Final Water Resource Management Plan 2024

Annex 19: Water Framework Directive Assessment Report

May 2025
Version 3.1

Contents

1. Introduction

Southern Water Services (Southern Water) has prepared its next Water Resource Management Plan (WRMP24). The WRMP sets out how the balance between water supply and demand, and security of supply, will be maintained over a minimum of 25 years in a way that is economically, socially and environmentally sustainable. WRMPs are reviewed on a rolling five-year basis, the most recent being published in 2019.

WRMPs must comply with international, UK and national legislation pertaining to the environment, as well as associated guidance on the development of WRMPs. The regulatory environmental assessment of the Southern Water WRMP24 includes the following:

- Strategic Environmental Assessment (SEA)[1];
- Habitats Regulations Assessment (HRA)[2]; and
- Water Framework Directive (WFD)[3] assessment.

The Water Framework Directive (2000/60/EC) is an EU Directive establishing a framework for Community action in the field of water policy which aims to protect and improve the water environment. The Directive was brought into UK law in 2003 and subsequently revoked by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 in England and Wales. From this point forward "WFD" refers to the legislation applicable to England and Wales, not the EU Directive.

As part of preparing the WRMP24, Southern Water must demonstrate how it has considered the requirements of the WFD regulations. The current expectations are reflected (and articulated) in the latest 2022 national Water Resource Planning Guidance[4] (WRPG), the WRPG Supplementary Guidance[5] and the UKWIR guidance[6] on environmental assessments for WRMPs and Drought Plans, both of which were updated in 2021. In addition, the All Company Working Group (ACWG) involved in developing Strategic Resource Options[7] (SROs) has published relevant assessment methodology to help ensure consistency in the assessments undertaken by individual water companies of their SROs, aligned to the RAPID gated process.

This report presents the findings of the WFD assessment for Southern Water's Final Draft WRMP24, as of April 2025.

1.1. Water Resource Management Plan

Each water company's WRMP sets out how the balance between water supply and demand, and security of supply, will be maintained over a minimum of 25 years in a way that is economically, socially and

[1] UK Government (2004) Statutory Instrument No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004

[2] UK Government (2017) Statutory Instrument No. 2010/490 Conservation of Habitats and Species Regulations 2017

[3] Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy and the Water Environment (WFD) (England and Wales) Regulations 2017

[4] Ofwat, NRW & EA (2022), Water Resources Planning Guideline – Updated 22 July 2022. Available at: https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline.

[5] Environment Agency (2022) *Water resources planning guideline supplementary guidance – Environment and society in decision-making* (External guidance: Version 2, Dated: 03 March 2022)

[6] UKWIR (2021) *Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans*. UK Water Industry Research Limited, London.

[7] The Strategic Water Resource Options (SROs) programme has been initiated by Ofwat to provide at least 1500Ml/d of water to areas of England facing a water deficit. The SRO Programme includes 17 schemes which will be funded and assessed during AMP7 to determine the right portfolio of projects to be selected by Regional Plans ready for implementation in AMP8. Schemes are evaluated at a series of decision points (Gates).

environmentally sustainable. This will include public water supply (PWS) and non-public water supply (non-PWS).

A supply-demand balance is used to identify those water resource zones[8] (WRZs) in deficit over the lifetime of the plan (and so where additional water resources are required). The WRMP presents options for the resolution of the WRZ deficit. The plan process initially reviews as many potential solutions as possible (the 'unconstrained list' of options) to identify 'feasible' options for each WRZ which will contribute to meeting the supply demand deficit across the operational area.

Types of water resource management options considered to meet any forecast deficit in a WRZ can include:

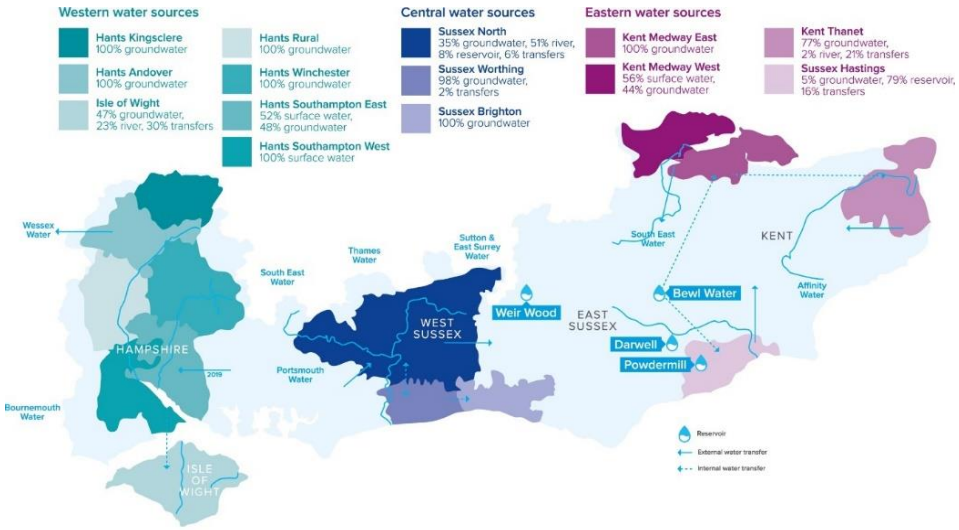
- **Customer options** which include measures to manage the demand for water such as smart meters, rainwater harvesting, greywater recycling or household visits to install water efficiency measures;
- **Distribution options** which include measures to optimise the efficiency of water networks, reduce leakage and minimise any unscheduled resource losses;
- **Production options** include measures to increase the efficiency and effectiveness of treatment processes;
- **Resource management options** which include measures to increase supply such as greater peak output at existing groundwater sources, reservoir or surface water supply and which will include SROs; this also includes catchment management options, for example nature-based solutions; and
- **Non-PWS options** which include any options which increase water resource availability or reduce the need for abstraction outside of that needed for public water supplies.

The 'feasible' options are screened against criteria and options that were impractical or have unacceptable environmental or economic impacts were removed. This identifies a constrained list of options which are then subject to more detailed assessment. These are reviewed and considered through decision making tools to identify the preferred plan options that collectively comprise the proposed plan programme. In developing the preferred programme, consideration is given to alternative plan programmes (or pathways) developed in response to different scenarios, to resolve any supply deficits in relation to financial, environmental and social costing and, potentially, to facilitate water trading between companies.

Southern Water provides water supplies to just over 2.4 million customers across an area of 4,450km^2, extending from East Kent, through parts of Sussex, to Hampshire and the Isle of Wight in the west. The Southern Water region is divided into fourteen Water Resource Zones (WRZs) which are geographically separate and amalgamated into three larger, sub-regional areas (see **Figure 1**).

[8] Ofwat, NRW & EA (2022), Water Resources Planning Guideline – Updated 22 July 2022 https://www.gov.uk/government/publications/waterresources-planning-guideline/water-resources-planning-guideline. Section 4.4. of the WRPG defines a water resource zone as "an area within which the sources of water and distribution of water to meet demand, is largely self-contained (with the exception of agreed bulk transfers)".

Figure 1 Southern Water's Supply Area



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 42,390Ml. South East Water is entitled to 25% of the available supplies from the River Medway Scheme, which incorporates Bewl Water Reservoir.

Southern Water face challenges in its Western and Central areas, as a result of already implemented licence changes, and proposed further abstraction reductions to protect and enhance the environment. There are now limited opportunities to develop new 'conventional' sources of water such as abstraction from rivers or groundwater. Consequently, in order to ensure uninterrupted supplies in all but the most extreme weather conditions (i.e. a drought of greater than 1:500 severity), Southern Water's fdWRMP24 includes ambitious demand management targets to reduce both leakage and consumption in addition to building 'non-conventional' sources of water such as water recycling and desalination.

At a **company level**, Southern Water aims to:

- reduce consumption by household customers in order to reduce average per capita consumption (pcc) to 110 litres per head per day by 2044-45 under dry year conditions. This is 5 years earlier than the 2049-50 target year set by the Government;
- reduce leakage by 53% by 2049-50 compared to the reported leakage in 2017-18. The is higher than the 50% reduction required by the Government;
- reduce non-household consumption by 9% compared to the reported figure in 2019-20 by 2037-38;
- promote catchment and nature-based solutions through the Catchment First programme to improve environmental resilience;

- stop the use of all supply-side drought permits and orders by 2040-41 at the latest, unless faced with a drought of more than 1-in-500 year severity.

The **Western Area** strategy involves:

- continuation of all existing internal transfers as well as external bulk imports and exports;
- implementing water efficiency programmes to reduce household and non-household consumption from 2025-26 to reduce consumption by 39.2 million litres per day (Ml/d) by 2049-50 excluding the impact of New Appointments and Variations on future growth;
- implementing leakage reduction measures from 2025-26 to reduce leakage by 9.9Ml/d by 2049-50 excluding the impact of New Appointments and Variations on future growth;
- removing constraints at Newbury groundwater source to increase yield (1.2Ml/d) from 2027-28;
- drilling new boreholes at Romsey to provide 4.8Ml/d from 2030-31;
- removing constraints and Kings Sombourne groundwater source to provide up to an additional 2.5Ml/d from 2030-31;
- increasing transfer capacity between Hampshire Rural and Hampshire Southampton West water resource zones through the Romsey Town and Test valve to transfer an additional 5Ml/d from 2030-31;
- delivering Sandown Wastewater Treatment Works recycling scheme to provide up to 8.5Ml/d from 2030-31;
- constructing 'Hampshire grid' to move water more easily in the Hampshire area from 2030-31;
- bulk import (up to 21Ml/d) from Portsmouth Water to Itchen Water Supply Works from 2031-32 following the construction of Havant Thicket Reservoir;
- bulk import (up to 90Ml/d) from Havant Thicket Reservoir to Itchen Water Supply Works from 2034-35 following the delivery of Hampshire Water Transfer and Water Recycling Project;
- implementing Test Managed Aquifer Recharge scheme to provide up to 5.5Ml/d from 2035-36;
- drilling new boreholes at Newchurch groundwater source to increase yield by 1.9Ml/d from 2036-37;
- drilling new boreholes at Eastern Yar3 groundwater source to increase yield by 1.5Ml/d from 2039-40;
- bulk import (up to 120Ml/d) into Hampshire through Thames to Southern Transfer from 2039-40;
- terminating the use of Lower Itchen Drought Permit/Order after 2029-30;
- terminating the use of Candover Drought Order after 2033-34;
- terminating the use of River Test Drought Permit/Order after 2033-34 under droughts of up to 1-in-200 year severity;
- terminating the use of all supply-side drought permits/orders after 2040-41 unless faced with a drought of more than 1-in-500 year severity;
- continuing to use Temporary Use Bans and Non-Essential Use Bans to manage demand during droughts.

The **Central Area** strategy involves:

- continuation of all existing internal transfers as well as external bulk imports and exports;
- implementing water efficiency programme to reduce household and non-household consumption from 2025-26 by 35.8Ml/d by 2049-50 excluding the impact of New Appointments and Variations on future growth;
- implementing leakage reduction measures from 2025-26 to reduce leakage by 7.6Ml/d by 2049-50 excluding the impact of New Appointments and Variations on future growth;

- bulk import from SES Water (up to 4Ml/d) from 2025-26 to 2030-31;
- reinstating West Chiltington groundwater source to provide up to 3.1Ml/d from 2028-29;
- refurbishing Petersfield groundwater source to provide up to 1.6Ml/d from 2028-29;
- terminating the use of Pulborough surface water drought permit/order after 2029-30 under droughts of up to 1-in-200 year drought severity;
- delivering a new treatment works at Weir Wood Reservoir with a 21Ml/d capacity from 2030-31
- drilling new boreholes at Petworth to provide up to 4Ml/d from 2030-31;
- asset enhancement at Lewes Road groundwater source to provide up to 3.5Ml/d from 2030-31;
- recycled water from Littlehampton Wastewater Treatment Works (up to 15Ml/d) from 2030-31;
- bulk import from SES Water of up to 10Ml/d from 2033-34;
- bulk import (up 10Ml/d) from South East Water to Pulborough from 2039-40;
- bulk import (up to 50Ml/d) from Havant Thicket Reservoir to Pulborough from 2039-40;
- building pipeline to transfer up to 35Ml/d between Pulborough and Worthing from 2039-40;
- improving treatment capacity at Pulborough to provide up to 2Ml/d from 2040-41;
- building pipeline to transfer up to 4Ml/d between Worthing and Brighton from 2040-41;
- building a desalination plant close to the River Arun to provide benefit from 2040-41 to deliver up to 40Ml/d by 2049-50;
- construction of River Adur Offline Reservoir to provide up to 19.5Ml/d from 2045-46;
- use of recycled water from Horsham Wastewater Treatment Works with storage at Pulborough to provide up to 11.5Ml/d from 2057-58;
- bulk import (up to 20Ml/d) from South East Water to Brighton from 2065-66;
- terminating the use of all supply-side drought permits/orders after 2040-41 unless faced with a drought of more than 1-in-500 year severity;
- continuing to use Temporary Use Bans and Non-Essential Use Bans to manage demand during droughts.

