



# South East Strategic Reservoir Option (SESRO)

Technical Supporting Document B7  
SEA

## Notice

### Position Statement

This document has been produced as the part of the process set out by RAPID for the development of the Strategic Resource Options (SROs). This is a regulatory gated process allowing there to be control and appropriate scrutiny on the activities that are undertaken by the water companies to investigate and develop efficient solutions on behalf of customers to meet future drought resilience challenges.

This report forms part of suite of documents that make up the 'Gate 2 submission.' That submission details all the work undertaken by Thames Water and Affinity Water in the ongoing development of the proposed SROs. The intention of this stage is to provide RAPID with an update on the concept design, feasibility, cost estimates and programme for the schemes, allowing decisions to be made on their progress and future funding requirements.

Should a scheme be selected and confirmed in the companies' final Water Resources Management Plan, in most cases it would need to enter a separate process to gain permission to build and run the final solution. That could be through either the Town and Country Planning Act 1990 or the Planning Act 2008 development consent order process. Both options require the designs to be fully appraised and in most cases an environmental statement to be produced. Where required that statement sets out the likely environmental impacts and what mitigation is required.

Community and stakeholder engagement is crucial to the development of the SROs. Some high level activity has been undertaken to date. Much more detailed community engagement and formal consultation is required on all the schemes at the appropriate point. Before applying for permission Thames Water and Affinity Water will need to demonstrate that they have presented information about the proposals to the community, gathered feedback and considered the views of stakeholders. We will have regard to that feedback and, where possible, make changes to the designs as a result.

The SROs are at a very early stage of development, despite some options having been considered for several years. The details set out in the Gate 2 documents are still at a formative stage and consideration should be given to that when reviewing the proposals. They are for the purposes of allocating further funding not seeking permission.

### Disclaimer

This document has been written in line with the requirements of the RAPID Gate 2 Guidance and to comply with the regulatory process pursuant to Thames Water's and Affinity 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, Thames Water and Affinity 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.

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## Abbreviations

| Abbreviation | Full Term   |
|--------------|---|
| <b>ACWG</b>  | All Companies Working Group                                     |
| <b>ALC</b>   | Agricultural Land Classification                                |
| <b>AONB</b>  | Area of Outstanding Natural Beauty                              |
| <b>AQMA</b>  | Air Quality Management Area                                     |
| <b>EAR</b>   | Environmental Appraisal Report                                  |
| <b>EU</b>    | European Union  |
| <b>HRA</b>   | Habitats Regulations Assessment                                 |
| <b>INNS</b>  | Invasive and non-native species                                 |
| <b>LVA</b>   | Landscape and Visual Appraisal                                  |
| <b>LVIA</b>  | Landscape and Visual Impact Assessment                          |
| <b>LWS</b>   | Local Wildlife Site   |
| <b>NAU</b>   | National Appraisal Unit   |
| <b>NCA</b>   | National Character Area   |
| <b>NPPF</b>  | National Planning Policy Framework                              |
| <b>PR19</b>  | Ofwat's Price Review 2019                                       |
| <b>RAPID</b> | Regulators' Alliance for Progressing Infrastructure Development |
| <b>SEA</b>   | Strategic Environmental Assessment                              |
| <b>SESRO</b> | South East Strategic Reservoir Option                           |
| <b>SPA</b>   | Special Protection Area   |
| <b>SRO</b>   | Strategic Reservoir Option                                      |
| <b>SSSI</b>  | Site of Special Scientific Interest                             |
| <b>WFD</b>   | Water Framework Directive                                       |
| <b>WRMP</b>  | Water Resources Management Plan                                 |
| <b>WRSE</b>  | Water Resources South East Group                                |
| <b>WRZ</b>   | Water Resource Zone   |

# 1. Introduction

## 1.1 Introduction

1.1 This Strategic Environmental Assessment (SEA) is a development and refinement of the SEA undertaken at Gate 1 for the South East Strategic Reservoir Option (SESRO), which has been identified as one of the Strategic Resource Options (SROs) in Ofwat's Price Review 2019 (PR19) Final Determination. This Gate 2 SEA takes into consideration the option concept design development in combination with updates to the environmental baseline and other relevant information made available following the completion of Gate 1 and into Gate 2.

1.2 At Gate 1 six main size options for SESRO were identified and assessed and taken forward into Gate 2. These comprise four single phase construction options and two dual phase construction options, with their specifications as follows:

- 150 Mm<sup>3</sup> capacity reservoir;
- 125 Mm<sup>3</sup> capacity reservoir;
- 100 Mm<sup>3</sup> capacity reservoir;
- 75 Mm<sup>3</sup> capacity reservoir;
- 30+100 Mm<sup>3</sup> capacity, two- phase construction reservoir; and
- 80+42 Mm<sup>3</sup> capacity, two- phase construction reservoir.

1.3 The final construction would comprise a fully bunded pumped storage reservoir located 5km to the south-west of Abingdon. Water would be abstracted from the River Thames downstream of Abingdon during periods of high flow and stored in the new reservoir. Water from the reservoir would then be released into the River Thames when flows are low and re-abstracted downstream of the River Thames for supply to the London Water Resource Zone (WRZ) or Slough Wycombe and Aylesbury WRZ. The maximum rate of abstraction from the River Thames to the raw water reservoir is 1,000MI/d. The maximum rate of discharge depends on the size of the proposed reservoir (see Section 4 (Hydrology) in Supporting Document B1, Environmental Appraisal Report (aquatic)).

1.4 Further details on these options is provided in Section 2.2 of this report. The Environmental Appraisal Reports (EARs) for aquatic and terrestrial topics (supporting documents B1 and B2) should be referred to for full details on the assessments undertaken for the following subjects which are incorporated into this SEA associated with the according SEA topics:

- Physical Environment – Landscape;
- Physical Environment – Air Quality;
- Physical Environment – Noise;
- Physical Environment – Land Quality;
- Physical Environment – Fluvial Geomorphology;
- Physical Environment – Hydrology;

- Water Quality;
  - Fisheries;
  - Other Freshwater Ecology;
  - Invasive and Non-Native Species (terrestrial and aquatic);
  - Other Habitats and Species (terrestrial);
  - Historic Environment;
  - Natural Capital Assessment; and
  - Biodiversity Net Gain.
- 1.5 At Gate 2 the assessments follow the Regulators’ Alliance for Progressing Infrastructure Development (RAPID), Strategic regional water resource solutions guidance for Gate 2 (April 2022)<sup>1</sup>, which states in the Environmental Appraisal section;
- ‘Justification should be given as to the preferred option within the solution taken forward.’*
- Whereabouts should there be a preferred option developing then it is outlined and the evidence for discounting the other options is also provided.
- 1.6 The guidance also indicates that the solutions in the SEA will feed into the Water Resources Management Plan (WRMP) and regional plans SEAs, with the SEA input being discussed with environmental regulators. This Gate 2 SEA and the associated other supporting appraisals and assessments were not in place to inform the Water Resources South East (WRSE) plan at the February 2022 upload. However, it will be used to inform and be incorporated into the future updates to the plans.
- 1.7 For the SESRO SRO several size variants of the scheme have been included in the Thames Water WRMP24 Constrained List of options and submitted as options to WRSE the largest of the single-phase options being a 150Mm<sup>3</sup> capacity reservoir. As this is the largest of the options the overall, immediate environmental impacts are considered to be the greatest when compared to the other lesser capacity options, with the addition that it better achieves the water resource provision benefits by inherently having a larger capacity. Therefore, the application of the SEA scoring of the alternative options has been considered at Gate 2 to be comparative to that of the largest option. The lesser capacity options are not likely to have a significant effect over and above what has been identified for the largest option. At Gate 1, all of the scores were the same for all of the options for all of the aspects, apart for Population and Human Health – ‘To secure resilient water supplies for the health and wellbeing of customers’ aspect, which was more positively scored for the largest option.
- 1.8 Consultation with the environmental regulators has been conducted via discussions with the All Company Working Group (ACWG) and National Appraisal Unit NAU regarding the overall requirements for the development and production of the SEA for the SRO at Gate 2. The environmental topics updated for Gate 2 which have been incorporated in this updated SEA, have included statutory consultations with environmental regulators where

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<sup>1</sup> <https://www.ofwat.gov.uk/publication/strategic-regional-water-resource-solutions-guidance-for-gate-two/>

necessary to ensure those particular appraisals are appropriate and applicable. Table 1-1 indicates which environmental topics have been updated at Gate 2 and provides a brief summary on the elements assessed for each topic, further details are provided in Section 4 as indicated.

*Table 1-1 – Summary of environmental topic updates at Gate 2*

| Updated at Gate 2   | Not Updated since Gate 1   |
|---|--|
| <ul style="list-style-type: none"> <li>• Biodiversity</li> </ul> <p>Further desk-based assessment, formal Habitat Regulations Assessment and Biodiversity Net Gain (BNG) calculations. Further field surveys have not been undertaken. Minimal changes to baseline. See Sections 4.2.2 and A.1.</p>                                       | <ul style="list-style-type: none"> <li>• Population and Human Health</li> </ul> <p>No anticipated changes in baseline or SEA scoring from the Gate 1 assessment. See Sections 4.2.3 and A.2.</p> |
| <ul style="list-style-type: none"> <li>• Water</li> </ul> <p>Updated design has been considered in a Water Framework Directive (WFD) Applicability Assessment. River BNG assessment has been updated to the 3.0 metric. Some baseline changes associated with waterbody changes between RBMP2 and dRBMP3. See Sections 4.2.4 and A.3.</p> | <ul style="list-style-type: none"> <li>• Material Assets</li> </ul> <p>No anticipated changes in baseline or SEA scoring from the Gate 1 assessment. See Sections 4.2.11 and A.9.</p>            |
| <ul style="list-style-type: none"> <li>• Soil</li> </ul> <p>Further assessment of agricultural land, potential contamination and sterilisation of mineral resources undertaken, including a soil survey. Baseline study area reduced from 2km to 250m from indicative location for SESRO. See Sections 4.2.5 and A.4.</p>                 |  |
| <ul style="list-style-type: none"> <li>• Air</li> </ul> <p>Updated assessment of potential air quality impacts during construction upon sensitive human and ecological receptors. Minimal baseline changes. See Sections 4.2.6 and A.5.</p>   |  |
| <ul style="list-style-type: none"> <li>• Noise</li> </ul> <p>Updated assessment of potential noise impacts during construction upon sensitive human and ecological receptors. Minimal baseline changes. See Sections 4.2.7 and A.5.</p>   |  |
| <ul style="list-style-type: none"> <li>• Historic Environment</li> </ul> <p>Updated assessment considers slightly larger study area than Gate 1. Geophysical survey and trial trench investigation identified as next steps. See Section 4.2.9 and A.7.</p>   |  |

| Updated at Gate 2  | Not Updated since Gate 1 |
|--|--------------------------|
| <ul style="list-style-type: none"> <li>Landscape</li> </ul> <p>More significant potential adverse effects on Landscape Character Areas (LCAs) identified at Gate 2. See Sections 4.2.10 and A.8.</p>   |                          |
| <ul style="list-style-type: none"> <li>Climate Factors</li> </ul> <p>Update to Carbon Assessment and inclusion of resilience in Natural Capital Assessment. No changes in baseline or SEA scoring from the Gate 1 assessment have been reported. See Sections 4.2.8 and A.6.</p> |                          |

1.9 Therefore, this SEA will focus on the largest option providing indications where necessary and appropriate for the discounting of the alternative options. For consistency this will be illustrated using the SEA scoring matrix previously developed at Gate 1 and adapted to take into consideration the updates to studies and appraisals which have also focused on the largest option.

1.10 An appraisal of the potential cumulative impacts has also been carried out as part of the Gate 2 SEA. This was not undertaken as part of the Gate 1 process. To enable a consistent approach across other SRO appraisals and to aid with the undertaking of appropriate cumulative impact and in-combination effects appraisals for the proposed schemes, which are still at the optioneering phase and only with concept designs; a cumulative effects assessment methodology guidance note<sup>2</sup> was developed and approved for use by the ACWG and NAU (See Appendix E). The guidance note provides an appropriate approach to take into consideration the long term optioneering, design, consenting and delivery programmes expected for the SRO.

## 1.2 Requirements of SEA and Purpose of this Report

1.11 This report has been carried out in line with the principles of the SEA Regulations by updating the SEA from Gate 1 with available and appropriate information provided by the option concept design development and supporting studies and assessments.

1.12 The SEA Regulations states that an Environmental Report should be developed and provide information on:

*'Any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC' (Annex I(d))*

1.13 Key reporting requirements are those set by the SEA Regulations:

*'An Environmental Report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking*

<sup>2</sup> Mott MacDonald (27 April 2022). Cumulative effects assessment methodology (Version 3). 100383187-023\_003. T2AT Gate 2 Environmental Assessments.

*into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated.'*

1.14 Table 1-2 sets out the way the specific SEA requirements, as outlined in the SEA Regulations, have been met in this report. The six SESRO options are all constrained options within Thames Water's WRMP, which falls under the auspices of the SEA Regulations.

Table 1-2 – SEA Requirements

| Information to be included in the Environmental Report under the SEA Regulations (Regulation 12 and Schedule 2) <sup>3</sup> |  | How has this been addressed?  |
|--|--|---|
| 1.   | An outline of the contents, main objectives of the plan, and of its relationship with other relevant plans and programmes  | This is set out in the overarching SESRO EARs for aquatic and terrestrial topics (Supporting documents B1 and B2).  |
| 2.   | The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan   | This is a key purpose of the baseline presented in Appendix A.  |
| 3.   | The environmental characteristics of areas likely to be significantly affected   | A detailed assessment table is provided in Appendix C and a summary of findings made in Section 4. Further information is included in the overarching SESRO EARs for aquatic and terrestrial topics (Supporting documents B1 and B2).   |
| 4.   | Any existing environmental problems which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC                  | This is a key purpose of the baseline presented in Appendix A.  |
| 5.   | The environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation | SEA Objectives <sup>1</sup> have been developed which, alongside consideration of detailed baseline collected as part of the assessment process, required consideration of environmental protection objectives (Table 1-2). See also the relevant assessments for WRSE Regional Plan and Thames Water WRMP. |

<sup>3</sup> <https://www.legislation.gov.uk/ukxi/2004/1633/schedules/2018-12-31>

| Information to be included in the Environmental Report under the SEA Regulations (Regulation 12 and Schedule 2) <sup>3</sup> |  | How has this been addressed?   |
|--|--|--|
| 6.   | The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects, on issues such as: biodiversity; population; human health; fauna; flora; soil; water; air; climatic factors; material assets; cultural heritage including architectural and archaeological heritage; landscape; the interrelationship between the above factors | A detailed assessment table for the options is provided in Appendix C and a summary of findings made for all the options is in Section 4.  |
| 7.   | The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan  | Suggested mitigation is made in the detailed assessment tables contained within Appendix C and detailed mitigation is also contained within the relevant sections of the EARs for aquatic and terrestrial topics (Supporting documents B1 and B2). |
| 8.   | An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information  | Each of the six potential SESRO options have been considered. However, the text in Section 1.1 relating to the appraisal of the 150Mm3 option needs to be taken into consideration.  |
| 9.   | A description of measures envisaged concerning monitoring in accordance with Regulation 17   | Monitoring to be addressed as set out in the EARs for aquatic and terrestrial topics (Supporting documents B1 and B2) and associated individual specialist reports.  |
| 10.  | A non-technical summary of the information provided under paragraphs 1 to 9  | A non-technical summary of the full environmental assessment process is provided in the EARs for aquatic and terrestrial topics (Supporting documents B1 and B2).  |

## 2. Solution design, options and sub-options

### 2.1 Solution description

- 2.1 The South East Strategic Reservoir Option (SESRO) is an ‘off-line’, fully bunded raw water storage reservoir in the upper catchment of the River Thames.
- 2.2 Water would be abstracted from the River Thames during periods of high flow and stored in a reservoir, to be released back into the River Thames when there is a need to augment the flows in the River Thames. Water released from SESRO could be re-abstracted by existing or new infrastructure further downstream to supply customers of Thames Water and Affinity Water.
- 2.3 SESRO also incorporates the future flexibility to abstract water direct from the reservoir, treat it on site and then transfer potable water either to the south to serve Southern Water<sup>4</sup> or else to support TW’s Swindon and Oxfordshire supply zone<sup>5</sup>. These elements will continue to be explored as the scheme develops and the timing and magnitude of each is confirmed in the final WRMPs.

