRMP19 feasible options

4.2.1 Stage 1 Screening assessment of feasible options

Appendix A provides the detailed Stage 1 Screening assessments for those options where likely significant effects are possible and therefore were assigned a 'red' or 'amber' status in the initial HRA review.

In the Stage 1 assessment, the Likely Significant Effect (LSE) on European designated site for each option was assessed in more detail, using a further 'Red', 'Amber', 'Green' classification in the assessment tables as follows:



Likely Significant Effect with strong potential for residual adverse effects to be identified at Stage 2 Appropriate Assessment. Option to be avoided where possible, but Stage 2 Appropriate Assessment required if the option is selected for inclusion in any WRMP19 strategy.

Likely Significant Effect but Stage 2 Appropriate Assessment may be able to ensure no adverse effects on site integrity. Stage 2 Appropriate Assessment required if the option is selected for inclusion in any WRMP19 strategy

No Likely Significant Effect. Stage 2 Appropriate Assessment not required.

The screening conclusions are summarised by operational area below.

Western area

Table 5 summarises those feasible options assessed as ***'red'*** or '***amber***' in the Stage 1 assessment with likely significant effects on European sites. The remaining options were assessed as having no LSEs.

Table 5 Option screening for Likely Significant Effects on a European site in the Western area

Option Name	Area	Option Group	Briddlesford Copses SAC	Dorset Heaths SAC	Emer Bog SAC	Great Yews SAC	Isle of Wight Downs SAC	Kennet & Lambourn Floodplain SAC	Kennet Valley Alderwoods SAC	Mottisfont Bats SAC	The New Forest SAC	River Avon SAC	River Itchen SAC	River Lambourn SAC	Solent & Isle of Wight Lagoons SAC	Solent Maritime SAC	South Wight Maritime SAC	Avon Valley SPA & RAMSAR	Chichester & Langstone Harbours SPA & RAMSAR	Dorset Heaths SPA & RAMSAR	New Forest SPA & RAMSAR	Outer Thames Estuary SPA & RAMSAR	Portsmouth Harbour SPA & RAMSAR	Solent & Southampton Water SPA & RAMSAR	Solent and Dorset Coast pSPA
Import from Bournemouth Water	Western	TW																							
Additional import from Portsmouth Water (Havant Thicket reservoir development)	Western	TW																							
Test to Lower Itchen - potable water	Western	ASS																							
Test Estuary WTW Industrial reuse (9Ml/d)	Western	WR																							
Fawley desalination (modular to 75Ml/d)	Western	NW																							
Fawley desalination (50 Ml/d)	Western	NW																							
Fawley desalination (100 Ml/d)	Western	NW																							
Southampton link main (reversible link HSW-HSE)	Western	ASS																							
Abingdon–Basingstoke–Lower Itchen (30 Ml/d)	Western	TW																							
Abingdon–Basingstoke–Lower Itchen (80 Ml/d)	Western	TW																							
Portsmouth Harbour WTW (40 Ml/d)	Western	WR																							
Portsmouth Harbour WTW (60 Ml/d)	Western	WR																							
Portsmouth Harbour WWTW & Fareham WWTW Indirect Potable Reuse (90 Ml/d)	Western	WR																							
Combined Woolston and Portswood WWTW Indirect Potable Reuse (13.5 Ml/d)	Western	WR																							
Combined Woolston and Portswood WWTW Indirect Potable Reuse (20.5 Ml/d)	Western	WR																							
Desalination plant at Sholling (10 Ml/d)	Western	NW																							
Desalination plant at Sholling (100 Ml/d)	Western	NW																							
Desalination plant at Sholling (20 Ml/d)	Western	NW																							
Desalination plant at Sholling (50 Ml/d)	Western	NW																							
Fawley desalination (150 Ml/d)	Western	NW																							
Fawley desalination (200 Ml/d)	Western	NW																							
Test Estuary Desalination (100 Ml/d)	Western	NW																							
Test Estuary Desalination (150 Ml/d)	Western	NW																							
Test Estuary Desalination (200 Ml/d)	Western	NW																							

Option Name	Area	Option Group	Briddlesford Copses SAC	Dorset Heaths SAC	Emer Bog SAC	Great Yews SAC	Isle of Wight Downs SAC	Kennet & Lambourn Floodplain SAC	Kennet Valley Alderwoods SAC	Mottisfont Bats SAC	The New Forest SAC	River Avon SAC	River Itchen SAC	River Lambourn SAC	Solent & Isle of Wight Lagoons SAC	Solent Maritime SAC	South Wight Maritime SAC	Avon Valley SPA & RAMSAR	Chichester & Langstone Harbours SPA & RAMSAR	Dorset Heaths SPA & RAMSAR	New Forest SPA & RAMSAR	Outer Thames Estuary SPA & RAMSAR	Portsmouth Harbour SPA & RAMSAR	Solent & Southampton Water SPA & RAMSAR	Solent and Dorset Coast pSPA
Test Estuary Desalination (50 Ml/d)	Western	NW																							
Portswood WWTW Indirect Potable Water Reuse (13 Ml/d)	Western	WR																							
Portswood WWTW Indirect Potable Water Reuse (8.5 Ml/d)	Western	WR																							
Sandown Coastal desalination IOW (20 Ml/d)	Western	NW																							
Sandown Coastal desalination IOW (8.5 Ml/d)	Western	NW																							
Test WSW	Western	DO																							
Transfer from UTMRD to Lower Itchen (30 Ml/d)	Western	TW																							
Transfer from UTMRD to Lower Itchen (80 Ml/d)	Western	TW																							
Triplicate Cross Solent Main	Western	ASS																							
Woolston WWTW Indirect Potable Reuse (5 Ml/d)	Western	WR																							
Woolston WWTW Indirect Potable Reuse (7.5 Ml/d)	Western	WR																							

Central area

Table 56 summarises those feasible options assessed as ***'red'*** or '***amber***' in the Stage 1 assessment with likely significant effects on European sites. The remaining options were assessed as having no LSEs.

Table 6 Option screening for Likely Significant Effects on a European site in the Central area

Option Name	Area	Option Group	Arun Valley SAC	Duncton to Bignor Escarpment SAC	Ebernoe Common SAC	The Mens SAC	Arun Valley SPA & RAMSAR
Littlehampton WWTW (10Ml/d)	Central	WR					
Littlehampton WWTW (MET 10Ml/d)	Central	WR					
Littlehampton WWTW (MET 20Ml/d)	Central	WR					

Eastern area

Table 7 summarises those feasible options assessed as ***'red'*** or '***amber***' in the Stage 1 assessment with likely significant effects on European sites. The remaining options were assessed as having no LSEs.

Table 7 Option screening for Likely Significant Effects on a European site in the Eastern area

Option Name	Area	Option Group	North Downs Woodlands SAC	Peter's Pit SAC	Queendown Warren SAC	Sandwich Bay SAC	Stodmarsh SAC	Thanet Coast SAC	Benfleet & Southern Marshes SPA & RAMSAR	Dungeness, Romney Marsh & Rye Bay SPA & RAMSAR	Foulness (Mid-Essex Coast Phase 5) SPA & RAMSAR	Medway Estuary and Marshes SPA & RAMSAR	Outer Thames Estuary SPA & RAMSAR	Stodmarsh SPA & RAMSAR	Thames Estuary & Marshes SPA & RAMSAR	Thanet Coast & Sandwich Bay SPA & RAMSAR	The Swale SPA & RAMSAR
Camber Desalination near Rye Bay (10 Ml/d)	Eastern	NW															
Camber Desalination near Rye Bay (5 Ml/d)	Eastern	NW															
Desalination in Thanet (10 Ml/d)	Eastern	NW															
Desalination in Thanet (20 Ml/d)	Eastern	NW															
Emergency Desalination - Sheerness	Eastern	NW															
Isle of Sheppey Desalination Plant 10 Ml/d	Eastern	NW															
Isle of Sheppey Desalination Plant 20 Ml/d	Eastern	NW															
Medway Estuary WWTW (20Ml/d)	Eastern	WR															
Medway Estuary WWTW (37Ml/d)	Eastern	WR															
Medway Estuary WWTW (MET 20 Ml/d)	Eastern	WR															
Medway Estuary WWTW (MET 37 Ml/d)	Eastern	WR															
Stourmouth WSW New WSW near Minster	Eastern	NW															
River Stour Desalination (10 Ml/d)	Eastern	NW															
River Stour Desalination (20 Ml/d)	Eastern	NW															
River Thames Desalination (10 Ml/d)	Eastern	NW															
River Thames Desalination (20 Ml/d)	Eastern	NW															
Sittingbourne Industrial Water Resue (17.5 Ml/d)	Eastern	WR															
Sittingbourne Industrial Water Resue (7.5 Ml/d)	Eastern	WR															

4.3 Role of HRA in developing the preferred programme (strategies) for the WRMP19

The findings of the HRA (along with the SEA and WFD assessment) have been used to help inform the development of the WRMP19. The process followed has been summarised earlier in Figure 2.

The findings of the HRA were used to help evaluate the overall environmental and social performance of a range of alternative strategies for maintaining a supply-demand balance in each operating area, with each alternative strategy comprising a different mix of options and option types. The appraisal of each alternative strategy included consideration of the potential for regulatory compliance risks associated with the Habitats Regulations.