The **Eastern Area** strategy involves:

- continuation of all existing internal transfers as well as external bulk imports and exports;
- implementing water efficiency programme to reduce household and non-household consumption from 2025-26 to reduce demand by 37.4Ml/d by 2049-50 excluding the impact of New Appointments and Variations on future growth;
- implementing leakage reduction measures from 2025-26 to reduce leakage by 10.9Ml/d by 2049-50 excluding the impact of New Appointments and Variations on future growth;
- recycling from Medway Wastewater Treatment Works for up to 14Ml/d from 2030-31;
- recycling from an industrial source in Sittingbourne (7.5M/d) from 2030-31;
- recommissioning Gravesend groundwater source (2.7Ml/d) from 2030-31;
- conjunctive use of Bewl Water with recycled water from Tonbridge Wastewater Treatment Works to provide up to 5.7Ml/d from 2035-36;
- reconfiguring Rye Wells to provide up to 1.5Ml/d benefit from 2039-40;
- developing a desalination plant on the Thames Estuary from 2039-40 to provide up to 40Ml/d;
- developing a desalination plant on the Isle of Sheppey to provide up to 20Ml/d from 2040-41, increasing to 30Ml/d by 2062-63;

- developing a desalination plant in East Thanet to provide 20Ml/d from 2040-41, increasing to 40Ml/d by 2049-50;
- bulk import (up to 20Ml/d) from South East Water to near Canterbury from 2049-50;
- bulk import (up to 10Ml/d) from South East Water to Rye from 2049-50;
- conjunctive use of Darwell Reservoir with recycled water from Hastings Wastewater Treatment Works (up to 6.8Ml/d) from 2050-51;
- raising Bewl Water by 0.4m for up to 3Ml/d benefit from 2060-61;
- terminating the use of all supply-side drought permits/orders after 2040-41 unless faced with a drought of more than 1-in-500 year severity;
- continuing to use Temporary Use Bans and Non-Essential Use Bans to manage demand drought droughts.

1.2. Relationship with Water Resources South East

National guidance[9] requires alignment of water company WRMPs with the respective regional plan. In the case of Southern Water, the Final Draft WRMP24 has been developed within the context of the Water Resources South East (WRSE) Regional Plan[10]. WRSE is a collaboration of the six[11] water companies that supply water in South East England. The Regional Plan looks beyond the boundaries of individual companies and identifies options that will deliver the most benefit across the region.

The interactions and the need for consistency between the regional plans and the WRMPs, and between regions has driven development of new approaches and methodologies in the preparation of water resources plans. In this regard, WRSE commissioned the development of a new integrated environmental appraisal process to provide a consistent framework for environmental assessments for WRMP24. The method[12] has been developed taking into account the guidance from the Environment Agency (EA) and uses an integrated approach covering SEA, HRA, WFD assessment, Natural Capital Assessment (NCA) and Biodiversity Net Gain (BNG). It was subject to consultation in 2020 and has been revised[13].

The revised WRSE environmental assessment methodology provides the approach to assessment for water companies when undertaking their WRMP24 regulatory environmental assessments. In consequence, a large amount of the supporting information required for the WFD assessment of Southern Water's WRMP24 has been produced as part of the regional plan environmental assessment. The relationship was set out in a scoping technical note issued for consultation with the Environment Agency, Natural England and Historic England for 5 weeks from 21st February to 27th March 2022. Subsequently, the approach has been further refined and is detailed in **Section 4**.

9 UK Government (2021) *Water Resource Planning Guidance* [online]. Available at: https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline.

10 WRSE (2022) Futureproofing our water supplies: A Consultation On Our Emerging Regional Plan For South East England. Available at: https://wrse.uk.engagementhq.com/the-proposed-solution.

11 Affinity Water, Portsmouth Water, SES Water, South East Water, Southern Water and Thames Water

12 WRSE (2020) WRSE Method Statement: Environmental Assessment Consultation version July 2020. Available at: wrse_file_1329_wrse-ms-environmental-assessment.pdf

13 WRSE (2021), Method Statement: Environmental Assessment Post-consultation version, November 2021. Available at: methodstatement-environmental-assessment-nov-2021.pdf (wrse.org.uk)

2. The Water Framework Directive

The environmental objectives of the WFD are set out within **Regulation 13** of the WFD Regulations 2017, for natural surface and groundwater bodies, artificial, and heavily modified water bodies (HMWBs). The objectives for surface waters are to:

- *(a) prevent deterioration of the status of each body of surface water;*
- *(b) protect, enhance and restore each body of surface water (other than an artificial or heavily modified water body) with the aim of achieving good ecological status and good surface water chemical status, if not already achieved, by 22nd December 2021;*
- *(c) protect and enhance each artificial or heavily modified water body with the aim of achieving good ecological potential and good surface water chemical status, if not already achieved, by 22nd December 2021;*
- *(d) aim progressively to reduce pollution from priority substances and aim to cease or phase out emissions, discharges and losses of priority hazardous substances.*

For groundwater bodies, the objectives are to:

- *(a) prevent deterioration of the status of each body of groundwater;*
- *(b) prevent or limit the input of pollutants into groundwater;*
- *(c) protect, enhance and restore each body of groundwater, and ensure a balance between abstraction and recharge of groundwater, with the aim of achieving good groundwater chemical status and good groundwater quantitative status, if not already achieved, by 22nd December 2021;*
- *(d) reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order to progressively reduce pollution of groundwater.*

Exemptions are defined within Regulations 16 to 19, outlining the conditions under which the achievement of good status or potential may be phased or not be achieved, or under which deterioration may be allowed. Regulation 16 to 19 describe these distinct conditions. In summary:

- **Regulation 16** allows an extension of the time limit so that good status or potential is, under certain conditions, achieved after 2021, but not later than December 2027;
- **Regulation 17** allows the achievement of less stringent objectives under certain conditions;
- **Regulation 18** allows the temporary deterioration of status in case of natural causes or "force majeure";
- **Regulation 19** allows for deterioration of status or non-achievement of good status or potential under certain distinct conditions.

3. The WFD and WRMPs

The requirements for a WFD assessment of a water company WRMP are outlined in the 2022 WRPG Section 8.2.2.2:

"RBMPs and WFD environmental objectives are a constraint on your options. You should screen out any options that have unacceptable environmental impacts that cannot be overcome. You should ensure that there is no risk of deterioration from a potential new abstraction or from increased abstraction at an existing source before you consider it as a feasible option. Alternatively if investigations are yet to be completed, you should set out what your alternative options would be should those investigations demonstrate that there will be an unacceptable environmental impact.

You should also assess new supply options against the RBMP measures and objectives for each water body and meet your obligations to avoid future deterioration. You should ensure that your feasible options do not compromise the achievement of RBMP objectives.

You should talk to the Environment Agency or Natural Resources Wales about any intended actions that may:

- *cause deterioration of status (or potential);*
- *prevent the achievement of the water body status objectives in RBMPs; or*
- *prevent the achievement of water body status (or potential) for new modifications.*

You should do this as soon as possible before developing your plan. You should make a clear statement in your plan about any potential impacts."

These WRPG requirements reflect Defra's Guiding Principles for Water Resources Planning (May 2016) which state that companies should take account of the government's objectives for the environment including the "*appropriate parts of the EU Water Framework Directive*". Defra also expects that companies will:

- Have regard to RBMPs and their objectives when making decisions that could affect the condition of the water environment;
- Ensure that current abstractions and operations, as well as future plans, support the achievement of environmental objectives and measures set out in RBMPs;
- Ensure plans:
  - prevent deterioration in water body status;
  - support the achievement of protected area and species objectives;
  - support the achievement of water body status objectives.
- Continue working with the Environment Agency to take a proportionate and evidence-based approach to identify the changes needed to current abstraction licences to meet environmental requirements.

Both the WRPG and the Defra Guiding Principles refer to ensuring 'no deterioration' of water body status. A recent (2015) European Court of Justice (ECJ) ruling clarified that 'no deterioration' means a deterioration between a whole 'status class' (e.g. 'good', 'moderate', etc.) of one or more of the relevant 'quality elements' (e.g. biological, physico-chemical, etc.). This definition applies equally to Artificial Water Bodies and Heavily Modified Water Bodies in respect of the relevant quality elements that relate to the defined uses of these water bodies. The ECJ ruling further states that if the quality element concerned is already in the lowest class, any deterioration of that element constitutes a deterioration of the status.

4. WFD Assessment Approach

4.1. Objectives

The objectives of the WFD assessment are to demonstrate that the individual options and the plan as a whole will:

1. Prevent deterioration between WFD status class of any element in the waterbody as set out in WFD Regulation 13;
2. Prevent new impediments to attaining 'Good' WFD status or potential for the waterbody, or any assessed element, as set out in Regulation 13;
3. Ensure that the planned programme of measures to help attain the WFD objectives for the waterbody in the current cycle of RBMPs, are not compromised.

These objectives are used as a test of constraint, and assess if an option and the plan is compliant or non-compliant with the WFD. In addition, the following objectives will apply to the plan as a whole. These are considered as progressive objectives rather than tests of constraint and do not lead to WFD non-compliance if not achieved. These are as follows:

4. Assist in attaining the WFD objectives for the waterbodies in line with Regulation 13;
5. Assist in attaining the objectives associated with WFD protected areas in line with Regulation 13;
6. Reduce treatment needed to produce drinking water and look to work in partnership with others; promoting the requirements of Regulation 8[14].

Where objectives 1, 2 and/or 3 are not met by an option or the plan then, unless there is no reasonable alternative, that option or plan should not be progressed as the preferred plan without discussion with the relevant regulatory body. Discussion with the regulatory body will include:

- If a plan is reported as potentially WFD non-compliant it may be appropriate to consider an adaptive plan where it is considered that additional evidence to improve confidence in assessment and enhanced design could mitigate the potentially WFD non-compliant issues.
- Where a plan is assessed as WFD non-compliant, in circumstances where there is an over-riding public interest or the benefits of achieving the WFD Assessment Objectives are outweighed by benefits to human health, human safety or sustainable development there is scope to apply for a Regulation 19 exemption as to why these WFD Assessment Objectives are not achieved.

The Environment Agency has published guidance setting out circumstances in which Regulation 19 exemptions may applied to water company water resources permissions[15]. The guidance clarifies that "*Regulation 19 can only be applied to a new modification of the characteristics of a surface water body or alteration to level of groundwater in a groundwater body which is authorised by the grant of a licence or variation to a licence. Regulation 19 cannot be applied to a plan. As a result, water companies are not required to provide a full Regulation 19 justification at the WRMP stage. Sufficient evidence is however needed that planning on the basis of Regulation 19 exemptions being granted is realistic. Accordingly, where a WRMP is based on the need for new or varied licences that would require a Regulation 19 exemption, the Environment Agency would need to see in the draft WRMP that a water company has given sufficient through to how it can take all reasonable steps to achieve the required environmental objectives or, in the event these cannot be achieved, how any shortfall can be minimised*".