### 2.2 Options considered

- 2.4 SESRO is one of various raw water storage reservoirs that have been considered for WRMP24 by Thames Water. Alternative options have been passed through an appraisal process<sup>6</sup> and feasible options costed and assessed as part of WRMP24. Analysis completed as part of the options appraisal for WRMP24 confirms that alternative sites for storage reservoirs are available in the Thames Valley, but none considered as suitable as SESRO. Building upon the options appraisal work that was originally undertaken for WRMP09 and has been updated for each subsequent strategic plan to ensure accuracy, the leading alternative sites have been analysed and costed (and made available for selection as feasible options) as part of option selection for WRMP24. Further ‘back-checking’ of the analysis and screening out of alternative sites has ensured that the list of options is correct and robust. This is all reported in the updated Reservoir Feasibility Report that will be published for consultation by Thames Water as part of WRMP24.
- 2.5 Several size variants of the SESRO scheme have been included in the Thames Water WRMP24 Constrained List of options and submitted as options to WRSE, as follows:
  - 150 Mm3 capacity reservoir;
  - 125 Mm3 capacity reservoir;
  - 100 Mm3 capacity reservoir;
  - 75 Mm3 capacity reservoir;

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<sup>4</sup> Thames to Southern Transfer, another SRO project, jointly funded by Thames Water and Southern Water

<sup>5</sup> The additional transfers and associated water treatment facilities are not included within the SESRO core scheme, although a provision of land allocation within the scheme is identified for such future use

<sup>6</sup> Thames Water WRMP24, Reservoir Feasibility Report Update.

- 30+100 Mm3 capacity phased reservoir; and
- 80+42 Mm3 capacity phased reservoir.

### 2.3 Option configuration and operation

- 2.6 The combined river intake / outfall Structure would be located on the western bank of the River Thames upstream of Culham. Abstracted water would pass through a tunnel and pumping station and jetted into the reservoir at the base of an inlet tower.
- 2.7 Water being discharged back into the river would pass through an outlet tower and the same tunnel before flowing over a stepped gravity weir at the outfall, which would maximise aeration whilst avoiding scour to the River Thames.
- 2.8 The current conceptual design provisionally allows for the inclusion of the outfall for the Severn to Thames Transfer (STT) SRO project within the SESRO outfall, providing a more efficient combined solution should both schemes be implemented.
- 2.9 The intake for the reservoir would operate under strict conditions imposed by the Environment Agency's future environmental permit for the scheme. This would be sought as part of the scheme's consenting strategy:
- The abstraction into SESRO shall be controlled by a Minimum Residual Flow (MRF) that must be retained in the River Thames at Culham of 1,450MI/d;
  - The maximum pumping capacity at the intake shall not exceed 1,200 MI/d;
  - The maximum 24-hour abstraction shall be < 1,000 MI/d (and < 150,000 MI/yr);
  - Abstraction will increase progressively at a rate of no more than 300 MI/d; and
  - Water would be discharged at a maximum rate of 600 MI/d, with typical release rate between ~165 MI/d and ~320 MI/d depending on the size of the reservoir.
- 2.10 The need for water to be released from the reservoir would be triggered by conditions in the lower River Thames, governed by the Lower Thames Operating Agreement<sup>7</sup>. It is expected that the release would primarily be triggered during periods of low flow.

### 2.4 Key assets required

- 2.11 The key components or assets required to deliver the scheme are as follows:
- Provision of a fully bunded raw water storage reservoir in Oxfordshire, 5km south-west of Abingdon.
  - Pumping station at the toe of the embankment (on the north-east side of the reservoir) including both inflow pumps and outflow energy-recovery turbines.
  - Conveyance tunnel to transfer flows via the pumping station to and from the intake / outfall structure on the River Thames near Culham.

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<sup>7</sup> Further information may be found in Supporting Document G: Planning and Consents Strategy

- Auxiliary drawdown channel (ADC) linking the reservoir siphons to the River Thames, to allow drawdown of the reservoir in emergency scenarios. This could also form a navigable channel and as plans progress for the SESRO scheme, there is an opportunity to engage with the promoter of any rehabilitation of the Wilts & Berks Canal for an ADC to form part of their scheme.
  - Main access road into the site (from A415, Marcham Road) and diversion of the existing East Hanney to Steventon Road.
  - Temporary rail siding to facilitate delivery of certain construction materials by freight train.
  - Public access, parking and recreation facilities, public education facilities, landscaping and creation of aquatic / grassland habitats.
  - Local stream channel diversion to both the east and the west of the reservoir and construction of compensatory floodplain.
- 2.12 To provide a first illustration of how the engineering requirements of the scheme may be integrated with the expected environmental mitigation and with possible recreational uses of the site, an indicative landscape and environment led Master Plan for the largest SESRO option has been developed for Gate 2 (see Figure 2.1). This vision will be subject to change and refinement if SESRO progresses through scheme promotion, through future consultation, environmental assessment and associated design iterations, but provides an initial overview of how the largest SESRO option could be conceptualised. We considered this level of detail appropriate for the SESRO Gate 2 submission, which may exceed that available or presented for other SROs, due to the maturity of the scheme (it has been considered in many previous strategic plans and subject to various previous public consultations) and the level of public interest in the scheme, as demonstrated by the consultation on the WRSE emerging regional plan and the SESRO Gate 1 submission (see Section 9 of the Gate 2 Report). As noted in paragraph 2.4 previously, the 150 Mm<sup>3</sup> option, as the largest option for the proposed site, has formed the basis of the design work completed for Gate 2. Although all options were considered feasible and available, this largest scheme contains the most constraints and issues to resolve and hence was considered a better ‘starting point’ for the Gate 2 design process and for the development of the indicative Gate 2 Master Plan.
- 2.13 This indicative Gate 2 Master Plan has been informed by the design principles and vision for the scheme and driven by the initial desk-based environmental assessments that have been completed (see Section 6.1 of the Gate 2 Report) and by initial community feedback. These are demonstrated in Table 2.1 below.
- 2.14 We aim to develop this indicative Gate 2 Master Plan once the size and / or phasing of the preferred scheme is confirmed by WRMP24 and as we progress more local, community engagement on the specific design and use of SESRO.

Table 2.1: Summary of key aspects of the Indicative Gate 2 Master Plan

| Design Philosophy   | Indicative Gate 2 Master Plan 'response'  |
|---|---|
| Provide value to local communities  | <p>Provide recreational and access opportunities for local communities. Small scale water-based recreation, under controlled conditions (such as via a sailing club or similar), could be provided in the north-east corner, co-located with the main access routes into and out of the site. This corner, furthest from the local villages, would be a much busier part of the site, dedicated to the more intensive recreational uses.</p> <p>The access and recreational concept for the site is intended to be modest, at this early stage, and to maximise environmental benefit and to minimise disturbance and disruption to the closest villages. The wetland focused western part of the site, adjacent to East Hanney would be designed to be a quieter, less disturbed part of the site, to maximise the environmental benefit. Some local access and parking would be provided on this western side for the benefit of East Hanney. Visitor footfall to the south-east corner of the site, around Steventon, would also be discouraged to minimise disturbance. However, the indicative master plan has been currently developed to allow local access from both villages to the circular footpath and cycle path networks, along with limited local parking.</p> |
| Manage visitors to the site to minimise local disruption and maximise environmental benefit | <p>'Zoning' of the site into different areas, to implement the habitat creation and mosaic of biodiversity net gain required and also to help manage the flow of visitors into and around the site and to help protect the more sensitive areas. Access into and out of the site is configured to minimise disruption to local traffic networks, as far as possible, making best use of the adjacent trunk main and A-road network. This enables the main access road to come into the site from the north, directing the majority of visitors and operational traffic to the north-east corner of the site, furthest from the existing villages of East Hanney and Steventon. A modest visitor 'hub' could be provided at this location, adjacent to the main parking areas, with a small café on the embankment crest overlooking the views of the Ridgeway towards the south.</p>  |
| Focus on the aquatic environment  | <p>The management of water on site, either drainage, stream diversion or floodplain compensation is designed to make best use of the existing topography of the site. This enables the lower lying western areas to be dedicated as a conservation and biodiversity led sector, providing extensive wetland habitat creation. A small education centre is envisaged to the north of this sector, providing educational opportunities for the local school communities. We have suggested the possibility of integrating this wetland creation, with conservation led features along the west and south-west sides of the main reservoir, including lagoons and small floating platforms for wildfowl.</p>   |
| Enable access for all   | <p>The network of footpaths and cycle paths across the site is intended to provide enhanced integration with the existing Public Rights of Way network and provide access to all across the site and link up with all surrounding routes and villages. The new paths across the site could include a crest path around the reservoir, various circular routes around the embankment and multiple access points up to the crest. The footpaths around the quieter western sector are designed to integrate into the wetland areas.</p>   |

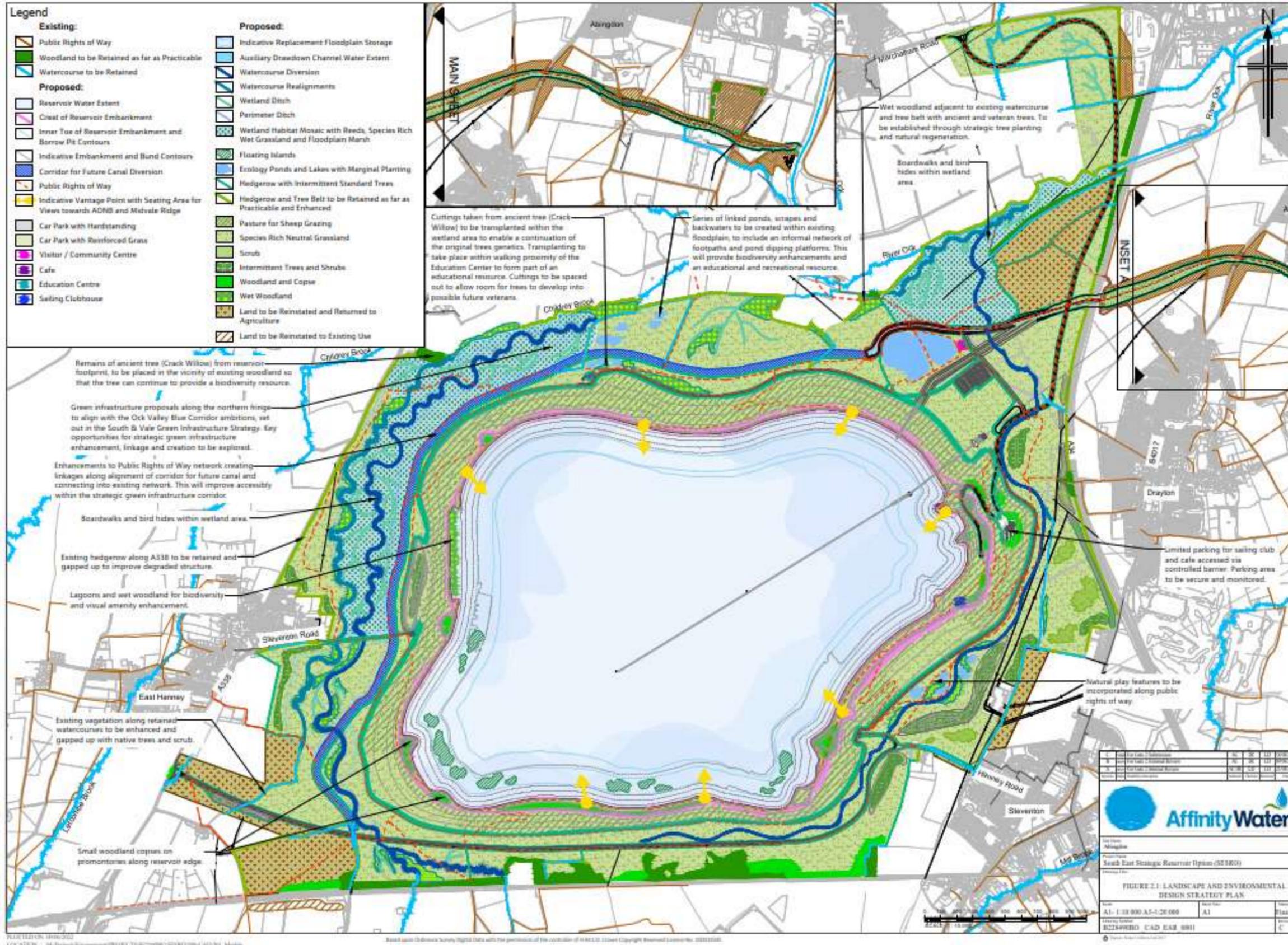
2.15 The design development undertaken for Gate 2 aligns to the design principles set out by the All Company Working Group Gate 2 methodology on design<sup>8</sup>, with further details provided in Supporting Document A1: Concept Design Report. This methodology provides a guiding framework for the design of the SROs to ensure consistency and best-practice.

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<sup>8</sup> All Company Working Group (ACWG) Design Principles, Process and Gate 2 Interim Guidance, December 2021, Fereday Pollard

Figure 2.1: SESRO 150Mm3 option, Indicative Gate 2 Master Plan

note, the details of this plan are subject to change through future community engagement and consultation, further environmental assessment and associated design development; it will be adjusted, as required, once the size of the preferred scheme is confirmed by WRMP24



## 2.5 Interactions with existing assets and other SROs

2.16 There are significant potential physical interactions between SESRO and other SROs and local water supply schemes, which may need to be integrated together in the final scheme design, depending on the final timing between schemes. These include:

- **Severn to Thames Transfer (STT) SRO:** to minimise construction disruption and to provide greater refill resilience if SESRO is linked to the Thames to Southern Transfer (T2ST) SRO. Further information on the Deployable Output benefit of combining the schemes is provided in Section 4.2 of the Gate 2 Report. In the WRSE draft Regional plan and draft WRMPs preferred plans, the STT is required by 2050 for the more extreme future scenarios (situations 1 and 4).
- **Thames to Southern Transfer (T2ST) SRO:** to minimise the impacts of the transfer on London’s Deployable Output and maximise the resilience of the transfer. In the WRSE draft Regional plan and draft WRMPs preferred plans, this is required by 2040 for the more extreme future scenarios (situations 1, 4 and 7).
- **Thames to Affinity Transfer (T2AT) SRO:** The resources from SESRO could provide supplies to the Thames to Affinity Transfer (T2AT), required by 2040 in the WRSE draft Regional plan and draft WRMPs preferred plans, hence they would need to be integrated in terms of utilisation and control. However, there is no physical interaction between the schemes at the reservoir site.
- **Supply to Thames Water’s Swindon and Oxford (SWOX) water resources zone.** In the WRSE draft Regional plan and draft WRMPs preferred plans, this would be utilised for up to 48 MI/d after 2050 for the more extreme future scenarios (situations 1, 4, 5 and 7).
- **Potential integration with Farmoor Reservoir:** to help manage potential future reductions in abstraction during low flow periods and deliver environmental benefits to the Oxford watercourses, which forms part of Thames Water’s medium and high scenario Environmental Destinations<sup>9</sup>.

2.17 These interactions and the implications for SESRO are summarised in Table 2.2 below. The exact integration of these different aspects has not yet been decided and will not be until the exact timing between them is finalised in the Final WRMP. However, it is probable that some of the aspects noted above may need to be integrated into the DCO for either SESRO or the STT, in order to deliver the schemes in the most cost efficient and the least environmentally and socially disruptive way.

Table 2.2: Interactions of SESRO with other SROs and with other local supplies and sources

| Interaction | Implication for SESRO  |
|-------------|--|
| STT         | The route of the STT pipeline passes close to the SESRO site. The two schemes could be joined via a connecting valve chamber west of the A34 crossing, linking the STT |

<sup>9</sup> In the draft WRMP the reductions at Farmoor are within the Medium scenario (15MI/d reduction in Deployable Output by 2050) and High scenario (35MI/d reduction in Deployable Output by 2050).

| Interaction             | Implication for SESRO  |
|-------------------------|--|
|                         | <p>pipeline and the SESRO intake pumping station. This means that either scheme could be delivered first, depending on the outcome of the WRMP process. The lower section of the STT pipeline follows the approximate route of the SESRO ADC and discharges to the River Thames at the same location as SESRO. The concept design currently allows for the lower sections of the STT pipeline to be constructed at the same time as the ADC, located in the towpath of the canal. This would minimise construction disruption, avoid the need for multiple road crossings and reduce the land area required for the two schemes. A single outfall structure could accommodate the discharge from both schemes. If STT precedes SESRO, then this configuration will need to be revised, but the current approach reflects the timing of the schemes within the draft WRMP.</p>  |
| T2ST                    | <p>The proposed site for the water treatment works for the T2ST is currently located on the SESRO site, adjacent to the intake pumping station. The site for this works would either need to be safeguarded within the SESRO site design, to enable future construction when required under separate consent by a third party, or else included within the SESRO scheme, depending on scheme timing. The initial sections of treated water main to Southern Water would pass to the east of the SESRO embankment, before crossing the Great West Railway. It is expected that the initial section of this treated water main would need to be constructed as part of the SESRO scheme, to avoid destroying new habitat that would be created as part of the SESRO scheme. The SESRO indicative Gate 2 Master Plan has been developed to ensure such a pipeline route is available through the site, into which the T2ST SRO could then connect, as required.</p> |
| SWOX Supply and Farmoor | <p>The proposed site for the water treatment works for the local SWOX supply is currently located on the SESRO site, adjacent to the intake pumping station. The site for this works would either need to be safeguarded within the SESRO site design, to enable future construction when required under separate consent by a third party, or else included within the SESRO scheme, depending on scheme timing. The initial sections of treated / raw water main(s) to SWOX and Farmoor would pass to the north, crossing the River Ock floodplain. The SESRO indicative Gate 2 Master Plan has been developed to ensure a route for these main(s) is available. The optimised option for meeting the SWOX supply and the abstraction reduction at Farmoor Reservoir has yet to be developed. This will be a key aspect of the scheme development in the next phase.</p>   |

## 2.6 Scalability

- 2.18 The SESRO options enable a degree of scalability and future phasing, but this is within the constraints of the main option chosen. For each of the single phase options, once built, these would not enable easy future expansion and no such facility is currently built into the concept design. The two phased options are available, which would enable the assets, and hence the available deployable output, to be phased if that is

the best value solution. The phased options do tend to be more expensive (see Section 8.1 of the Gate 2 Report) as they involve more earthworks, overall, for the volume of storage created, and would need to be developed in multiple construction phases thereby extending the time of the construction phase impacts.

