



ANNEX B2

Environmental Regulatory Assessments (SEA)

This document has been written in line with the requirements of the RAPID gate two guidance and to comply with the regulatory process pursuant to Severn Trent Water's statutory duties. The information presented relates to material or data which is still in the course of completion. Should the solution presented in this document be taken forward, Severn Trent Water will be subject to the statutory duties pursuant to the necessary consenting process, including environmental assessment and consultation as required. This document should be read with those duties in mind.



SEVERN TRENT SOURCES SRO

B2. STS Strategic Environmental Assessment

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1. INTRODUCTION

1.1 BACKGROUND

This report examines the Strategic Environmental Assessment (SEA) as part of the Severn Trent Sources (STS) Strategic Resource Option (SRO) ('the Scheme'). The Scheme was identified as an SRO in the PR19 Final Determination, with funding provided to Severn Trent Water (STW) as an individual company. The STS SRO is considered integral to the Severn Thames Transfer (STT) SRO. The central aspect of the STT is the interconnector which enables the transfer of raw water from the River Severn to the River Thames (Deerhurst to Culham pipeline). To support this transfer, additional sources of water are required to support baseline river flows. These additional sources of water will be supported by United Utilities and STW, which comprise of water resources that can be added, or not abstracted (redeployed), from the Rivers Vyrnwy, Severn and Avon. This assessment only considers the STS SRO option, which comprises:

- A transfer of up to 35Ml/d of final effluent from Netheridge Wastewater Treatment Works (WwTW) to the River Severn at Haw Bridge.
- A 15Ml/d licence transfer from Mythe Water Treatment Works (WTW) to the Severn to Thames Transfer pipeline abstraction location at Deerhurst.

This report is a Technical Appendix to the STS SRO Interim Environmental Assessment (IEA), which provides further background information to the Scheme.

In October 2020, the group of Water Companies involved in developing SROs (known as the All Company Working Group - ACWG), published guidance¹ for environmental assessment methods for SROs which is aligned to the draft Water Resources Planning Guideline (WRPG): Working Version for Water Resource Management Plan 2024 (WRMP24) to increase the consistency of environmental assessment and the evaluation of impacts on environmental water quality in particular.

The ACWG guidelines indicate that the process requires Water Companies to provide the following information related to each SRO at the stage outlined (see Figure 1.1).

In February 2022, the Regulators' Alliance for Progressing Infrastructure Development's (RAPID) produced final guidance as to the expectations of the regulators for solution submission at Gate 2². This guidance indicates a change in approach from the original Gate 2 guidance and the ACWG methodology, which both envisaged a SEA approach, to an 'Initial Environmental Appraisal'.

1.2 PURPOSE OF REPORT

This report sets out the SEA for the STS SRO scheme at Gate 2 and builds upon work undertaken at Gate 1 of the design process. The scheme is integral to a larger STT system, which does not form part of this assessment and is being assessed separately.

The Gate 2 submission does not form a statutory plan or project and, therefore, there is no statutory requirement for a SEA. However, as with Gate 1, it is recognised that the SEA approach can assist in the identification of potential environmental effects (positive and negative) as well as mitigation and enhancement measures, and aid option refinement and selection. Furthermore, updated environmental metrics that utilise SEA output tables are likely to be required during Gate 2 for regional planning, and the ongoing WRMP24 process. In consequence, updated SEA output tables for the Scheme have been refined during Gate 2.

¹ Mott MacDonald Limited (2020). All Companies Working Group WRMP environmental assessment guidance and applicability with SROs. Published October 2020

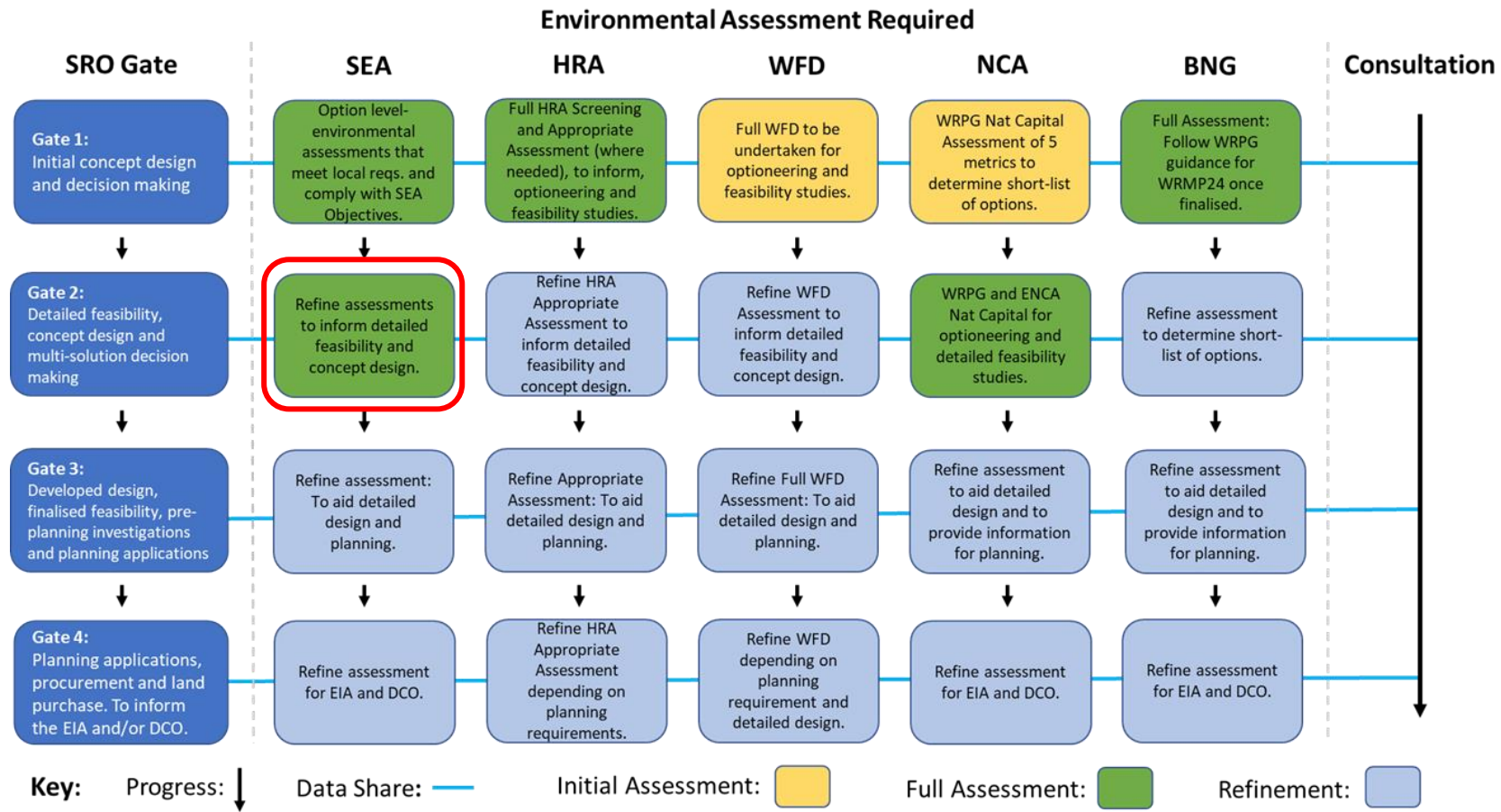
² Strategic regional water resource solutions: detailed feasibility and concept design. Gate Two Guidance, NRW, NE, NEAS, April 2022.