This information was used by Southern Water to help make decisions on which programmes (strategies) to explore further through the programme appraisal modelling process and to finally determine the appropriate programmes (strategies) for inclusion in the WRMP19. Several modifications were made as part of this process to remove options where environmental effects were considered to be unacceptable relative to other alternative options available to meet the forecast supply deficit. For example, the Test Estuary desalination plant was excluded from selection for the final Western Area strategy due to the risks identified in the SEA, HRA and WFD assessment about the effects on the Solent and Southampton Water SPA and Ramsar site and the Solent Maritime SAC.

4.4 HRA Stage 1 Screening of WRMP19 preferred programme and strategic alternative options

The output of the Stage 1 Screening assessments for the options included in the WRMP19 preferred programmes (and strategic alternative options) is summarised in this section. The detailed assessments are provided in Appendix A.

4.4.1 Potentially affected European sites

Table 8 sets out the European sites that might potentially be affected by the WRMP19 preferred programmes and strategic alternatives.

Table 8 European sites potentially affected by Preferred Programme and strategic alternatives

Designated Site	Option
Special Area of Conservation	
Arun Valley	• ASR_SCL ASR Scheme Lower Greensand (SW WRZ) • PWR_For2 Littlehampton WTW Indirect Potable Water Reuse (20Ml/d) • LV_Har Pulborough groundwater licence variation • IZT_Har2 Pulborough winter transfer: Stage 2
Blean Complex	• IZT_Sel3 Selling-Fleet Main - Maximise Capacity • SWA_Plu1 Stourmouth WSW 10Ml/d
Briddlesford Copse	• PWR_SEY Sandown WTW Indirect Potable Water Reuse 8.5Ml/d • DES_San9 Sandown desalination (8.5Ml/d)
Butser Hill	• BR_Rog Transfer to Midhurst WSW & Petersfield BH rehabilitation
Dorset Heaths	• BS_Kna Import from Bournemouth Water

Designated Site	Option
Duncton to Bignor Escarpment	• PWR_For2 Littlehampton WTW Indirect Potable Water Reuse (20Ml/d)
East Hampshire Hangers	• BR_Rog Transfer to Midhurst WSW & Petersfield BH rehabilitation
Ebernoe Common	• PWR_For2 Littlehampton WTW Indirect Potable Water Reuse (20Ml/d)
Emer Bog	• IWR_SCM9 Test Estuary Industrial Reuse • DES_FawM75 Fawley Desalination (75Ml/d) • BS_Kna Import from Bournemouth Water • BS_PWC2 Additional import from Portsmouth Water (Havant Thicket reservoir development) • IZT_OAN Hampshire Grid Main • WTW_TOt 1 Southampton Link Main
Great Yews	• BS_Kna Import from Bournemouth Water
Isle of Wight Downs	• PWR_SEY9 Sandown WwTW Indirect Potable Reuse 8.5Ml/d • DES_San9 Sandown desalination (8.5Ml/d)
Kennet and Lambourn Floodplain	• AE_EWo Newbury WSW asset enhancement
Kennet Valley Alderwoods	• AE_EWo Newbury WSW asset enhancement
Lydden Temple Ewell Downs	• BS_Win South East Water bulk supply near Canterbury
Mottisfont Bats	• BS_Kna Import from Bournemouth Water • WTW_TOt 1 Southampton Link Main
The New Forest	• IWR_SCM9 Test Estuary Industrial Reuse • DES_FawM75 Fawley Desalination (75Ml/d) • BS_Kna Import from Bournemouth Water • WTW_TOt 1 Southampton Link Main • GWA_Bro WSW near Cowes - reinstate & additional treatment
North Downs Woodlands	• PWR_Ecc Medway WTW Indirect Potable Water Reuse (18Ml/d) • BR_LuG Recommission Meopham Greensand groundwater source
Parkgate Down	• BS_Win South East Water bulk supply near Canterbury
Peter's Pit	• PWR_Ecc Medway WWTW Indirect Potable Water Reuse (18Ml/d) • BR_LuG Recommission Meopham Greensand groundwater source
River Avon	• BS_Kna Import from Bournemouth Water
River Itchen	• IWR_SCM9 Test Estuary Industrial Reuse • WTW_TOt 1 Southampton Link Main • IZT_OAN Hampshire Grid Main • PWR_BPC 90 Portsmouth Harbour and Fareham WwTW indirect potable reuse • PWR_WPI Combined Woolston and Portswood WwTW indirect potable reuse
River Lambourn	• IZT_OAN Hampshire Grid Main • AE_EWo Newbury WSW asset enhancement
Rook Clifts	• BR_Rog Transfer to Midhurst WSW & Petersfield BH rehabilitation
Sandwich Bay	• BS_Win South East Water bulk supply near Canterbury • SWA_Plu Stourmouth WSW 10Ml/d
Solent and Isle of Wight Lagoons	• PWR_SEY9 Sandown WTW Indirect Potable Reuse (8.5Ml/d) • PWR_BPC 90 Portsmouth Harbour and Fareham WwTWs to River Itchen Indirect Potable Reuse • DES_San9 Sandown desalination (8.5Ml/d)
Solent Maritime	• BS_PWC2 Additional import from Portsmouth Water (Havant Thicket reservoir development) • PWR_SEY9 Sandown WTW Indirect Potable Reuse (8.5Ml/d) • WTW_TOt Southampton Link Main • BS_Kna - Import from Bournemouth Water • GWA_Bro WSW near Cowes - reinstate & additional treatment

Designated Site	Option
	• IWR_SCM9 - Test Estuary Industrial Reuse • DES_FawM75 Fawley desalination (modular up to 75Ml/d) • DES_FawM100 Fawley desalination (modular up to 100Ml/d) • PWR_BPC 90 Portsmouth Harbour and Fareham WTWs to River Itchen Indirect Potable Reuse • PWR_WPI Combined Woolston and Portswood WwTW indirect potable reuse
South Wight Maritime	• PWR_SEY9 Sandown WTW Indirect Potable Reuse 8.5Ml/d • DES_San9 Sandown desalination (8.5Ml/d)
Stodmarsh	• SWA_Plu Stourmouth WSW 10Ml/d • BS_Win South East Water bulk supply near Canterbury
Thanet Coast	• SWA_Plu Stourmouth WSW 10Ml/d
The Mens	• PWR_For20 Littlehampton WTW Indirect Potable Water Reuse
Woolmer Forest	• BR_Rog Transfer to Midhurst WSW & Petersfield BH rehabilitation
Wye and Crundale Downs	• IZT_Sel Selling-Fleet Main - Maximise Capacity
Special Protection Areas and Ramsar	
Arun Valley	• ASR_SCL ASR Scheme Lower Greensand (SW WRZ) • PWR_For2 Littlehampton WTW Indirect Potable Water Reuse (20Ml/d) • LV_Har Pulborough groundwater licence variation • IZT_Har2 Pulborough winter transfer: Stage 2
Avon Valley	• BS_Kna Bournemouth Water Import
Chichester and Langstone Harbour	• PWR_BPC 90 Portsmouth Harbour and Fareham WTWs to River Itchen Indirect Potable Reuse
Dorset Heathlands	• BS_Kna Bournemouth Water Import
Medway Estuary and Marshes	• IWR_Sit Sittingbourne Industrial Water Reuse (7.5Mld) • PWR_Ecc1 Medway WTW Indirect Potable Water Reuse (1Ml/d)
New Forest	• IWR_SCM9 Test Estuary Industrial Reuse • DES_FawM75 Fawley Desalination (75Ml/d) • DES_FawM100 Fawley Desalination (100Ml/d) • BS_Kna Bournemouth Water Import • WTW_TOt 1 Southampton Link Main • GWA_Bro WSW near Cowes - reinstate & additional treatment
Portsmouth Harbour	• PWR_BPC 90 Portsmouth Harbour and Fareham WTWs to River Itchen Indirect Potable Reuse
Solent and Southampton Water	• BS_PWC2 Additional import from Portsmouth Water (Havant Thicket reservoir development) • PWR_SEY9 Sandown WTW Indirect Potable Reuse (8.5Ml/d) • WTW_TOt Southampton Link Main • BS_Kna - Bournemouth Water Import • GWA_Bro WSW near Cowes - reinstate & additional treatment IWR_SCM9 - Test Estuary Industrial Reuse • DES_FawM75 Fawley desalination (75Ml/d) • DES_FawM100 Fawley desalination (100Ml/d) • PWR_BPC 90 Portsmouth Harbour and Fareham WTWs to River Itchen Indirect Potable Reuse • PWR_WPI Combined Woolston and Portswood WwTW indirect potable reuse • PWR_WPI Combined Woolston and Portswood WwTW indirect potable reuse • DES_San9 Sandown desalination (8.5Ml/d)
Stodmarsh	• SWA_Plu Stourmouth WSW 10Ml/d • BS_Win South East Water bulk supply near Canterbury
Thames Estuary and Marshes	• BR_LuG Recomission Meopham Greensand groundwater source

Designated Site	Option
Thanet Coast and Sandwich Bay	• BS_Win South East Water bulk supply near Canterbury • SWA_Plu Stourmouth WSW 10Ml/d
The Swale	• IZT_Sel Selling-Fleet Main - Maximise Capacity • IWR_Sit Sittingbourne Industrial Water Reuse (7.5Mld)
Wealden Heaths Phase II	• BR_Rog Transfer to Midhurst WSW & Petersfield BH rehabilitation

4.4.2 Western area preferred programme and strategic alternative options

Table shows that in the Western Area there are four options included in the preferred programme ("Strategy A") that have been assigned a '***red***' rating at Stage 1 Screening and therefore Stage 2 Appropriate Assessments are required for these options; Bournemouth Water Import, Additional import from Portsmouth Water (Havant Thicket reservoir development, 23Ml/d), Fawley Desalination (75Ml/d), and Southampton Link Main. Stage 2 Appropriate Assessments have been completed for these options and are detailed in Appendices B to E.