- 2.19 The integration with other schemes would enable scalability in the future. For example, the STT connection could be enabled for future use but not commissioned immediately, which would enable future integration with transfers from the Severn to maximise the potentially available additional DO (see Section 4.2.1 of the Gate 2 Report). Equally, the SWOX supply or the Thames to Southern Transfer WTWs could be developed in a modular fashion, depending on future need for the water. This would enable the supply of water to those subsidiary uses to be scaled if required, to help manage future uncertainty. The design of these aspects of the scheme will be developed during the next design phase, depending on the outcome of the WRMP24 process.

### 3. Methodology and Identification of the Assessment Framework

#### 3.1 Methodology

- 3.1 This SEA has principally built on the results of the Gate One SEA. It has also been developed following the assessments undertaken as part of the SEAs being carried out for both the WRSE Regional Plan and the Thames Water WRMP19 and will input into the next iteration of the Regional Plans and WRMP24. The information contained within those SEA Reports has been considered alongside a review of specific baseline data relevant to the SESRO area and proposed option. An overview of the key issues identified that are specific to the SESRO local and regional areas is provided in Table 2-1 below.
- 3.2 The core SEA objectives are in keeping with ACWG Objective Identification Report<sup>10</sup> and the RAPID Strategic Regional Water Resource Solutions Guidance for Gate Two<sup>1</sup>. The core SEA objectives support a variety of existing European and national environmental legislation ranging from the European Union (EU) Water Framework Directive (WFD) to The Climate Change Act (2008). A number of the SEA objectives also support the Environment Act 2021<sup>11</sup>.
- 3.3 As noted in the ACWG Objective Identification Report study, it is important that this core set of objectives forms the basis for this SEA update to ensure consistency and alignment throughout the various regional and other plans. There is, however, a need for flexibility and as such this core set of objectives can be added to should local and individual needs warrant. In accordance with the RAPID gated process the SEA can undergo further assessment at subsequent project stages if necessary to aid the detailed design and planning. Validation of the SEA objectives used in this SEA is set out in Table 2-1.
- 3.4 Each of the six reservoir options (set out in Section 1, with further detail provided in Section 2.2) were assessed against the objectives listed in Table 2-1 at Gate 1 and have been reviewed in Gate 2, although with the focus in accordance with the associated studies on the 150Mm<sup>3</sup> option. To inform the relevant issues for the regional and local area, baseline environmental data has been captured and is presented in full as Appendix A with any changes realised from Gate 1 also incorporated. A study area of a minimum of 2km around the combined indicative reservoir option locations (apart for the soils assessment which was 250m) was created at Gate 1 and maintained at Gate 2 to ensure a consistent approach for the assessment and indication of local issues.

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<sup>10</sup> [https://www.affinitywater.co.uk/docs/corporate/plans/Draft\\_Determination/CE-Appendix%20D-joint-Statement.pdf](https://www.affinitywater.co.uk/docs/corporate/plans/Draft_Determination/CE-Appendix%20D-joint-Statement.pdf)

<sup>11</sup> <https://bills.parliament.uk/bills/2593>

Table 3-1 – Validation of Core SEA Objectives

| SEA Topic    | Core SEA Objective  | Relevant issues for the SESRO local and regional area (see Appendix A for full baseline and sources, where appropriate)  |
|--------------|---|--|
| Biodiversity | To protect designated sites and their qualifying features   | There are a number of internationally designated nature conservation sites within proximity (between 2.7 and 8.9km) to the proposed reservoir site, including Cothill Fen Special Area of Conservation (SAC), Little Wittenham SAC and Hackpen Hill SAC. Barrow Farm Fen, Culham Brake, Frilford Heath, Ponds and Fends, Cothill Fen, and Dry Sandford Pit are all Sites of Special Scientific Interest (SSSI) and are situated within the study area. Cothill and Chimney Meadows are also a designated National Nature Reserves situated within the study area and 8km northwest of the study area respectively. While there are no Local Nature Reserves within the study area, Abbey Fishponds Local Nature Reserve is located just over 1km northeast. There are also two County Wildlife Sites within or in proximity to the reservoir (Hutchin’s Copse and The Cutting). It is therefore warranted that an objective concerning the protection of designated sites and their qualifying features be included as part of the Assessment Framework. |
|              | To avoid a net reduction, and where reasonably practicable enhance, in non-monetised natural capital assets | The Vale of White Horse district contains a rich variety of semi-natural habitats, including woodlands, hedgerows, streams and rivers, meadows, pastures and wetlands; together these habitats help to secure the survival of many species of wildlife. The diversity of wildlife helps to ensure that the countryside remains healthy and productive and that its complex natural cycles are kept in balance. This natural balance enables multiple ecosystem services to exist, including provisioning, regulating, cultural and supporting. Consideration of non-monetised natural capital assets through this objective is therefore relevant to the local setting of the proposed reservoir.  |
|              | To protect and enhance biodiversity, priority species and vulnerable habitats such as chalk rivers          | Multiple animal species have been recorded within the study area, including bats, amphibians, reptiles, birds, crayfish, invertebrates and mammals. The site is also intersected by priority habitat which includes coastal and floodplain grazing marsh, broadleaved woodland and semi-improved grassland. In addition, among the diverse habitats found in the district ancient woodland, the Chalk Downs, Heathland, fenland and wetlands are of special nature conservation interest. It is evident that there is a dense and varied biodiversity in the local and surrounding area and therefore important that an objective concerning the protection of priority species and their habitats is included as part of the Assessment Framework.  |

| SEA Topic                   | Core SEA Objective   | Relevant issues for the SESRO local and regional area (see Appendix A for full baseline and sources, where appropriate)  |
|-----------------------------|--|--|
|                             | To avoid and, where required, manage invasive and non-native species (INNS)                                      | Invasive species are present in the surrounding local area, including Himalayan balsam which is widespread throughout the Chimney Meadows Nature Reserve <sup>12</sup> . As the spread of this invasive species must be avoided, especially during construction activities and robust biosecurity measures relating to INNS would need to be adopted. The impact of SESRO on invasive and non-native species would therefore be considered through this objective.   |
|                             | To meet Water Framework Directive (WFD) objectives relating to biodiversity                                      | SESRO would likely have impact on main waterbodies including Cow Common Brook, Childrey Brook, Sandford Brook, Ginge Brook, Mere Dyke, River Ock as well as unnamed tributaries through the presence of the reservoir as well the River Thames through the abstraction and discharge of water. It is acknowledged that these impacts have the potential to put pressure on WFD status of waterbodies and consideration through this objective is therefore warranted.  |
| Population and Human Health | To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing | With respect to healthy lifestyles Vale of White Horse compares favourably to both Oxfordshire and England averages in terms of binge drinking and smoking. In terms of healthy eating (consumption of 5+ fruit and vegetables a day) the Vale of White Horse District maintains the England average of 30.2% of the total population, better than the Oxfordshire percentage of 28.7%. In addition, obesity levels in the district are lower than in Oxfordshire and England for both children and adults, which is also linked to the increased amount of physical activity in the Vale of White Horse. Economic wellbeing is also high in the Vale of White Horse with a higher-than-average number of residents owning their residence. There are a number of community facilities including allotments and sports grounds within the study area and it is also important that any impact on these is considered as part of this SEA. The reservoir development provides an opportunity to enhance and further develop community facilities. |

<sup>12</sup> [dynamic\\_serve.jsp\(whitehorsedc.gov.uk\)](dynamic_serve.jsp(whitehorsedc.gov.uk))

| SEA Topic | Core SEA Objective   | Relevant issues for the SESRO local and regional area (see Appendix A for full baseline and sources, where appropriate)  |
|-----------|--|--|
|           | To maintain and enhance tourism and recreation                               | <p>The River Thames flows within a few hundred meters of Abingdon town centre and the town is on two national trails; Thames Path and Vale Way, and one Long Distance Path; Oxfordshire Way. Further, Abingdon Museum, Abbey Gardens and Abbey Meadow represent key tourism opportunities for the district. A network of public rights of way provide recreational access across the downs, including parts of the Ridgeway National trail and a significant number of bridleways which may be impacted by SESRO. There are wide panoramic views, including north from the Ridgeway, across the Vale landscapes to the Corallian Limestone ridge further north, and expansive views across the downs to the south of the wider region beyond the District. Farmoor is a large reservoir, filled from the adjacent River Thames, which provides opportunities for waterborne recreation, including fly and coarse fishing, bird watching, sailing and windsurfing. Equally it is understood that additional recreational features have the potential to be included as part of SESRO and it is important that any contribution to tourism and recreation is then captured in this assessment.</p> |
|           | To secure resilient water supplies for the health and wellbeing of customers | <p>Thames Water projects water demand forecasts out to 2100 for London WRZ and Swindon and Oxfordshire WRZ based on uncertain population and household forecasts. The long-term issues relating to population growth and associated requirement for housing and water (and wastewater) infrastructure provision represent key issues. This issue of increased demand is also felt more locally as Oxfordshire is growing and increasing pressure on housing is felt. The proposed site lies within the Lower Thames (Cookham Teddington &amp; Wey) Drinking Water Safeguard Protection Zone (surface water), so it is also important that any potential effects on this resource through, for example construction works, is considered.</p> <p>The South East Strategic Reservoir Option is proposed to improve the resilience of the Thames Water and Affinity Water regions through the creation of a regional storage and transfer hub, providing water supplies during future drought conditions and it is important that the degree to which this is achieved is also captured in this assessment.</p>   |

| SEA Topic | Core SEA Objective   | Relevant issues for the SESRO local and regional area (see Appendix A for full baseline and sources, where appropriate)   |
|-----------|--|---|
|           | To increase access and connect customers to the natural environment, provide education or information resources for the public | The Vale of White Horse district contains a rich variety of semi-natural habitats, including woodlands, hedgerows, streams and rivers, meadows, pastures and wetlands, as well as nationally and locally designated sites. There are many opportunities for recreational, educational and tourism activities in the surrounding natural landscape and this is vitally important for the wellbeing of the local community. SESRO also has the potential to provide education and recreation facilities. It is therefore important that an objective capturing potential effects as a result is included in the scope of this assessment.   |
| Water     | To reduce or manage flood risk, taking climate change into account   | The majority of the proposed site is situated within Flood Zone 3 which is classified as land having a 1 in a 100 or greater annual probability of river flooding.<br><br>There is provision within the design for flood compensation work. It is however likely that, in general terms, flood risk would continue to increase in the UK due to changing weather patterns attributed to climate change and so it is of significant importance that an objective focused on flood risk is included as part of the Assessment Framework.  |
|           | To enhance or maintain groundwater quality and resources   | A primary objective of the reservoir would be to maintain flows in the River Thames during dry periods by discharging water that had been abstracted during high flows. This has the potential to effect groundwater resources. Of note the closest source protection zone (zone 1, 2 and 3) is located 3km southwest of the study area but the geology allows for hydraulic continuity. As the proposed site is in close proximity to sensitive surface water environments as well as intersecting with multiple river crossings which also have influences on the groundwater quality and resource. It is important that an objective focused on water quality and resources is included as part of the Assessment Framework. |
|           | To enhance or maintain surface water quality, flows and quantity   | Watercourses included Cow Common Brook, Childrey Brook, Landmead ditch, Mere Dyke and River Ock are all within the reservoir footprint and two diversions would take flow from some of these watercourses along the west and the east of the reservoir.<br><br>The River Thames would also be subject to changes to abstraction and discharges, which can provide both benefits and disbenefits. It is important that potential effects on such watercourses are reflected within this SEA.   |

| SEA Topic | Core SEA Objective  | Relevant issues for the SESRO local and regional area (see Appendix A for full baseline and sources, where appropriate)  |
|-----------|---|--|
|           | To meet WFD objectives and support the achievement of environmental objectives set out in River Basin Management Plans                    | Within the study area, there are multiple river crossings proposed including that of the River Thames, the River Ock, Ginge Brook, Mill Brook and Sandford Brook. As a primary function, the reservoir would abstract water from the River Thames during periods of high flow for release during periods of low flow/drought. Through construction and operation, SESRO therefore has the potential to impact on these and connecting watercourses.  |
|           | To increase water efficiency and increase resilience of Public Water Supply and natural systems to droughts                               | As highlighted in Thames Water's and Affinity Water's published WRMP19 documents and would be included in the WRMP24 documents, there is significant challenge in ensuring that both the water environment and water services infrastructure has the capacity to sustain the required levels of future growth and development proposed for their supply areas. It is therefore important that an objective focused on increasing reliance of water supply is included as part of the Assessment Framework.   |
| Soil      | To protect and enhance the functionality and quality of soils, including the protection of high-grade agricultural land, and geodiversity | Both historic and active landfill sites are recorded as being within the study area. Mineral Safeguarding Areas are designated within the study area towards the north under Policy M8 and M3 (Mineral Strategic Resource Area). The majority of agricultural land within the study area is classified as Grade 3 and Grade 4, with smaller pockets of Grade 2, Non-Agricultural and Urban also intersecting. As soil quality and structure is affected by changes in land use, groundwater levels and farming practices and can influence run-off rates and therefore flooding and water quality, it is important that an objective focused on protecting soil quality and agricultural land is included as part of the Assessment Framework.                               |
| Air       | To reduce and minimise air and noise emissions during construction and operation  | There are currently three Air Quality Management Areas (AQMA) designated within the Vale of White Horse district: Abingdon AQMA, Botley AQMA and Marcham AQMA. Seven Noise Action Planning Important Areas have been identified within the study area. Associated road and rail noise contours which indicate a number of primary noise sources within the study area including the Great Western Rail Line, A34, A338, Frilford/Marcham Road and Abingdon Road. It should be noted also that there are a number of sites designated for nature conservation within the wider study area that have the potential to be impacted. It is therefore appropriate that an objective that focuses on air and noise considerations is included as part of the Assessment Framework. |

| SEA Topic         | Core SEA Objective  | Relevant issues for the SESRO local and regional area (see Appendix A for full baseline and sources, where appropriate)  |
|-------------------|---|--|
| Climate Factors   | To introduce climate mitigation where required and improve the climate resilience of assets and natural systems                 | In June 2019, the UK became the first major economy in the world to pass laws to end its contribution to global warming by 2050. The target would require the UK to bring all greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels. The regional estimates of carbon dioxide emissions illustrate that the transport sector and domestic sector contribute 40.8% and 30.6% respectively of carbon dioxide emissions. With increased summer temperatures and reduced rainfall predicted for the region, it is clear that climate action would be required at the local level to minimise the impacts of climate change in the future and ensure that national targets are achieved. It is therefore of significant importance that an objective concerning climate mitigation and resilience is included as part of the Assessment Framework. |
|                   | To reduce embodied and operational carbon emissions   | Carbon would be generated from materials used to construct the reservoir (embodied carbon), construction activities and from operation of the reservoir and consideration should therefore be given to carbon emissions in the assessment.   |
| Cultural Heritage | To conserve, protect and enhance historic assets/cultural heritage and their setting, including archaeological important sites. | The Vale of White Horse benefits from substantial heritage assets that make a positive contribution towards the district's local character and distinctiveness. There are over 500 Listed Buildings within the study area, nine Scheduled Monuments and a number of Settlement Sites. Two Registered Parks and Gardens are also within the study area. There are nine Conservation Areas within or intersecting the study area. These conservation areas are also described as forming an important and visible part of the Vale's cultural heritage and enhance the attractiveness of individual settlements for residents and visitors. Given the rich heritage and archaeological potential within the area, it is important that an objective concerning the protection and enhancement of the historic environment is included as part of the Assessment Framework.   |