1.3 STRUCTURE OF THIS REPORT

The report is divided into the following sections:

- Section 2: Scheme description
- Section 3: Methodology used for the SEA
- Section 4: Assessment outcomes
- Section 5: Conclusions.

Figure 1.1 Environmental Assessment Integration with SRO Gates



2. SCHEME DESCRIPTION

A summary of the two main STS SRO components is provided in Sections 2.1 and 2.2, and their joint operation in Section 2.3. A detailed overview of the scheme is presented within the main IEA report and a map of the STS SRO Scheme is available in Technical Appendix B3.2. The Scheme description provided at Gate 2 (on which Gate 2 assessments have been based) will be subject to further review in Gates 3 and 4.

2.1 MYTHE WTW ABSTRACTION LICENCE TRANSFER (15 ML/D)

This part of the Scheme provides support to the STT System from the Severn catchment by redeploying 15 Ml/d of the existing STW abstraction licence at its Mythe WTW intake in the lower River Severn. This infrequently used licensed volume from Mythe would now remain in the River Severn for abstraction downstream at Deerhurst. STW has advised that no construction works would be required to redeploy the spare licence volume for abstraction. It is understood from STW that no specific additional resource to replace this current abstraction licence volume has been determined to date. The Mythe WTW abstraction licence Scheme will not operate alone and will operate in-combination with the Netheridge WwTW discharge diversion to Haw Bridge.

2.2 NETHERIDGE WWTW EFFLUENT TRANSFER TO HAW BRIDGE PIPELINE (35 ML/D)

Currently treated effluent from the Netheridge WwTW is discharged into the upper Severn Estuary. STS SRO proposes to divert a 35 Ml/d portion of this treated discharge from Netheridge WwTW (approx. grid reference: SO 80891 15805) to a new outfall at Haw Bridge (just downstream from Deerhurst (approx. grid reference: SO 84595 27955)), on the freshwater River Severn to support STT abstraction at Deerhurst.

The outfall location to the River Severn will be located just upstream of the level gauge at Haw Bridge (see Scheme map in Technical Appendix B3.2). The discharge diversion from Netheridge WwTW would be pumped by a new pumping station, located at the WwTW via a 700 mm diameter pipeline approximately 15.5 km long with tunnelling under named watercourses, such as the River Severn.

The pipeline discharge to Haw Bridge will not be continuous. It will range from zero (when flows are high enough in the River Severn to support the STT transfer) to 35 Ml/d when fully operational (during periods of lower flows in the River Severn). The pipeline will include nine drain-down points through which water in the pipeline will be discharged during maintenance activities (Technical Appendix B3.3). These drain-down points will be set back at least 10 m from water courses. The Netheridge WwTW final effluent would receive additional treatment to mitigate any water quality issues, which includes the removal of ammonia using a Multi-Bed Bio Reactor (MBBR), removal of phosphorus using 'CoMag'®, and removal of selected organic compounds including phenols, Perfluorooctane sulfonic (PFOS) and some pesticides using Ozone, Biological Aerated Flooded Filter (BAFF) and Granulated Activated Carbon (GAC).

2.3 INDICATIVE OPERATION OF STS SRO

There are the following modes of operation. Please note the duration of the Scheme's operation is indicative at this stage and could be refined based on further modelling or changes to river flow triggers.

- **Mode 1 -STT SRO sweetening flow provided by unsupported river abstraction:** STS SRO is not in operation and STT is also off. There is enough water in the River Severn at Deerhurst to provide the 20 Ml/d STT sweetening flow between the River Severn to the Thames, with no undesirable effects on the River Severn.
- **Mode 2- STT SRO sweetening flow provided by STS Netheridge WwTW effluent transfer at 20 Ml/d:** STS is 'on' but STT off. This means 20 Ml/d is piped from Netheridge WwTW to Haw Bridge because STT is not working and thus only requires the sweetening flow, which the

river can't provide. This mode of operation would be expected to occur 12 % of the time (modelled over a 47-year period).

- **Mode 3- STT SRO water resources provided by the STS Netheridge WwTW effluent transfer at 35 MI/d:** STS is 'on' and STT is 'on'. This means 35 MI/d is piped from Netheridge to Haw Bridge to allow a 35 MI/d STT abstraction. STT takes the additional 15 MI/day from Mythe WTW abstraction licence transfer, so STT takes a 50 MI/d contribution from STS overall. This mode of operation would be expected to occur 16 % of the time (modelled over a 47-year period).

3. METHODOLOGY

3.1 OVERALL APPROACH

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

The requirement for SEA was brought into legislation by the SEA Regulations³. These regulations transposed the requirements of EU Directive 2001/42/EC (the SEA Directive) into English legislation. Following Brexit, minor amendments, to correct deficiencies and terminology, were made to the SEA Regulations through the Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018.

It is recognised that the SEA approach can assist in the identification of likely significant environmental effects (positive and negative) of water resource components, both individually and in-combination, and that knowledge of these effects can help to identify preferred options and programmes of options.

Whilst it is acknowledged that there is no requirement for a statutory SEA with respect to SROs, adoption of some of the principles of SEA in the assessment of SROs can help inform decision-making by bringing different environmental considerations into one place. In the same way that a statutory SEA, is informed by the Habitats Regulation Assessment (HRA) and Water Framework Directive (WFD) assessments, the approach adopted to the environmental assessment approach for Gate 1 has equally had regard to the assessment conclusions of the HRA and WFD assessment work that has been undertaken to inform the submission at Gate 1.

3.2 ASSESSMENT METHODOLOGY

An objectives-led approach to SEA has become standard practice in the assessment of both WRMPs and Drought Plan (DPs). An objective-led approach to this environmental assessment has therefore been adopted. The establishment of SEA objectives are commonly derived from a review of baseline conditions and of relevant plans, programmes and policies. Key issues that were identified from a review of baseline conditions and of relevant plans, programmes and policies undertaken during the development of STW's WRMP24 SEA Scoping Report have been reviewed as part of this assessment. These are summarised in **Appendix B2.1**.