The remaining resource development and bulk supply options, demand management (leakage reductions) and catchment management were screened out as having no LSEs. The drought management options, and drought permits and orders have been already assessed in the revised draft Drought Plan 2018 HRA Report.

A number of strategic alternatives are proposed for the Western area. These may be required if a strategic option in the preferred programme cannot be delivered following more detailed planning and further environmental assessment studies. The six options being considered are: Fawley desalination (100Ml/d), Test Estuary Industrial Water Reuse (9Ml/d), Woodside transfer valve, Sandown desalination (8.5Ml/d) and the Itchen indirect water reuse schemes; Portsmouth Harbour and Fareham WwTWs indirect potable reuse (90Ml/d) or Woolston and Portswood WwTW indirect potable reuse (20.5Ml/d). Of these schemes, LSEs were identified for Fawley desalination (modular to 100Ml/d), Test Estuary Industrial Reuse, and the two Itchen indirect water reuse schemes. These have therefore been subject to Stage 2 Appropriate Assessment and these are detailed in Appendices B (Fawley desalination) and F (Test Estuary Industrial Reuse), G (Portsmouth Harbour and Fareham WwTWs indirect water reuse) and H (Woolston and Portswood WwTW indirect potable reuse). No LSEs were identified for Woodside transfer valve or Sandown desalination schemes.

Table 9 Summary of HRA Screening of the Western area preferred programme

Option Name	Area	Option Group	Briddlesford Copses SAC	Dorset Heaths SAC	Emer Bog SAC	Great Yews SAC	Isle of Wight Downs SAC	Kennet & Lambourn Floodplain SAC	Kennet Valley Alderwoods SAC	Mottisfont Bats SAC	The New Forest SAC	River Avon SAC	River Itchen SAC	River Lambourn SAC	Solent & Isle of Wight Lagoons SAC	Solent Maritime SAC	Avon Valley SPA & RAMSAR	Dorset Heaths SPA & RAMSAR	New Forest SPA & RAMSAR	Solent & Southampton Water SPA & RAMSAR	Solent and Dorset Coast pSPA
Import from Bournemouth Water	Western	TW																			
Additional import from Portsmouth Water (additional 9Ml/d)	Western	TW																			
Additional import from Portsmouth Water (Havant Thicket reservoir development)	Western	TW																			
Fawley desalination (modular to 75Ml/d)	Western	NW																			
Southampton link main (reversible link HSW-HSE)	Western	ASS																			
WSW near Cowes - reinstate & additional treatment	Western	NW																			
Hampshire grid (reversible link HSE-HW)	Western	ASS																			
Hampshire grid (reversible link HW-HA)	Western	ASS																			
Sandown WwTW Indirect Potable Reuse (8.5Ml/d)	Western	WR																			
Newbury WSW asset enhancement	Western	ASS																			
Romsey Town and Broadlands valve (HSW-HR reversible)	Western	ASS																			
Romsey Town and Broadlands valve (HSW-HR reversible)	Western	ASS																			

4.4.3 Central area preferred programme and strategic alternative options

Table 10 shows that there are no LSEs arising from the options included in the preferred programme (strategy) for the Central Area. The remaining resource development and bulk supply options, demand management (leakage reductions) and catchment management were screened out as having no LSEs. The drought management options, and Drought Permits and Orders have already been assessed in the Drought Plan 2019 HRA Report.

Four strategic alternative options are being considered for the Central area: Coastal desalination – Shoreham harbour (up to 30Ml/d), Tidal River Arun desalination (10Ml/d), Brighton WwTW indirect potable reuse (10Ml/d) and the Pulborough Winter Transfer Stage 1 scheme. These options may be required if an option in the preferred programme cannot be delivered following more detailed planning and further environmental assessment studies. Since the draft WRMP19 and representations made by Natural England, the treated water pipeline route for the Brighton WwTW indirect potable reuse option has been reviewed and completely re-routed to avoid impacting the Lewes Downs SAC and surrounding habitat used by a designated species. As a result of this significant change to the pipeline route, no LSEs

have been identified for the option (see Appendix A for details). No LSEs have been identified in respect of the Coastal desalination – Shoreham Harbour (up to 30Ml/d), Tidal River Arun desalination (10Ml/d) or Pulborough Winter Transfer Stage 1 scheme.

Table 10 Summary of HRA Screening for the Central area preferred programme

Option Name	Area	Option Group	Arun Valley SAC	Buster Hill SACI=	Castle Hill SAC	Duncton to Bignor Escarpment SAC	East Hampshire Hangers SAC	Ebernoe Common SAC	Rook Clift SAC	The Mens SAC	Woolmer Forest SAC	Arun Valley SPA & RAMSAR	Wealden Heaths Phase II
Littlehampton WTW Indirect Potable Water Reuse (20Ml/d)	Central	WR											
ASR (Sussex Coast - Lower Greensand)	Central	STR											
Coastal Desalination - Shoreham Harbour (10 Ml/d)	Central	NW											
Pulborough groundwater licence variation	Central	ENV											
Winter transfer Stage 2: New main Shoreham/North Shoreham and Brighton A	Central	ASS											
Transfer to Midhurst WSW & Petersfield BH rehabilitation	Central	BR											
Scheme to bring West Chiltington back into service	Central	BR											

4.4.4 Eastern area preferred programme and strategic alternative options

Table 11 shows that no option in the preferred programme (strategy) for the Eastern Area has an '***amber***' or '***red'*** Stage 1 Screening rating and therefore no Stage 2 Appropriate Assessments were required.

The remaining resource development and bulk supply options, demand management (leakage reductions) and catchment management were screened as having no LSEs. The drought management options, and Drought Permits and Orders have been already assessed in the Drought Plan 2019 HRA Report.

One strategic alternative option is proposed for the Eastern area. This option may be required if an option in the preferred programme cannot be delivered following more detailed planning and further environmental assessment studies. The option is the Sittingbourne Industrial Water Reuse (7.5Ml/d). Construction and operation impacts to The Swale SPA and Ramsar site could not be ruled out at the HRA Stage 1 screening assessment and therefore a Stage 2 Appropriate Assessment has been completed for this option (see Appendix I).

Table 11 Summary of HRA Screening for the Eastern area preferred programme

Option Name	Area	Option Group	Blean Complex SAC	Margate & Longsands SAC	Lydden and Temple Ewell Downs SAC	North Downs Woodlands SAC	Parkgate Down SAC	Peter's Pit SAC	Sandwich Bay SAC	Stodmarsh SAC	Thanet Coast SAC	Wye and Crundale Down SAC	Medway Estuary and Marshes SPA & RAMSAR	Stodmarsh SPA & RAMSAR	Thames Estuary & Marshes SPA & RAMSAR	Thanet Coast & Sandwich Bay SPA & RAMSAR	The Swale SPA & RAMSAR
Stourmouth WSW (10Ml/d with 20Ml covered storage)	Eastern	NW		■					■	■	■			■		■	
Medway WTW Indirect Potable Water Reuse (18 Ml/d)	Eastern	WR				■		■					■				
West Sandwich & Sandwich WSW licence variation	Eastern	NW				■		■					■				
Recommission Meopham Greensand groundwater source	Eastern	ASS				■		■							■		
Utilise full existing transfer capacity (from Faversham4)	Eastern	ASS	■									■					■
SEW bulk supply near Canterbury	Eastern	TW			■		■		■	■				■		■	

5. Stage 2: Appropriate Assessment

5.1 Introduction and approach

5.1.1 Legislation and guidance

The responsibility for undertaking the Appropriate Assessments lies with Southern Water as the plan-making authority, as described earlier in this HRA report. The Appropriate Assessments have been carried out in accordance with the Habitats Directive and the Conservation of Habitats and Species Regulations 2017 (as amended), and taking account of the latest available national guidance from Natural England and the Habitats Regulations Assessment Handbook[9].

5.1.2 Conservation objectives

The Habitats Regulations require that the Appropriate Assessment considers "the implications for the site in view of that site's conservation objectives". In accordance with the Habitats Directive, the objectives aim to achieve the favourable conservation status of the habitat and species features for which the European site is designated (see Box 6.1).

5.1.3 Assessment

The Appropriate Assessment considers the potentially damaging aspects of the proposed WRMP options and the potential effects on the qualifying features of the relevant European sites and likely achievement of the conservation objectives of the site. The assessment characterises the impacts in terms of their likelihood, nature, scale, severity and duration.