|           |   |  |
|-----------|---|--|
| Landscape | To conserve, protect and enhance landscape and townscape character and visual amenity | <p>The landscape character of the Vale of White Horse is distinctive comprising open undulating clay lowland farmland that contrasts with enclosed pastures along watercourses. The wooded Corallian limestone ridge lies to the north whilst to the south the Hendred Plain forms a low ledge of lower chalk that separates the clay vale from the high downs forming the North Wessex Downs Area of Outstanding Natural Beauty (AONB). Long distance views overlook the vale from vantage points. National Character Areas (NCA) include: 108 Upper Thames Vale NCA; 109 Midvale Ridge NCA; and 116 Berkshire and Marlborough Downs NCA. The Vale of White Horse Landscape Character Assessment 2016 identifies key characteristics, key positive landscape attributes, forces for change/sensitivities/pressures, landscape strategy guidance, and landscape guidelines on land management and built development.</p> <p>Relevant issues highlighted for consideration<sup>13</sup>:</p> <ul style="list-style-type: none"> <li>• Siting of ‘any new large mass of development or bulky structures where they would affect the northern setting of the Downs, and subject any development to rigorous landscape and visual impact assessment, site carefully, and design to minimise impact, particularly regarding issues of intrusive colour and glare, and integrate with the area’s rural context’.</li> <li>• ‘Development within the Vale effecting views from the Downs and it’s wider setting’.</li> <li>• ‘North Wessex Downs AONB, the objectives and policies set out in the current AONB management plan’</li> <li>• Open panoramic views from viewpoints on the scarp and ridge, ‘where unimpeded by woodland, over the footslopes and Vale to the north, towards the Corallian Limestone Ridge on the horizon’.</li> </ul> <p>Climate change and land use change (e.g. due to agricultural reform associated with the UK’s exit from the EU and Common Agricultural Policy) may also, in the longer term, lead to changes to landscape character.</p> <p>As part of Gate 1, potentially significant issues were identified in consultation with Environment Agency due to the proposed location of SESRO in relation to the North Wessex Downs AONB. This was also flagged in a representation by Natural England on Thames Water’s WRMP19 which stated:</p> <p><i>‘If the Abingdon Reservoir option<sup>14</sup> is pursued, Thames Water will need to undertake a full Landscape and Visual Impact Assessment (LVIA) at the project stage.’</i></p> <p><i>‘We advise that Thames Water works with relevant parties (including Natural England and the AONB Board) in the option</i></p> |
|-----------|---|--|

| SEA Topic       | Core SEA Objective   | Relevant issues for the SESRO local and regional area (see Appendix A for full baseline and sources, where appropriate)   |
|-----------------|--|---|
|                 |  | <p><i>development in order to make sure that, despite the scale of impact, the option is designed to be as sensitive to its setting as possible and that the most appropriate landscape mitigation is selected. There are opportunities for landscape improvements, and careful design would be essential to ensure local landscape character is not just protected, but also enhanced.'</i></p> <p>It is therefore of significant importance that an objective concerning the conservation, protection and enhancement of landscape and townscape character and visual amenity is included as part of the Assessment Framework.</p>  |
| Material Assets | To minimise resource use and waste production              | <p>Transport remains the highest energy consumer across the country at 40%, while domestic demand is consistent around 30%. Industry and Commercial represents a slightly lower proportion of energy consumption in the Vale of White Horse, as it does in South Oxfordshire. Oxfordshire's Resource and Waste Strategy (2018-2023)<sup>15</sup> notes that the County is one of the best at recycling in England, recycling around 58% of household waste, exceeding the current English Government target of 50% (by 2020). Vale of White Horse District Councils percentage reuse, recycling or composting rate is among the highest in all Oxfordshire at 60.4%. As resource use and waste generation is of key importance at the local level, it would be important to monitor the activities of the water industry in terms of contributing to construction, demolition and excavation waste, through construction of new infrastructure.</p> |
|                 | To avoid negative effects on built assets / infrastructure | <p>Baseline investigation finds that private property, agricultural and other land uses including solar photovoltaic (PV) farms as well as allotments and sports pitches, lie within or intersect the study area. It is evident that there are a wide range of built assets and infrastructure that have the potential to be directly and indirectly impacted by SESRO and consideration of these impacts should be reflected within this objective.</p>  |

### 3.2 Application of assessment methodology

3.5 The assessment methodology that has been adopted utilises the validated SEA objectives and therefore further builds upon that outlined in the WRSE Regional Plan SEA. This methodology involves the systematic application of assessment scales for

<sup>13</sup> [19. Landscape Character Assessment \(whitehorsedc.gov.uk\)](https://www.whitehorsedc.gov.uk)

<sup>14</sup> It is noted that historic pertaining to SESRO have previously been referred to as the Upper Thames Major Reservoir Development (UTRMD), Upper Thames Reservoir or Abingdon Reservoir.

<sup>15</sup> <https://www.oxfordshire.gov.uk/sites/default/files/file/waste-and-recycling/OxfordshiresResourcesandWasteStrategy.pdf>

each objective developed around the following generic assessment scale and significance scores which align with that of the WRSE and WRPM24 SEA methodologies (see Tables 2-2 and 2-3). The assessment also considers information and findings from other technical assessments, as appropriate. At Gate 2, the same criteria and methodology is used to review and update the original Gate 1 assessment, ensuring accordance with the set objectives and alignment with the RAPID guidance for Gate 2.

*Table 3-2 – SEA Assessment scale and significance scores*

| Significance score | Description       |
|--------------------|-------------------|
| +++                | Major Positive    |
| ++                 | Moderate Positive |
| +                  | Minor Positive    |
| 0                  | Neutral           |
| -                  | Minor Negative    |
| --                 | Moderate Negative |
| ---                | Major Negative    |
| ?                  | Uncertain         |

Table 3-3 – SEA Objective Assessment Rationale (adapted from WRSE Regional Plan SEA methodology)

| SEA Theme and updated Objectives   | Datasets/Key Themes   | Effect | Description  |
|--|---|--------|--|
| <b>Biodiversity, Flora, Fauna:</b><br><b>To protect designated sites and their qualifying features</b><br><br><b>To avoid a net reduction, and where reasonably practicable enhance, in non-monetised natural capital assets</b><br><br><b>To protect and enhance biodiversity, priority species and vulnerable habitats such as chalk rivers.</b> | Special Protection Area (SPA)<br>Special Area of Conservation (SAC)<br>Ramsar site<br>Sites of Special Scientific Interest (SSSIs)              | +++    | Major Positive<br><br>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.<br>The option would result in a major reduction or management of INNS.  |
|  | National Nature Reserves<br>Local Nature Reserves<br>Priority habitats and species<br>Non-designated sites                                      | ++     | Moderate Positive<br><br>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.<br>The option would result in a moderate reduction or management of INNS. |
|  | Terrestrial and aquatic habitats, protected species, other species and protected sites<br>Green networks and corridors (e.g. foraging areas and | +      | Minor Positive<br><br>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.<br>The option would result in a minor reduction or management of INNS.                   |

| SEA Theme and updated Objectives   | Datasets/Key Themes   | Effect | Description   |
|--|---|--------|---|
| <b>To avoid and, where required, manage invasive and non-native species (INNS)</b><br><br><b>To meet Water Framework Directive (WFD) objectives relating to biodiversity</b> | commuting routes, migration routes, hibernation areas etc. at all scales) | 0      | Neutral<br><br>The option would not result in any effects on designated or non-designated sites including habitats and/or species). It would not have an effect on INNS.  |
|  |   | -      | Minor Negative<br><br>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.<br>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.<br>The option would result in a minor increase or spread of INNS.                  |
|  |   | --     | Moderate Negative<br><br>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.<br>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.<br>The options would result in a moderate increase or spread of INNS. |
|  |   | ---    | Major Negative<br><br>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.<br>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.<br>The option would result in a major increase or spread of INNS.                  |

| SEA Theme and updated Objectives   | Datasets/Key Themes  | Effect | Description   |
|--|--|--------|---|
|  |  | ?      | Uncertain<br>From the level of information available the effect that the option would have on this objective is uncertain   |
| <b>Soil:</b><br><br><b>To protect and enhance the functionality and quality of soils, including the protection of high-grade agricultural land, and geodiversity</b> | Agricultural Land Classification<br>Landfill sites – authorised and historic | +++    | Major Positive<br>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<br>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<br>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<br>The option would not result in any effects on soils or land use.   |
|  |  | -      | Minor Negative<br>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<br>The option would 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<br>The option would 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<br>From the level of information available the effect that the option would have on this objective is uncertain.  |

| SEA Theme and updated Objectives  | Datasets/Key Themes                                | Effect | Description   |
|---|--|--------|---|
| <b>Water:</b><br><br><b>To reduce or manage flood risk, taking climate change into account.</b>       | Environment Agency Flood Defences                  | +++    | Major Positive<br><br>The option results in addressing failure of WFD Good Ecological Status / Good Ecological Potential.<br>The option would result in a major improvement to flood risk.<br>The option would result in a major improvements in water efficiency, reduces demand and improves resilience.  |
|   | Environment Agency Main Rivers Flood Zones 2 and 3 |        |   |
| <b>To enhance or maintain groundwater quality and resources</b>                                       | Surface Water Features                             | ++     | Moderate Positive<br><br>The option achieves savings through demand management and does not require abstraction to achieve yield.<br>The option contributes to addressing failure of WFD Good Ecological Status / Good Ecological Potential.<br>The option would result in a moderate improvement to flood risk.<br>The option would result in a moderate improvements in water efficiency, reduces demand and improves resilience. |
|   | WFD River Waterbody Catchments                     |        |   |
| <b>To enhance or maintain surface water quality, flows and quantity</b>                               | WFD River  | +      | Minor Positive<br><br>The option achieves savings through demand management and does not require abstraction to achieve yield.<br>The option would result in a minor improvement to flood risk.<br>The option would result in a minor improvements in water efficiency, reduces demand and improves resilience.   |
|   | Waterbodies Cycle 2                                |        |   |
| <b>To meet WFD objective and support the achievement of environmental objectives set out in RBMPs</b> | Source Protection Zones                            | 0      | Neutral<br><br>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.  |
|   | WFD Groundwater bodies                             |        |   |
|   | Drinking Water Safeguard Zone (Groundwater)        | -      | Minor Negative<br><br>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.   |

| SEA Theme and updated Objectives  | Datasets/Key Themes | Effect | Description  |
|---|---------------------|--------|--|
| <b>To increase water efficiency and increase resilience of Public Water Supply and natural systems to droughts.</b> |                     |        | <p>The option would result in minor decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 2.</p> <p>The option would result in minor decreases in water efficiency, increases demand and reduces resilience.</p>  |
|   |                     | --     | <p>Moderate Negative</p> <p>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.</p> <p>The option results in the likely deterioration of WFD classification.</p> <p>The option would result in moderate decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 3.</p> <p>The option would result in moderate decreases in water efficiency, increases demand and reduces resilience.</p>                         |
|   |                     | ---    | <p>Major Negative</p> <p>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.</p> <p>The option results in the deterioration of WFD classification.</p> <p>The option would result in major decreases in groundwater quality or levels.</p> <p>The option is located in Flood Zone 2 or 3 and further contributes to flood risk.</p> <p>The option would result in major decreases in water efficiency, increases demand and reduces resilience.</p> |
|   |                     | ?      | <p>Uncertain</p> <p>From the level of information available the effect that the option would have on this objective is uncertain.</p>  |

| SEA Theme and updated Objectives   | Datasets/Key Themes   | Effect | Description  |
|--|---|--------|--|
| <b>Air:</b><br><br><b>To reduce and minimise air and noise emissions</b> | Air Quality Management Zones<br>Air quality monitoring sites<br>Noise Action Planning Important Areas | +++    | Major Positive<br>The option would result in a major enhancement of the air quality within one or more AQMAs.<br>The option would result in a major enhancement of the noise environment.  |
|  |   | ++     | Moderate Positive<br>The option would result in a moderate enhancement of the air quality within one or more AQMAs.<br>The option would result in a moderate enhancement of the noise environment.   |
|  |   | +      | Minor Positive<br>The option would result in an enhancement of the air quality.<br>The option would result in an enhancement of the noise environment.   |
|  |   | 0      | Neutral<br>The option would not result in any effects on Air Quality, AQMAs or noise.  |
|  |   | -      | Minor Negative<br>The option would result in a decrease of the air quality.<br>The option would increase or contribute to noise levels.  |
|  |   | --     | Moderate Negative<br>The option would result in a decrease of the air quality within one or more AQMAs.<br>The option would result in a moderate increase or contribution to noise levels and/or is in proximity to Noise Action Planning Important Areas. |
|  |   | ---    | Major Negative<br>The option would result in a major decrease in the air quality within one or more AQMAs.<br>The option would result in a major increase or contribution to noise levels and/or intersects Noise Action Planning Important Areas          |
|  |   | ?      | Uncertain<br>From the level of information available the effect that the option would have on this objective is uncertain.   |

| SEA Theme and updated Objectives  | Datasets/Key Themes   | Effect | Description  |
|---|---|--------|--|
| <b>Climate Factors:</b><br><br><b>To introduce climate mitigation where required and improve the climate resilience of assets and natural systems</b><br><br><b>To reduce embodied and operational carbon emissions</b> | Option Carbon data<br>UKCP18 climate data<br>Sea level rise projections | +++    | Major Positive<br><br>The option would generate significant additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale)<br>The option would result in a major increase in carbon sequestration.<br>The option would increase resilience/decrease vulnerability to climate change effects.    |
|   |   | ++     | Moderate Positive<br><br>The option would increase resilience/decrease vulnerability to climate change effects.<br>The option would result in a moderate increase in carbon sequestration.<br>The option would generate moderate additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale) |
|   |   | +      | Minor Positive<br><br>The option would increase resilience/decrease vulnerability to climate change effects.<br>The option would result in a minor increase in carbon sequestration.<br>The option would generate minor additional zero carbon energy that can be fed back into the grid/reduce carbon emissions (see carbon scale)          |
|   |   | 0      | Neutral<br><br>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<br><br>The option would have a minor impact on resilience/decrease vulnerability to climate change effects.<br>The option would generate minor construction and/or operational carbon emissions (see carbon scale).   |
|   |   | --     | Moderate Negative<br><br>The option would have a moderate impact on resilience/significantly decrease vulnerability to climate change effects.<br>The option would generate moderate construction and/or operational carbon emissions (see carbon scale).<br>The option would result in a moderate release of previously sequestered carbon. |

| SEA Theme and updated Objectives  | Datasets/Key Themes   | Effect | Description  |
|---|---|--------|--|
|   |   | ---    | Major Negative<br>The option would have a major impact on resilience/significantly decrease vulnerability to climate change effects.<br>The option would generate significant construction and/or operational carbon emissions (see carbon scale).<br>The option would result in a major release of previously sequestered carbon. |
|   |   | ?      | Uncertain<br>From the level of information available the effect that the option would have on this objective is uncertain.   |
| <b>Landscape:<br/>To conserve, protect and enhance landscape and townscape character and visual amenity</b> | Areas of Outstanding Natural Beauty<br>National Character Areas<br>Green Belt land<br>National Park | +++    | Major Positive<br>The option would have a major positive contribution to designated landscape (AONB or National Park) management plan objectives<br>The option results in new, above ground infrastructure that significantly enhances the local landscape, townscape or seascape.   |
|   |   | ++     | Moderate Positive<br>The option would have a moderate positive contribution to designated landscape management plan objectives<br>The option results in new, above ground infrastructure that has a moderate positive effect on the local landscape, townscape or seascape.  |
|   |   | +      | Minor Positive<br>The option results in new, above ground infrastructure that has a minor positive effect on the local landscape, townscape or seascape.   |
|   |   | 0      | Neutral<br>The option would not result in any effects on the local landscape, townscape or seascape.   |
|   |   | -      | Minor Negative<br>The option results in new, above ground infrastructure that has a minor negative effect on the local landscape, townscape or seascape.   |
|   |   | --     | Moderate Negative<br>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.   |

| SEA Theme and updated Objectives   | Datasets/Key Themes   | Effect | Description   |
|--|---|--------|---|
|  |   |        | The option results in new, above ground infrastructure that has a moderate negative effect on the local landscape, townscape or seascape.   |
|  |   | ---    | Major Negative<br>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.<br>The option results in new, above ground infrastructure that has a major negative effect on the local landscape, townscape or seascape.  |
|  |   | ?      | Uncertain<br>From the level of information available the effect that the option would have on this objective is uncertain.  |
| <b>Historic Environment</b><br><br><b>To conserve/protect and enhance historic assets/cultural heritage and their setting, including archaeological important sites.</b> | Listed buildings:<br>- Grade I listed structures<br>- Grade II* listed structures<br>- Grade II listed structures | +++    | Major Positive<br>The option would result in enhancements to designated heritage assets and/or their setting, fully realising the significance and value of the asset, such as:<br>- Securing repairs or improvements to heritage assets, especially those identified in the Historic England Buildings/Monuments at Risk Register;<br>- Improving interpretation and public access to important heritage assets. |
|  | Registered Parks and Gardens:<br>- Grade I<br>Registered Parks and Gardens  | ++     | Moderate Positive<br>The option would result in enhancements to designated heritage assets and/or their setting. Improving interpretation and public access to important heritage assets.   |
|  | - Grade II* Registered Parks and Gardens  | +      | Minor Positive<br>The option would result in enhancements to non-designated heritage assets and/or their setting.   |
|  |   | 0      | Neutral<br>The option would have no effect on cultural heritage assets or archaeology.  |
|  |   | -      | Minor Negative<br>The option would result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.<br>There would be limited damage to known, undesignated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.  |
|  |   |        |   |