[14] Regulation 8.2 *For each drinking water protected area, the programme of measures for the river basin district within which it is located must include measures with the aim of avoiding deterioration in the quality of the water in that area, in order to reduce the level of purification treatment required in the production of drinking water abstracted from it.*
[15] Environment Agency (2023) *WFD Regulation 19 exemptions for water company water resources permissions* (LIT 65716) Published 27/03/2023

4.2. Methodology

The WFD Assessment comprises four stages, to ensure a level of assessment proportionate to the risk posed by the options and the status of the options within the WRMP (i.e. constrained or preferred options):

- Stage 1: Basic Screening of Options
- Stage 2: Detailed Impact Screening of Options
- Stage 3: Plan Level Assessment
- Stage 4: Cumulative Assessment with other Plans/Projects.

Descriptions of the four Stages of assessment are provided in the following sections.

4.2.1. Stage 1: Basic Screening based on activities

The first stage of WFD assessment was initially completed by Mott Macdonald on behalf of Southern Water using the agreed WRSE Regional Plan methodology, and was used to inform the WFD assessment of the WRSE Emerging Regional Plan.

In producing the Final Draft WRMP, the Stage 1 screening was repeated by Southern Water for the preferred options, in order to review the assessment against the latest option information, and to take into account previous regulator feedback.

The purpose of Stage 1 is to identify and 'screen-out' options and waterbodies with no or very minor potential impacts from further assessment (Stage 2), and focus further assessment effort on those options with the potential to be non-compliant with the WFD.

The Stage 1 assessment comprises a basic screening of all constrained and preferred options and follows the following steps for each option:

- Identification of the activities involved in construction, operation and decommissioning phases;
- Identification of the WFD waterbodies which these activities may affect, and collation of baseline WFD status for each waterbody;
- Each activity in each water body is assigned an impact score;
- Consideration of the embedded mitigation measures included in the option design, and assumed in the list of impact scores. Where appropriate, the impact score is revised to take account of additional or reduced embedded mitigation; and
- Selection of the maximum impact score (i.e. the highest screening score from any one activity in any waterbody).

The impact scores are a six-point scale ranging from -2 'very beneficial' to 3 'high impact', see **Table 1**. Options with a maximum impact score of two or higher are "screened-in" for the Stage 2 assessment, and considered, at this stage, to be potentially non-compliant with the WFD.

Options with an impact score of one or less are not "screened-in" for Stage 2 assessment and are considered to be WFD compliant. This means that WFD compliance will not be a constraint on the implementation of the option. Embedded mitigation may be required, and further WFD investigation may be required at the time of implementation to design such mitigation, but that should be easily achieved within normal best practice for construction and operation.

Table 1 Impact scoring system for Stage 1 of the WFD assessment

Impact	Score	Description
Very beneficial	-2	Impacts that, taken on their own, have the potential to lead to the improvement in the ecological status or potential of a WFD quality element for the entire waterbody.
Beneficial	-1	Impacts that, when taken on their own, have the potential to lead to a minor localised or temporary improvement that does not affect the overall WFD status of the waterbody or any quality elements.
No/minimal	0	No measurable change in the quality of the water environment or the ability for target WFD objectives to be achieved.
Low	1	Impacts that, when taken on their own, have the potential to lead to a minor localised, short-term and fully reversible effects on one or more of the quality elements but would not result in the lowering of WFD status. Impacts would be very unlikely to prevent any target WFD objectives from being achieved.
Medium	2	Impacts that, when taken on their own, have the potential to lead to a widespread or prolonged effect on the quality of the water environment. This may result in the temporary reduction in WFD status class (e.g., from good to moderate), or temporary deterioration within the lowest status class. Impacts have the potential to prevent target WFD objectives from being achieved.
High	3	Impacts when taken on their own have the potential to lead to a significant effect and permanent deterioration of WFD status class, or permanent deterioration within the lowest status class. Potential for high impact on preventing target WFD objectives from being achieved.

A summary of the outcomes from the Stage 1 assessments for all the constrained and preferred options is provided within **Section 5**.

4.2.2. Stage 2: Detailed Impact Screening

Options that are considered to be potentially non-compliant in Stage 1, and selected by Southern Water as preferred options, have been brought forward to Stage 2 assessment.

The Stage 2 assessment for each option comprises a waterbody scale assessment of impacts on each WFD quality element for each activity flagged as potentially non-compliant. Where appropriate, activities or quality elements are grouped where potential impacts are similar. The assessments are based on expert judgement, supported by the following:

- Baseline WFD data (status, objectives, reasons for not achieving good status);
- A review of the hydrological/hydrogeological setting;
- A review of the regulatory position on water availability as presented in the Environment Agency Abstraction Licensing Strategy datasets;
- Where available, a review of regulator concerns/comments on the options;
- Where available any existing studies/knowledge of the options or water bodies in which they are located (e.g., WINEP investigations);
- Consideration of additional mitigation that could be implemented to limit or avoid impacts.

The Stage 2 impact screening has been undertaken on all water bodies that could potentially be impacted by an option. For example, for a new/increased surface water abstraction, the river water body in which the abstraction is located has been assessed, as well as any downstream water bodies which may be impacted by changes to the flow regime. For options which impact groundwater, the assessment also considers surface water bodies that may be hydraulically connected to the groundwater body in which the option is located.

The same numerical scale for scoring is used for the Stage 2 assessment as has been used in the Stage 1 assessments (i.e. **Table 1**). The Stage 1 impact scores have been reviewed and where appropriate revised

based on the Stage 2 assessment. Where it is possible to lower the impact score to one or lower, the option is considered to be compliant with the WFD. Where the impact scores are unchanged or raised, the option is considered to be potentially non-compliant with the WFD.

A confidence level is assigned to the Stage 2 assessment, based on the quality and availability of both environment data and design information about the option at the time of assessment (see **Table 2**). Where the confidence levels are medium or low, the requirements for further data or design information to raise this confidence level are identified.

Where there is high confidence that an option is potentially non-compliant with the WFD Assessment Objectives, it should not be included as a preferred option, without more detailed impact assessment (this may include site specific data collection, bespoke modelling etc), and/or inclusion of alternative options within the preferred plan should WFD compliance not be established. This will require discussion with the environmental regulators at an early stage as the option may pose a risk to the plan. A bespoke method for this detailed assessment will be produced if required. However, no preferred options have been assessed as potentially non-compliant (high confidence) (see **Section 5**).

Table 2 Confidence levels used in Stage 2 assessment

Confidence level	Description
Low	Limited data and evidence available, based mainly or completely on expert judgement with many assumptions. Preliminary design information only, detailed information on location/routes, construction methods etc. not yet available.
Medium	Some data and evidence available, based partially on expert judgement with some assumptions Design progressed but some assumptions made on construction methods etc.
High	Lots of good data and evidence available, minimal assumptions Design advanced, so minimal assumptions needed.

4.2.3. Stage 3: Plan Level Assessment

A cumulative assessment of the preferred options has been undertaken to assess the WFD compliance of the preferred plan and any alternative plans.

Where more than one option is located in the same groundwater body and/or in the same surface water catchment, there is the potential for cumulative impacts. This could occur even where the individual options have been assessed to be WFD compliant (e.g., the cumulative impact of multiple small river flow reductions in several tributaries of the same river). The potential for cumulative impacts has been undertaken in two stages:

- Identifying water bodies that were included in the Stage 1 or Stage 2 assessment for more than one option
- Assessing potential for cumulative impacts further downstream, through grouping options at the Operational Catchment level.

The preferred plan has been reviewed for WFD compliance using the same method and WFD objectives as the option level assessments.

4.2.4. Stage 4: Cumulative Assessment with other Plans/Projects

The preferred plan has been assessed for in combination impacts with WRMPs for other water companies, and the WRSE Regional Plan. This follows a similar process to the Stage 3 Plan Level Assessment.

4.2.5. Limitations and assumptions

The constrained and preferred options are still in the early stages of design development and therefore a precautionary approach has been exercised because of residual uncertainty. The WFD assessments have applied the following limitations and assumptions:

- The assessments refer WFD baseline data for the third cycle of RBMP (RBMP3) where it is available. For water bodies where RBMP3 data is not yet available 2015 and 2019 WFD baseline data have been used (where 2015 is the officially reported baseline for Cycle 2 RBMP).
- The assessment assumes pipelines are underground beneath watercourses (directionally drilled or pipe-jacked) and therefore will not cross watercourses above ground or cause direct impacts.
- For effluent reuse options, it is assumed that the current discharge water quality would fail to meet Good status for at least some of the WFD water quality parameters in receiving waterbodies. At this stage the WFD risk assessment does not take into account additional treatment and retains a risk of changes to physico-chemical conditions until further evidence is provided by treatment process design and water quality dispersion modelling.
- Assessment assumes fail safes / stop of transfer will be in place in the case of a significant failure of treatment.
- For construction activities, the geographical extent of the WFD assessment has been limited to waterbodies between the start point and end point of the option. For options which involve abstractions from or discharges to watercourses there is potential for some effects continuing downstream or upstream. These would become increasingly limited to 'negligible' with distance, but downstream and upstream waterbodies are considered in the Stage 2 assessments.
- Transfer operational requirements are unknown at this stage and the assessment has not accounted for seasonality or sweetening flows (e.g. with respect to flows in watercourses).

4.3. Consultation

Environment Agency (EA) comments were provided on the options in January 2021 after the initial Stage 1 WFD assessment of the constrained options was completed (see Section 5.1). Further comments were provided on the WRSE WFD assessment for the emerging Regional Plan in May 2022.

Southern Water consulted on the draft WRMP24 and supporting technical documents (including the Environmental Report) between 14th November 2022 and 20th February 2023. Over 500 responses were received including some relating to the impacts of options, that were relevant to the WFD assessment.

Southern Water subsequently consulted on its revised draft WRMP24, concluding on 4th December 2024. Over 1,000 responses were received, including some of relevance to the WFD Assessment and wider environmental assessments.

Relevant comments have been taken into account in this report.

5. Option-level WFD Assessment (Stage 1 and Stage 2)

5.1. Initial Constrained Options Stage 1 WFD assessment

288 constrained options were initially subjected to Stage 1 WFD assessment, completed by Mott Macdonald on behalf of Southern Water Services using the agreed WRSE Regional Plan methodology, and used to inform the WRSE Emerging Regional Plan. In their initial assessment, of the 288 constrained options:

- 193 passed the initial Stage 1 WFD assessment and therefore were considered to be likely to be WFD compliant;
- The remaining 95 options were flagged as having the potential to adversely impact one or more WFD waterbodies during the construction or operation of the scheme. For these options further assessment is required to understand the implications of the scheme on WFD objectives and to identify whether mitigation is possible.
- In total there were 76 unique WFD waterbodies identified for the 95 options screened in as requiring further WFD assessment (some WFD waterbodies are linked to more than one option).

5.2. Preferred Options Stage 1 and Stage 2 WFD assessment

Preferred Options included in the WFD Compliance Assessment

The options which have been selected as preferred options for inclusion in Southern Water's Final Draft WRMP24 for WRZs in deficit include:

- Generic demand management and leakage options. These are not expected to impact WFD status;
- Drought options identified in the draft Drought Plan 2022 and assessed as part of the WFD assessment of that Plan (available from Southern Water). These have been assessed in more detail in the EARs of separate drought orders/permits, and are not included in this report, to avoid repetition;
- 60 supply-side preferred options that could potentially impact on WFD status. These include some SROs that are also subject to separate WFD assessments.

The demand management, leakage and drought options are detailed within the WRMP. They are not included in this WFD assessment, to ensure consistency of approach across the parallel workstreams (i.e. the environmental assessments for the Drought Plan).

The 60 supply-side preferred options are the subject of this WFD compliance assessment. These include:

- 11 desalination options (including phases and variants at four locations);
- 13 groundwater options;
- Eight options involving water recycling;
- Two options providing additional storage;
- 24 options transferring water from other water companies or between water resource zones;
- Two other options involving enhancements to assets or treatment capacity.