[9] Tyldesley, D. and Chapman C. (2015) - The Habitats Regulations Assessment Handbook. Version 4. DTA Publications.

The potential for adverse effects on the integrity of the site depends on the scale and magnitude of the effects of the WRMP option and the predicted impacts, taking into account the distribution of the qualifying features across the relevant European sites in relation to the predicted impact and the location, timing and permanence of the impact and the level of understanding of the effect, such as whether it has been recorded before and, based on current ecological knowledge, whether it can be expected to operate at the site in question.

Where qualitative and/or quantitative information is available, this has been used to inform the assessment. Where this information is not available, professional judgement has been used. In some cases, the ecological functioning of the site and the likely effects are well understood and documented elsewhere, for instance in studies previously commissioned to inform the Environment Agency's Habitats Directive Review of Consents. Where there is not sufficient information to undertake the assessment, this has been identified.

Box 6.1 Favourable conservation status definition

Favourable conservation status as defined in Articles 1(e) and 1(i) of the Habitats Directive

"The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:

- Its natural range and areas it covers within that range are stable or increasing, and
- The specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- The conservation status of its typical species is favourable.

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' when:

- Population dynamics data on the species indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis."

The Appropriate Assessment set outs, in sufficient detail for it to be transparent and understandable, what the effects of the proposed WRMP option (either alone or in-combination with other measures, activities, plans or programmes) are likely to be on each qualifying feature of the relevant European site, referring to relevant background documents and other information on which these judgements, which are essentially ecological judgements, rely.

Guidance[10] states that the size or complexity of the assessment will not necessarily reflect the scale of the proposal, but rather the complexity of the potential effects. The length of the Appropriate Assessment may not reflect the complexity of ecological judgements made to arrive at the necessary conclusions. Very complex ecological analysis and judgements may be expressed succinctly, with detailed supporting analyses contained in appendices or clearly referenced separate documents where necessary.

5.1.4 Mitigation measures

The Appropriate Assessment includes consideration of any potential mitigation measures that, in addition to any which may already form part of the WRMP option specification (often referred to as embedded mitigation), to determine whether any can reduce the likelihood, magnitude, scale, and duration of the effect to a lower level. The Appropriate Assessment seeks to identify mitigation measures that are capable of implementation and will reduce the impact to the lowest level possible. These measures can include both avoidance and reduction measures, with the former being the preferred option.

The Appropriate Assessment has assumed that measures to minimise impacts upon qualifying features and conservation objectives of the designated sites will be embedded within the final specification of any WRMP option and therefore no supplementary mitigation measures will be required.

5.1.5 Integrity test

The integrity test is the conclusion of the Appropriate Assessment and requires the competent authority to ascertain whether the proposed WRMP option (either alone or in-combination), will not have an adverse effect on site integrity. The following definition of site integrity has previously been provided by Defra:

> "*the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the level of populations of the species for which it was classified*"[11].

From the evidence and assessments undertaken, a statement has been made as to whether it can be ascertained that the proposed WRMP option alone, or in-combination with other WRMP options, other activities, plans or projects, will not adversely affect the integrity of the relevant European sites.

5.1.6 Limitations and residual uncertainties

Information provided by third parties, including publicly available information and databases, is considered correct at the time of publication. Due to the dynamic nature of the environment, conditions may change in the period between the preparation of this HRA report, and the implementation of the proposed WRMP option. This HRA Report is a strategic, plan-level assessment to support the WRMP and is not an application-specific ("project" level) assessment. A more detailed, application-specific Appropriate Assessment will be required to support any actual planning application to the relevant authorities, and this will be carried out in consultation with Natural England.

[10] Tyldesley, D. and Hoskin, R. (2008) *Assessing projects under the Habitats Directive: guidance for competent authorities*. Report to the Countryside Council for Wales, Bangor.
[11] Defra Circular 01/2005.

The Appropriate Assessment has been undertaken in as detailed a way as possible consistent with the strategic nature of the WRMP19 and using all available data sources where they exist. However, the conclusions drawn from this are necessarily limited by the age, type, coverage and availability of data.

Any uncertainties and the limitations of the assessment process are acknowledged and highlighted in the Appropriate Assessments provided in this HRA Report.

As part of the ongoing consultation on the WRMP19 and subsequent delivery, further discussions were held on the revised draft WRMP Appropriate Assessments presented in this report with Natural England and the Environment Agency. Following a request for further information issued by Defra in March 2019, further discussions were held with Natural England and the Environment Agency to understand discuss and clarify the requirements for the response to Defra. An overview of this is provided in Section 5.2 below.

5.2 Further Information Request: Addendum to Statement of Response

As part of Defra's request for further information in March 2019, Southern Water were asked to "*further assess the environmental impacts and demonstrate the viability of the preferred plan*" with specific reference to; Fawley desalination and the Itchen indirect potable reuse strategic alternatives.

The WRMP19 strategy for the Western area - and in particular, the delivery timescales for implementation of the strategy, - is driven by the Water Resources Act 1991 Section 20 Agreement signed in March 2018 following the Public Inquiry, and the associated changes to Southern Water's River Test and River Itchen abstraction licences, which were confirmed by Defra in March 2019. These licence changes have resulted in an immediate and significant supply-demand deficit affecting around 0.57 million customers in Hampshire and the Isle of Wight, including the large population centres of Southampton and Winchester. This supply-demand deficit drives the need to develop the Fawley desalination scheme or the alternative Itchen indirect potable reuse options.

The revised draft WRMP19 set out the proposed approach to develop the Fawley desalination scheme (up to 75Ml/d) and in parallel, develop the strategic alternative Itchen indirect potable reuse options to meet the Section 20 Agreement timescales. An Addendum to the Statement of Response was produced to answer the questions posed by Defra, and this was published in June 2019. The final plan was given approval to be published by the Secretary of State in November 2019.

In the Addendum to the Statement of Response, Southern Water recognised that there are range of uncertainties and risks that needed to be managed, relating to the Fawley desalination option and the strategic alternatives. As such, Southern Water has identified a timeline of further survey, modelling and assessment work required to reduce uncertainties and further assess the environmental risks of each option. This is presented in Section 8.5 of the SEA (Annex 14), and will be used to inform the scheme design, development of mitigation measures and ultimately a project-level HRA for each option to ensure no adverse effects to the qualifying features of the designated sites. At the plan level, Appendix B Stage 2 Appropriate Assessment for the Fawley desalination scheme, and Appendices G and H for the Itchen indirect potable reuse options, have been updated to include the survey work, studies and mitigation measures committed to in the addendum.

Defra also sought clarification on the Southampton Link Main (referred to as the "Test Surface Water Pipeline" in the Defra letter) requesting confirmation as to whether the pipeline was required or not, and how the pipeline had been re-routed to minimise impacts to designated sites. Appendix E has been updated to reflect the additional information provided in the addendum.

5.3 Stage 2 Appropriate Assessment Conclusions

HRA Stage 2 assessments (information to inform Appropriate Assessments) were carried out on eight main options (four in the preferred programme and four strategic alternatives):

- Fawley desalination scheme (75Ml/d and 100Ml/d)
- Bournemouth Water import
- Additional import from Portsmouth Water (Havant Thicket reservoir development)
- Southampton Link Main
- Test Estuary industrial reuse (7.5Ml/d)
- Portsmouth Harbour and Fareham WwTW to River Itchen Indirect Potable Reuse (90Ml/d)
- Woolston and Portswood WwTW Indirect Potable Reuse (20.5Ml/d)
- Sittingbourne industrial water reuse (7.5Ml/d)

The information to inform Appropriate Assessments provided in Appendices B to I concluded that **none of the options assessed would, individually, lead to any adverse effect on the integrity of a European site** after taking account of the proposed mitigation measures to address identified effects of the option on one or more of the designated site features.

6. Cumulative effects of WRMP19

The WRMP19 preferred programmes (strategies) have also been assessed to determine if the individual options in the programmes (strategies) will have any LSEs when implemented in combination with other options in this plan. This may be a result of the cumulative effects of construction or operation, for example if construction dates overlap or if multiple options will affect the same European site(s) during operation.

In identifying the potential for cumulative effects, the following steps have been considered:

- STEP 1 – Does the option have residual effects that are not significant 'alone'? If NO, then an in-combination assessment is not required.
- STEP 2 – Does the option have any effect (significant or insignificant) on the European Site? If NO, then an in-combination assessment is not needed.
- STEP 3 – Does the option have a discernible effect, but one that isn't significant alone? If YES, then an in-combination assessment is required.
- STEP 4 – Identify the other options that also (1) don't have a significant effect alone but (2) do have an effect and might act in combination.

A large proportion of the options were screened out of having construction phase LSEs based on the exceedance of a number of distance thresholds beyond which LSEs would not arise.

Similarly, a large proportion of the options were screened out of having operational phase LSEs based on the small volumes of water being abstracted, or where the abstraction remains within existing licence volumes that have been assessed as having no LSE or no adverse effects in the Environment Agency Review of Consents process, or where the effects of a redirection of wastewater treatment works effluent will not be discernible in the receiving waterbody.