| SEA Theme and updated Objectives | Datasets/Key Themes  | Effect | Description   |
|----------------------------------|--|--------|---|
|                                  | - Grade II Registered Parks and Gardens  | --     | Moderate Negative<br>The option would result in the loss of significance of undesignated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.<br>The option would diminish of significance of designated heritage assets and/or their setting, notwithstanding remedial recording of any elements affected.   |
|                                  | Protected Wrecks<br>Registered Battlefields<br>Scheduled Monuments<br>Conservation Areas<br>World Heritage Sites | ---    | Major Negative<br>The option would diminish the significance of designated heritage assets and/or their setting such as: <ul style="list-style-type: none"> <li>• Demolition or further deterioration in the condition of designated heritage assets especially those identified in the Historic England Buildings/Monuments at Risk Register.</li> <li>• Loss of public access to important heritage assets and lack of appropriate interpretation.</li> <li>• There would be major damage to known, designated archaeology important sites with a consequent loss of significance only partly mitigated by archaeological investigation.</li> </ul> |
|                                  |  | ?      | Uncertain<br>From the level of information available the effect that the option would have on this objective is uncertain.  |
|                                  | Indices of Multiple Deprivation 2015<br>Functional site:<br>- Schools<br>- Medical facilities                    | +++    | Major Positive<br>The option leads to major positive effect on the health of local communities and would ensure that surface water and bathing water quality is maintained within statutory limits.<br>The option creates new, and significantly enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.   |
|                                  | OS Greenspace dataset:<br>- Allotments   | ++     | Moderate Positive<br>The option leads to positive effect on the health of local communities and would ensure that surface water and bathing water quality is maintained within statutory limits.<br>The option enhances existing, recreational facilities, publicly accessible greenspace and/or tourism within the operational area.   |

| SEA Theme and updated Objectives | Datasets/Key Themes  | Effect | Description  |
|----------------------------------|--|--------|--|
|                                  | - Bowling green<br>- Cemetery  | +      | Minor Positive<br>The option has a temporary positive effect on the health of local communities and would ensure that surface water and bathing water quality is maintained within statutory limits.   |
|                                  | - Golf course<br>- Sports facility   | 0      | Neutral<br>The option would not result in any effects on human health and existing recreational facilities and/or tourism.   |
|                                  | - Play space<br>- Playing field  | -      | Minor Negative<br>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.                               |
|                                  | - Public park or garden<br>- Religious grounds   | --     | Moderate Negative<br>The option results in the permanent removal of existing recreational facilities, publicly accessible greenspace and/or tourism within the operational area.   |
|                                  | - Tennis courts<br>Natural England - Country Parks<br>National Parks                                 | ---    | Major Negative<br>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. |
|                                  | Section 15 open access areas<br>CRoW S4<br>Conclusive Registered Common Land<br>Public rights of way | ?      | Uncertain<br>From the level of information available the effect that the option would have on this objective is uncertain.   |

| SEA Theme and updated Objectives  | Datasets/Key Themes  | Effect | Description  |
|---|--|--------|--|
|   | Drinking water (surface water) safeguard zone  |        |  |
| <b>Material Assets</b><br><br><b>To minimise resource use and waste production</b><br><br><b>To avoid negative effects on built assets/infrastructure</b> | Transport:<br>- Major roads – A roads<br>- Major roads motorway<br>- Railway line<br>- National cycle route<br>- National trails<br>- Buildings<br>- Infrastructure and facilities | +++    | Major Positive<br><br>The option would re-use or recycle substantial quantities of waste materials and any new infrastructure would incorporate substantial sustainable design measures and materials. There would be no increase in energy consumption or energy would be from 100% renewable sources.<br>The option improves national cycle routes or national trails. |
|   |  | ++     | Moderate Positive<br><br>The option would re-use or recycle moderate quantities of waste materials and any new infrastructure would incorporate some sustainable design measures and materials. There would be no increase in energy consumption or energy would be from 90% renewable sources.<br>The option improves national cycle routes or national trails.         |
|   |  | +      | Minor Positive<br><br>The option would re-use or recycle a limited quantity of waste materials and any new infrastructure would incorporate some limited sustainable design measures and materials. There would be no increase in energy consumption or energy would be from 80% renewable sources.<br>The option improves national cycle routes or national trails.     |
|   |  | 0      | Neutral<br><br>The option would not result in any effects on material assets.  |
|   |  | -      | Minor Negative<br><br>The option would 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.<br>The option results in a minor increase in energy consumption with no renewable energy                                   |

| SEA Theme and updated Objectives | Datasets/Key Themes | Effect | Description   |
|----------------------------------|---------------------|--------|---|
|                                  |                     |        | options.<br>The option results in a minor disruption on built assets and infrastructure, including transport.   |
|                                  |                     | --     | Moderate Negative<br>The option would require new infrastructure with only limited opportunities for the re-use or recycling of waste materials.<br>The option results in a moderate increase in energy consumption with no renewable energy options.<br>The option results in a moderate disruption on built assets and infrastructure, including transport links.   |
|                                  |                     | ---    | Major Negative<br>The option would 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.<br>The option results in a major increase in energy consumption with no renewable energy options.<br>The option results in a major disruption on built assets and infrastructure, including transport links. |
|                                  |                     | ?      | Uncertain<br>From the level of information available the effect that the option would have on this objective is uncertain.  |

## 4. SESRO Options Assessment

- 4.1 A summary of residual effects for all the SESRO options is presented below against each of the SEA Objectives for the construction phase and operational phase (Table 4-1) post mitigation. Positive (+) and adverse (-) effects are reported against each Objective, where identified.
- 4.2 The update to the concept design has focused on the largest option. The full assessment table for the largest SESRO option is attached to this report as Appendix C. For full assessment tables for all of the alternative options refer to the Gate 1 SEA.

Table 4-1 – Summary of Reservoir Option Assessments

|                  |              | SEA Objective   |    |   |   |  |    |   |   |   |    |  |    |  |   |  |   |  |   |  |   |  |                 |  |   |  |   |   |    |   |    |  |   |   |    |   |   |  |   |   |    |   |   |  |    |
|------------------|--------------|---|----|---|---|--|----|---|---|---|----|--|----|--|---|--|---|--|---|--|---|--|-----------------|--|---|--|---|---|----|---|----|--|---|---|----|---|---|--|---|---|----|---|---|--|----|
|                  |              | Biodiversity  |    |   |   |  |    | Population and Human Health   |   |   |    |  |    | Water  |   |  |   |  |   | Soil   |   | Air  | Climate Factors |  |   | Cultural Heritage  |   | Landscape   |    | Material Assets   |    |  |   |   |    |   |   |  |   |   |    |   |   |  |    |
| Reservoir Option | Phase        | To protect designated sites and their qualifying features |    | To avoid a net reduction, and where reasonably practicable enhance, in non-monetised natural capital assets |   | To protect and enhance biodiversity, priority species and vulnerable habitats such as chalk rivers |    | To avoid and, where required, manage invasive and non-native species (INNS) |   | To meet WFD objectives relating to biodiversity |    | To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing |    | To maintain and enhance tourism and recreation |   | To secure resilient water supplies for the health and wellbeing of customers |   | To increase access and connect customers to the natural environment, provide education or information resources for the public |   | To reduce or manage flood risk, taking climate change into account |   | To enhance or maintain groundwater quality and resources |                 | To enhance or maintain surface water quality, flows and quantity |   | To meet WFD objectives and support the achievement of environmental objectives set out in River Basin Management Plans |   | To increase water efficiency and increase resilience of Public Water Supply and natural systems to droughts |    | To protect and enhance the functionality and quality of soils, including the protection of high-grade agricultural land, and geodiversity |    | To reduce and minimise air and noise emissions during construction and operation | To introduce climate mitigation where required and improve the climate resilience of assets and natural systems |   |    | To reduce embodied and operational carbon emissions |   | To conserve/protect and enhance historic assets/cultural heritage and their setting, including archaeological important sites. |   | To conserve, protect and enhance landscape and townscape character and visual amenity |    | To minimise resource use and waste production |   | To avoid negative effects on built assets / infrastructure |    |
|                  |              | +   | -  | +   | - | +  | -  | +   | - | +   | -  | +  | -  | +  | - | +  | - | +  | - | +  | - | +  | -               | +  | - | +  | - | +   | -  | +   | -  | +  | -   | + | -  | +   | - | +  | - | +   | -  | +   | - | +  | -  |
| 75               | Construction | 0   | -- | 0   | - | 0  | -- | 0   | + | 0   | -  | +  | -- | 0  | - | 0  | 0 | 0  | - | 0  | - | 0  | 0               | 0  | 0 | 0  | 0 | 0   | -- | 0   | -- | 0  | 0   | 0 | 0  | -   | 0 | --   | 0 | ---   | 0  | -   | 0 | -  |    |
|                  | Operation    | +++   | 0  | 0   | - | +++  | 0  | 0   | 0 | 0   | -- | ++   | -  | +++  | 0 | ++   | 0 | +++  | 0 | 0  | 0 | 0  | +               | 0  | + | -  | 0 | -   | ++ | 0   | +  | 0  | +   | - | ++ | -   | + | -  | + | 0   | ++ | ---   | 0 | -  | ++ |
| 100              | Construction | 0   | -- | 0   | - | 0  | -- | 0   | + | 0   | -  | +  | -- | 0  | - | 0  | 0 | 0  | - | 0  | - | 0  | 0               | 0  | 0 | 0  | 0 | 0   | -- | 0   | -- | 0  | 0   | 0 | 0  | -   | 0 | --   | 0 | ---   | 0  | -   | 0 | -  |    |
|                  | Operation    | +++   | 0  | 0   | - | +++  | 0  | 0   | 0 | 0   | -- | ++   | -  | +++  | 0 | ++   | 0 | +++  | 0 | 0  | 0 | 0  | +               | 0  | + | -  | 0 | -   | ++ | 0   | +  | 0  | +   | - | ++ | -   | + | -  | + | 0   | ++ | ---   | 0 | -  | ++ |
| 125              | Construction | 0   | -- | 0   | - | 0  | -- | 0   | + | 0   | -  | +  | -- | 0  | - | 0  | 0 | 0  | - | 0  | - | 0  | 0               | 0  | 0 | 0  | 0 | 0   | -- | 0   | -- | 0  | 0   | 0 | 0  | -   | 0 | --   | 0 | ---   | 0  | -   | 0 | -  |    |
|                  | Operation    | +++   | 0  | 0   | - | +++  | 0  | 0   | 0 | 0   | -- | ++   | -  | +++  | 0 | ++   | 0 | +++  | 0 | 0  | 0 | 0  | +               | 0  | + | -  | 0 | -   | ++ | 0   | +  | 0  | +   | - | ++ | -   | + | -  | + | 0   | ++ | ---   | 0 | -  | ++ |
| 150              | Construction | 0   | -- | 0   | - | 0  | -- | 0   | + | 0   | -  | +  | -- | 0  | - | 0  | 0 | 0  | - | 0  | - | 0  | 0               | 0  | 0 | 0  | 0 | 0   | -- | 0   | -- | 0  | 0   | 0 | 0  | -   | 0 | --   | 0 | ---   | 0  | -   | 0 | -  |    |
|                  | Operation    | +++   | 0  | 0   | - | +++  | 0  | 0   | 0 | 0   | -- | ++   | -  | +++  | 0 | +++  | 0 | +++  | 0 | 0  | 0 | 0  | +               | 0  | + | -  | 0 | -   | ++ | 0   | +  | 0  | +   | - | ++ | -   | + | -  | + | 0   | ++ | ---   | 0 | -  | ++ |
| 30 + 100 Phased  | Construction | 0   | -- | 0   | - | 0  | -- | 0   | + | 0   | -  | +  | -- | 0  | - | 0  | 0 | 0  | - | 0  | - | 0  | 0               | 0  | 0 | 0  | 0 | 0   | -- | 0   | -- | 0  | 0   | 0 | 0  | -   | 0 | --   | 0 | ---   | 0  | -   | 0 | -  |    |
|                  | Operation    | +++   | 0  | 0   | - | +++  | 0  | 0   | 0 | 0   | -- | ++   | -  | +++  | 0 | ++   | 0 | +++  | 0 | 0  | 0 | 0  | +               | 0  | + | -  | 0 | -   | ++ | 0   | +  | 0  | +   | - | ++ | -   | + | -  | + | 0   | ++ | ---   | 0 | -  | ++ |
| 80 + 42 Phased   | Construction | 0   | -- | 0   | - | 0  | -- | 0   | + | 0   | -  | +  | -- | 0  | - | 0  | 0 | 0  | - | 0  | - | 0  | 0               | 0  | 0 | 0  | 0 | 0   | -- | 0   | -- | 0  | 0   | 0 | 0  | -   | 0 | --   | 0 | ---   | 0  | -   | 0 | -  |    |
|                  | Operation    | +++   | 0  | 0   | - | +++  | 0  | 0   | 0 | 0   | -- | ++   | -  | +++  | 0 | ++   | 0 | +++  | 0 | 0  | 0 | 0  | +               | 0  | + | -  | 0 | -   | ++ | 0   | +  | 0  | +   | - | ++ | -   | + | -  | + | 0   | ++ | ---   | 0 | -  | ++ |

## 4.2 Discussion of Assessment

4.3 The following discussion summarises the key significant effects identified (i.e. moderate and major beneficial/adverse effects) as part of the SEA of the appraised largest reservoir option, following mitigation. The assessments focus on the largest SESRO option at Gate 2 (i.e. 150 Mm<sup>3</sup>). This option has been used for the assessment as it encompasses the same, and in some cases, greater footprint of each of the other five options, so is precautionary for the smaller reservoir capacity options. It is understood that the concept design elements developed for the largest capacity option for Gate 2 would be adopted (applicable to their aspect and dimensions) for the other smaller options also.

4.4 This assessment acts to update and refine the findings of previous regional SEA work undertaken at Gate 1. This assessment also benefits from and incorporates findings from concurrent investigations under headings of Biodiversity, Air Quality, Historic Environment, Landscape and Visual, Noise and other specialists, as referenced below. The complete assessment table is provided as Appendix C. Further details of the specialist studies are included in the EARs for aquatic and terrestrial topics (Supporting documents B1 and B2). Table A-10 includes the mitigation used to derive the residual effects discussed below and should therefore be consulted for further information.

### 4.2.2 Biodiversity

4.5 No direct land take for any statutory designated sites is anticipated for the largest SESRO option. However, there is potential for indirect impacts on Barrow Farm Fen Site of Special Scientific Interest (SSSI) during construction due to its location within 0.5km of the indicative location for SESRO. For the three Special Areas of Conservation (SAC) located within 10km of the indicative location for SESRO, a separate Habitat Regulations Assessment (Supporting Document B4) concluded that no likely significant effects upon SAC would occur as a result of habitat degradation via pollution of surface water, changes in hydrology, and the introduction of invasive non-native species as a result of the construction or operation of the SESRO option. Impacts on all other SSSI, National and Local Nature Reserves are not anticipated due to distance and absence of downstream hydrological links.

4.6 For non-statutory designated sites, the indicative location for SESRO directly overlaps the Cuttings and Hutchin's Copse Local Wildlife Site (LWS). The preferred SESRO option could be designed to avoid or reduce direct impacts to the LWS. This would include siting the new railway siding outside of the LWS. Should the LWS be unavoidably impacted by SESRO, appropriate mitigation proposals would be required. It is anticipated that notable and protected species may be impacted through the loss of suitable habitat, for example waterbodies and ancient woodlands. A targeted ancient woodland survey and ancient woodland indicator species survey would be undertaken to determine which of the woodlands on site and within the zone of influence, are considered to be ancient. Appropriate protection measures would be put in place to ensure ancient woodland is retained where reasonably practicable or losses minimised. Any losses would be

compensated for through a bespoke mitigation strategy (see 4.7 for more information).