In undertaking this environmental assessment work the list of SEA objectives set out in Table 6.1 of the ACWG Strategic Environmental Assessment: Core Objective Identification report (October 2020) have been adopted. These SEA objectives were identified by the ACWG following a review of Water Company approaches to SEA and an updated assessment of legislation, policies and guidance.

Regarding the STS SRO for Gate 1, the principles of SEA, HRA and WFD have been adopted. The ACWG guidelines have been followed with regard to the approach to SEA. The approach adopted included for updates, such as in relation to carbon levels for assessing climatic factors, that were subsequently advised by the authors to the ACWG SEA methodology.

The key issues identified in **Appendix B2.1** have been used to create a number of key guide questions related to each SEA topic. These key guide questions have been used as prompts in the assessments to help ensure consistent and robust assessment for each of the SEA topic areas. As with the development of the SEA objectives the development of the guide questions has also drawn upon other sources of information including:

- the SEA guide questions set out in the WRSE Regional Plan SEA Scoping Report September 2020; and
- the SEA guide questions included in the SEAs of recent WRMPs.

The list of SEA topics, SEA objectives and associated key guide questions adopted for the SEA undertaken for the STS SRO are set out in **Table 3.1** below.

³ The Environmental Assessment of Plans and Programmes Regulations 2004 (Statutory Instrument 2004 No. 1633) apply to any plan or programme which relates solely or in part to England.

Table 3.1 SEA objectives and key guide questions⁴

SEA topic	SEA objective	Key guide questions
Biodiversity, flora and fauna	1.1 To protect designated sites and their qualifying features	<ul style="list-style-type: none"> Is the option likely to affect the conservation status of any SPAs, SACs, Ramsar sites, SSSIs or National Nature Reserves? Will it affect HRA compliance (taken from HRA assessment results)? Will the option affect the marine environment, habitats and species (including MCZs and MPAs)? Is the option likely to affect ancient woodland?
	1.2 To avoid a net reduction, and where possible enhance, in non-monetised natural capital assets	<ul style="list-style-type: none"> Are there any opportunities for habitat creation or restoration and a net benefit/gain for biodiversity? Will the option contribute to the loss or gain in habitat connectivity? Does it protect, conserve and enhance biodiversity natural capital and the ecosystem services the natural capital provides (taken from the natural capital assessment results)?
	1.3 To protect and enhance biodiversity, priority habitats and species	<ul style="list-style-type: none"> Will the option protect and enhance priority habitats and species? Will the option affect a priority habitat on the priority habitat inventory?
	1.4 To avoid and, where required, manage invasive and non-native species (INNS)	<ul style="list-style-type: none"> Is there a possibility for INNS to be spread/ introduced? Is there an opportunity to improve biodiversity value through removal of INNS?
	1.5 To meet WFD objectives relating to biodiversity	<ul style="list-style-type: none"> Will it affect WFD compliance e.g. good ecological potential/status?
Soil	2.1 To protect and enhance the functionality, quantity and quality of soils, including the protection of high-grade agricultural land	<ul style="list-style-type: none"> Will the option affect high grade agricultural land? Will the option promote the efficient use of land? Will the option prevent soil erosion and retain soil stocks as a natural resource? Will the option involve use of brownfield or greenfield land? Is the option likely to affect SSSIs of geological importance?
Water	3.1 To minimise or manage flood risk, taking climate change into account	<ul style="list-style-type: none"> Is the option vulnerable to flood risk? Will the option contribute to the risk of flooding? Will the option protect and enhance the environmental resilience of the water environment to climate change, flood risk and drought?
	3.2 To enhance or maintain groundwater quality and resources	<ul style="list-style-type: none"> Will the option affect groundwater quality or quantity?
	3.3 To enhance or maintain surface water quality, flows and quantity	<ul style="list-style-type: none"> Will the option affect surface water quality or quantity?
	3.4 To meet WFD objectives	<ul style="list-style-type: none"> Is the option likely to contribute to or conflict with the achievement of WFD objectives (taken from the WFD assessment results)?
	3.5 To improve water efficiency through provision of access to a resilient and sustainable supply of water.	<ul style="list-style-type: none"> Does the option provide a reliable and sustainable water supply which meets changing demand?
Air	4.1 To minimise air emissions during construction and operation	<ul style="list-style-type: none"> Is the option in an air quality management area (AQMA)? Will the option affect local air quality?

⁴ Mott MacDonald Limited (2020). All Companies Working Group WRMP environmental assessment guidance and applicability with SROs. Published October 2020

SEA topic	SEA objective	Key guide questions
Climatic Factors	5.1 To introduce climate mitigation where required and improve the climate resilience of assets and natural systems	<ul style="list-style-type: none"> Is there potential for the option to incorporate climate mitigation measures to reduce its carbon footprint, such as lower embodied carbon or incorporating renewable energy? Is the option vulnerable to climate change effects? Does the option include climate resilience measures?
	5.2 To minimise embodied and operational emissions	<ul style="list-style-type: none"> Will the option affect carbon or other greenhouse gas (GHG) emissions? Will the option minimise energy demand during construction and operation?
Landscape	6.1 To conserve, protect and enhance landscape and townscape character and visual amenity	<ul style="list-style-type: none"> Will the option have an effect on the character of the landscape or townscape, including views? Will the option improve access to the countryside? Will the option create or improve green infrastructure which contributes to access to the landscape? Will the option protect and enhance designated landscapes and features? Will the option affect visual amenity?
Historic Environment	7.1 To conserve/protect and enhance historic assets/cultural heritage and their setting, including archaeological important sites	<ul style="list-style-type: none"> Will the option affect designated historic assets, sites and features? Will the option affect the setting and/or significance of a historic asset? Will the option affect archaeological important sites?
Population and Human Health	8.1 To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing	<ul style="list-style-type: none"> Will the option allow for economic development? Will the option provide employment opportunities? Will the option affect road or rail infrastructure? Will the option minimise disturbance from noise, light, visual, and transport? Will the option affect the local area in terms of noise emissions?
	8.2 To maintain and enhance tourism and recreation	<ul style="list-style-type: none"> Will the option have an effect on active lifestyles, such as impacts on active travel through disruption to pedestrian and cycle routes? Will the option affect Public Rights of Way? Will the option maintain or enhance tourism? Will the option affect water resources that are used to provide tourist facilities?
	8.3 To secure resilient water supplies for the health and wellbeing of customers	<ul style="list-style-type: none"> Will the option secure resilient water supplies for the health and wellbeing of customers? Does the option promote water efficiency and encourage a reduction in water consumption?
	8.4 To increase access and connect customers to the natural environment, provide education or information resources for the public	<ul style="list-style-type: none"> Does the option improve access to the natural environment for recreation, including those living within deprived areas?
Material Assets	9.1 To minimise resource use and waste production	<ul style="list-style-type: none"> Will the option minimise the use of resources? Will the option minimise the production of waste?
	9.2 To avoid negative effects on major built assets and infrastructure	<ul style="list-style-type: none"> Will the option reuse existing infrastructure? Will the option affect major built assets and infrastructure, including transport infrastructure?