Those options that were considered in the cumulative, in-combination HRA screening assessment were:

- Fawley desalination (75 and 100Ml/d options)
- Bournemouth Water import
- Test Estuary Industrial reuse
- Southampton Link Main
- Additional import from Portsmouth Water (Havant Thicket reservoir development)
- Portsmouth Harbour and Fareham WwTW to River Itchen Indirect Potable Reuse (90Ml/d)
- Woolston and Portswood WwTW Indirect Potable Reuse (20.5Ml/d)

These options could cumulatively impact the following European sites:

- The New Forest SAC
- New Forest SPA and Ramsar
- Solent Maritime SAC
- Solent and Southampton Water SPA and Ramsar
- River Itchen SAC

The findings of the screening of LSEs is set out below for each of these European sites.

6.1.1 The New Forest SAC – cumulative effects screening decision

Stage 1 HRA Screening of each option in isolation highlighted that LSEs were associated with the implementation of the Fawley Desalination (100Ml/d, strategic alternative), Bournemouth Water import and Test Estuary Industrial Reuse options. The potential in-combination LSEs associated with these options relate to the construction of pipelines which may have temporary or permanent effects on the SAC.

The construction periods for two of these options will overlap:

- A four year construction period will be required for the Bournemouth Water import option commencing in 2024 with construction finalised in 2027
- A three year construction period will be required for the Fawley Desalination option, commencing in 2023 and completed by 2026

The Test Estuary Industrial Reuse option is no longer in the preferred programme, however if it is required as a strategic alternative to the Portsmouth Water additional import 9Ml/d, it will be required by 2024 and therefore there is potential for construction to overlap with the start of the above schemes.

The Stage 2 HRA Appropriate Assessment indicated that the Bournemouth Water import option infrastructure will be constructed approximately 21km from the Fawley Desalination and the Test Estuary Industrial Reuse options. The infrastructure construction for the Bournemouth Water import option would potentially effect different designated features than those that would be affected by the Fawley Desalination and the Test Estuary Industrial Reuse options. Pipeline route optimisation during the detailed development stage and the implementation of the identified construction mitigation measures will ensure that no in-combination effects will arise in relation to the Bournemouth Water import option, either during construction or once the pipeline is in place.

There is currently some uncertainty as to whether a new pipeline northwards from Fawley to the Southern Water supply system will be required for the 100Ml/d option, and also whether this option will be taken forward into the preferred programme (currently a strategic alternative). Adopting a precautionary approach, it is currently assumed it will be required. This pipeline and the Test Estuary Industrial Reuse pipeline will either follow the same route through an existing power supply wayleave next to the bypass road located within the SAC or, alternatively, the pipeline to supply water northwards associated with the Fawley Desalination option will be constructed within the curtilage of the existing bypass road (subject to agreement by the highways authority). Regardless of the final route selected for the Fawley desalination option, impacts on the SAC can be mitigated through route optimisation and the implementation of mitigation measures. In particular, the pipelines would be laid through dry heath habitat and avoid wetland habitats, and given the potential overlap in construction periods, would be laid in the same easement at the same time to avoid multiple disturbances of the SAC.

No cumulative LSEs are therefore anticipated with the selected routes for the pipelines. The pipeline routes and construction mitigation requirements set out in the Appropriate Assessments for each individual option will be discussed and agreed with Natural England during the detailed design stages of the schemes (noting that the Test Estuary Industrial Reuse scheme is not required to be developed until 2065).

6.1.2 New Forest SPA and Ramsar– cumulative effects screening decision

Stage 1 HRA Screening highlighted that LSEs were associated with the implementation of the Fawley Desalination (100Ml/d, strategic alternative), Bournemouth Water import and Test Estuary Industrial Reuse options. The potential in-combination LSEs associated with these options relate to the construction of pipelines only; no operational effects are anticipated.

The construction periods for two of these options will overlap

- A four year construction period will be required for the Bournemouth Water import option commencing in 2024 with construction finalised in 2027
- A three year construction period will be required for the Fawley Desalination option, commencing in 2025 and completed by 2027

The Test Estuary Industrial Reuse option is no longer in the preferred programme, however if it is required as a strategic alternative to the Portsmouth Water additional import 9Ml/d, it will be required by 2024 and therefore there is potential for construction to overlap with the start of the above schemes.

The Bournemouth Water import option infrastructure will be constructed approximately 21km from the Fawley Desalination construction site. With pipeline route optimisation and the mitigation measures included in the Stage 2 Appropriate Assessments for the Fawley Desalination and Bournemouth Water import options, it is assessed that these measures will ensure that, in combination, any residual noise, vibration or air quality effects of the construction activities would not become significant for bird species. The overall resource available to each qualifying feature bird species within the designated site will remain unaffected. Further discussion on the precise details of the mitigation measures necessary during the concurrent construction period will be required with Natural England as part of the proposed Steering Group and scheme-specific Working Groups that Southern Water is committed to establishing to enable close dialogue with regulators and interested stakeholders during the planning and detailed design of these options.

As discussed in Section 6.1.1 there is currently some uncertainty as to whether a new pipeline northwards from Fawley to the Southern Water supply system will be required for the 100Ml/d option, and also whether this option will be taken forward into the preferred programme (currently a strategic alternative). Adopting a precautionary approach, it is currently assumed it will be required. This pipeline and the Test Estuary Industrial Reuse pipeline will either follow the same route through an existing power supply wayleave next to the bypass road located within the SAC or, alternatively, the pipeline to supply water northwards associated with the Fawley Desalination option will be constructed within the curtilage of the existing bypass road (subject to agreement by the highways authority). Regardless of the final route selected for the Fawley desalination option, impacts on the SPA and Ramsar can be mitigated through route optimisation and the implementation of mitigation measures. In particular, the pipelines would be laid through dry heath habitat and avoid wetland habitats, and given the potential overlap in construction periods, would be laid in the same easement at the same time to avoid multiple disturbances of the SPA and Ramsar.

6.1.3 Solent Maritime SAC – cumulative effects screening decision

Stage 1 HRA Screening highlighted that LSEs were associated with the implementation of the Fawley Desalination, Bournemouth Water import, Test Estuary Industrial Reuse and the Southampton Link Main options in the preferred programme, and the Test Estuary Industrial Reuse and Portsmouth Harbour and Fareham WwTW Indirect Potable Reuse strategic

alternatives[12]. The potential in-combination effects associated with some combinations of these options relate to both the construction phase and the operational phase.

The construction periods for three of these options will overlap:

- A four year construction period will be required for the Bournemouth Water supply option commencing in 2024 with construction finalised in 2027
- A three year construction period will be required for the Fawley Desalination option, commencing in 2025 and completed by 2027
- A two year construction period will be required for the Southampton Link Main option, commencing in 2026 and completed in 2027

The Test Estuary Industrial Reuse option is no longer in the preferred programme, however if it is required as a strategic alternative to the Portsmouth Water additional import 9Ml/d, it will be required by 2024 and therefore there is potential for construction to overlap with the start of the above schemes.

The construction activities relating to these three options will not result in direct impacts on the designated habitats of the European site. There is however a possible risk of damage to offsite habitat that provides a functional linkage to the SAC. Indirect impact associated with run-off from construction sites and dust could affect some of the habitats associated with the SAC and therefore mitigation measures will be required to ensure the habitats are not adversely affected. With careful application of integrated mitigation measures during any concurrent construction activities, any residual effects will not be significant such that no adverse effects on site integrity are anticipated. Further discussion on the precise details of the mitigation measures necessary during the concurrent construction period will be required with Natural England as part of the proposed Steering Group and scheme-specific Working Groups that Southern Water is committed to establishing to enable close dialogue with regulators and interested stakeholders during the planning and detailed design of these options.

The operation of the Fawley desalination and Test Estuary industrial reuse options could also result in impact on the SAC either through changes in hydrological regime due to the cumulative effect of a decrease in treated effluent inputs and the discharge of brine. The brine discharge from the Fawley desalination scheme may lead to a very minor increase in salinity in the lower reaches of Southampton Water: Far field dispersion modelling shows a very minor increase above ambient salinity levels for a 200Ml/d capacity desalination plant – i.e. a worst case scenario – in Southampton Water in the area downstream of the Hamble Estuary. The proposed operating of the Test Estuary scheme (if required) could result in a reduction in effluent discharge into the SAC of 9Ml/d. The Q95 flows in the River Test at Broadlands has been calculated as 496.8Ml/d. The reduction of 9Ml/d equates to approximately 1.8% of Q95 flows for the reach between the discharge point and the River Itchen confluence. Further in-combination assessment will be required if both schemes are to be implemented, however mitigation could involve the alteration of normal discharge/abstraction patterns during significant low flow conditions.

[12] The Woolston and Portswood WwTW Indirect Potable Reuse option was screened out of LSEs on the Solent Maritime SAC given the closest compartment is Dibden Marshes SSSI and Hythe to Calshot Marshes SSSI on the opposite site of Southampton Water. Pipeline construction is required at Woolston, with the proposed discharge further upstream on the River Itchen just above the tidal limit.