- 4.7 An ancient tree within the footprint of the indicative location for SESRO would be unavoidably lost to the Development. This is because the tree is located within the reservoir footprint and the design of the Reservoir cannot be altered to retain the tree. As the tree is considered to be an 'irreplaceable habitat', the scheme cannot achieve BNG at the 'project level'. However, the project would generate meaningful gains for other biodiversity features such as neutral grassland, wet woodland and wetland areas. Compensation for the loss of 'irreplaceable habitats' cannot be provided on a 'like for like' basis that reduces the impact on those habitats to neutral. The compensation would need to be designed in recognition of the nature and extent of the loss or damage, to make a contribution to biodiversity that is considered proportionate. Bespoke compensation which may include habitat creation, enhancement or restoration would need to be agreed with the statutory nature conservation body. The veteran trees growing along the River Ock would be retained and suitably protected under the current proposals.
- 4.8 Four habitats of principal importance have been recorded in the study area; coastal and floodplain grazing marsh, traditional orchard, wood pasture and parkland and deciduous woodland. Where reasonably practicable these habitats would be retained. Some parcels of habitats would be lost although clearance would be kept to a minimum. Based on current data, adverse impacts upon protected and notable species within the indicative location for SESRO are likely.
- 4.9 The Biodiversity Net Gain calculations for the scheme have been calculated for all six Reservoir options as outlined in the BNG Report (Supporting Document B6). The results of the calculations indicate that all Reservoir options exceed the required 10% net gain in biodiversity. This has been achieved following a series of multi-disciplinary workshops and meetings, the purpose of which was to design a scheme with a primary focus to improve the biodiversity on site. The current baseline habitats on site are largely poor-quality habitats of low to moderate distinctiveness including lowland arable fields, modified grassland and neutral grassland. There are also some pockets of woodland with higher distinctiveness which would be retained on site where possible. The site is bisected with hedgerows, tree lines and wet ditches. As much of these baseline habitats would be lost to SESRO, the significant net gain in biodiversity for all options indicates that the replacement habitats and future landscape surrounding SESRO would be far more beneficial to biodiversity compared with the current landscape. This is because the habitats to be created, such as the reservoir itself with floating islands and reedbed lagoons, wetland habitat mosaic, wildlife ponds, species-rich grassland and wet woodland would provide habitat for a huge diversity of wildlife species from invertebrates through to larger mammals and birds.
- 4.10 The calculations also indicate that there would be a small loss of hedgerow units. Off-site compensation for the loss of these hedgerows would be sought to ensure a 10% net gain in hedgerow units is achieved for the Development. Where feasible more hedgerows would be retained on site and more would be planted. (refer to

Supporting Document B6, Biodiversity Net Gain Report). Further fieldwork is needed to accurately map these habitats.

4.11 It should also be noted that the trading rule for the loss of lowland mixed deciduous woodland, a habitat with high distinctiveness, has not been appropriately accounted for within the metric. Further iterations of the scheme design and more detailed field work is to be undertaken with the aim of rectifying this issue, where possible.

4.12 The next steps in terms of biodiversity would be to undertake a preliminary ecological appraisal and UK Hab survey, followed by phase 2 surveys for specific species and habitats.

#### 4.2.3 Population and Human Health

4.13 An update of the Population and Human Health assessment was not conducted at Gate 2 and there are no anticipated changes from the Gate 1 assessment and SEA scoring to be made. This assessment would be further developed at subsequent project stages.

4.14 At Gate 1, moderate adverse effects were considered likely during construction, owing to losses of residential and commercial properties, roads, solar farms, allotments, and sport facilities. During operation, improved recreational value of the site associated with planned water sports facilities and an events centre amongst other improvements contribute to a moderate and major beneficial effect. Increased resilience of water supply associated with the largest option result in a major beneficial effect in terms of the health and wellbeing of customers. As the general footprint and design capacity have not changed since Gate 1 it is anticipated that the construction impacts and the operational benefits identified would remain the same.

#### 4.2.4 Water

4.15 Each of the reservoir options would increase capacity and therefore improve resilience for supply although it is noted that the largest option would have a greater resilience and this has therefore been the focus of this assessment. SESRO would also help reduce abstractions in more vulnerable areas and during times of low flow, further increasing the resilience of water supply.

4.16 Additional design work undertaken in Gate 2 for SESRO has significantly reduced the uncertainties around compliance with the WFD for the key water bodies (Cow Common Brook and Portobello Ditch and Childrey Brook and Norbrook at Common Barn) identified as having been significantly impacted by the footprint of the reservoir in the Gate 1 WFD assessment. The two key waterbodies are currently of poor WFD status, although the Gate 2 assessment indicates that SESRO provides an opportunity to provide significant enhancement of condition and value to both water bodies. This is despite a short deterioration of around 6-9 months while habitats recover to the newly enhanced channel form. For more information see the SESRO WFD Applicability Assessment (Supporting documents B5).

4.17 At Gate 2, the Rivers Biodiversity Net Gain assessment has been updated to the 3.0 metric (refer to Supporting Document B6, Biodiversity Net Gain Report). For the 150Mm<sup>3</sup> option, 14.19km of river and 43.91km of ditch are lost as a result of the current concept design, yet 16.63km of river, 12.55km of ditch and 3.32km of canal are to be either enhanced or created on site. This culminates in a +17.09% net gain for Rivers, but a -34.83% net loss for ditches. Resulting in a -9.08% net loss for all watercourses associated with this option. Off-site mitigation would need to be explored to achieve ≥10 % net gain for ditches, although for a scheme of this size it may not be practicable to achieve ≥10% net gain for option 150Mm<sup>3</sup> due to the extent of works required. Therefore, a bespoke but proportionate approach may have to be developed with the Environment Agency. Next steps and further detail are outlined within the Supporting Document B6.

#### 4.2.5 Soil

4.18 Agricultural land makes up 1645.5ha of the total 1755.7ha of land within the indicative location for SESRO. The majority of this land comprises of best and most versatile (BMV) soils of Agricultural Land Classification (ALC) grade 3a and 2 (58.5% and 10%, respectively). There are also some grade 3b and 4 areas (31% and 0.4%, respectively). The areas of permanent land take to construct the largest SESRO option would result in permanent loss of this agricultural land, this presents a potentially significant adverse effect.

4.19 There is potential to encounter unexploded ordnance (UXO) during construction, presenting a potentially significant adverse effect.

4.20 Contamination of surface and groundwater and harm to human health through construction activities causing exposure, mobilisation or leaching of potential existing contamination on site and operational activities such as accidental spills and mismanagement of solid and liquid wastes may present potentially significant adverse effects.

4.21 There is also potential for sterilisation of mineral resources by construction on or near to sand and gravel resources towards the eastern end of the indicative location for SESRO.

4.22 Mitigation measures include re-using topsoil and subsoil to improve the quality of agricultural land elsewhere, developing a Soil Management Plan (SMP), clearance of UXO, developing a remediation strategy for any contaminated areas, and further assessment of mineral extraction proposals (as described in detail within Section 8.7 of Proposed Mitigation of the terrestrial EAR (supporting document B2)). It is anticipated that through these measures, significant adverse effects can be avoided.

#### 4.2.6 Air

4.23 It is anticipated that there would be no significant air quality effects associated with the operation phase of SESRO. Therefore, the scope of air quality impacts is restricted to the construction phase of works only. The air quality impacts on key

sensitive receptors at human exposure locations and ecological receptors (designated sites of nature conservation) have been considered.

4.24 Human receptors include nearby residential properties, schools, hospitals, busy streets, shops, etc. The changes in the concentrations of pollutants at these sensitive receptors from emissions from road traffic and from plant and machinery is considered to be negligible, and therefore would not present a significant effect on Air quality. However, there is a medium to high risk of dust soiling and a low to medium risk of human health impacts associated with dust emissions from the demolition of existing buildings, earthworks, construction and trackout.

4.25 The term ecological receptors refers to European designated sites (i.e. Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar sites), Site of Special Scientific Interest (SSSI) and local nature sites including ancient woodlands, Local Wildlife Sites (LWS) and National and Local Nature Reserves (NNR and LNR). Hyde's Copse ancient woodland (approximately 550m north of the indicative location for SESRO) and Barrow Farm Fen SSSI (approximately 470m north of the indicative location for SESRO) are the closest relevant ecological receptors to the scheme. As per IAQM guidance<sup>16</sup>, the absence of any relevant ecological sites within 50m of the indicative location for SESRO or relevant ecological sites within 50m of the route(s) used by construction vehicles up to 500m from the main site exit, means the potential effects of construction dust on ecological sites is not required to be considered further.

#### 4.2.7 Noise

4.26 There are four Noise Action Planning Important Areas in or in close proximity to the study area. There is potential for significant effects associated with construction noise during earthworks, service diversion works, access road construction, material handling/unloading (before 07:00) in the vicinity of sensitive receptors, site clearance and vegetation removal, earthworks for main embankments and screening mounds, bridge piling, replacement flood plain storage in Drayton, Steventon, East Hanney and the areas North and South of East Hanney. Vibration impacts, both in terms of human response and building damage, during construction have the potential to be significant. It is anticipated that vibration impacts can be controlled, and significant adverse effects can be avoided, through mitigation measures (as outlined in Section 7.6 Proposed Mitigation of the terrestrial EAR (supporting document B2)). Damage to buildings is considered to be unlikely, and significant effects are not predicted, provided mitigation measures are followed. No significant construction traffic impacts, nor effects from construction rail noise, are anticipated. In operation, no significant effects are anticipated for road traffic changes. Similarly, significant noise effects from the operation of the pump station would be avoided with appropriate mitigation.

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<sup>16</sup> <https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf>

#### 4.2.8 Climate Factors

- 4.27 At Gate 1, it was determined that the ability of the reservoir to release water into river during low flow and drought conditions would in turn help reduce the negative impacts of abstraction in more vulnerable areas. This has been classed as a moderate beneficial effect in operation. During construction, embodied carbon will be present in the materials used to construct the reservoir. It is anticipated that the enhancement potential for carbon sequestration relative to the existing predominantly arable land cover, on balance, will result in an overall neutral effect. Fundamentally, as the general footprint and design capacity have not changed since Gate 1 it is anticipated that the construction impacts and the operational benefits identified would remain the same.
- 4.28 An updated Carbon Report has been produced, detailing the carbon assessment supporting the Gate 2 submission. Capital carbon emission estimates have been produced for each SESRO option, these were slightly higher for the larger reservoir capacity options, with the phased options being the greatest. The largest 'carbon hotspot' is associated with the embankment works, followed by roads, and to a lesser degree rip-rap, concrete, various steel items and other structures. The assessment of operational carbon concluded the largest operational emissions source would be maintenance activities, followed by indirect emissions associated with grid power consumption. The whole life carbon assessment for the largest SESRO option, 150 Mm<sup>3</sup>, estimated total emissions at 485,563 tCO<sub>2</sub>e. Carbon mitigation opportunities identified include electric/hybrid powered plant, materials reuse, solar panel reuse, low carbon construction materials, hydropower turbines and EV charging provision.
- 4.29 The Natural Capital Assessment did also assess climate change and appropriate mitigation by valuing the impacts that the change in land use would have on the amount carbon sequestered by habitats within the boundary of each option.
- 4.30 Climate resilience was not considered as directly however, although an appraisal of natural hazard regulation was conducted within the relevant guidance parameters, which is effectively the flood regulation benefits provided by woodland and other habitats to be introduced by the proposed scheme. Drought resilience was not systematically appraised as there is no current guidance developed yet to incorporate that. It is noted that the principal purpose of SESRO is to improve the resilience of the Thames Water and Affinity Water regions through the creation of a regional storage and transfer hub.

#### 4.2.9 Historic Environment

- 4.31 The indicative location for SESRO lies within a highly sensitive archaeological environment, previous investigation has confirmed the existence of locally, regionally and nationally important archaeological remains in the area. Multiple medieval, Romano-British and prehistoric assets are located within the indicative option for SESRO, as well as two Grade II listed buildings. There are 12 Scheduled Monuments, two registered historic parks and gardens, multiple other listed

buildings and numerous archaeological assets recorded within the wider study area. The largest SESRO option is likely to change the setting of many of these designated and non-designated historic environment assets in the area around it. The scale of the largest SESRO option would require a significant amount of geophysical survey and trial trench investigation to inform future assessment. Archaeological investigation would need to be implemented at the earliest opportunity and carried out in line with an approved method statement (Written Scheme of Investigation) agreed with Oxfordshire County Council's archaeological advisory service. On a scheme of this scale, a strategic Written Scheme of Investigation would be required.

#### 4.2.10 Landscape

- 4.32 North Wessex Downs Area of Outstanding Natural Beauty (AONB), Oxford Green Belt, Ancient Woodland, veteran trees, tree preservation orders and biodiversity and cultural heritage designations are located within the landscape of the indicative location for SESRO and the wider study area. During construction and year one of operation, small adverse impacts on North Wessex Downs AONB are anticipated, reducing to negligible adverse after year 15 of operation. When considering the high sensitivity of the AONB, effects could potentially be significant during construction and year one of operation. It is unlikely that effects on the AONB would be significant in year 15 of operation. Affected Landscape Character Areas may experience negligible to large adverse effects during construction and year one of operation. In year 15 of operation, effects on Landscape Character Areas vary between small beneficial and large adverse.
- 4.33 These findings are more significant than those reported at gate 1, as the appraisal at gate 1 was very high level and considered the potential broad effects on landscape character, while the gate 2 appraisal has considered the effects on individual local landscape character areas in conjunction with the appraisal of effects on the North Wessex Downs AONB. The potential effects on the most significantly impacted local landscape character areas are reported in the assessment table in Appendix C.
- 4.34 Furthermore, these findings are under the condition that essential mitigation illustrated on the Illustrative Environmental Masterplan (Appendix B, Figure 5-1) is incorporated into the design of the 150Mm<sup>3</sup> option. Further measures proposed to mitigate potential landscape and visual effects during construction and operation are set out in Section 6.6 of Supporting Document B2, Environmental Appraisal Report (terrestrial).

#### 4.2.11 Material Assets

- 4.35 An update of the Material Assets assessment was not conducted at Gate 2 and there are no anticipated changes from the Gate 1 assessment and SEA scoring to be made at Gate 2. This assessment would be further developed at subsequent project stages.
- 4.36 At Gate 1, moderate adverse effects were anticipated during construction, associated with loss of private property, agricultural and other businesses including Solar PV farms. In operation, the reservoir presents a significant asset in terms of

recreation, water resource, attracting development and increasing tourism potential in the local and wider area. This is attributed moderate beneficial effects. As the general footprint and design capacity have not changed since Gate 1, it is anticipated that the construction impacts and the operational benefits identified would remain the same.

#### 4.2.12 Cumulative Assessment

- 4.37 Following the guidance note<sup>2</sup> (see Appendix E), a high-level cumulative effects assessment (CEA) has been undertaken for the largest SESRO option.
- 4.38 A sift of major planning allocations (not already complete or in construction) within a 2km buffer of the indicative location for SESRO was conducted using information from the Vale of White Horse District Council Local Plan (2031)<sup>17</sup>. Much of these land allocations were with respect to strategic and additional housing allocations, in addition to land safeguarded for highways improvements. Three of the allocations identified were located directly adjacent to the indicative site for SESRO. This review also considered major planning applications that have planning approved, or are pending approval, within the Vale of White Horse District Council and within 2km of SESRO that have not yet begun construction. For each of these allocations and applications, there is the potential that construction dates may align with the construction period for SESRO. Furthermore, any operational impacts of nearby developments not captured within the baseline assessment for SESRO would need to be considered for their potential to contribute to cumulative effects. From this initial and high-level cumulative assessment sift, specific disciplines and receptors of concern include rail and road noise, setting impacts upon listed buildings and scheduled monuments, landscape impacts upon Upper Thames Clay Vales NCA, degradation of grade 3 and 4 ALC and overlap with existing Flood Zones. See Appendix D for further detail on the cumulative assessment sift.
- 4.39 Currently there are no other Nationally Significant Infrastructure Projects (NSIP) identified within the Zone of Influence, however this does not mean that there would be none brought forward within the development programme for SESRO and therefore this should be revisited at the next gate stages.
- 4.40 The CEA is limited somewhat by the unknown temporal factors of the identified other developments and the SESRO delivery and the conceptual nature of the design of the option at Gate 2. Taking into consideration the expected commencement of construction and delivery of SESRO being in the early 2030s, the majority of those other developments may have already been completed and therefore there would be no cumulative construction effects.
- 4.41 There are a number of SRO, although they are still at concept and optioneering stages with programmes for delivery still to be confirmed. The SRO within the Thames Water domain, in addition to SESRO (Abingdon Reservoir), are:

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<sup>17</sup> <https://www.whitehorsedc.gov.uk/vale-of-white-horse-district-council/planning-and-development/local-plan-and-planning-policies/local-plan-2031/>

- London effluent reuse;
  - River Severn to River Thames transfer;
  - Thames – Affinity transfer; and
  - Thames – Southern transfer.
- 4.42 For detailed solution descriptions and an illustrative map of interlinking SRO see the PR19 draft determinations: Strategic regional water resource solutions appendix (July 2019)<sup>18</sup>.
- 4.43 The cumulative and in combination effects associated with delivery, construction and operation of the other SRO would be borne out of the Regional Plans and WRMP identifying when the water resource is anticipated to be needed from that individual scheme. Further cumulative assessment of concurrent SRO and major planning allocations and applications would be further developed at subsequent project stages once the chosen options and designs are established. Other major developments and in particular Nationally Significant Infrastructure Projects should also be taken into consideration once designs and programmes are better defined as they can combine to impact upon material, equipment and personnel resources.
- 4.44 An update to the CEA should be carried out at subsequent project stages once the design and programme for delivery are better defined.