As can be seen from **Table 3.1** the SEA is informed by the results of the HRA and WFD assessments undertaken. In particular the HRA assessment results help inform the assessment of objectives related to biodiversity, flora and fauna whilst the WFD assessment results help to inform the assessment of objectives

1.5 and 3.4. Furthermore, the natural capital and biodiversity assessments undertaken as part of the SRO have assisted the conclusions reached in terms of the SEA topic area of biodiversity, flora and fauna.

As well as the baseline being used to inform the SEA objectives it is also important in helping to determine the effects of the proposed options. The Gate 2 option-level environmental assessment has utilised a GIS-based system to help identify and map environmental constraints within the Scheme indicative site boundary. The datasets used in this detailed assessment, as provided in **Appendix B2.2**, have been updated from those used in the Gate 1 assessments to reflect the current baseline.

The results of the SEA component assessments are presented in output tables, which reflects the SEA outputs set out in Table A.1 of the ACWG guidelines. The SEA assessment table that has been adopted in the assessment of the Scheme is provided in **Appendix B2.3**. Further details and explanation on the content of the detailed SEA assessment output tables is provided below.

The first and second columns of the assessment output table set out the SEA topics and objectives. The third and fourth columns provide the assessment results, positive and negative effects, during the construction phase and the fifth and sixth columns provide the positive and negative effects, during the operational phase. These assessment results have regard to embedded mitigation (mitigation measures identified as part of the Scheme subject to assessment) that have been costed into the design of the Scheme. For assessment purposes embedded mitigation includes best practice mitigation and any additional specific mitigation included as part of scheme design as set out in the conceptual design report (CDR) for the Scheme.

In line with best practice the negative and positive effects are assessed separately for each objective and are not aggregated or “netted off” in any way. This approach has been adopted to maintain transparency of negative and positive effects.

The seventh column provides commentary and evaluation of the effects of the element on the SEA objective, with reference to the guide questions (outlined in **Table 3.1**). This commentary is split into construction and operational aspects and outlines the key details that underpin the assessment against that SEA objective, providing transparency as to how the significance of effects has been determined.

The eighth column provides details of any further measures to mitigate adverse effects or enhance beneficial effects that are recommended but not committed to as part of the Scheme. The residual negative and positive effects (after application of further mitigation measures) during construction are identified in the ninth and tenth columns respectively. Whilst the eleventh and twelfth columns provide the residual positive and negative effects, during the operational phase.

The assessment of the elements has been carried out applying the SEA assessment significance ratings shown in **Table 3.2** below.

Table 3.2 Significance ratings⁵

Effect	Description
+++	Major Positive
++	Moderate Positive
+	Minor Positive
0	Neutral
-	Minor Negative
--	Moderate Negative
---	Major Negative
?	Uncertain

The definitions for the significance of effects are provided in **Appendix B2.4**, and have had regard to those set out in Table B.1 of the ACWG guidance, although in order to be consistent with the WRSE regional plan have been updated, for example, to reflect consideration of INNS and a revised carbon threshold scale. The assessment conclusions also consider the sensitivity of the environmental receptor and magnitude of the

⁵ Derived from both the ACWG environmental assessment guidance but also that of the WRSE regional plan.

effect, the latter of which is a factor of the scale of effect, whether the effects arise in the short, medium or long term, and whether the effects are permanent or temporary.

Where qualitative and/or quantitative information was available (e.g. as identified by the HRA, WFD, Biodiversity Net Gain (BNG) and Natural Capital (NCA) assessment process, conceptual design information, public domain datasets including GIS datasets), this has been used to inform the assessment. Objectives or key guide questions that were not supported by available data or information have been evaluated using spatial analysis, professional judgement and applicable assessment guidelines relating to that topic/objective.

3.3 LIMITATIONS OF THE STUDY

SEA is a strategic assessment aimed at highlighting potential environmental concerns. The environmental data used in this assessment are based on those that are readily available from existing sources. Limitations in undertaking this SEA included the requirement to rely on conceptual designs appropriate to the development of the Scheme for Gate 1 and which therefore have a lower level of detail to inform assessment of very specific impacts on specific receptors. Assessment of impacts is necessarily limited when, for example, pipeline routes are at the outline conceptual design stage only.

The level of detail used in the environmental assessments produced for Gate 2 submission is consistent with the strategic nature of SEA and the concept scheme level of detail of the Scheme at Gate 2. The scope of the assessment has not strayed into the statutory Environmental Impact Assessment (EIA) process which is a detailed project-level assessment using detailed design information. Such detailed information will not be available for the Scheme until later in the RAPID gated process. For example, assessment of the potential impacts on protected species will be carried out as the option is taken forward for detailed design and environmental surveys are carried out for protected species to inform the assessments. This approach is supported in national guidance⁶ on SEA. It is recognised that if schemes are progressed, there would be more detailed assessment work (including EIA where relevant) to support the detailed design as well as any subsequent planning application and that further engagement with stakeholders would be undertaken during this period.

Where particular limitations or outstanding issues are known, these are described in the SEA output assessment table for the relevant element concerned.

3.4 ASSESSMENT PURPOSE AND SCOPE

The SEA process has been applied to test the performance of the Scheme against environmental objectives to see how far they meet these objectives. This approach enables the environmental performance of the Scheme to be used to inform decision-making.

The in-combination assessments with other SROs, non-SRO options and other plans and projects has not been undertaken. It is understood that such assessments will be undertaken as part of the relevant regional plan or WRMP24 assessment processes.

⁶ For example the ODPM guidance on SEA.

4. ASSESSMENTS OUTCOMES

4.1 OVERVIEW

The SEA assessment tables for both the Netheridge WwTW effluent transfer, Haw Bridge pipeline and the Mythe WTW abstraction licence transfer components are provided in **Appendix B2.5**

The assessment conclusions during construction and operation for each objective have been determined firstly after application of embedded mitigation measures included in the conceptual design (and cost) of each Scheme and then subsequently having regard to the application of potential further mitigation measures.

The mitigation included as embedded mitigation in the assessments has been developed through the work undertaken leading to the Gate 2 submission. The mitigation measures identified as embedded mitigation have been included in the CDR. These mitigation measures have been costed for in the design and thus have been taken into account in the assessment of likely environmental effects. Where, even after the consideration of these embedded mitigation measures, these assessments have identified potential environmental effects, regard has been given to further mitigation measures. These are measures that, although have not been costed for as yet, could be undertaken and implemented in order to reduce or overcome negative effects or increase positive effects.