A full list of the supply side options that have been included in the assessment can be found in **Appendix A**.

WFD Compliance Assessment Outcomes

The results of the screening (Stage 1) and impact assessment (Stage 2) are given in full in **Appendix B** and **Appendix C** respectively, and summarised in **Table 3.**

In summary, the list of preferred options assessed includes:

- 27 options that were anticipated at Stage 1 to be Compliant with the WFD, and therefore required no further WFD assessment for the fdWRMP;
- 33 options taken forward to Stage 2 for further assessment. Of these:
  - Eight options are concluded, following the Stage 2 assessment, to be potentially compliant (seven with low confidence and one with medium confidence). These options included seven options involving changes to groundwater abstractions, and one recycling scheme;
  - 21 options are anticipated to be potentially non-compliant (with low confidence). These options include all of the desalination schemes, some storage schemes, some recycling schemes (with discharge to river), and some involving changes to groundwater abstraction. It is possible that, with more information, it may be concluded that some of these options are compliant, but there is insufficient evidence available at this stage to reliably to do.
  - 4 options are anticipated to be potentially non-compliant (with medium confidence). Three of these options involve effluent re-use schemes where the effluent would be discharged to a lake. The other involves a groundwater abstraction. Again, there is limited detail available for these options, and it is possible that different conclusions could be drawn with more evidence. However, it is considered more likely that these options would remain non-compliant, compared to the non-compliant (low confidence) options.
- No options were identified as being non-compliant (high confidence) and, as noted above, in all cases it is possible that further evidence and design detail could allow different conclusions to be drawn. Therefore, these options can be retained for further consideration.

There are a variety of options available from the wider pool of the constrained option list which passed the Stage 1 assessment, and so may be available for Southern Water to supply the deficit of the WRZ even if further assessment shows that some options are not compliant with the WFD because their impacts cannot be mitigated. In addition, if required, Southern Water will discuss with the Environment Agency the potential for the application of Regulation 19 to individual options, in line with guidance issued by the Environment Agency (2023).

Table 3 Summary of WFD Compliance Assessment of preferred options

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Groundwater	Groundwater (SNZ): New borehole at Petworth (4Ml/d)	Potentially non-compliant (low conf.)	Increase in recent actual abstraction within licence limits may affect flow in nearby stream discharging to the River Rother. Abstraction Licensing Strategy for the surface waterbody shows there is no water available at Q95 and Q70. Restricted water available at Q50. The GWMU has restricted water availability. Geology indicates likely high degree of continuity between groundwater and surface water due to the permeable nature of the solid and superficial geology, and the proximity of watercourses. Increased abstraction will reduce the surplus in the water balance potentially leading to deterioration. Changes to the hydrological regime, river continuity and morphological conditions due to change in baseflow could impact fish, invertebrate and macrophyte/phytobenthos populations, and potentially alter water quality through reduced dilution. The source had previously experienced rising nitrate levels and elevated iron, so it is possible that reinstating it could contribute to the poor status of the groundwater body.
Recycling	Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d)	Potentially non-compliant (low conf.)	A new discharge into the river could potentially change the physico-chemistry of the water body, for example by increasing nutrient concentrations, changing dissolved oxygen concentrations, and changing water temperature. The water body is currently failing to achieve status targets due to phosphate, and any increases could result in further deterioration or make future improvements more challenging. This could, in turn, impact on biological elements. In addition, the new discharge could, in theory, introduce new chemicals or increase the loading of chemicals already found in the waterbody. Further assessment is therefore required to consider the final characteristics of the new discharge and ensure that water quality is not compromised, particularly given the likely connectivity between the river and the Arun Valley SAC, SPA and Ramsar.
Recycling	Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d)	Compliant (low conf.)	A reduction in discharges from the WwTW will reduce the total flow in the River Arun, and will reduce the input of nutrients from effluent into the river. The Arun is discharge rich, which supports flows above natural at low flows. Therefore it may be assumed that a reduction in discharge would not be detrimental to the Arun, and may provide a beneficial change to water quality, particularly since sewage discharge is identified as an RNAG for phosphate, invertebrates and macrophytes
Storage	Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d)	Potentially non-compliant (low conf.)	An increase in abstraction from the River Adur will have an impact on flows, which could be substantial based on the proposed maximum abstraction rate. Although the ALS shows there is water available at Q95, Q70, Q50, Q30, the proposed flow reductions could potentially result impacts on hydromorphology and water quality, with resulting impacts on biological elements. The water body is already failing for phosphate, associated with point source discharges, and reduced flow would reduce the dilution available for those discharges.
Bulk import	Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	Compliant (stage 1)	-
Bulk import	Bulk import (SNZ): SES to SNZ (10Ml/d)	Compliant (stage 1)	-

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Bulk import	Bulk import (SNZ): SES re-zoning (4Ml/d)	Compliant (stage 1)	-
Bulk import	Bulk import (SNZ): SEW RZ5 to Pulborough	Compliant (stage 1)	-
Interzonal transfer	Interzonal transfer (SNZ-SWZ): Pulborough to Worthing	Compliant (stage 1)	-
Desalination	Desalination (SWZ): Tidal River Arun (10Ml/d)	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the coastal water body could impact on water quality and affect biological elements. Water quality modelling will be required to determine the potential effects on biological compliance parameters and protected areas. Whilst fish is not a parameter monitored under coastal water bodies, the potential impacts on fish resulting from a plume of hypersaline water could give rise to an impact on nearby transitional water bodies, e.g. by creating a barrier to population movements.
Desalination	Desalination (SWZ): Tidal River Arun (20Ml/d)	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the coastal water body could impact on water quality and affect biological elements. Water quality modelling will be required to determine the potential effects on biological compliance parameters and protected areas. Whilst fish is not a parameter monitored under coastal water bodies, the potential impacts on fish resulting from a plume of hypersaline water could give rise to an impact on nearby transitional water bodies, e.g. by creating a barrier to population movements.
Desalination	Desalination (SWZ): Tidal River Arun (20Ml/d) Phase 2	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the coastal water body could impact on water quality and affect biological elements. Water quality modelling will be required to determine the potential effects on biological compliance parameters and protected areas. Whilst fish is not a parameter monitored under coastal water bodies, the potential impacts on fish resulting from a plume of hypersaline water could give rise to an impact on nearby transitional water bodies, e.g. by creating a barrier to population movements.
Treatment capacity	Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d)	Compliant (stage 1)	Assessed as compliant on the basis of the option including the sludge treatment and associated length of pipeline. No assessment of changes to abstraction
Interzonal transfer	Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d)	Compliant (stage 1)	-

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Interzonal transfer	Interzonal transfer (SBZ-SWZ): Brighton to Worthing	Compliant (stage 1)	-
Bulk import	Bulk import (SBZ): SEW Barcombe to Rottingdean (20Ml/d)	Compliant (stage 1)	-
Groundwater	Groundwater (SBZ): Lewes Road (3.5Ml/d)	Potentially non-compliant (low conf.)	There are no WFD surface waterbody receptors in proximity to the Lewes Road abstraction. However, increased abstraction will reduce the surplus in the water balance, and the Adur and Ouse ALS shows restricted water availability in the Brigton Chalk Block, so there is some risk that an increase in abstraction within licence may be considered non-compliant. The Brighton Chalk and associated abstractions are currently subject to a WINEP investigation.
Groundwater	Groundwater (HKZ): Remove constraints at Newbury to increase yield (1.2Ml/d)	Compliant (low conf.) (Stage 2)	The overlying surface water body in the vicinity of Newbury is the Enborne, which is isolated from the Chalk aquifer by the London Clay. No impacts on the Enbourne are therefore anticipated.
Interzonal transfer	Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional	Compliant (stage 1)	-
Groundwater	Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)	Potentially non-compliant (low conf.)	The Isle of Wight ALS (2019) shows limited water available in the Eastern Yar catchment (Q30 only). Geology indicates likely connectivity between groundwater and surface water. Therefore the increased rate of abstraction could result in changes to the hydrological regime in the Eastern Yar. DO of the scheme is 4.5 Ml/d, and Q95 in the Eastern Yar at Alverstone is 0.05 m3/s (4.3 Ml/d). Therefore if all impact were felt on the river, at low flows this would constitute a significant impact on flows. Augmentation is used to support flows in the river. Therefore it is possible that use of Eastern Yar3 (WR171) may help to offset impact, but this would need further investigation. Potential for impact on Alverstone Marshes SSSI should also be given further consideration. This option should be concluded as non-compliant, subject to further investigation.
Recycling	Recycling (IOW): Sandown WTW (8.5Ml/d)	Potentially non-compliant (low conf.)	The new discharge could affect physico-chemistry, potentially including concentrations of dissolved oxygen and nutrients, and water temperature. However, conversely, the increase in flow associated with the discharge may be beneficial to water quality and biology. Further investigations are required to determine whether any changes to flow and physico-chemistry could result in impacts upon biological quality elements, and therefore a precautionary conclusion of potentially non-compliant has been drawn.

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Groundwater	Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d)	Compliant (low conf.)	Increase in recent actual abstraction within licence limits may affect the water balance of the River Test Chalk, and have an influence on flows in the River Test. The ALS shows there is restricted water available at Q95, with water available at Q70, Q50, Q30. Changes to the hydrological regime, water quality, river continuity and morphological conditions due to change in baseflow could impact fish and invertebrate populations. However, restricted water availability applies only further downstream, and is protected by a HOF. Therefore, local flow changes, within existing licence, should be acceptable and downstream impacts avoided by HOF (and potentially associated reduction in other sources)
Interzonal transfer	Interzonal transfer (HWZ-HAZ): Crabwood to Andover uni-directional	Compliant (stage 1)	-
Bulk import	Bulk import (HSE): PWC Source A to Itchen WSW (21Ml/d)	Compliant (stage 1)	-
Bulk import	Bulk import (HSE): Havant Thicket Reservoir to Itchen WSW (90Ml/d)	Compliant (stage 1)	
Recycling	Recycling (HSE): Recharge of Havant Thicket Reservoir from Portsmouth Harbour WTW (60Ml/d)	Compliant (stage 1)	Conclusions based on Scheme B4 (Portsmouth Harbour to Havant Thicket components only) of Water Framework Directive Compliance Assessment. Water for Life Hampshire: Gate 2 Submission (Dec 2021). Concludes changes to discharges from Portsmouth Harbour would be compliant. Construction activities between Portsmouth Harbour and Havant Thicket would be compliant. Impacts on Havant Thicket itself not assessed because water body does not yet exist.
Interzonal transfer	Interzonal transfer (HSE-HWZ): Itchen WSW to Yew Hill bi-directional	Compliant (stage 1)	-
Groundwater	Groundwater (HSW): Test MAR (5.5Ml/d)	Compliant (med.conf.) (stage 2)	-

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Desalination	Desalination (KME): Isle of Sheppey (10Ml/d) phase 2	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the transitional water body could impact on water quality and affect biological habitats. Water quality modelling will be required to determine the potential effects on biological compliance parameters and protected areas. Construction of new infrastructure to support this option could impact on both water quality and biology if significant seabed disturbance is required. Sediment sampling will be required to confirm whether there is sufficient risk to water quality to affect biological parameters. The new abstraction could impinge fish and phytoplankton. It is not predicted that the discharge would contain any chemicals supporting chemical status. However, bed disturbance during construction could give rise to the release of sediment bound chemicals. Sediment sampling will therefore be required to confirm whether there is a risk to water quality.
Desalination	Desalination (KME): Isle of Sheppey 20Ml/d	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the transitional water body could impact on water quality and affect biological habitats. Water quality modelling will be required to determine the potential effects on biological compliance parameters and protected areas. Construction of new infrastructure to support this option could impact on both water quality and biology if significant seabed disturbance is required. Sediment sampling will be required to confirm whether there is sufficient risk to water quality to affect biological parameters. The new abstraction could impinge fish and phytoplankton. It is not predicted that the discharge would contain any chemicals supporting chemical status. However, bed disturbance during construction could give rise to the release of sediment bound chemicals. Sediment sampling will therefore be required to confirm whether there is a risk to water quality.
Interzonal transfer	Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d)	Compliant (stage 1)	-
Interzonal transfer	Interzonal transfer (HSW-HRZ): Romsey Town and Test valve expansion (5Ml/d)	Compliant (stage 1)	-