6.1.4 Solent and Southampton Water SPA and Ramsar – cumulative effects screening decision

Stage 1 HRA Screening highlighted that LSEs were associated with the implementation of the Fawley Desalination, Bournemouth Water import, Test Estuary Industrial Water Reuse and the Southampton Link Main options in the preferred programme, and the Itchen indirect potable reuse strategic alternatives (Portsmouth Harbour and Fareham WwTW Indirect Potable Reuse and Woolston and Portswood WwTW Indirect Potable Reuse). The potential in-combination effects associated with some combinations of these options relate to both the construction phase and the operational phase.

The construction periods for potentially four of these options will overlap:

- A four year construction period will be required for the Bournemouth Water import option commencing in 2024 with construction finalised in 2027
- A three year construction period will be required for the Fawley Desalination option, commencing in 2025 and completed by 2027
- A two year construction period will be required for the Southampton Link Main option, commencing in 2026 and completed in 2027

The Test Estuary Industrial Reuse option is no longer in the preferred programme, however if it is required as a strategic alternative to the Portsmouth Water additional import 9Ml/d, it will be required by 2024. Similarly, the Itchen indirect potable reuse schemes are strategic alternatives to the Fawley desalination scheme, and if required, would be constructed for operation in AMP8 (2025-2030). Therefore there is potential for the construction programmes of some of the preferred programme and strategic alternatives to overlap.

Direct loss of habitat as a result of construction will not occur with the mitigation measures proposed during the construction of the Bournemouth Water supply and Fawley Desalination options. Direct habitat loss has been identified for the Southampton Link Main but Southern Water has previously agreed through consultation with Natural England to provide an equivalent functioning area of habitat within the extent of the SPA/Ramsar sites before commencing construction in this location in order to mitigate for the permanent loss of 12m^2 of SPA/Ramsar habitat. Furthermore, the construction activities associated with these options could potentially result in disturbance to the breeding or overwintering bird populations and are most likely to occur as a result of the construction noise, visual stimuli from the construction workforce and plant operations on the construction sites.

With careful application of integrated mitigation measures during any concurrent construction activities, residual effects on the designated species and assemblages will not be significant such that no adverse effects on site integrity are anticipated. Further discussion on the precise details of the mitigation measures necessary during the concurrent construction period will be required with Natural England as part of the proposed Steering Group and scheme-specific Working Groups that Southern Water is committed to establishing to enable close dialogue with regulators and interested stakeholders during the planning and detailed design of these options.

The operation of the Fawley desalination, and/or Itchen indirect potable reuse schemes (strategic alternatives to Fawley), and/or Test Estuary Industrial Reuse options could also result in impact on the SPA and Ramsar sites either through the decrease in treated effluent inputs or the discharge of brine. As discussed in Section 6.1.3, further in-combination assessment will be required if both schemes are to be implemented, however mitigation could involve the alteration of normal discharge/abstraction patterns during significant low flow

conditions. The existing effluent from the Portsmouth Harbour WwTW was redirected as part of a multi-million pound environmental improvement programme, and now discharges through an existing 5.7km sea outfall from Eastney Pumping station, into the main channel. A reduction in effluent resulting from the operation of the reuse scheme is therefore unlikely to be perceptible. The effluent from the Woolston WwTW is discharged through the existing outfall into the main channel of the River Itchen, approximately 300m offshore. A reduction in effluent discharge could result in localised changes to the benthic community. Further inc-combination assessment will be required if this scheme is implemented with the Test Estuary Industrial Reuse option, although as previously stated, mitigation could involve the alteration of normal discharge/abstraction patterns during low flow conditions.

6.1.5 River Itchen SAC – cumulative effects screening decision

Stage 1 HRA Screening highlighted that LSEs were associated with the implementation of the Portsmouth Water (Havant Thicket reservoir development) option and the Itchen indirect potable reuse schemes (Portsmouth Harbour and Fareham WTWs Indirect Potable Reuse option and Woolston and Portswood WwTW Indirect Potable Reuse option). The latter are considered a strategic alternative option to the Fawley Desalination option. As such, the Itchen indirect potable reuse options are considered mutually exclusive.

Any in-combination effects will only occur during construction and the concurrent operation of the Portsmouth Water (Havant Thicket reservoir development) and the Itchen indirect potable reuse options will not result in any in-combination impacts.

Should either of the Itchen indirect potable reuse options be required to be developed, the construction will be completed over a three year period up to 2027 which may overlap with some of the Portsmouth Water (Havant Thicket reservoir development) construction period in respect of pipeline construction. Further work on the river crossings of all schemes will be needed to minimise the number of crossings, avoid the wetland habitat where possible, and determine the most suitable construction techniques and methods and the mitigation measures required to avoid adverse effects. Detailed site survey including ground investigations and consideration of alternative crossing points where infrastructure is already in place or habitats degraded will be needed. Modelling of the impacts to drainage, for example, will be iterative with the engineering design to deliver an optimum design of the pipeline routes, to minimise impact on the environment and avoid adverse effects on European sites. It is considered that cumulative impacts on the River Itchen SAC can be mitigated through application of the mitigation measures set out for pipeline river crossings in the Appropriate Assessments of each option, including the above detailed investigation and design work, and examining, during the detailed planning stage, the potential for integrating any overlapping river crossing work in dialogue with Natural England.

Further discussion on the precise details of the mitigation measures necessary during the concurrent construction period (in the event that the alternative scheme is required to be developed) will be required with Natural England as part of the proposed Steering Group and scheme-specific Working Groups that Southern Water is committed to establishing to enable close dialogue with regulators and interested stakeholders during the planning and detailed design of these options.

The above in-combination screening assessments have concluded that there would be **no cumulative likely significant effects due to the WRMP19 options being implemented**.

6.2 Potential in-combination effects of this plan with other plans and projects

As well as in-combination effects between options included in this plan, the HRA has also considered the potential for in-combination, cumulative effects with other relevant plans and projects as set out below.

6.2.1 Southern Water Drought Plan 2019

The scope for in-combination operational effects of this plan with the drought management measures included in the Drought Plan 2019 is limited as in most cases the drought management measures will come into operation once the operation of the WRMP19 schemes have ceased due to abstraction licence conditions. However, the following potential in-combination effects were identified and assessed in relation to specified European sites.

6.2.2 Solent Maritime SAC, Solent and Southampton Water SPA and Ramsar plus Potential Solent to Dorset Coast SPA

The Solent Maritime SAC, Solent and Southampton Water SPA and Ramsar sites, and the Potential Solent to Dorset Coast SPA are located within the hydrological zone of influence of seven Drought Order / Permit options: Lukely Brook, Eastern Yar Augmentation Scheme, Caul Bourne, Shalcombe, Candover Augmentation Scheme, Test and Lower Itchen sources, plus the Sandown emergency desalination scheme, as well as the following WRMP19 schemes:

- Fawley desalination scheme (75 or 100Ml/d options)
- Test Estuary industrial reuse scheme.
- Sandown WwTW indirect potable water reuse scheme
- Bournemouth Water import
- Sandown desalination scheme (strategic alternative option – mutually exclusive with the Sandown WwTW indirect potable water reuse scheme)

The Bournemouth water import, Fawley desalination and Sandown WwTW indirect potable water reuse schemes (or the alternative Sandown desalination scheme) are not expected to be completed until 2027 (and the Test Estuary industrial reuse scheme not until 2065) and therefore do not overlap with the Drought Plan timeframe of 2019 to 2024. Consequently, these options will not be developed during the lifetime of the Drought Plan; the potential for cumulative operational effects will be further reviewed as part of the next Drought Plan update for 2021. However, if required, the Test Estuary industrial reuse scheme will be constructed and operational by 2024. The proposed operation of the Test Estuary scheme could result in a reduction in effluent discharge into Southampton Water of 9Ml/d. The Q95 flows in the River Test at Broadlands has been calculated as 496.8Ml/d. The reduction of 9Ml/d equates to approximately 1.8% of Q95 flows for the reach between the discharge point and the River Itchen confluence. Further in-combination assessment will be required if any of the drought options are required when the scheme is operational, however mitigation could involve the alteration of the Test Estuary WwTW discharge pattern during significant low flow conditions to increase water for a short period of time.

If construction of the Sandown WwTW indirect potable water reuse scheme (or the mutually exclusive Sandown desalination scheme) commences before 2023, this would be mutually exclusive with a Sandown emergency desalination plant as they would occupy the same land area. Consequently, no in-combination effects would arise in relation to European sites.

Construction activities for the Bournemouth Water import and Fawley desalination will potentially take place during the lifetime of the Drought Plan. The screening assessment concluded that the Fawley desalination plant and Bournemouth Water import construction works would have no in-combination effects with the construction or operation of a Sandown emergency desalination plant. The Sandown emergency desalination plant construction activity would take place on the south-eastern coastline of the Isle of Wight which is geographically remote from the European sites that may be affected by the Fawley and Bournemouth Water import construction work.

6.2.3 River Itchen SAC

The River Itchen SAC is within the zone of influence of two Drought Order options (Lower Itchen sources and Candover Augmentation Scheme) and three WRMP19 schemes:

- Portsmouth Water (Havant Thicket reservoir development)
- Itchen indirect potable reuse (Portsmouth Harbour and Fareham WTWs Indirect Potable Reuse or Woolston and Portswood WwTW Indirect Potable Reuse) (only required to be implemented instead of the Fawley desalination scheme)

The construction work associated with pipeline crossing of the rivers will not result in any cumulative adverse effects with the Drought Order options given the mitigation measures that will be in place as identified in the Appropriate Assessments of the WRMP options to prevent any adverse effects to the River Itchen SAC.