The assessment conclusions during the construction and operational phases of each component after consideration of embedded mitigation, considering both negative (-ve) and positive (+ve) effects, are summarised below using a colour-coded visual evaluation summary matrix (**Table 4.2**). The colours in the table reflect the level of significance of the effect as set out in **Table 3.2**. The assessment conclusions during the construction and operational phases of each component after consideration of further potential mitigation measures are summarised below using a colour-coded visual evaluation summary matrix (**Table 4.3**).

Table 4.2 SEA Assessment Summary Matrix after embedded mitigation⁷

Component	Phase	Effect	SEA Topics and Objectives																					
			Biodiversity, flora & fauna					Soil	Water					Air	Climatic Factors		Landscape	Historic	Population and Human Health				Material Assets	
			1.1	1.2	1.3	1.4	1.5	2.1	3.1	3.2	3.3	3.4	3.5	4.1	5.1	5.2	6.1	7.1	8.1	8.2	8.3	8.4	9.1	9.2
Mythe WTW abstraction licence transfer	Construction Effects	+ve	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	
		-ve	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Operational Effects	+ve	Yellow	Light Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Light Green	Yellow	Light Green	Yellow	Yellow	Yellow	Yellow	Light Green	Yellow	Light Green	Yellow	Light Green	Yellow	
		-ve	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Light Blue	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Light Blue	Yellow
Netheridge WwTW effluent transfer, Haw Bridge Pipeline	Construction Effects	+ve	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	
		-ve	Orange	Orange	Orange	Yellow	Orange	Red	Orange	Orange	Orange	Yellow	Orange	Yellow	Orange	Yellow	Orange	Orange	Orange	Orange	Yellow	Yellow	Orange	Orange
	Operational Effects	+ve	Light Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Green	Yellow	Yellow	Yellow	
		-ve	Yellow	Orange	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Orange	Yellow	Orange	Yellow	Yellow	Yellow	Yellow	Orange	Yellow

⁷ Refer to Table 3.2 for significance colours.

Table 4.3 SEA Assessment Summary Matrix after further mitigation⁸

Component	Phase	Effect	SEA Topics and Objectives																						
			Biodiversity, flora & fauna					Soil	Water					Air	Climatic Factors		Landscape	Historic	Population and Human Health				Material Assets		
			1.1	1.2	1.3	1.4	1.5		2.1	3.1	3.2	3.3	3.4		3.5	4.1			5.1	5.2	6.1	7.1	8.1	8.2	8.3
Mythe WTW abstraction licence transfer	Construction Effects	+ve	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
		-ve	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
	Operational Effects	+ve	Yellow	Light Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Light Green	Yellow	Yellow	Light Green	Yellow	Yellow	Yellow	Yellow	Light Green	Yellow	Light Green	Yellow	Light Green	Yellow	Yellow
		-ve	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Light Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Netheridge WwTW effluent transfer, Haw Bridge Pipeline	Construction Effects	+ve	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	
		-ve	Orange	Orange	Yellow	Yellow	Yellow	Orange	Orange	Yellow	Orange	Yellow	Yellow	Orange	Yellow	Orange	Yellow	Orange	Yellow	Orange	Yellow	Yellow	Orange	Orange	Orange
	Operational Effects	+ve	Light Green	Light Green	Light Green	Yellow	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Green	Light Green	Green	Yellow	Yellow	Yellow	Yellow
		-ve	Yellow	Orange	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Orange	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Orange	Yellow	Yellow

⁸ Refer to Table 3.2 for significance colours.

A summary of the key environmental effects of each of the components after embedded mitigation measures have been considered are provided below. The potential effects of undertaking the further mitigation measures identified in the SEA assessment output tables is discussed at the end of each assessment.

4.2 MYTHE WTW ABSTRACTION LICENCE TRANSFER (15 MLD)

This component does not have any major or moderate positive or negative effects associated with it. The component has some uncertain effects associated with operational carbon emissions and resource use. Effects are otherwise neutral with a few minor positives identified during operation resulting from leaving water in the river for abstraction further downstream and the component contributing to a more resilient water supply.

4.3 NETHERIDGE WWTW EFFLUENT TRANSFER (35 MLD) – HAW BRIDGE PIPELINE

This component has some major and moderate negative and moderate positive effects after consideration of currently embedded mitigation measures.

Major negative effects include:

- Effects associated with soil as the route crosses a landfill site and is within proximity of others therefore there exists the potential for contaminated land and associated risks to health and environment during construction.

Moderate negative effects include:

- Effects on habitats of very high distinctiveness (lowland meadows)
- Potential effects on the health and well-being of the local community during construction of the proposed development; and
- Significant volumes of chemicals will be required for advanced treatment processes.

Moderate positive effects are identified in respect of the component contributing to a more resilient water supply. Furthermore, with respect to climatic factors this component provides additional water resource and will during operation assist the reliable transfer of water, therefore reducing the vulnerability to drought risks associated with climate change and improving resilience to the likely effects of climate change. A further moderate positive effect was identified with respect to potential economic opportunities during construction.

The major and moderate negative effects identified with the currently costed embedded mitigation measures could potentially be further mitigated to reduce effects to a minor negative or neutral effect through the implementation of further mitigation measures. These measures, which are proposed to be investigated further during Gate 3, include:

- Re-routing of the pipeline away from lowland meadow habitat and Alney Local Nature Reserve (LNR);
- Re-routing the pipeline away from the permitted waste site and undertaking investigations/remediation for land contamination. This could mitigate the potential negative effects relating to soil; and
- Sensitive siting of construction compounds, routing of construction traffic and limiting hours of working. This could reduce effects on the environment and amenity to a minor negative effect.

5. CONCLUSION AND RECOMMENDATIONS

As set out in Section 4, some major and moderate negative and positive effects have been identified for the Netheridge WwTW effluent transfer, Haw Bridge pipeline component, which is to be expected given the scale of the Scheme and the concept design stage of scheme development.

The negative effects, in particular, are dependent on the specific geographical setting of the option and its proximity (or otherwise) to sensitive environmental, human and built receptors. Some of these negative effects identified are temporary in nature and largely unavoidable while construction works take place. Some exist as a consequence of the scale of the proposed works, whilst others may be able to be mitigated with investigation of further measures. These mitigations will be further investigated during Gate 3, including optimisation of the pipeline route.

Beneficial effects have been identified in respect of providing additional water resource, contributing to a more resilient water supply, helping to support a sustainable socio-economy and reducing the vulnerability to drought risks associated with climate change and improving resilience to the likely effects of climate change.

The Mythe WTW abstraction licence transfer component does not have any major or moderate positive or negative effects associated with it.

Discussions with WRSE during Gate 1 had identified that their SEA assessments have been unable to have regard to the impacts of undertaking embedded mitigation measures. In addition, it is understood that consideration of positive effects during construction such as employment and economic benefits have not been included in their assessments. Both of these factors are considered relevant, in particular for the larger scale potential developments. As set out in Section 4 and in the SEA assessment output tables in **Appendix 5** the Scheme has included for, and costed, a number of embedded mitigation measures that have reduced potential negative environmental effects.