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Groundwater	Groundwater (KME): Recommission Gravesend (2.7Ml/d)	Potentially non-compliant (med. conf.)	The Medway ALS (from 2013) highlights the vulnerability of the North Kent Chalk aquifer and associated abstractions to drought, and the potential influence on groundwater sources. While the RNAGs on the Catchment Data Explorer attribute the Poor status to natural conditions, from the ALS it can be presumed that abstraction contributes to the water balance failures. The ALS states a desire to "seek to secure downward variations of existing licences" from the Chalk. In addition, the ALS indicates restricted water available (Q30 only) in the Ebsfleet catchment, with similarly restricted water availability in other nearby surface water bodies, and the licence is also included in the ongoing North Kent Marshes WINEP investigation. Therefore it may be concluded that an increase in abstraction, even within licence, would be considered to fail the water balance test and potentially dependent surface water body status.
Recycling	Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d)	Potentially non-compliant (low conf.)	The option will result in reduced discharge from Sittingbourne WwTW to the Swale. The North Kent & Swale ALS (2013) shows restricted water available (Q30 only) for the lower Swale catchment. As the discharge is to the tidal Milton Creek, shortly upstream of the Swale SPA boundary. Considering the perceived sensitivity of freshwater flows to estuaries, potential non-compliance has been concluded on a precautionary basis. However, this requires further assessment. From a water quality perspective, the option will reduce loading to Milton Creek, but will also reduce the total flow in the creek. It is assumed that it is more likely to have a positive effect overall, although further assessment would be required to confirm this It is assumed that there will be no net change to groundwater abstraction as a result of the licence trading, and hence the option will be compliant with respect to the groundwater body
Interzonal transfer	Interzonal transfer (KTZ-KME): Utilise full existing capacity	Compliant (stage 1)	-
Desalination	Desalination (KMW): Thames Estuary (10Ml/d)	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the transitional water body could impact on water quality and affect habitats for biological parameters. Water quality modelling will be required to determine potential effects on water quality, which would then determine the potential effects on biological compliance parameters and protected areas. The new abstraction could impinge fish and phytoplankton.

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Desalination	Desalination (KMW): Thames Estuary (10Ml/d) Phase 2	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the transitional water body could impact on water quality and affect habitats for biological parameters. Water quality modelling will be required to determine potential effects on water quality, which would then determine the potential effects on biological compliance parameters and protected areas. The new abstraction could impinge fish and phytoplankton.
Desalination	Desalination (KMW): Thames Estuary (20Ml/d)	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the transitional water body could impact on water quality and affect habitats for biological parameters. Water quality modelling will be required to determine potential effects on water quality, which would then determine the potential effects on biological compliance parameters and protected areas. The new abstraction could impinge fish and phytoplankton.
Desalination	Desalination (KMW): Thames Estuary (20Ml/d)	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the transitional water body could impact on water quality and affect habitats for biological parameters. Water quality modelling will be required to determine potential effects on water quality, which would then determine the potential effects on biological compliance parameters and protected areas. The new abstraction could impinge fish and phytoplankton.
Recycling	Recycling (KMW): Medway WTW to lake (14Ml/d)	Potentially non-compliant (med. conf.)	A new discharge into the reservoir could potentially change the physico-chemistry of the water body, for example by increasing nutrient concentrations, changing dissolved oxygen concentrations, and changing water temperature. Phosphate is Moderate, and there is a risk that the option could result in further deterioration, or prevent future improvements. This could, in turn, impact phytoplankton communities. This is particularly a risk if the option was used during drought periods, i.e. with low water levels and high temperatures. Further assessment is therefore required to consider the final characteristics of the new discharge and ensure that water quality is not compromised.
Asset enhancement	Asset enhancement (KMW): Remove network constraint in KMW (13Ml/d)	Compliant (stage 1)	-
Bulk import	Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d)	Compliant (stage 1)	-

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Desalination	Desalination (KTZ): East Thanet (20Ml/d)	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the coastal water body could impact on water quality and affect biological elements. Water quality modelling will be required to determine the potential effects on biological compliance parameters and protected areas. Whilst fish is not a parameter monitored under coastal water bodies, the potential impacts on fish resulting from a plume of hypersaline water could give rise to an impact on nearby transitional water bodies, e.g. by creating a barrier to population movements. Construction of new infrastructure to support this option could impact on both water quality and biology if significant seabed disturbance is required. Sediment sampling will be required to confirm whether there is sufficient risk to water quality to affect biological parameters.
Desalination	Desalination (KTZ): East Thanet (20Ml/d) Phase 2	Potentially non-compliant (low conf.)	The discharge of hypersaline water into the coastal water body could impact on water quality and affect biological elements. Water quality modelling will be required to determine the potential effects on biological compliance parameters and protected areas. Whilst fish is not a parameter monitored under coastal water bodies, the potential impacts on fish resulting from a plume of hypersaline water could give rise to an impact on nearby transitional water bodies, e.g. by creating a barrier to population movements. Construction of new infrastructure to support this option could impact on both water quality and biology if significant seabed disturbance is required. Sediment sampling will be required to confirm whether there is sufficient risk to water quality to affect biological parameters.
Bulk import	Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d)	Compliant (stage 1)	-
Interzonal transfer	Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d)	Compliant (stage 1)	
Groundwater	Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d)	Compliant (low conf.)	Increase in abstraction could potentially affect flow in nearby River Brede, although the Rother ALS (most recent from 2013) notes that at a "broad scale... only in the upper reaches of the Rother, are existing licensed groundwater abstractions likely to have the potential to significantly reduce baseflow in our surface watercourses". The ALS also states that there is a "theoretical surplus of water within this groundwater management unit", although notes that the situation can vary locally due to the heterogeneity of the geology. For surface water, the ALS shows there is restricted water available at Q95 and Q70 on the Brede, with water available at Q50 and Q30. As this is an existing licence, with potentially limited connectivity to the river, then a tentative conclusion of compliant (low conf.) has been drawn.

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Recycling	Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d)	Potentially non-compliant (med. conf.)	A new discharge into the reservoir could potentially change the physico-chemistry of the water body, for example by increasing nutrient concentrations, changing dissolved oxygen concentrations, and changing water temperature. The water body is already at Poor status for phosphate, and the introduction of treated effluent (depending on the final discharge quality) could worsen this or prevent future improvements. This could have a resulting impact on macrophyte communities, which are currently Moderate. This is particularly a risk if the option was used during drought periods, i.e. with low water levels and high temperatures. Further assessment is therefore required to consider the final characteristics of the new discharge and ensure that water quality is not compromised.
Recycling	Recycling (SHZ): Hastings to Darwell (15.3Ml/d)	Potentially non-compliant (med. conf.)	A new discharge into the reservoir would change the physico-chemistry of the water body, for example by increasing nutrient concentrations, changing dissolved oxygen concentrations, and changing water temperature. The water body has had previous issues due to phosphorus, as demonstrated in the 2015 status classification which for phosphorous was moderate. This could impact phytoplankton communities. This is particularly a risk if the option was used during drought periods, i.e. with low water levels and high temperatures. In addition, the discharge could introduce new or increased concentrations of chemicals in to the water body. This will require further review to determine the relative concentrations of chemicals in the discharge and receiving water. Further assessment is therefore required to consider the final characteristics of the new discharge and ensure that water quality is not compromised.
Bulk import	Bulk import (SHZ): SEW RZ8 to Rye	Compliant (stage 1)	-
Storage	Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d)	Potentially non-compliant (low conf.)	Raising the reservoir could have impacts on upstream feeder streams (flooding of short reaches, and reduced connectivity to downstream), on the reservoir (temporary impacts on marginal habitat; potential longer-term impacts on water quality) and downstream waterbody (delayed spills and potential reduction to total spills, with potential impacts on biological elements). Further assessment will be required, to provide an improved understanding.
Interzonal transfer	Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d)	Compliant (stage 1)	-
Groundwater	Groundwater (HAZ): Recommission Chilbolton (0.5 Ml/d)	Compliant (low conf.)	Increase in recent actual abstraction within licence limits may affect the water balance of the River Test Chalk, and have an influence on flows in the River Test. The ALS shows there is restricted water available at Q95, with water available at Q70, Q50, Q30. Changes to the hydrological regime, water quality, river continuity and morphological conditions due to change in baseflow could impact fish and invertebrate populations. However, restricted water availability applies only further downstream, and is protected by a HOF. Therefore, local flow changes, within existing licence, should be acceptable and downstream impacts avoided by HOF (and potentially associated reduction in other sources)

Option Type	Option name	Outcome	Reason, if not confirmed as compliant
Groundwater	Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5 Ml/d)	Compliant (low conf.)	Increase in recent actual abstraction within licence limits may affect the water balance of the River Test Chalk, and have an influence on flows in the River Test. The ALS shows there is restricted water available at Q95, with water available at Q70, Q50, Q30. Changes to the hydrological regime, water quality, river continuity and morphological conditions due to change in baseflow could impact fish and invertebrate populations. However, restricted water availability applies only further downstream, and is protected by a HOF. Therefore, local flow changes, within existing licence, should be acceptable and downstream impacts avoided by HOF (and potentially associated reduction in other sources)
Groundwater	Groundwater (SNZ): Petersfield refurbishment (1.6 Ml/d)	Potentially non-compliant (low conf.)	Increased groundwater abstraction (within the current licence quantity) could result in reduced river flows. The Arun & Western Stream ALS has restricted water available in the catchment, and the scheme is subject to an ongoing WINEP investigation. Therefore, pending the outcome of that investigation, it is assumed that the option may be non-compliant with the WFD.
Groundwater	Groundwater (SNZ): Reinstate West Chiltington (3.1 Ml/d)	Potentially non-compliant (low conf.)	Increased groundwater abstraction (within the current licence quantity) could result in reduced river flows. The Arun & Western Stream ALS has restricted water available in the catchment, and the scheme is subject to an ongoing WINEP investigation. Therefore, pending the outcome of that investigation, it is assumed that the option may be non-compliant with the WFD.
Bulk import	Bulk import (HAZ): T2ST to Andover	Compliant (stage 1)	-
Bulk import	Bulk import (HKZ): T2ST to HKZ (5Ml/d)	Compliant (stage 1)	-
Bulk import	Bulk import (HWZ): T2ST to Yew Hill (95Ml/d)	Compliant (stage 1)	-
Groundwater	Groundwater (IOW): New borehole at Eastern Yar3 (1.5Ml/d)	Compliant (low conf.) (Stage 2)	The IOW ALS shows there is no water available in Wroxall Stream at Q95, Q70, Q50, Q30. Geology indicates likely high degree of continuity between groundwater and surface water. However, the source is only used intermittently, and is used to augment the Yar, thereby offsetting any flow impacts. As a result of being used only intermittently, it is expected that this source will be excluded from ongoing No Deterioration investigations on the IOW. Taking these factors in to account, it is reasonable to include that reinstating the ability to use the augmentation source effectively will not result have an impact on WFD status of the surface or groundwater.

6. Programme-level WFD Assessment (Stage 3)

In order to understand the WFD compliance of the Final Draft WRMP as a whole, a cumulative assessment has been undertaken of the options within the preferred plan. This makes use of the individual option-level assessments (as presented in **Section 5**), but also recognises that when considered as a whole plan, some water bodies could be impacted by more than one option and have cumulative downstream impacts on main rivers.

The basis of this assessment was formed from a matrix setting out all water bodies relevant to each option, which can be found in **Appendix D**. From this, water bodies and operational catchments requiring further assessment were identified. Those further assessments are detailed in **Appendix E** (water body scale) and **Appendix F** (catchment scale), and summarised below.