The WRMP scheme for carrying out in-stream river restoration works on the River Itchen will have cumulative beneficial effects with the Lower Itchen Drought Order and Candover Drought Order options on the River Itchen SAC.

No in-combination likely significant effects on the River Itchen SAC are therefore anticipated.

6.2.4 Arun Valley SAC, SPA and Ramsar

The Arun Valley SAC, SPA and Ramsar is within the zone of influence of three drought management options (Pulborough and North Arundel Drought Permits/Orders and the Littlehampton emergency desalination plant) and three WRMP schemes: the Pulborough winter transfer scheme Stage 2 (and, if required, the Stage 1 option as an alternative option), Littlehampton WwTW indirect potable water reuse scheme and the Tidal River Arun Desalination (strategic alternative).

The Littlehampton WwTW indirect potable water reuse scheme and (if required) the Pulborough winter transfer scheme Stage 1 option and Tidal River Arun Desalination, will not be in operation until AMP8 (~2027) and therefore do not overlap operationally with the Drought Plan timeframe of 2019 to 2024. Consequently, there is no potential for cumulative operational effects; the potential for cumulative effects will be further reviewed as part of the next Drought Plan update in 2023. Construction of the Littlehampton reuse scheme and the Littlehampton emergency desalination option are mutually exclusive as they would need to use the same land area.

Construction of the Pulborough winter transfer scheme Stage 1 and Tidal River Arun Desalination (if required) are unlikely to overlap with the Drought Plan 2019 time period. There is no construction associated with the Pulborough winter transfer scheme Stage 2 option but this would be operational during the lifetime of the Drought Plan 2019. Cumulative effects with

the Pulborough Drought Permit/Order options are considered to be minor at greatest due to the limited interaction in drought conditions between the groundwater abstraction and the surface water abstraction under the Drought Permit/Order. No cumulative LSEs are therefore anticipated.

Medway Estuary and Marshes SPA and Ramsar

The Medway Estuary and Marshes SPA and Ramsar are within the hydrological zone of influence of three Southern Water Drought Order/Permit options (Faversham sources, Weir Wood Reservoir, River Medway Scheme) plus the Sheerness emergency desalination plant, together with the WRMP19 Medway WTW Indirect Potable Water Reuse option. However, the Medway reuse scheme is not due to be implemented until 2027 which is beyond the lifetime of the Drought Plan 2019 (2019-2024), so no cumulative operational effects will arise during this period.

The Sheerness emergency desalination plant is located at some distance downstream of Medway WTW indirect reuse option. No cumulative effects during construction of the reuse scheme with construction and/or operation of the emergency desalination plant. Consequently, no cumulative likely significant adverse effects are anticipated on the SPA or Ramsar site.

No cumulative likely significant effects on the Medway Estuary and Marshes SPA or Ramsar site are anticipated between the construction of the Medway WTW reuse scheme and the operation of the River Medway Scheme Drought Permits/Order.

The update to the Drought Plan in 2021 will need to review the potential for cumulative effects on this SPA and Ramsar.

6.2.5 Other water company drought plans

Assessment of the potential for in-combination impacts of this plan with drought management measures listed in neighbouring water companies' drought plans has been undertaken.

The information used to carry out these assessments is considered to be the most up to date information available at the time of writing (November 2019).

There are no cumulative effects on any European sites identified in relation to supply-side (including Drought Orders and Permits) Drought Plan options of the following neighbouring water companies:

- Affinity Water (Southeast Region)
- South West Water (Bournemouth Water)
- Thames Water
- Wessex Water
- Cholderton and District Water Company
- SES Water
- South East Water
- Portsmouth Water

6.2.6 Other water company Water Resources Management Plans

All of the neighbouring water companies to Southern Water are also preparing revised draft or final 2019 WRMPs to the same timeframe. The HRA cumulative assessment has made use

of outputs of a Water Resources South East Group (WRSE)[13] project. The WRSE group includes six south east water companies (Affinity Water, Portsmouth Water, South East Water, Southern Water, SES Water and Thames Water). The purpose of the project was to input to the development of long term best value plans for securing water supplies in the south east. Since 2016 the WRSE has been working to improve the approach to undertaking cumulative effects assessment for WRMP options developed by neighbouring water companies in the South East of England.

The latest piece of work aimed to identify the potential for cumulative effects between the six WRSE water companies, to support their revised draft WRMP19s and related SEAs in a regional context. It has provided a unique opportunity for communication between the six water companies and sharing of respective revised draft WRMP19 geographical information.

Based upon the information available in early November 2019, the following schemes were identified as potentially giving rise to in-combination effects:

- Southern Water Stourmouth WSW (10Ml/d with 20Ml covered storage) and South East Water Broad Oak larger reservoir size - 5,126 Ml: construction and operation
- Southern Water Medway WwTW Indirect Potable Water Reuse (18Ml/d) and South East Water Bewl-Darwell Option 1c: Transfer of 8Ml/d from Bewl to Hazards Green via a Southern Route: construction
- Southern Water Recommission Meopham Greensand groundwater source and Thames Water's Southfleet/Greenhithe disaggregation: operation

Affinity Water's draft final WRMP19 has removed a number of the groundwater abstractions that were considered to have potential in-combination effects with Southern Water's West Sandwich and Sandwich WSW licence variation. Those remaining have no impact pathways to designated sites and as such, no in-combination effects have been identified

Stodmarsh SAC, SPA and Ramsar, Sandwich Bay SAC and Thanet Coast and Sandwich Bay SPA and Ramsar

The Stourmouth WSW and Broad Oak schemes, although identified as being within 5km, will not give rise to any in-combination effects on Stodmarsh SAC, SPA and Ramsar as the Stourmouth option is 2.5km downstream of the site, and therefore outside the commonly applied thresholds for air quality and noise issues. It will have no operational effects on Stodmarsh SAC, SPA and Ramsar. Operation will not result in any in-combination impacts to Sandwich Bay SAC or Thanet Coast and Sandwich Bay SPA and Ramsar as both schemes will need to comply with the Environment Agency Hands Off Flows designed to protect the downstream designated sites. Therefore no in-combination LSEs are anticipated.

Medway Estuary and Marshes SPA and Ramsar

Although the Medway WwTW Indirect Potable Water Reuse (18Ml/d) and Bewl-Darwell Option 1c: Transfer of 8Ml/d from Bewl to Hazards Green via a Southern Route are identified through the WRSE project as potentially having construction impacts, this is not an HRA issue as no European sites were identified as being potentially impacted by the Bewl scheme. Therefore no in-combination LSEs are anticipated.

[13] Water Resources South East Group (WRSE) project is an alliance of the six south east water companies (Affinity Water, Portsmouth Water, South East Water, Southern Water, SES Water and Thames Water), the Environment Agency, Natural England, Ofwat, Consumer Council for Water and Defra.

Equally, although the Recommission Meopham Greensand groundwater source and Thames Water's Southfleet/Greenhithe disaggregation were identified as potentially affecting the same groundwater body, the designated sites which each scheme would potentially impact did not overlap. Therefore no in-combination LSEs are anticipated.

For other water companies outside of the WRSE group, but neighbouring Southern Water (South West Water (Bournemouth Water), Cholderton and District Water and Wessex Water), we have reviewed the information available at November 2019. No cumulative likely significant effects on European sites are anticipated in relation to these three final WRMPs. The South West Water (Bournemouth Water) final WRMP19 has included the Bournemouth Water import option to Southern Water's Western Area: the HRA implications of this scheme have been considered earlier in this HRA Report.

6.2.7 Cumulative effects with other national and regional plans

Environment Agency National Drought Plan

The potential for in-combination effects of this plan with the Environment Agency's National Drought Action Plan has been assessed. No in-combination impacts on any European sites are anticipated.

Thames River Basin District and South East River Basin District: River Basin Management Plans 2015

The HRAs of the RBMPs have concluded that none of the measures identified in these plans would have any significant adverse effects on any European site, as the locations where the measures would be implemented are not constrained. The measures would also be implemented in such a way that there would be no in-combination effects within the RBMPs.

Therefore, no cumulative impacts with Southern Water's WRMP19 have been identified, and no cumulative LSEs are anticipated.

Canal and River Trust: Putting Water into Waterways Water Resources Strategy 2015-2020

To ensure a longer term security of water supply, the Canal and River Trust (CRT) has developed a Water Resources Strategy setting out 14 strategic actions for completion by 2020 and dividing the entire network into hydrological units for more effective management of water resources. The Kennet and Avon Canal hydrological unit partially overlaps with the Southern Water operational and water source catchment boundaries.

No in-combination effects with any of Southern Water's WRMP19 options are considered likely during the lifetime of the CRT plan.

At the time of writing (November 2019), CRT had not published its drought plans in the public domain but there are no known likely cumulative effects of CRT drought management activities with this plan that would significantly affect any European sites.