Further investigations and works are proposed during Gate 3 that will help to identify further mitigation measures to potentially reduce the identified effects further. It should be noted that the further mitigation measures identified have not been costed for or integrated into detailed design at this stage. In consequence, these measures are subject to more detailed assessment and, at this stage, the effectiveness of these measures has still to be fully determined. In addition to identifying and assessing the effectiveness of further mitigation measures, the Gate 3 activities will also confirm the effectiveness of the embedded mitigation measures identified within the assessments contained in **Appendix 5**.

The proposed Gate 3 investigations and works are set out in Section 5.4 of the Scheme Gate 2 Initial Environmental Appraisal⁹.

Consideration of potential cumulative effects and interactions with other major projects identified in programmes and plans can also be found within the IEA (Section 6). No significant cumulative effects have been identified at Gate 2 with other developments and plans.

⁹ Atkins (2022). Severn Trent Sources. Initial Environmental Appraisal Report. Report for: Severn Trent Water Limited. Issue 2. Atkins ref. 5213609.

APPENDICES

Appendix B2.1 Summary of Key Issues

A summary of the issues associated with the SEA topic areas that has helped inform the development of the SEA objectives and associated indicator questions is set out below.

Biodiversity, Flora and Fauna Key Issues

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

- The need to protect or enhance the region's biodiversity, particularly protected sites designated for nature conservation.
- The need to avoid activities likely to cause irreversible damage to natural heritage.
- The need to take opportunities to improve connectivity between fragmented habitats.
- The need to control the spread of Invasive Non-Native Species (INNS).
- The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.

Soil Key Issues

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

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

Water Key Issues

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

- The need to maintain the quantity and quality of groundwater resources taking into account WFD status targets.
- The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change impacts on surface waters and groundwaters.
- The need to ensure sustainable abstraction.
- The need to ensure that people understand the value of water.
- The need to reduce and manage flood risk.

Air Key Issues

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

- The need to reduce air pollutant and greenhouse emissions and limit air emissions to comply with air quality standards.

Climatic Key Issues

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

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

Landscape and Visual Amenity Key Issues

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

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

Historic Environment Key Issues

The key issue arising from the baseline assessment for the historic environment is:

- The need to conserve or enhance sites of archaeological importance and cultural heritage interest, and their settings, particularly those which are sensitive to the water environment.

Population and Human Health Key Issues

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

- The need to ensure water supplies remain affordable especially for deprived or vulnerable communities
- The need to ensure public awareness of drought conditions and importance of maintaining security of supply without the need for emergency drought measures.
- The need to ensure water quantity and quality is maintained for other users including tourists, recreational users and other users such as farmers.
- The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities local residents and tourists, including opportunities for access to recreation resources and the natural and historic environment.
- The need to accommodate an increasing population
- Sites of nature conservation importance, heritage assets, water resources, important landscapes and public rights of way contribute to recreation and tourism opportunities and subsequently health and well-being and the economy.

Material Assets Key Issues

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

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

Appendix B2.2 List of datasets

All datasets were downloaded in March 2022.

Data Source	Publisher
Air Quality Management Areas	DEFRA
Noise Action Planning Important Areas Round 2 England	DEFRA
Special Protection Areas (England)	Natural England
Special Areas for Conservation (England)	Natural England
Ramsar	Natural England
Sites of Special Scientific Interest (England)	Natural England
SSSI Impact Risk Zones (England)	Natural England
Special Areas of Conservation (SACs) with marine components (all UK waters)	JNCC
Possible Special Areas of Conservation (England)	Natural England
Special Protection Areas (SPAs) with marine components (all UK waters)	JNCC
Potential Special Protection Areas (England)	Natural England
Marine Conservation Zones (England)	Natural England
National Nature Reserves (England)	Natural England
Ancient Woodland (England)	Natural England
Local Nature Reserves (England)	Natural England
Priority Habitat Inventory (England)	Natural England
Ancient Woodland (England)	Natural England
Nature Improvement Areas	Natural England
National Priority Focus Areas	Natural England
OS Open Greenspace	Ordnance Survey
Country Parks (England)	Natural England
CRoW Act 2000 - Section 4 Conclusive Registered Common Land	Natural England
CRoW Act 2000 - Section 15 Land	Natural England
OS OpenMap - Roads	Ordnance Survey
OS OpenMap - Railways	Ordnance Survey
OS OpenMap Local - Buildings	Ordnance Survey
National Cycle Network (Public)	Sustrans
English indices of deprivation 2015	Ministry of Housing, Communities and Local Government
Agricultural Land Classification (ALC) Grades - Post 1988 Survey (polygons)	Natural England
Permitted Waste Sites - Authorised Landfill Site Boundaries	Environment Agency
Historic Landfill Sites	Environment Agency
LVMF protected vistas - GIS files	Greater London Authority
English Local Authority Green Belt Dataset	Ministry of Housing, Communities and Local Government
Areas of Outstanding Natural Beauty (England)	Natural England
National Character Areas (England)	Natural England

Data Source	Publisher
Flood Map for Planning (Rivers and Sea) - Flood Zone 2	Environment Agency
Flood Map for Planning (Rivers and Sea) - Flood Zone 3	Environment Agency
Statutory Main River Map	Environment Agency
OS Open Rivers	Ordnance Survey
Source Protection Zones	Environment Agency
WFD River Canal and Surface Water Transfer Cycle 2	Environment Agency
WFD Groundwater Bodies Cycle 2	Environment Agency
Listed Buildings	Historic England
Registered Parks and Gardens	Historic England
Protected Wrecks	Historic England
Registered Battlefields	Historic England
Scheduled Monuments	Historic England
World Heritage Sites	Historic England
Built-up Areas (December 2011) Boundaries V2 - 350 metre buffer used	Office for National Statistics
National Trails	Natural England

Appendix B2.3 SEA output table

Scheme Name	
Scheme Reference	
Description	

3.1 SEA topic	SEA objective	Construction Effects		Operational Effects		Effect Description (including embedded mitigation)	Further Mitigation	Residual Construction Effects		Residual Operational Effects	
		+ve	-ve	+ve	-ve			+ve	-ve	+ve	-ve
Biodiversity, flora and fauna	1.1 To protect designated sites and their qualifying features					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	1.2 To avoid a net reduction, and where possible enhance, in non-monetised natural capital assets					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	1.3 To protect and enhance biodiversity, priority habitats and species					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	1.4 To avoid and, where required, manage invasive and non-native species (INNS)					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	1.5 To meet WFD objectives relating to biodiversity					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
Soil	2.1 To protect and enhance the functionality, quantity and quality of soils, including the protection of high-grade agricultural land					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				