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<sup>18</sup> <https://www.ofwat.gov.uk/publication/pr19-draft-determinations-strategic-regional-water-resource-solutions-appendix/>

## 5. Summary and Recommendations

- 5.1 On the whole there are limited changes from the baseline and associated appraisals identified at Gate 1 to the SEA for Gate 2 and this is illustrated in the tables within Appendix A. Each of the reservoir options would provide significant benefit in achieving resilient water supplies for the region though it is acknowledged that the largest of the reservoirs options (150Mm<sup>3</sup>) would go furthest and therefore is attributed Major Beneficial effects.
- 5.2 In SEA terms, the potential for significant adverse effects associated with the 150Mm<sup>3</sup> option has been identified with respect to Soils, Landscape and Visual and Material Assets. It is evident that many of the significant adverse effects can be addressed through appropriate mitigation, as described in Table A-10 therefore highlighting the importance of these measures in delivering a scheme that minimises impacts on the environment. Next steps in terms of further surveys and assessment have been described within Section 4 of this report and are discussed further within the EAR for aquatic and terrestrial topics (Supporting documents B1 and B2).

## Appendix A Baseline

In this Appendix, the baseline summaries described in Gate 1 are updated where necessary following a review of the newly available information, masterplan and other design iterations at Gate 2 against the Gate 1 SEA baseline information. Where changes are not required, the reasons why are also described. This baseline is largely based on desk-based assessments, future survey work would be picked up in subsequent project stages as required.

### A.1 Biodiversity

For Gate 2, a full updated desk-based assessment (MAGIC, TVERC records, ancient woodland inventory and tree websites checked etc.) has been undertaken. This information has been used in Chapter 4 of the Terrestrial EAR (supporting document B2). Access to the site was not permitted at this stage, as such, field surveys for protected and notable species and habitat have not been undertaken.

Table A-1– Biodiversity baseline update from Gate 1 to Gate 2

| Section (Gate 1)                        | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed   | Next steps |
|---|--|-----------------|---|------------|
| <b>A.2. Biodiversity and Ecosystems</b> | <p>Biodiversity comprises the variety of plants (flora) and animals (fauna) in an area, and their associated habitats. The importance of preserving biodiversity is recognised from an international to a local level. Biodiversity has importance in its own right and has value in terms of quality of life and amenity. While there are no European (SAC, SPA or Ramsar) or nationally designated sites within the reservoir footprint, the River Thames basin, where the proposed Abingdon Reservoir is situated, includes a variety of sites that are designated at a European, national or local level as important for biodiversity, flora and fauna, including:</p> <ul style="list-style-type: none"> <li>• 5 Ramsar Sites (South-west London waterbodies, Lee Valley, Thursley &amp; Ockley Bogs, Benfleet and Southend Marshes, and Thames Estuary &amp; Marshes)</li> <li>• 7 Special Protection Areas (SPA)</li> <li>• 23 Special Areas of Conservation (SAC)</li> <li>• 511 Sites of Special Scientific Interest (SSSI)</li> </ul> | No              | There have been no changes to the designated sites baseline between desk-based assessments for Gate 1 and Gate 2. | N/A        |

| Section (Gate 1)                        | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed                                    | Next steps   |
|---|---|-----------------|--|--|
|   | <ul style="list-style-type: none"> <li>• 19 National Nature Reserves (NNR)</li> <li>• 503 Local Nature Reserves (LNR)</li> </ul>  |                 |  |  |
| <b>A.2. Biodiversity and Ecosystems</b> | Figure B-3 shows the location of the designated sites in proximity to the study area. Two locally designated sites are of note, Hutchins's Copse and The Cutting County Wildlife Sites, and are within the study area.  | No              | N/A  | N/A  |
| <b>A.2. Biodiversity and Ecosystems</b> | Marine, terrestrial and freshwater habitats exist within and in the vicinity of the nomination site. These habitats support many plant and animal species. Some of these habitats have conservation designations as set out below.  | No              | N/A  | N/A  |
| <b>A.2.1. Habitats and Species</b>      | The Vale of White Horse district contains a rich variety of semi-natural habitats, including woodlands, hedgerows, streams and rivers, meadows, pastures and wetlands; together these habitats help to secure the survival of many species of wildlife. The diversity of wildlife helps to ensure that the countryside remains healthy and productive and that its complex natural cycles are kept in balance. Much of the Vale's countryside is also of great natural beauty. The district occupies an attractive part of the upper Thames Valley where the landforms have a gentle rounded nature. There is no dramatic scenery but the landscape, reflecting the underlying geology, presents a good deal of variety and interest, ranging from the rolling sweep of the chalk downs to the floodplain of the Thames. Among the diverse habitats found in the district, some are recognised as having special nature conservation interest, for example: | Yes             | Records for Ancient Woodland have been updated between Gate 1 and 2. | Refer to Chapter 4 of Terrestrial EAR (supporting document B2) |

| Section (Gate 1)                   | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed                                    | Next steps  |
|------------------------------------|---|-----------------|--|---|
|                                    | <ul style="list-style-type: none"> <li>• Ancient Woodland: there is a broken band of ancient woodland (woodland which broadly has been undisturbed since medieval times) on the ridge of corallian limestone in the north of the Local Plan area;</li> <li>• The Chalk Downs: the Berkshire Downs once presented a great expanse of unimproved chalk grassland grazed by sheep. This habitat, with its springy turf, colourful and scented wildflowers and rare butterflies, now survives in only small fragments. The largest remaining areas, at White Horse Hill and Hackpen Down, are protected as SSSIs and the latter is a candidate Special Area of Conservation. The Ridgeway track forms a natural wildlife corridor, a valuable habitat for native chalk grassland plants;</li> <li>• Heathland and Fenland: some of Oxfordshire's rarest habitats – heathland, acid grassland and fenland – are found in the Local Plan area. Acid grasslands are found at Hurst Hill and around Frilford. Remnants of heathland survive at Frilford Heath. A complex of fens exists at Lashford Lane, Cothill and Dry Sandford, along the line of the Sandford Brook, a tributary of the River Ock. This particular complex is regarded as being of European importance and the Cothill Fen is a Special Area of Conservation; and</li> <li>• Wetlands: a few hay meadows are still managed traditionally on the floodplains of the Thames and Ock: Fernham Meadows and Grafton Lock Meadows are SSSI. The river valleys generally form natural wildlife corridors, and rivers and streams are key elements for wildlife within the landscape structure of the Vale.</li> </ul> |                 |  |   |
| <b>A.2.1. Habitats and Species</b> | Ancient woodlands in England and Wales are important habitats that should be protected. An ancient woodland is any wooded area that has contained woodland continuously since at least 1600 AD. They tend to be more ecologically diverse and of a higher nature conservation value than those developed recently, or where cover on the site has been intermittent. They often also have cultural importance.  | Yes             | Records for Ancient Woodland have been updated between Gate 1 and 2. | Refer to Chapter 4 of Terrestrial EAR (supporting |

| Section (Gate 1)                   | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed | Next steps   |
|------------------------------------|---|-----------------|-----------------------------------|--------------|
|                                    | Within the study area there are four Ancient woodland sites, including Hyde's copse, Bailey's Med Copse and Lain's row.   |                 |                                   | document B2) |
| <b>A.2.1. Habitats and Species</b> | <p>Natural England has defined a series of 160 National Character Areas (NCA) as a means to conserve nature in England. These are areas of countryside identified by the unique combination of physical attributes, wildlife, land use and culture. In particular, within the study area, there are two NCA:</p> <ul style="list-style-type: none"> <li>• 109 Midvale Ridge NCA</li> <li>• A band of low-lying limestone hills that stretch from east to west across the area from the Vale of Aylesbury to Swindon. It is surrounded by the flat lands of the Oxfordshire clay vales, which allows for extensive views across the countryside.</li> <li>• Swindon and Oxford are the main towns within the area; outside of this the remaining settlements are mostly small, nucleated villages along the top of the ridge and the springline.</li> <li>• The majority of the area is agricultural with a mixed arable/ pastoral farming landscape, cereals being the most important arable crop.</li> <li>• The soil types are made up of heavy rendzinas, stagnogleys and lighter sandy brown earths with small patches of sandy soils.</li> <li>• It is an area of significant importance for its geological sites, yielding fossils of international importance.</li> <li>• 108 Upper Thames Clay Vales NCA</li> <li>• An area characterised by its open, gently undulating lowland farmland on mostly Jurassic and Cretaceous clays.</li> </ul> | No              | N/A                               | N/A          |

| Section (Gate 1)                   | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed | Next steps |
|------------------------------------|--|-----------------|-----------------------------------|------------|
|                                    | <ul style="list-style-type: none"> <li>The World Heritage site of Blenheim Palace falls within the NCA boundaries, coupled with 5000 ha of the North Wessex Downs AONB and smaller sections of the Chilterns and Cotswolds AONB.</li> <li>The landscape is contrasting, with enclosed pastures of the clay lands with wet valleys, mixed farming, hedge trees and field trees opposed by more open, arable lands.</li> </ul> |                 |                                   |            |
| <b>A.2.1. Habitats and Species</b> | In addition to NCA the proposed reservoir site also lies within the priority habitat of broadleaved deciduous woodland.  | No              | N/A                               | N/A        |
| <b>A.2.1. Habitats and Species</b> | Approximately 1100 animal species have been recorded within the study area, including 149 bird species, 24 fish species and 21 mammals.  | No              | N/A                               | N/A        |
| <b>A.2.1. Habitats and Species</b> | <p>The following legally protected mammals have been recorded within the study area:</p> <ul style="list-style-type: none"> <li>Roe deer</li> <li>Fallow deer</li> <li>West European hedgehog</li> <li>Water vole</li> <li>Brown hare</li> <li>Water shrew</li> <li>European otter</li> <li>Eurasian badger</li> <li>Chinese muntjac</li> <li>Stoat</li> </ul>   | No              | N/A                               | N/A        |

| Section (Gate 1)                   | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed               | Next steps |
|------------------------------------|---|-----------------|---|------------|
|                                    | <ul style="list-style-type: none"> <li>Weasel</li> <li>Polecat</li> <li><i>Pipistrelle</i> and other bat species</li> <li>Eurasian pygmy shrew.</li> </ul>  |                 |   |            |
| <b>A.2.1. Habitats and Species</b> | <p>Of the approximately 149 bird species that have been recorded within the study area, those identified below are some of the most common legally protected bird species:</p> <ul style="list-style-type: none"> <li>Short-eared owl</li> <li>Long-eared owl</li> <li>Little owl</li> <li>Barn owl</li> <li>Red kite</li> <li>Goshawk</li> <li>Sparrowhawk</li> <li>Goldfinch</li> <li>Greenfinch</li> <li>Kingfisher</li> </ul> | No              | N/A   | N/A        |
| <b>A.2.1. Habitats and Species</b> | There are also records common species of fish falling within the study area.  | No              | N/A   | N/A        |
| <b>A.2.2. Statutory Sites</b>      | The following are internationally designated nature conservation sites within close proximity to the proposed reservoir site:   | No              | No changes required in terms of the SACS listed |            |

| Section (Gate 1)                  | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed | Next steps |
|-----------------------------------|---|-----------------|-----------------------------------|------------|
|                                   | <ul style="list-style-type: none"> <li>Cothill Fen Special Area of Conservation (SAC) is located within a 2km radius of the proposed site. In addition, Little Wittenham SAC and Hackpen Hill SAC are located 5km east and 7km southwest respectively of the study area;</li> <li>Thames Basin Heaths Special Protection Area (SPA) is located 39km southeast of the study area (this has not been included in the study);</li> <li>Barrow Farm Fen Site of Special Scientific Interest (SSSI), Culham Brake SSSI, Frilford Heath, Ponds and Fens SSSI, Cothill Fen SSSI and Dry Sandford Pit SSSI are all located within the study area</li> </ul> |                 |                                   |            |
| <b>A2.2. Statutory Sites</b>      | There are approximately 39 National Nature Reserves (NNR) within the London and South East Region, with four occurring in Oxfordshire. The Cothill NNR is located on the northern boundary of the study area, while Chimney Measors NNR is located 8km northwest of the study area.   | No              | N/A                               | N/A        |
| <b>A2.2. Statutory Sites</b>      | There are 11 Local Nature Reserves (LNR) in Oxfordshire. No LNR fall within the study area, however Abbey Fishponds LNR is located 1.2km northeast of the study area and Mowbray Fields LNR is located 4.7km southeast of the study area.   | No              | N/A                               | N/A        |
| <b>A2.2. Statutory Sites</b>      | The closest Area of Outstanding National Beauty (AONB) is the North Wessex Downs, situated 0.3km south of the study area. South Downs is the closest National Park to the proposed reservoir site, situated approximately 57km south of the study area.   | No              | N/A                               | N/A        |
| <b>A.2.3. Non-Statutory Sites</b> | Shotover Country Park is located 9.5km northeast of the study area. Covering 117 hectares on the southern slopes of Shotover Hill there are spectacular views from the top across south Oxfordshire. Part of the Shotover Country Park is designated as a SSSI due to the national importance of wildlife in the area. Two locally  | No              | N/A                               | N/A        |

| Section (Gate 1)              | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed | Next steps |
|-------------------------------|--|-----------------|-----------------------------------|------------|
|                               | designated sites are of note as being within the study area (Hutchins's Copse and The Cutting CWS).  |                 |                                   |            |
| <b>A.2.4. Future Baseline</b> | Although designated sites are afforded protection, this is unlikely to prevent some decline in condition due to the effects of climate change.   | No              | N/A                               | N/A        |
| <b>A.2.4. Future Baseline</b> | Much of the green infrastructure network is not designated, but the Nature Recovery Network provides a focus that should be reflected in planning activities at the unitary authority level.   | No              | N/A                               | N/A        |
| <b>A.2.5. Key Issues</b>      | There are a number of internationally designated nature conservation sites within close proximity to the proposed reservoir site, including Cothill Fen SAC, Little Wittenham SAC and Hackpen Hill SAC. Barrow Farm Fen, Culham Brake, Frilford Heath, Ponds and Fends, Cothill Fen, and Dry Sandford Pit are all SSSI and are situated within the study area. Cothill and Chimney Meadows are also designated National Nature Reserves, situated within the study area and 8 km northwest of the study area respectively. While there are no Local Nature Reserves within the study area, Abbey Fishponds LNR is located just over 1km northeast. | No              | N/A                               | N/A        |
| <b>A.2.5. Key Issues</b>      | The Vale of White Horse district contains a rich variety of semi-natural habitats, including woodlands, hedgerows, streams and rivers, meadows, pastures and wetlands; together these habitats help to secure the survival of many species of wildlife. The diversity of wildlife helps to ensure that the countryside remains healthy and productive and that its complex natural cycles are kept in balance. Of note, two Country Wildlife Sites have been identified within the footprint of the reservoir, Hutchins's Copse and The Cutting CWS.   | No              | N/A                               | N/A        |

## A.2 Population and Human Health

An update of the Population and Human Health assessment was not undertaken at Gate 2 and there are no anticipated changes from the Gate 1 assessment and SEA scoring to be made. See Gate 1 baseline below:

*Table A-2 - Population and Human Health baseline (Gate 1)*

| Section (Gate 1)                        | Gate 1 Text  |
|---|--|
| <b>A.6. Population and Human Health</b> | <p>The greater South East region is a densely populated part of the UK. London, as expected, is the most densely populated area with 5,285 people per square kilometre, compared to an average of 411 per square kilometre in England as a whole. Households in England are projected to increase by 10% between 2014 and 2024, from 22.7 million to 25 million.</p>   |
|   | <p>Table A-5 describes the latest population statistics for the NUTS regions covered by the River Thames basin. Data projections at the regional scale do not generally extend beyond 2030 whereas Thames Water is having to develop water demand forecasts out to 2100 for London WRZ and Swindon and Oxfordshire WRZ based on uncertain population and household projections. The long-term issues relating to population growth and associated requirement for housing and water (and wastewater) infrastructure provision represent key issues. However, the UK's recent departure from the European Union (EU) may lead to greater short-term uncertainty regarding future population and housing growth.</p> |
|   | <p>More locally, Oxfordshire is growing and there is a subsequent pressure on housing. Oxfordshire currently has a population of around 677,000. Within Oxfordshire, Vale of White Horse District Council has a population of around 133,665. Of that, 49.8% are male and 50.2% are female. In terms of youth dependency, 19.3% are aged 0-15 compared to the 18.9% average for Oxfordshire. A working age population of 81,135 represents 60.7%, compared to the Oxfordshire average of 62.8%. 20% of the Districts population are aged over 65, compared to 18.2% in Oxfordshire.</p>  |

Section (Gate 1) Gate 1 Text

**Table A-5 - Population statistics and projections (millions)**

| Region          | Population 2014 (mid) | Population 2024 (mid) | % change |
|-----------------|-----------------------|-----------------------|----------|
| London          | 8.5                   | 9.7                   | 13.7%    |
| South East      | 8.9                   | 9.6                   | 8.1%     |
| South West      | 5.4                   | 5.8                   | 7.3%     |
| East of England | 6                     | 6.5                   | 8.9%     |
| England         | 54.3                  | 58.4                  | 7.4%     |

**A.6.1. Human health and deprivation**

It has been shown that, in some cases, people in disadvantaged areas experience greater exposure to negative impacts on human health including air pollution, sea flooding, and proximity to large industrial and waste management sites. The Index of Multiple Deprivation combines a number of indicators, chosen to cover a range of economic, social and housing issues, into a single deprivation score for each Lower Super Output Area in the UK. This allows each area to be ranked relative to one another according to their level of deprivation. The Indices are used widely to analyse patterns of deprivation, identify areas that would benefit from special initiatives or programmes and as a tool to determine eligibility for specific funding streams. The English Index of Multiple Deprivation (2015) and the Welsh Index of Multiple Deprivation (2014) have been developed slightly differently and cannot be compared directly.