Lower Tidal River Arun Flood Management Strategy (EA 2012)

The Environment Agency has prepared a long-term plan to manage the risk of flooding from the tidal River Arun between Pallingham and Littlehampton. The scheme was formally approved in March 2014 and consists of a range of measures and recommends maintaining and enhancing many existing flood defences and providing some new ones in strategic locations.

The Pulborough to Houghton Strategy Unit (SU3) covers the Arun Valley SAC, SPA and Ramsar sites. The Environment Agency have identified that the risk of flooding to the sites would change under every proposed management option. More work needs to be completed to understand what management option would be acceptable and how it could be implemented. Therefore, for the next 10 years the proposed management option will be to sustain the flood defences.

Following consultation with the Environment Agency and Natural England on the Southern Water Drought Plan 2019, it is understood that the flood banks will be in place until approximately 2025, after which there is a proposal to remove the flood banks. No in-combination operational significant adverse effects are anticipated with the Littlehampton WTW indirect potable water reuse scheme or Tidal River Arun Desalination scheme (strategic alternative), but further dialogue will be necessary with the Environment Agency and Natural England to avoid any risks of LSE on the European sites during any construction works for the flood management scheme and the development of the Littlehampton reuse scheme, and Tidal River Arun Desalination (if required).

6.2.8 Cumulative effects with identified relevant regional and local level projects

A review of relevant regional and local level projects that may have cumulative effects with this plan was carried out. This showed that a number of projects may be implemented in proximity to some of the WRMP19 schemes:

- Fawley desalination scheme – Fawley Power Station site redevelopment scheme
- Pipelines for various schemes in the Marchwood/Dibden area – potential for further port development at Marchwood Military Port / Dibden Bay (Port of Southampton)
- Test Estuary industrial water reuse – Planned residential allocations to the south and west of the existing WTW in the emerging New Forest District Council Local Plan
- Littlehampton water reuse – Planned residential development on the former Littlehampton Aerodrome site (as set out in Local Plan)
- Pipeline construction near Arundel – Highways England is currently consulting on routes currently for the Arundel bypass

Assessment of these projects indicates that no operational cumulative effects on any European sites are likely; however, depending on the relative timing and specific spatial proximity of any construction works for these projects with construction works for the WRMP19 schemes highlighted, there may be a risk of some cumulative effects on some European sites during construction which would require careful planning and consideration of appropriate mitigation measures to ensure no cumulative effects.

7. HRA conclusions and recommendations

The HRA has been undertaken in parallel with the SEA and WFD assessments to ensure an integrated approach to environmental assessment of the WRMP19 and to ensure its overall compliance with international and national environmental legislation.

The HRA Stage 1 Screening assessment concluded that four options included within the preferred programmes (strategies) for the WRMP19 required a Stage 2 Appropriate Assessment. The information provided to inform the Appropriate Assessments has concluded that, with the proposed mitigation measures in place for each scheme, there would be no adverse effects on the integrity of any European site.

The assessments concluded that as the schemes are taken forward for further detailed design, the finer details of the required mitigation measures will need to be developed in dialogue with Natural England and the site operators/owners and secured during the project-stage HRA when a detailed design and construction method statement will be developed.

Assuming the mitigation measures described in the Appropriate Assessments are implemented, then it can be reasonably concluded that the WRMP19 schemes will not have an adverse effect on the integrity of any SACs, SPAs and Ramsar sites.

The HRA Stage 1 Screening assessment for the remaining options included within this plan, both individually and in combination, confirmed that there would be no likely significant adverse effects on any European site.

Strategic alternative options to those included in the proposed strategies for the WRMP19 have also been considered as part of the HRA. The Stage 1 HRA screening concluded that for all but four of these options, there would be no LSEs on any European site. The Appropriate Assessments for the remaining four options concluded there would be no adverse effects on site integrity, subject to implementation of mitigation.

Southern Water recognises that there a range of uncertainties and risks that need to be managed, relating to the Fawley desalination option and the strategic alternatives; Itchen indirect potable reuse schemes. As such, Southern Water has identified a timeline of further survey, modelling and assessment work required to reduce uncertainties and further assess the environmental risks of each option. This was provided as an Addendum to the Statement of Response to Defra in June 2019.

This report provides a strategic, plan-level assessment to support the WRMP and is not an application-specific (“project” level) assessment. A more detailed, application-specific HRA (with Stage 2 Appropriate Assessment where required) will be needed to support any actual planning application and environmental permits/consents. At this stage, the HRA will need to be revisited to take account of any changes to scheme design, construction and operational arrangements, site specific survey and modelling work, as well as the package of mitigation measures proposed at that stage. Cumulative, in-combination effects will also need to be re-assessed to take account of prevailing, updated information on other projects, programmes and plans, including those highlighted in the section of this HRA report that describes the potential in-combination effects of this plan with other plans and projects.

References

- Defra, 2012, “The Habitats and Wild Birds Directives in England and its seas: Core guidance for developers, regulators & land/marine managers”.
- Department for Communities and Local government (DCLG), 2006, “Planning for the Protection of European Sites”. Guidance for Regional Spatial Strategies and Local Development Documents.
- English Nature, 1997, “The Appropriate Assessment” (Regulation 48).
- English Nature, 1997, The Determination of Likely Significant Effect under The Conservation (Natural Habitats &c.) Regulations 1994. Guidance Note HRGN3.
- EA, NRW, Ofwat, Defra and the Welsh Government, 2018, “Water Resources Planning Guideline”. Interim Update. July 2018.
- Environment Agency, 2012, “Lower Tidal River Arun Draft flood risk management strategy Consultation on draft recommendations for managing the risk of flooding from the tidal River Arun” [online]. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/322086/LTRAS_Consultation_Document_cf575d.pdf
- European Commission Environment DG, 2001, “Assessment of plans and projects significantly affecting European Sites”, Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.
- Highways Agency, 2003, “Design Manual for Roads and Bridges” (DMRB), Volume 11.
- Institute of Air Quality Management, 2014, “Guidance on the assessment of dust from demolition and construction”, v1.1.
- The Conservation (Natural Habitats &c) Regulations, 1994, Guidance Note HRGN1.
- Tyldesley D. and Chapman C., 2015, “The Habitats Regulations Assessment Handbook”, Version 4.
- UKWIR, 2012, “Strategic Environmental Assessment and Habitats Regulations Assessments - Guidance for Water Resources Management Plans and Drought Plans”, (WR/02/A).
- UKWIR, 2012, “Strategic Environmental Assessment and Habitats Regulations Assessment of Water Resources Management Plans”, UKWIR Project WR/02/A.

Water Resources Management Plan 2019

Annex 15: HRA Main Report

Appendix A: HRA Stage 1 Screening

December 2019

Version 1

from Southern Water

RESTRICTED INFORMATION IN SEPARATE PDF, AVAILABLE UPON REQUEST

Water Resources Management Plan 2019

Annex 15: HRA Main Report

Appendix B: HRA Stage 2 Appropriate Assessment Fawley Desalination

December 2019

Version 1

from Southern Water

RESTRICTED INFORMATION IN SEPARATE PDF, AVAILABLE UPON REQUEST

Water Resources Management Plan 2019

Annex 15: HRA Main Report

Appendix C: HRA Stage 2 Appropriate Assessment Bournemouth

December, 2019

Version 1

from Southern Water

RESTRICTED INFORMATION IN SEPARATE PDF, AVAILABLE UPON REQUEST

Water Resources Management Plan 2019

Annex 15: HRA Main Report

Appendix D: HRA Stage 2 Appropriate Assessment Portsmouth Water

December, 2019

Version 1

from Southern Water

RESTRICTED INFORMATION IN SEPARATE PDF, AVAILABLE UPON REQUEST

Water Resources Management Plan 2019

Annex 15: HRA Main Report

Appendix E: HRA Stage 2 Appropriate Assessment Southampton Link Main

December, 2019

Version 1

from Southern Water

RESTRICTED INFORMATION IN SEPARATE PDF, AVAILABLE UPON REQUEST

Water Resources Management Plan 2019

Annex 15: HRA Main Report

Appendix F: HRA Stage 2 Appropriate Assessment Test Estuary Industrial Reuse

December, 2019

Version 1

from Southern Water

RESTRICTED INFORMATION IN SEPARATE PDF, AVAILABLE UPON REQUEST

Water Resources Management Plan 2019

Annex 15: HRA Main Report

Appendix G: HRA Stage 2 Appropriate Assessment Portsmouth Harbour and Fareham WTWs Indirect Water Reuse

December 2019

Version 1

from Southern Water

RESTRICTED INFORMATION IN SEPARATE PDF, AVAILABLE UPON REQUEST

Water Resources Management Plan 2019

Annex 15: HRA Main Report

Appendix H: HRA Stage 2 Appropriate Assessment Woolston and Portswood WwTW Indirect Potable Reuse

December, 2019

Version 1

from Southern Water

RESTRICTED INFORMATION IN SEPARATE PDF, AVAILABLE UPON REQUEST

Water Resources Management Plan 2019

Annex 15: HRA Main Report

Appendix I: HRA Stage 2 Appropriate Assessment Sittingbourne Industrial Reuse

December 2019

Version 1

from Southern Water

RESTRICTED INFORMATION IN SEPARATE PDF, AVAILABLE UPON REQUEST