3.1 SEA topic	SEA objective	Construction Effects		Operational Effects		Effect Description (including embedded mitigation)	Further Mitigation	Residual Construction Effects		Residual Operational Effects	
		+ve	-ve	+ve	-ve			+ve	-ve	+ve	-ve
Water	3.1 To minimise or manage flood risk, taking climate change into account					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	3.2 To enhance or maintain groundwater quality and resources					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	3.3 To enhance or maintain surface water quality, flows and quantity					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	3.4 To meet WFD objectives					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	3.5 To improve water efficiency through provision of access to a resilient and sustainable supply of water.					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
Air	4.1 To minimise air emissions during construction and operation					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
Climatic Factors	5.1 To introduce climate mitigation where required and improve the climate resilience of assets and natural systems					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	5.2 To minimise embodied and operational emissions					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				

3.1 SEA topic	SEA objective	Construction Effects		Operational Effects		Effect Description (including embedded mitigation)	Further Mitigation	Residual Construction Effects		Residual Operational Effects	
		+ve	-ve	+ve	-ve			+ve	-ve	+ve	-ve
Landscape	6.1 To conserve, protect and enhance landscape and townscape character and visual amenity					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
Historic Environment	7.1 To conserve/protect and enhance historic assets/cultural heritage and their setting, including archaeological important sites					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
Population and Human Health	8.1 To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	8.2 To maintain and enhance tourism and recreation					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	8.3 To secure resilient water supplies for the health and wellbeing of customers					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	8.4 To increase access and connect customers to the natural environment, provide education or information resources for the public					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
Material Assets	9.1 To minimise resource use and waste production					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				
	9.2 To avoid negative effects on built assets and infrastructure					Construction effects: Operation effects:	Construction mitigation: Operation mitigation:				

Appendix B2.4 SEA scoring criteria

SEA Objective	Effect	Description
Biodiversity, Flora, Fauna:	+++	<p>Major Positive</p> <p>The option would result in a major enhancement on the quality of designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat quality and availability. The option would result in a major increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or large amounts of creation or enhancement of habitat, promoting a major increase in ecosystem structure and function. The option would result in a major reduction or management of INNS.</p>
	++	<p>Moderate Positive</p> <p>The option would result in a moderate enhancement on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a moderate increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or moderate amounts of creation or enhancement of habitat, promoting a moderate increase in ecosystem structure and function. The option would result in a moderate reduction or management of INNS.</p>
	+	<p>Minor Positive</p> <p>The option would result in a minor enhancement of the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat creation and enhancement measures. The option would result in a minor increase in the population of a priority species. Effects could be caused by beneficial changes in water flows/water quality, or small amounts of creation or enhancement of habitat, promoting a minor increase in ecosystem structure and function. The option would result in a minor reduction or management of INNS.</p>
	0	<p>Neutral</p> <p>The option would not result in any effects on designated or non-designated sites including habitats and/or species). It will not have an effect on INNS.</p>
	-	<p>Minor Negative</p> <p>The option would result in a minor negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a minor decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or small losses or degradation of habitat leading to a minor loss of ecosystem structure and function. The option would result in a minor increase or spread of INNS.</p>
	--	<p>Moderate Negative</p> <p>The option would result in a moderate negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a moderate decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or moderate loss or degradation of habitat leading to a moderate loss of ecosystem structure and function. The options would result in a moderate increase or spread of INNS.</p>

SEA Objective	Effect	Description	
	---	Major Negative	The option would result in a major negative effect on the quality of designated and/or non-designated sites / habitats due to changes in flow or groundwater levels, water quality or habitat loss or degradation. The option would result in a major decrease in the population of a priority species. Effects could be caused by detrimental changes in flows/water quality, or large losses or degradation of habitat leading to a major loss of ecosystem structure and function. The option would result in a major increase or spread of INNS.
	?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
Soil: Protect and enhance the functionality, quantity and quality of soils	+++	Major Positive	The option would result in a major enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
	++	Moderate Positive	The option would result in a moderate enhancement on the quality of soils through the implementation of catchment approaches, remediation or other measures.
	+	Minor Positive	The option is located on a brownfield site and has no effect on soils or existing land use. The option results in the remediation of contaminated land.
	0	Neutral	The option would not result in any effects on soils or land use.
	-	Minor Negative	The option is not located on a brownfield site and/or results in a minor loss of best and most versatile agricultural land or is in conflict with existing land use. The option results in land contamination.
	--	Moderate Negative	The option will result in a moderate loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option is partially overlying mineral resources leading to partial mineral sterilisation.
	---	Major Negative	The option will result in a major loss of best and most versatile agricultural land or is in substantial conflict with existing land use. The option results in land contamination. The option is directly overlying mineral resources leading to mineral sterilisation.
	?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain
Water: Increase resilience and reduce flood risk Protect and enhance the quality of the water environment and water resources Deliver reliable and resilient water supplies	+++	Major Positive	The option results in addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a major improvement to flood risk. The option would result in a major improvement in water efficiency, reduces demand and improves resilience.
	++	Moderate Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option contributes to addressing failure of WFD Good Ecological Status / Good Ecological Potential. The option would result in a moderate improvement to flood risk. The option would result in a moderate improvement in water efficiency, reduces demand and improves resilience.
	+	Minor Positive	The option achieves savings through demand management and does not require abstraction to achieve yield. The option would result in a minor improvement to flood risk. The option would result in a minor improvement in water efficiency, reduces demand and improves resilience.

SEA Objective	Effect	Description
	0	Neutral The option would have no discernible effect on river flows or surface/coastal water quality or on groundwater quality or levels. The option would not have an effect on or be affected by flood risk.
	-	Minor Negative The option would result in minor decreases in river flows. River and/or coastal water quality may be affected and lead to short term or intermittent effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not be avoided but could be mitigated. The option would result in minor decreases in groundwater quality or levels. The option is located in Flood Zone 2. The option would result in minor decreases in water efficiency, increases demand and reduces resilience.
	--	Moderate Negative The option would result in moderate decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option results in the likely deterioration of WFD classification. The option would result in moderate decreases in groundwater quality or levels. The option is located in Flood Zone 3. The option would result in moderate decreases in water efficiency, increases demand and reduces resilience.
	---	Major Negative The option would result in major decreases in river flows. River and/or coastal water quality may be affected and lead to long term or continuous effects on receptors (e.g. designated habitats, protected species or recreational users of rivers and the coastline) that could not reasonably be mitigated. The option results in the deterioration of WFD classification. The option would result in major decreases in groundwater quality or levels. The option is located in Flood Zone 2 or 3 and further contributes to flood risk. The option would result in major decreases in water efficiency, increases demand and reduces resilience.
	?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.
Air: Reduce and minimise air emissions	+++	Major Positive The option would result in a major enhancement of the air quality within one or more AQMAs.
	++	Moderate Positive The option would result in a moderate enhancement of the air quality within one or more AQMAs.
	+	Minor Positive The option would result in an enhancement of the air quality.
	0	Neutral The option would not result in any effects on Air Quality and AQMAs.
	-	Minor Negative The option would result in a decrease of the air quality.
	--	Moderate Negative The option would result in a decrease of the air quality within one or more AQMAs.