The cumulative assessment is summarised in **Table 4** (individual water bodies) and **Table 5** (operational catchments). The assessment considered whether any of those options cumulatively could result in an increased level of WFD non-compliance compared to any of the options individually.

Table 4 shows that seven individual water bodies were identified as having the potential for cumulative impacts from multiple options in the Preferred Plan, as summarised below:

- GB107041012810 (Western Rother): There are five options in the catchment of this water body, three of which have the potential to alter river flows. Use of multiple options together could result in a cumulative impact;
- GB30644398 (Bewl Water): There are two options relating to this water body. How they interact will depend on the relative timings and details of the scheme, but there is potential for cumulative impact;
- GB106040018500 (Bewl): There are two options relating to this water body. There is a risk of non-compliance (low confidence) from one option, but this risk is not expected to increase cumulatively;
- GB107042022580 (Itchen): This waterbody was identified for cumulative assessment due to there being seven options involving construction activities in the catchment. However, the cumulative effect is concluded to be WFD compliant, with some options using the same infrastructure and others not crossing the watercourse;
- GB107101005971 (Eastern Yar (Lower)): There are three options relating to this waterbody. The cumulative effects may reduce the risk of WFD non-compliance compared to the options alone, as they balance each other out from a water balance perspective;
- GB40701G501200 (River Test Chalk): There are four options involving abstraction from this groundwater body. However, due to other constraints that limit abstraction in the Test catchment, non-compliance with the WFD is not anticipated either alone or cumulatively;
- GB40701G503100 (Lower Greensand Arun & Western Streams): There are three options involving abstraction from this groundwater body. Use of multiple options together could result in a cumulative impact.

Of these seven, risks of cumulative impacts greater than those associated with the individual options are identified for three water bodies: the Western Rother, Bewl Water and the Lower Greensand Arun & Western Streams.

- The main river catchments containing multiple options have also been identified (where the water bodies may be in the same or different water bodies in the wider catchment, but could potentially converge at a downstream point). Only those options involving operational activities that may impact the WFD status of the waterbody have been considered. There are 10 main river catchments that could potentially be impacted by multiple options, as summarised in **Table 5**. Based on available information, the assessments conclude that there may be cumulative effects resulting in WFD non-compliance, to a greater extent than for the options individually, for three of those catchments. These are the Arun, Ouse and Medway catchments. However, the nature and scale of those potential cumulative impacts will require further assessment.

While no change to the categorisation of level of confidence of WFD compliance/ non-compliance has been identified as a result of this cumulative assessment, compared to the individual option assessments, further investigation is required for most options (both individually and cumulatively) in order to better understand their impacts on WFD status. It is likely that, as described in the preceding paragraphs, there is the potential for some impacts to be 'more' non-compliant with WFD, when considered cumulatively at the plan level, compared to the options individually.

Table 4 Cumulative Assessment of the Preferred Plan: waterbody-level assessment

WFD Waterbody	Options Contributing to Cumulative Impacts	Cumulative Assessment Summary
GB107041012810 (Western Rother)	Groundwater (SNZ): New borehole at Petworth (4Ml/d) Bulk import (SNZ): SEW RZ5 to Pulborough Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d) Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d) Petersfield refurbishment (1.96 Ml/d)	The following options only involve construction activities in the catchment of the surface waterbody and it is assumed that this can be completed without deteriorating the WFD status: – Bulk import (SNZ): SEW RZ5 to Pulborough – Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d) The increased groundwater abstraction from the Lower Greensand Arun & Western Streams due to the new borehole at Petworth and refurbishment of Petersfield groundwater abstraction could reduce upstream flows prior to the treated effluent discharge point from the Littlehampton recycling option, and therefore change the assumption of river dilution capacity that would be used to define the water quality standards of the treated effluent discharge. This in turn could lead to a deterioration in physico-chemical quality elements, particularly since point source water industry discharge is the Reason for Not Achieving Good Status (RNAG) for the moderate phosphate sub-quality element. **Cumulative effects of multiple options on this water body could result in increased levels of WFD non-compliance compared to individual options.**
GB30644398 (Bewl Water)	Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d) Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d)	Cumulatively, these two schemes may both have negative impacts on the Physico-chemical water quality and ecological status of the water body, whilst only the treated effluent discharge scheme has the potential for an impact on chemical quality status. How these two schemes will interact will require further assessment of the final characteristic of the water quality of the new discharge and modelling of the water quality impact of reservoir storage change. Therefore, the potential for deterioration of each status element will remain at the highest potential designated in each stage 2 screening assessment **Cumulative effects of multiple options on this water body could result in increased levels of WFD non-compliance.**
GB106040018500 (Bewl)	Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d) Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d)	The two schemes that directly impact Bewl Reservoir GB30644398 may also have a cumulative impact on the downstream Bewl surface water body (GB106040018500). A reduction in overspill from the reservoir may change the hydromorphology of the water body which could impact the physico-chemical and ecological quality status elements. Additionally, the discharge of treated effluent into the reservoir may impact the water quality of the Bewl Reservoir compensation flow releases to the Bewl surface water body, leading to potential deterioration of the physico-chemical status elements. Further investigation is needed to assess the cumulative impact of both schemes. **Cumulative effects of multiple options on this water body could result in increased levels of WFD non-compliance.**

WFD Waterbody	Options Contributing to Cumulative Impacts	Cumulative Assessment Summary
GB107042022580 (Itchen)	Interzonal transfer (HSE-HWZ): Itchen WSW to Yew Hill bi-directional (74Ml/d) Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d) Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d) Bulk import (HSE): PWC Source A to Itchen WSW (21Ml/d) Bulk import (HSE): Havant Thicket Reservoir to Itchen WSW (90Ml/d) Recycling (HSE): Recharge of Havant Thicket from Portsmouth Harbour WTW (60Ml/d)	All of these schemes include pipeline construction within the catchment of the River Itchen: – Three schemes do not cross the Itchen itself. – Three schemes also require a watercourse crossing The screening of these options assumes the construction activities will be WFD compliant through the use of trenchless or other appropriate construction methods. These schemes are still WFD compliant after the cumulative assessment assuming best practice construction methods are used, the timing and occurrence of these construction activities is appropriate to avoid any deterioration of the WFD elements and there is adequate water quality and ecological monitoring of the waterbody to identify any impacts due to construction. **Cumulative effects of multiple options on this water body are expected to be WFD compliant.**
GB107101005971 (Eastern Yar Lower)	Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d) Recycling (IOW): Sandown (8.5Ml/d) Groundwater (IOW): New borehole at Eastern Yar3 (1.5Ml/d)	The cumulative impact of these schemes is that the New borehole at Eastern Yar (which will be used for augmentation) and Sandown recycling options may offset the reduction in baseflow to the Eastern Yar surface water body potentially caused by the increase in RA abstraction from the new boreholes at Newchurch option. However, this needs to be investigated in more detail to understand the likely allocation of groundwater abstraction to the surface water body, the spatial impact on the GWDTE and the implication for the water quality requirements of the treated effluent discharge. **Cumulative effects of multiple options on this water body have the potential to be WFD compliant**, by offsetting rather than compounding effects. However, the potential water quality impacts associated with the Sandown recycling scheme could still result in potential non-compliance alone.
GB40701G501200 (River Test Chalk)	Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d) Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d) Groundwater (HSW): New boreholes at Romsey (4.8 Ml/d) Groundwater (HSW): Test MAR (5.5 Ml/d)	The Chilbolton, Kings Somborne and Romsey options would all involve additional abstraction (within existing licensed quantities) from the River Test Chalk. However, restricted water availability in the catchment applies only further downstream, and is protected by a HoF. Therefore, local impacts, within existing licence, should be acceptable and downstream impacts avoided by the HoF (and potentially associated reduction in other sources). The Test MAR option involves recharge of the confined chalk aquifer during periods of high flows in the River Test. The water would then be abstracted from the Chalk aquifer during periods of low flows in the river. This option is not expected to affect river flows because it would abstract from the confined aquifer. **Therefore, these options cumulatively would not be expected to be non-compliant with respect to the River Test Chalk**, in relation to dependent surface water body status or any other classification elements.

WFD Waterbody	Options Contributing to Cumulative Impacts	Cumulative Assessment Summary
GB40701G503100 (Lower Greensand Arun & Western Streams)	Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) Groundwater (SNZ): New borehole at Petworth (4Ml/d)	All three options will increase groundwater abstraction from the Greensand above recent levels, but within the existing licensed quantity. Southern Water is currently undertaking a WINEP investigation to develop the Pulborough groundwater model (which covers the Greensand water body) and assess potential impacts of abstraction on rivers and designated sites. This includes the West Chiltington and Petworth options. Until the WINEP investigation concludes, it must be assumed that impacts on dependent surface waters or Groundwater Dependent Terrestrial Ecosystems (GWDTEs) are possible. This is in line with the ALS current conclusion that there is restricted water available at the groundwater body level. **Cumulative effects of multiple options on this water body could result in increased levels of WFD non-compliance compared to individual options.**

Table 5 Cumulative Assessment of the Preferred Plan: Operational Catchment level assessment

Operational Catchment	Options (WRSE-ID)	Cumulative Assessment Summary
Adur	Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d) Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d) Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d) Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d) Interzonal transfer (SNZ-SWZ): Pulborough to Worthing Interzonal transfer (SBZ-SWZ): Brighton to Worthing Groundwater (SBZ): Lewes Road (3.5Ml/d) Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)	In the catchments associated with the River Adur and Western Rother, the impacts of the following options are only construction activities: – Interzonal transfer (SBZ-SWZ): Brighton to Worthing – Interzonal transfer (SNZ-SWZ): Pulborough to Worthing – Recycling (SNZ): Horsham WTW with storage at Pulborough (6.8Ml/d) – Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d) – Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d) Greater surface water abstraction from the Upper Adur Catchment due to the River Adur Offline Reservoir option and increased groundwater abstraction from West Chiltington potentially affecting flows in Lancing Brook, could have a cumulative effect on the tidal River Adur. The Lewes Road abstraction would not be expected to contribute to this cumulative effect, because it is in the Brighton Chalk Block, which the Adur and Ouse ALS states does not contribute significantly to River Adur flow. The ALS shows there is water available in the lower Adur at Q_{95} to Q_{30} and the streams are discharge rich. Therefore, it is considered relatively unlikely that cumulative effects would have an impact on WFD status in the tidal Adur, and hence in the Adur catchment as a whole. **Cumulative effects are unlikely, over and above the effects associated with individual options in relevant water bodies in the Adur catchment.**
Arun	Bulk import (SNZ): SEW RZ5 to Pulborough Recycling (SNZ): Horsham WTW with storage at	In the operational catchments associated with the River Arun the impacts of the following option are related to construction activities only and are assumed to be WFD compliant:

Operational Catchment	Options (WRSE-ID)	Cumulative Assessment Summary
	Pulborough (11.5 Ml/d) Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d) Groundwater (SNZ): New borehole at Petworth (4Ml/d) Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d) Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)	– Bulk import (SNZ): SEW RZ5 to Pulborough Of the remaining schemes: – The reduction of the discharge of treated effluent into the Arun, due to the transfer of the discharge to storage at Pulborough, was considered compliant (low confidence) alone, because the river is discharge rich and a reduction in discharge may improve water quality. – The Littlehampton recycling scheme, in contrast, was considered potentially non-compliant due to potential physico-chemical impacts from the addition of further nutrient loading to the Western Rother. However, the scheme would also add additional water to the river, which may be beneficial. – The three options involving groundwater abstraction have the potential to reduce river flows in the Western Rother and other tributaries, and subsequently downstream in the tidal Arun, and have all been identified as being potentially non-compliant. Two of these sources are currently subject to a WINEP investigation, the outcome of which could potentially alter the conclusions of this assessment. The effects of reduced flows associated with the groundwater options would be offset by the Littlehampton recycling scheme if all were to be operated together (although the balance of losses and gains cannot be reliably quantified from the level of evidence available). **Cumulative effects are possible, beyond the extent of individual options, but the scale and nature of those effects requires further assessment.**
Ouse	Interzonal transfer (SBZ-SWZ): Brighton to Worthing Bulk import (SBZ): SEW to Rottingdean (20Ml/d) Groundwater (SBZ): Lewes Road (3.5Ml/d) Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d)	The interzonal transfer option only carries construction impacts on the Operational catchments associated with the Ouse and is therefore assumed to be WFD compliant. There may be a cumulative impact on the coastal groundwater bodies, which are the Brighton Chalk Block and Worthing Chalk. Depending on the timing of abstraction from Lewes Road and the Pulborough winter transfer scheme and the frequency of the transfer of rested groundwater to the Brighton WRZ, there could be a canceling out of impacts which could reduce the impact that the LEW option has on the groundwater water balance. Further investigation is needed to investigate the impact on the groundwater body and confirm the assumptions on surface-water interactions with the Adur and Ouse. **Cumulative effects are possible, but the scale and nature of those effects requires further consideration.**
Western Streams	Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d) Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	In the Operational Catchments associated with the Western Streams, the impacts of both options are only construction activities and are classified as WFD compliant. Therefore there are no downstream cumulative impacts in the Western Streams Catchment. **No cumulative effects are anticipated in this catchment.**

Operational Catchment	Options (WRSE-ID)	Cumulative Assessment Summary
Rother	Bulk import(SHZ): SEW RZ8 to Rye Recycling (SHZ): Hastings to Darwell (15.3Ml/d)	For the River Rother, the bulk import option only impacts the catchment due to construction activities. Therefore there are no cumulative plan level impacts on this main river. **No cumulative effects are anticipated in this catchment.**
Stour	Bulk import(SHZ): SEW RZ8 to Rye Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d) Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d) Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d)	In the Operational Catchments associated with the Stour, the impacts of the listed options are only construction activities and are classified as WFD compliant. Therefore there are no cumulative impacts on downstream waterbodies for the Stour. **No cumulative effects are anticipated in this catchment.**
Test	Bulk import (HAZ): T2ST to Andover Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d) Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d) Interzonal transfer (HSE-HWZ): Itchen WSW to Yew Hill WSW bi-directional (74Ml/d) Groundwater: Test MAR (5.5Ml/d) Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d) Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d) Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)	In the operational catchments associated with the River Test, the impacts of the following options are only construction activities and are classified as WFD compliant: – Bulk import (HAZ): T2ST to Andover Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d) – Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d) Interzonal transfer (HSE-HWZ): Itchen WSW to Yew Hill WSW bi-directional (74Ml/d) The remaining options that could have operational impacts on the Test and its tributaries are: Test MAR, Romsey new boreholes, Kings Sombourne and Chilbolton recommissioning. The alone assessment of the reinstated/replaced groundwater sources concludes compliance (low confidence) since the restricted water availability on the Test only applies to the downstream river and a HoF exists to protect the downstream waterbody. The downstream protection means that this conclusion should not change even if multiple of these options are implemented together. The stage 2 screening of the Test MAR scheme concluded that the scheme was Compliant (low.confidence) since there are no WFD surface waterbody or GWDTE receptors in connectivity with the confined aquifer and the scheme is designed to balance water availability. The four groundwater schemes will abstract from the same groundwater body however, since the MAR scheme is designed to balance the recharge and abstraction of the groundwater body there should be no long or short term impact on the WFD status from this scheme. **No cumulative effects, that would result in a change to WFD status, are therefore anticipated in this catchment.**

Operational Catchment	Options (WRSE-ID)	Cumulative Assessment Summary
Medway	Bulk import(SHZ): SEW RZ8 to Rye Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d) Asset enhancement (KMW): Remove network constraint at Longfield (13Ml/d Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d) Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d) Desalination (KME): Isle of Sheppey 20 Ml/d Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d) Recycling (KMW): Medway WTW to lake (14Ml/d) Groundwater (KME): Recommission Gravesend (2.7Ml/d)	The first 3 options listed only impact the operational catchments of the Medway with construction activities and are therefore assumed to be WFD compliant. In the Upper and Mid-Medway catchments, the two Bewl options may have a combined impact of a reduction in high flows and low flows on the downstream waterbodies that converge upstream of the Teston Gauging Station. The potential cumulative impacts of changes to baseflow and the consequences on Hydrological regime, physico-chemical and biological status elements require further assessment. The remaining schemes are located more than 50km downstream of the Teston Gauging Station and are therefore unlikely to cause cumulative impacts with those in the upper catchment. The Recommission Gravesend option would increase RA groundwater abstraction in the North Kent Medway Chalk, with potential resultant impacts on flows to Ebsfleet river water body, but these are separate water bodies that flow directly to the Thames Middle, not into the Medway or Swale. The Medway WTW to lake scheme is unlikely to have any cumulative impacts as the reduction in discharge only impacts the river discharge directly into the tidal reach and the receiving reservoir has no outflow to the environment. The current scheme information suggests that there will be no cumulative impacts between the Isle of Sheppey desalination schemes and the reduction in discharge to the Swale Estuary under the Sittingbourne industrial water reuse scheme. The influence of the tides on these estuaries will likely mean that any impacts from the reduction in discharge to the Swale will be too dispersed before reaching the Medway to have a cumulative impact. **No cumulative effects are anticipated at the scale of the overall Medway catchment feeding into the estuary, but cumulative effects at points within the catchment (notably waterbody GB106040018500, as discussed in Table 4) require further consideration.**
Thames Lower	Bulk import (SNZ): SES re-zoning (4Ml/d) Bulk import (SNZ): SES to SNZ (10Ml/d) Groundwater (HKZ): Remove constraints at Newbury to increase yield (1.2Ml/d)	The first 2 options listed will only impact the operational catchment through construction activities and are classified as WFD compliant. The increased abstraction from removing constraints at Newbury is assumed to not have an impact on the overlying surface waterbody because the groundwater source abstracts from the underlying chalk aquifer that is confined by the London Clay. Therefore no SWS option is anticipated to have a cumulative impact on the Lower Thames or its tributaries. **No cumulative effects are anticipated in this catchment.**
Brede and Tillingham	Bulk import(SHZ): SEW RZ8 to Rye Recycling (SHZ): Hastings to Darwell (15.3Ml/d) Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d)	The first two of these options only impact this operational catchment with construction activities, therefore no cumulative plan level impacts exist for the Brede and Tilllingham catchment. **No cumulative effects are anticipated in this catchment.**

7. Preferred WRMP WFD Assessment Stage 4 Results: assessment against other Plans and Projects

The potential for combined impacts of SWS's WRMP24 with other water companies' WRMPs has been considered.

The WFD assessment produced by WRSE to support the revised draft Regional Plan contains an in-combination effects assessment for options across the WRSE water companies, based on the options proposed in the individual WRMP plans. A draft version of this was issued on 12th September 2023[16], and WRSE have confirmed that there has not been a more recent update. The assessment identifies catchments that contain options from the revised draft plans of one or more water companies, and whether multiple options may result in cumulative effects. For the Best Value Plan (BVP Sit 4), WRSE's assessment identifies a number of catchments where SWS and at least one other water company have an option. However, it does not identify any of SWS's options as contributing to a cumulative risk to WFD compliance.

Southern Water has also reviewed the WFD compliance assessment of its own plan against information available from other plans. This has been undertaken at both the water body and Operational Catchment level, to supplement and complement the assessment undertaken by WRSE. The comparison exercise found:

- Portsmouth Water: there are no waterbodies that could be impacted by both options of both Portsmouth Water and Southern Water;
- South East Water: There are options in a number of Operational Catchments that are identified in both South East Water and Southern Water's WRMPs, including in the Thames, Medway, Rother and Brede catchments. However, no catchments have been identified where both water companies have operational impacts. Therefore, it may be assumed that there will be no cumulative risks to WFD compliance;
- Sutton and East Surrey: There is one option in the Medway Operational Catchment where a risk to WFD compliance has been identified, and could potentially have an in-combination effect with some of Southern Water's options in the Medway catchment. This is set out in **Table 6**;
- Affinity water: There are options in a number of Operational Catchments that are identified in both Affinity and Southern Water's WRMPs, including in the Thames and Stour catchment. However, no catchments have been identified where both water companies have operational impacts. Therefore, it may be assumed that there will be no cumulative risks to WFD compliance;
- Thames Water: Four WFD water bodies (including one transitional, two groundwater and one river) have been identified where there are options belonging to both Thames Water and Southern Water that could involve operational impacts. These are set out in **Table 6**.

In summary, therefore, there are potential in-combination effects of Southern Water's WRMP with Sutton and East Surrey and Thames Water's WRMPs, which should be given further consideration.

[16] WRSE Revised Draft Regional Plan. Strategic Environmental Assessment Environmental Report. Appendix I- WFD Report. 12th September 2023.

Table 6 Cumulative Assessment of the Preferred Plan against other Plans: Potential increased risk of WFD deterioration

Waterbody ID	Waterbody/ catchment name	Other water company	Options (WRSE ID)	In-combination impact assessment
GB530603911402	Thames Middle	Thames Water	Desalination (KMW): Thames Estuary (20Ml/d) (and variants) TWU_HON_HI-ROC_NET_CNO_cop'mills-honoroak TWU_LON_HI-DES_ALL_CNO_beckton desal 150 TWU_LON_HI-TFR_LON_CNO_beckton-coppermills TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg	There is potential for combined cumulative operational impacts on this waterbody through multiple desalination options including TWU_LON_HI-DES_ALL_CNO_beckton desal 150 and Southern Water's Thames Estuary desalination options. Further water quality modelling of the discharge of hypersaline water into the Thames Middle surface water body is required to understand whether the options will produce a cumulative impact. TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg involves increased groundwater abstraction beyond licence conditions. The TWU_HON_HI-ROC_NET_CNO_cop'mills-honoroak and TWU_LON_HI-TFR_LON_CNO_beckton-coppermills options may short term impacts on a tributary (GB106038077852) to the Thames Middle through dewatering discharges during construction however it is assumed these short term risk to WFD status can be mitigated. **There is potential for cumulative effects on this water body as a result of options in Thames Water and Southern Water's WRMPs in combination.**
GB106040024190	Ebbsfleet	Thames Water	Groundwater (KME): Recommission Gravesend (2.7Ml/d) TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg	The combined impact of the two groundwater abstraction options requires further investigation into the impact of abstraction from the underlying North Kent Medway Chalk GWM on surface water flows, taking into consideration changes in upstream abstraction/discharge and abstraction reduction due to environmental destination targets. **There is potential for cumulative effects on this water body as a result of options in Thames Water and Southern Water's WRMPs in combination.**

Waterbody ID	Waterbody/ catchment name	Other water company	Options (WRSE ID)	In-combination impact assessment
GB40601G600900	Berkshire Downs Chalk	Thames Water	TWU_SWX_HI-GRW_ALL_ALL_woods farm do TWU_SWX_HI-GRW_ALL_ALL_moulsford gw Groundwater (HKZ): Remove constraints at Newbury to increase yield (1.2Ml/d)	All three options listed would increase groundwater abstraction in this GWB above recent actual, within licence limit. There is some potential for this to deteriorate the quantitative water balance status and dependent surface water body status requires further consideration. **There is potential for cumulative effects on this water body as a result of options in Thames Water and Southern Water's WRMPs in combination.**
GB40601G500300	North Kent Medway Chalk	Thames Water	TWU_LON_HI-GRW_ALL_ALL_s'fleet lic disagg Groundwater (KME): Recommission Gravesend (2.7Ml/d)	The two SWS and TWUL options impacting the North Kent Medway Chalk will increase recent actual abstraction from the groundwater body. This could potentially lead to a deterioration of the quantitative water balance status and potentially impede the improvement of the dependent surface water body status by reducing baseflow to dependent surface water bodies. The TWUL stage 2 assessment mentions that the option will not be implemented prior to the cessation of dewatering from a quarry, which will subsequently increase flows on the Ebbsfleet, but nonetheless the cumulative impact on the groundwater body of these schemes requires further investigation. **There is potential for cumulative effects on this water body as a result of options in Thames Water and Southern Water's WRMPs in combination.**
Multiple water bodies	Medway catchment	Sutton and East Surrey Water	SES_SES_HI-ROC_RE2_ALL_r1 Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d) Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d)	Both water companies have an option in the Medway catchment that involves raising the level of a reservoir, and otherwise altering the water balance of a reservoir. Although they are in different parts of the catchment, they have the potential to affect downstream flows, which could converge downstream on the Medway, and combine with effects of the proposed SWS effluent re-use at Tonbridge. There are existing flow constraints on the Medway at Teston that may be used to manage this effect. However, further detailed assessment is required of the options individually, in order to then ascertain whether any potential in-combination effect remains. **There is potential for cumulative effects in this catchment as a result of options in Southern Water and Sutton and East Surrey's WRMPs in combination.**

8. WFD compliance summary of the Southern Water Final Draft WRMP24

A summary of the assessment is provided in **Table 7**, which considers the overall compliance of the Preferred Plan.