SEA Objective	Effect	Description
	---	Major Negative The option would result in a major decrease in the air quality within one or more AQMAs.
	?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.
Climate Factors: Reduce embodied and operational carbon emissions Reduce vulnerability to climate change risks and hazards	+++	Major Positive The option will generate significant additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale) The option will result in a major increase in carbon sequestration. The option will increase resilience/decrease vulnerability to climate change effects.
	++	Moderate Positive The option will increase resilience/decrease vulnerability to climate change effects. The option will result in a moderate increase in carbon sequestration. The option will generate moderate additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale)
	+	Minor Positive The option will increase resilience/decrease vulnerability to climate change effects. The option will result in a minor increase in carbon sequestration. The option will generate minor additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale)
	0	Neutral The option would have no discernible effect on greenhouse gas emissions, nor would the option increase resilience/decrease vulnerability to climate change effects.
	-	Minor Negative The option will have a minor impact on resilience/decrease vulnerability to climate change effects. The option will generate minor construction carbon emissions (1 - 6,964,452 tCO ₂ e) and/or operational carbon emissions (1 - 3,492 tCO ₂ e).
	--	Moderate Negative The option will have a moderate impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate moderate construction carbon emissions (6,964,453 - 20,000,000 tCO ₂ e) and/or operational carbon emissions (3,493 - 10,000 tCO ₂ e). The option will result in a moderate release of previously sequestered carbon.
	---	Major Negative The option will have a major impact on resilience/significantly decrease vulnerability to climate change effects. The option will generate significant construction carbon emissions (Above 20,000,000 tCO ₂ e) and/or operational carbon emissions (Above 10,000 tCO ₂ e). The option will result in a major release of previously sequestered carbon.
	?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.
Landscape: Conserve, protect and enhance landscape, townscape and seascape character and visual amenity	+++	Major Positive The option would have a major positive contribution to designated landscape (AONB or National Park) management plan objectives The option results in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.
	++	Moderate Positive The option would have a moderate positive contribution to designated landscape management plan objectives The option results in new, above ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape.

SEA Objective	Effect	Description
	+	Minor Positive The option results in new, above ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.
	0	Neutral The option would not result in any effects on the local landscape, townscape or seascape.
	-	Minor Negative The option results in new, above ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape.
	--	Moderate Negative The option would have a moderate negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a moderate negative effect on the local landscape, townscape or seascape.
	---	Major Negative The option would have a negative effect on a designated landscape or feature (i.e. significant visually intrusive infrastructure) whose effects could not be reasonably mitigated. The option results in new, above ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.
	?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.
Historic Environment Conserve, protect and enhance the historic environment, including archaeology	+++	Major Positive The option will result in enhancements to designated heritage assets and/or their setting, fully realising the significance and value of the asset, such as: - Securing repairs or improvements to heritage assets, especially those identified in the Historic England Buildings/Monuments at Risk Register; - Improving interpretation and public access to important heritage assets.
	++	Moderate Positive The option will result in enhancements to designated heritage assets and/or their setting. Improving interpretation and public access to important heritage assets.
	+	Minor Positive The option will result in enhancements to non-designated heritage assets and/or their setting.
	0	Neutral The option will have no effect on cultural heritage assets or archaeology.
	-	Minor Negative The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. There will be limited damage to known, undesignated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
	--	Moderate Negative The option will result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected. The option will diminish of significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.

SEA Objective	Effect	Description	
	---	Major Negative	The option will diminish the significance of designated heritage assets and/or their setting such as: - Demolition or further deterioration in the condition of designated heritage assets especially those identified in the Historic England Buildings/Monuments at Risk Register. - Loss of public access to important heritage assets and lack of appropriate interpretation. - There will be major damage to known, designated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.
	?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Population, Human Health Maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing Maintain and enhance tourism and recreation	+++	Major Positive	The option leads to major positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. The option creates new, and significantly enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
	++	Moderate Positive	The option leads to positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits. The option enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area
	+	Minor Positive	The option has a temporary positive effect on the health of local communities and will ensure that surface water and bathing water quality is maintained within statutory limits.
	0	Neutral	The option would not result in any effects on human health and existing recreational facilities and/or tourism.
	-	Minor Negative	The option has a temporary effect on human health (e.g. noise or air quality). The option reduces the availability and quality of existing recreational facilities and/or tourism within the operational area.
	--	Moderate Negative	The option results in the permanent removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
	---	Major Negative	The option has a significant long-term effect on human health (e.g. noise or air quality). The option results in the removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.
	?	Uncertain	From the level of information available the effect that the option would have on this objective is uncertain.
Material Assets Minimise resource use and waste production Avoid negative effects on built assets and infrastructure	+++	Major Positive	The option will re-use or recycle substantial quantities of waste materials and any new infrastructure will incorporate substantial sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 100% renewable sources. The option improves national cycle routes or national trails.
	++	Moderate Positive	The option will re-use or recycle moderate quantities of waste materials and any new infrastructure will incorporate some sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 90% renewable sources. The option improves national cycle routes or national trails.
	+	Minor Positive	The option will re-use or recycle a limited quantity of waste materials and any new infrastructure will incorporate some limited sustainable design measures and materials. There will be no increase in energy consumption or energy will be from 80% renewable sources. The option improves national cycle routes or national trails.

SEA Objective	Effect	Description
	0	Neutral The option would not result in any effects on material assets.
	-	Minor Negative The option will require new infrastructure with only limited opportunities for the re-use or recycling of waste materials. There are limited opportunities for sustainable design or the use of sustainable materials. The option results in a minor increase in energy consumption with no renewable energy options. The option results in a minor disruption on built assets and infrastructure, including transport.
	--	Moderate Negative The option will require new infrastructure with only limited opportunities for the re-use or recycling of waste materials. The option results in a moderate increase in energy consumption with no renewable energy options. The option results in a moderate disruption on built assets and infrastructure, including transport links.
	---	Major Negative The option will require significant new infrastructure that cannot be provided through the re-use or recycling of waste materials. There are no opportunities for sustainable design or the use of sustainable materials. The option results in a major increase in energy consumption with no renewable energy options. The option results in a major distribution on built assets and infrastructure, including transport links.
	?	Uncertain From the level of information available the effect that the option would have on this objective is uncertain.

Appendix B2.5 Assessments

[insert assessment matrices]



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