The assessments shown in this report currently conclude potential non-compliance of the Preferred Plan, with individual options being potentially non-compliant with either low or medium confidence. Some potential cumulative effects between options, as well as potential in-combination effects with other water companies, have also been identified.

Those that have low confidence of non-compliance are considered relatively precautionary assessments, whereas for those with medium confidence of non-compliance, there is a greater chance of a conclusion of non-compliant being retained following further assessments. However, in all cases, further evidence and assessment is required, and is being progressed through the programme of work to reduce delivery risk as well as programmes to support the Hampshire Water Transfer and Water Recycling Project (HWTWRP) SRO. Given the significant lead in time for some options, it is considered to provide an adequate period with which to conclude such investigations and establish conclusions with which the regulator would concur.

However, if after the completion of the further work, a conclusion of potential non-compliance remains, Southern Water will then review the potential to use alternative water resource options. In this regard, given that 193 of the original 288 constrained options were assessed as passing the initial Stage 1 WFD assessment, Southern Water has a range of options that are considered to be viable and potentially deliverable if required. In conjunction with this, if required, Southern Water will discuss with the Environment Agency the potential for the application of Regulation 19 to individual options, in line with guidance issued by the Environment Agency (2023[17]).

Table 7 Summary of plan level WFD compliance for the Southern Water Final Draft WRMP24

WFD Assessment Objective	Summary of WFD compliance (Preferred Plan)	Explanation
1) To prevent deterioration of any WFD element of any water body - in line with Regulation 13(2)a and 13(5)a	Potentially non-compliant	25 preferred options in the plan remain potentially non-compliant at this stage, due to the relatively limited level of evidence and assessment available. Further evidence collection and assessment is ongoing through the programme of work to reduce delivery risk with pre-planning work and enabling studies. This includes: ■ Engineering, process, MEICA, civil engineering and network connectivity work, with activities including: – Water quality sampling of sources and baselining for consideration in design; – Intake and outfall screening and pipe configurations; – Detailed site locations and assessments; – Saline plume modelling (for desalination plants). ■ Environmental and planning works

[17] Environment Agency (2023) *WFD Regulation 19 exemptions for water company water resources permissions* (LIT 65716) Published 27/03/2023

WFD Assessment Objective	Summary of WFD compliance (Preferred Plan)	Explanation
		– Baseline surveys of the current environmental conditions, possibly over multiple years – Investigations on the impact of any new discharge in conjunction with the Environmental Quality Standards (EQS (environmental quality standards) Some of this will be completed through further work to support SRO programmes.
2) To prevent the introduction of impediments to the attainment of 'Good' WFD status or potential for any water body -in line with Regulation 13(2)b and 13(5)c.	Potentially non-compliant	25 preferred options in the plan remain potentially non-compliant at this stage, due to the relatively limited level of evidence and assessment available. Further evidence collection and assessment is ongoing through the programme of work to reduce delivery risk with pre-planning work and enabling studies. This includes: ■ Engineering, process, MEICA, civil engineering and network connectivity work, with activities including: – Water quality sampling of sources and baselining for consideration in design; – Intake and outfall screening and pipe configurations; – Detailed site locations and assessments; – Saline plume modelling (for desalination plants). ■ Environmental and planning works – Baseline surveys of the current environmental conditions, possibly over multiple years – Investigations on the impact of any new discharge in conjunction with the Environmental Quality Standards (EQS (environmental quality standards) Some of this will be completed through further work to support SRO programmes.
3) To ensure that the planned programme of water body measures in RBMP2 to protect and enhance the status of water bodies are not compromised.	Potentially non-compliant	One preferred option in the plan is potentially non-compliant, with the potential to compromise planned measures in the RBMP. This relates to raising the level of Bewl reservoir, where there is a required measure relating to the downstream flow regime. Further detail and assessment will be required to establish an appropriate flow regime as part of the planned level raising.
4) To assist the attainment of the WFD objectives for the water body – in line	Neutral	Some of the options proposed have the potential to assist in the attainment of WFD objectives in individual water bodies, through improvements to river flow regimes (including changes to abstraction regimes, augmentation and water recycling schemes

WFD Assessment Objective	Summary of WFD compliance (Preferred Plan)	Explanation
with Regulation 13(2)b and 13(2)c		involving discharge to rivers). These have not been explicitly identified as benefits in the assessment due to the limited information available, but benefit could be delivered through effective implementation. Other options may also be able to deliver benefits through delivery of BNG or other enhancements, once they are further developed. Demand and leakage management options could also assist.
5) To assist the attainment of the WFD objectives for associated WFD protected areas – in line with Regulation 13(6)	Potentially non-compliant	The HRA for the WRMP concludes that, based on the currently available data, all but one of the options can be concluded to have no adverse affect on the integrity of any European sites, alone or in combination. For one site, there are minor residual uncertainties, which would require more detailed project-level field investigations.
6) To progressively reduce or phase out the release of individual pollutants or groups of pollutants that present a significant threat to the aquatic environment	Compliant	The options in the preferred plan will be compliant with any required discharge consents. This will ensure that any activities do not have a significant adverse effect or pose a risk of a significant adverse effect on the aquatic environment.

Commented [JJ1]: Note to SWS: This is TBC pending the conclusions of the completed Final WRMP24 HRA and will be updated for the final WFD report.

Commented [HW2R1]: I've updated this based on current HRA conclusions. Note that this changes the conclusion for this objective, which was previously Compliant

Appendix A: Supply side options included in the WFD compliance assessment for the fdWRMP

Option type	Region	Option Name
Groundwater	Central	Groundwater (SNZ): New borehole at Petworth (4Ml/d)
Recycling	Central	Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d)
Recycling (SNZ)	Central	Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d)
Storage	Central	Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d)
Bulk import	Central	Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)
Bulk import	Central	Bulk import (SNZ): SES to SNZ (10Ml/d)
Bulk import	Central	Bulk import (SNZ): SES re-zoning (4Ml/d)
Bulk import	Central	Bulk import (SNZ): SEW RZ5 to Pulborough
Interzonal transfer	Central	Interzonal transfer (SNZ-SWZ): Pulborough to Worthing
Desalination	Central	Desalination (SWZ): Tidal River Arun (10Ml/d)
Desalination	Central	Desalination (SWZ): Tidal River Arun (20Ml/d)
Desalination	Central	Desalination (SWZ): Tidal River Arun (20Ml/d) Phase 2
Treatment capacity	Central	Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d)
Interzonal transfer	Central	Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d)
Interzonal transfer	Central	Interzonal transfer (SBZ-SWZ): Brighton to Worthing
Bulk import	Central	Bulk import (SBZ): SEW to Rottingdean (20Ml/d)
Groundwater	Central	Groundwater (SBZ): Lewes Road (3.5Ml/d)
Groundwater	Western	Groundwater (HKZ): Remove constraints at Newbury to increase yield (1.2Ml/d)
Interzonal transfer	Western	Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d)
Groundwater	Western	Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)
Recycling	Western	Recycling (IOW): Sandown (8.5Ml/d)
Groundwater	Western	Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d)
Interzonal transfer	Western	Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d)
Bulk import	Western	Bulk import (HSE): PWC Source A to Itchen WSW (21Ml/d)

Option type	Region	Option Name
Bulk import	Western	Bulk import (HSE): Havant Thicket Reservoir to Itchen WSW (90Ml/d)
Recycling	Western	Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour (60Ml/d)
Interzonal transfer	Western	Interzonal transfer (HSE-HWZ): Itchen WSW to Yew Hill bi-directional (74Ml/d)
Groundwater	Western	Groundwater (HSW): Test MAR (5.5Ml/d)
Interzonal transfer	Western	Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d)
Interzonal transfer	Western	Interzonal transfer (HSW-HRZ): Romsey Town and Test valve expansion (5Ml/d)
Desalination	Eastern	Desalination (KME): Isle of Sheppey (10Ml/d) phase 2
Desalination	Eastern	Desalination (KME): Isle of Sheppey 20Ml/d
Groundwater	Eastern	Groundwater (KME): Recommission Gravesend (2.7Ml/d)
Recycling	Eastern	Recycling (KME): Sittingbourne Industrial Water Reuse (7.5Mld)
Interzonal transfer	Eastern	Interzonal transfer (KTZ-KME): Utilise full existing transfer capacity (9Ml/d)
Desalination	Eastern	Desalination (KMW): Thames Estuary (10Ml/d)
Desalination	Eastern	Desalination (KMW): Thames Estuary (10Ml/d) Phase 2
Desalination	Eastern	Desalination (KMW): Thames Estuary (20Ml/d)
Desalination	Eastern	Desalination (KMW): Thames Estuary (20Ml/d) Phase 2
Recycling	Eastern	Recycling (KMW): Medway WTW to lake (14Ml/d)
Asset enhancement	Eastern	Asset enhancement (KMW): Remove network constraint at Longfield (13Ml/d)
Bulk import	Eastern	Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d)
Desalination	Eastern	Desalination (KTZ): East Thanet (20Ml/d)
Desalination	Eastern	Desalination (KTZ): East Thanet (20Ml/d) Phase 2
Bulk import	Eastern	Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d)

Option type	Region	Option Name
Interzonal transfer	Eastern	Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d)
Groundwater	Eastern	Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d)
Recycling	Eastern	Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d)
Recycling	Eastern	Recycling (SHZ): Hastings to Darwell (15.3Ml/d)
Bulk import	Eastern	Bulk import (SHZ): SEW RZ8 to Rye
Storage	Eastern	Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d)
Interzonal transfer	Western	Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d)
Groundwater	Western	Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)
Groundwater	Western	Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)
Groundwater	Central	Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d)
Groundwater	Central	Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)
Bulk import	Western	Bulk import (HAZ): T2ST to Andover (20Ml/d)
Bulk import	Western	Bulk import (HKZ): T2ST to HKZ (5Ml/d)
Bulk import	Western	Bulk import (HWZ): T2ST to Yew Hill (95Ml/d)
Groundwater	Western	Groundwater (IOW): New borehole at Eastern Yar3 (1.5Ml/d)

Appendix B: Results of Stage 1 assessments of the Preferred Plan Options

This Appendix presents the results of the Stage 1 assessments for final draft WRMP.

Appendix C: Stage 2 assessments for relevant Preferred options in the Final Draft WRMP

This Appendix presents the Stage 2 assessments for relevant preferred options, for water bodies that were identified as being required further assessment at Stage 1.

Appendix D: Matrices identifying water bodies requiring cumulative (Stage 3) assessment

This Appendix presents a matrix showing which water bodies were identified (at Stage 1) as being relevant to each individual option. This is used to identify which water bodies require an assessment of potential cumulative impacts.

Appendix E: Stage 3 cumulative assessments: water body-level assessments

This Appendix presents assessment of potential cumulative impact on individual water bodies, for the Preferred Plan.

Appendix F: Stage 3 cumulative assessments: Operational Catchment-level assessments

This Appendix presents assessment of potential cumulative impact at the Operational Catchment level, for the Preferred Plan.