Many of the least deprived areas in the country lie within the Thames Water supply area.

The Consumer Council for Water report (2015) on complaints and enquiries for the year 2014-15 shows that overall industry complaints increased by 2% compared to the previous year (from 9,957 to 10,138). However, there has been an overall downward trend in the number of complaints received, e.g. from 11,333 complaints in 2011/12. Thames Water reported 1,835 complaints for the 2014/15 period, a reduction of 15% from the previous year.

In general, the health of the population in the regions that the Thames Water supply area and Thames River basin covers is good. Health-related sustainability indicators are reported in the annual ONS Sustainable Development Indicators report.

| Section (Gate 1)                   | Gate 1 Text   |
|------------------------------------|---|
|                                    | <p>Within the Vale of White Horse District, 8% of children are living in poverty. This compares to 10% across Oxfordshire. It is noted that 14% of people have a limiting long-term illness in Vale of White Horse, the same as the average across Oxfordshire. According to the Indices of Deprivation 2015 there are no health deprivation hotspots within the Vale of White Horse, this compares favourably to the 3% of people that make up the Oxfordshire average. Further, there are 6,625 (8.7%) people aged 16-64 with a limiting long-term illness living in Vale of White Horse. This is lower than the average for Oxfordshire (8.9%).</p>  |
|                                    | <p>Emergency hospital admissions for children under 5 (per 1,000 population) is 98, comparing favourably to the Oxfordshire average of 122. The district performs similar better in respect of A&amp;E attendance for children under 5 (per 1,000 population) at 359 compared to 378.</p>   |
|                                    | <p>With respect to healthy lifestyles Vale of White Horse compares favourably to both Oxfordshire and England averages in terms of binge drinking (18.8%, 20%, 20.4% respectively) and smoking (16.2%, 22.2%, 18.7% respectively) In terms of healthy eating (consumption of 5+ fruit and vegetables a day) the Vale of White Horse District maintains the England average of 30.2% of the total population, better than the Oxfordshire percentage of 28.7%.</p> <p>Obesity in the district is lower than that in Oxfordshire and England for both children and adults. Physical activity among adults (undertaking at least 150 minutes per week in the past month) is also higher in Vale of White Horse District (70%) than both the Oxfordshire (69%) and England (64%).</p>   |
| <p><b>A.6.2. Affordability</b></p> | <p>Nationally, approximately 24% of households spend more than 3% of their income (after housing costs) on water and sewerage bills, and 11% spend more than 5%. Ofwat and government policy has focused on addressing this issue through continued incentives for water companies to drive out financial efficiencies in its operations and investment programmes, as well as consider the use of ‘social tariffs’ for those struggling to pay their water bills. In 2014-15, 2,682 Thames Water households were paying for water in line with the company’s means-tested social tariff. Thames Water’s level of “doubtful” debt (i.e. unpaid household water bills) remains the second highest in England and Wales (after North West England) reflecting the customer affordability challenge in the Thames Water supply area.</p> |

| Section (Gate 1)                                   | Gate 1 Text  |
|--|--|
|  | <p>Water metering can help customers reduce their bills through improved water use efficiency. However, there are concerns that metering can disadvantage vulnerable and low income groups: this is recognised by Thames Water through various activities to offer help to customers on low incomes, including special tariffs. Currently, only around 35% of Thames Water’s household customers are on a water meter with the company’s strategy being to increase meter penetration as far as economically feasible (i.e. taking account of the costs and practical difficulties of metering multi-occupancy dwellings, especially high-rise flats and apartment blocks) over the coming decades.</p> <p>In respect of housing in Vale of White Horse, 35,264 are owner occupied representing 71.4%. This compares favourably to the Oxfordshire average of 66.6%. Social rented households makes up 13.3% (compared to an Oxfordshire average of 14.2%) and 10.8% are rented from housing associated or social landlord, slightly higher than the Oxfordshire average of 9.7%.</p>  |
| <p><b>A.6.3<br/>Recreation and<br/>Tourism</b></p> | <p>There are many areas that may be used for recreation within the Thames River Basin. This includes National Trails, Areas of Outstanding Natural Beauty (AONB) (see Landscape and Visual Amenity topic), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) (see Biodiversity, Flora and Fauna topic). The River Thames flows within a few hundred yards of Abingdon town centre and the town is on two national trails; Thames Path and Vale Way, and one Long Distance Path; Oxfordshire Way. Further, Abingdon Museum, Abbey Gardens and Abbey Meadow represent key tourism opportunities for the district. A network of public rights of way provide recreational access across the downs, including parts of the Ridgeway National trail and a significant number of bridleways. There are wide panoramic views, including north from the Ridgeway, across the Vale landscapes to the Corallian Limestone ridge further north, and expansive views across the downs to the south of the wider region beyond the District. Farmoor is a large reservoir, filled from the adjacent River Thames, which provides opportunities for waterborne recreation, including fly and coarse fishing, bird watching, sailing and windsurfing.</p> <p>Angling is a popular pastime with over 339,000 rod licences sold in 2014/15 in the Environment Agency South East Region. The River Severn (a potential source of future water supplies) caters for the full range of freshwater angling; traditional river fly fishing for trout in the upper reaches, specimen chub and barbel in the middle reaches, roach and bream in the lower reaches and salmon fishing in some of the upland tributaries.</p> |

Section (Gate 1) Gate 1 Text

Public areas of open space, National Parks (see Landscape and Visual Amenity topic), country parks, Rights of Way, walking routes and cycle routes are also important with respect to recreation and tourism. Some, for example the Thames Path, form features of particular importance. The National Planning Policy Framework (NPPF) states planning policies should protect and enhance public rights of way and access. All Local Authorities are required to prepare and publish Rights of Way Improvement Plans (ROWIPs). These plans explain how improvements made by local authorities to the public rights of way network will provide a better experience for a range of users, including pedestrians, cyclists, horse riders, horse and carriage drivers, people with mobility problems, and people using motorised vehicles (e.g. motorbikes).

With respect to the study area a network of National Cycle Network routes (on and off carriageway), public footpaths, byways and bridleways all intersect the study area. A restricted byway also intersects the study area.

The NPPF defines green infrastructure as ‘a network of multi-functional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities’ (including rivers and ponds). Local planning authorities are required to plan positively for strategic networks of green infrastructure, and take account of the benefits of green infrastructure in reducing the risks posed by climate change. The majority of LAs have therefore developed Green Infrastructure Strategies or Studies addressing these issues. Green infrastructure will often play a large part in local recreational resources.

The Archaeology and Cultural Heritage topic identifies the importance of the Thames River Basin with respect to heritage assets, including 6 internationally-recognised World Heritage Sites and 2,228 Scheduled Monuments. Within the study area there are 539 Listed Buildings, nine Scheduled Monuments, two Registered Parks and Gardens and nine Conservation Areas.

| Section (Gate 1) Gate 1 Text         |   |
|--------------------------------------|---|
|                                      | <p>Tourism is the fifth largest industry in the UK and supports 22 million jobs in England (forming England’s third largest employer), contributing nearly £97billion to the economy. London represents one of the most visited cities in the world and 17.4 million tourists were reported to have visited London in 2014. With the potential to hold major international events (sporting and cultural), the additional non-domestic population can cause the number of people relying on water supply to swell relatively significantly, although this will be offset to some extent by the number of people on holiday or away from their homes. Many tourist attractions have some connection with the water environment. For example, various waterways were restored as a showcase project for the Olympics and now offer improved recreation value.</p> |
| <b>A.6.4. Economy and Employment</b> | <p>The Greater South East region is a prosperous region of the UK and has relatively low rates of unemployment. The Greater South East as a whole has shown a greater level of resilience to the effects of the recession that followed the banking crisis in 2008 compared to other parts of the UK. This is evident in economic indicators such as house prices and un-employment rates. Compared to a UK average in 2015 of 5.1%, the rate in the South East was 3.9%, 3.9% in the East and 3.7% in the South West. The rate in London was considerably higher at 6.3%. However, all are considerably lower than in 2010.</p>  |
|                                      | <p>The South East region is one of the most densely populated and urbanised parts of the UK, where businesses services make up a significant proportion of the economy; however, agriculture is also one of the more important industries outside of Greater London.</p>  |
|                                      | <p>Oxfordshire is described as a thriving economy with almost 31,000 business contributing 321.9 billion to the national economy. This is reflected locally with unemployment within Vale of White Horse as of January 2020 at 1,050 (1.3%). This compares favourably to the Oxfordshire average (1.5%). JSA claimants is as per the Oxfordshire average (0.1%) however youth unemployment claimants is higher (1.7%) than the Oxfordshire average (1.4%). Older unemployed (JSA/UC claimants) is lower (0.5%) than the Oxfordshire average (0.7%).</p>   |
| <b>A.6.5. Future Baseline</b>        | <p>Population is projected to grow at a rate between 6.9% and 13% across the Thames river basin area (10 years from 2012 to 2022) with an increasing proportion of people at or above state pension age. There is an estimated annual demand of 243,300 new homes in England (until 2031) as a result of the changing population, of which 152,800 are in the Thames River Basin District. Equally by 2040 Oxfordshire’s population is expected to grow to 944,700 with over 123,500 new houses constructed.</p>  |

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However, the result of the UK's recent departure from the European Union (EU) may lead to greater uncertainty in the short term regarding future population and housing growth.

Changes in water bills in the medium term are likely to remain below the rate of inflation as regulatory pressure and incentives, further competition and innovation drive cost-effective responses to future water service challenges, thereby limiting the impact on customer bills. Social tariffs will continue to be offered to provide support to customers experiencing affordability problems and further alternative tariff options are likely to be developed to try and resolve the high levels of doubtful household water bill debt experienced by Thames Water. Metering of Thames Water's household customers will continue to increase reaching a feasible maximum of around 70% over the next decade or so.

In response to recent studies access to the recreational resources, green spaces and the historic environment will have greater importance in future planning. For example the National Ecosystem Assessment and the Marmot Review, Fair Society, Healthy Lives, demonstrate the positive impact that nature has on mental and physical health and as a result the Government intends to establish a Green Infrastructure Partnership with civil society to support the development of green infrastructure in England. The 'Sustaining a Living Wales' consultation document has the aim to ensure that Wales has increasingly resilient and diverse ecosystems that deliver economic, environmental and social benefits. Improvements to the quality of the water environment and certain potential climate change impacts will present opportunities for an expanding tourist industry in the region.

| Section (Gate 1)         | Gate 1 Text   |
|--------------------------|---|
| <b>A.6.6. Key Issues</b> | <p>The key sustainability issues arising from the baseline assessment for population and human health are:</p> <ul style="list-style-type: none"> <li>• The need to ensure water supplies remain affordable especially for deprived or vulnerable communities, reflecting the importance of water and sewerage services for health and wellbeing.</li> <li>• The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas.</li> <li>• The need to ensure continuing safe, reliable and resilient provision of water and sewerage services to maintain health and wellbeing of the population.</li> <li>• The need to ensure a balance between different aspects of the built and natural environment that will help to provide opportunities for local residents and tourists, including opportunities for access to, protecting and enhancing recreation resources, green infrastructure and the natural and historic environment.</li> <li>• The need to accommodate an increasing population.</li> <li>• 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.</li> </ul> |

### A.3 Water

Table A-3 - Water baseline update from Gate 1 to Gate 2

| Section (Gate 1)                | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed                                     | Next steps |
|---------------------------------|--|-----------------|---|------------|
| <b>A.9.1 Thames River Basin</b> | The Thames River basin district covers over 16,200km <sup>2</sup> . It encompasses all of Greater London and extends from north Oxfordshire southwards to Surrey and from Gloucester in the west to the Thames Estuary and parts of Kent in the east. In total over 15 million people live in the Thames district with many entering daily to work | No              | SE England appears to have stayed the same between Gate 1 and Gate 1. | N/A        |

| Section (Gate 1) | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed   | Next steps |
|------------------|---|-----------------|---|------------|
|                  | or visit. In addition to Greater London, other urban centres in the river basin district include Luton, Reading and Guildford.  |                 |   |            |
|                  | The Thames River basin district has a rich diversity of wildlife and habitats, supporting many species of global and national importance from chalk streams such as the River Kennet to the Thames Estuary and salt marshes. The management catchments that make up the river basin district include many interconnected rivers, lakes, groundwater, estuarine and coastal waters. These catchments range from chalk streams and aquifers to tidal and coastal marshes. The river basin district is mostly rural to the west and very urban to the east where it is dominated by Greater London. Around 17% of the river basin district is urbanised and the rural land is mainly arable, grassland and woodland. | Yes             | Suggest Jacobs check any changes to land use (17%).   | N/A        |
|                  | The ecological and chemical classifications for surface waters within the Operational Catchment under the 2019 Cycle 2 are illustrated in Table A-11.   | Yes             | It is now more appropriate to use draft RBMP3 (dRBMP3) classifications, RNAGs, RFD etc. Yet to see any RBMP3 data for 2021 (at time of writing), so dRBMP3 is based on 2019 also - but the dataset it truly different (!). Use of dRBMP3 would align with Atkins' WFD work. | N/A        |
|                  | A summary of ecological status or potential and chemical status and objectives for surface water bodies (number of water bodies) including those with less stringent objectives and extended deadlines (blue shaded cells) are shown in Table A-12.   | No              | N/A   | N/A        |

| Section (Gate 1)   | Gate 1 Text   | Changes Needed?        | Reason why change is/isn't needed | Next steps |                  |                 |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
|--|---|------------------------|-----------------------------------|------------|------------------|-----------------|---|-----------------|----|-----|------|----------|------|------|------|------|---------|----|-----|-----|----|-----------|-----|---|-----|-------------------------------|-------------|----|---|---|----|-------|-----|----|-----|-----|-----|---|-----|
|  | Reasons for not achieving good status (RNAGS) and reasons for deterioration (RFD) in the Thames River Basin Operational Catchment are highlighted in Table A-13.  | No                     | N/A                               | N/A        |                  |                 |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
| <b>Table A-10 - Operational catchment surface waterbodies within the Thames River Basin</b>                | <p>Table A-10 - Operational catchment surface waterbodies within the Thames River Basin</p> <table border="1"> <thead> <tr> <th>Waterbody Categories</th> <th>Natural</th> <th>Artificial</th> <th>Heavily Modified</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>River, canals and surface water transfers</td> <td>287</td> <td>21</td> <td>106</td> <td>414</td> </tr> <tr> <td>Lake</td> <td>7</td> <td>47</td> <td>19</td> <td>73</td> </tr> <tr> <td>Coastal</td> <td>0</td> <td>0</td> <td>1</td> <td>1</td> </tr> <tr> <td>Estuarine</td> <td>1</td> <td>4</td> <td>5</td> <td>10</td> </tr> <tr> <td>Groundwater</td> <td>47</td> <td>0</td> <td>0</td> <td>47</td> </tr> <tr> <td>Total</td> <td>342</td> <td>72</td> <td>131</td> <td>545</td> </tr> </tbody> </table> | Waterbody Categories   | Natural                           | Artificial | Heavily Modified | Total           | River, canals and surface water transfers | 287             | 21 | 106 | 414  | Lake     | 7    | 47   | 19   | 73   | Coastal | 0  | 0   | 1   | 1  | Estuarine | 1   | 4 | 5   | 10                            | Groundwater | 47 | 0 | 0 | 47 | Total | 342 | 72 | 131 | 545 | Yes | dRBMP3 has resulted in some waterbody changes when compared to RBMP2 - which may have led to changes to the number of waterbodies in each category. | N/A |
| Waterbody Categories   | Natural   | Artificial             | Heavily Modified                  | Total      |                  |                 |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
| River, canals and surface water transfers  | 287   | 21                     | 106                               | 414        |                  |                 |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
| Lake   | 7   | 47                     | 19                                | 73         |                  |                 |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
| Coastal  | 0   | 0                      | 1                                 | 1          |                  |                 |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
| Estuarine  | 1   | 4                      | 5                                 | 10         |                  |                 |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
| Groundwater  | 47  | 0                      | 0                                 | 47         |                  |                 |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
| Total  | 342   | 72                     | 131                               | 545        |                  |                 |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
| <b>Table A-11 - Operational Catchment Ecological and Chemical Classification of the Thames River Basin</b> | <p>Table A-11 - Operational Catchment Ecological and Chemical Classification of the Thames River Basin</p> <table border="1"> <thead> <tr> <th rowspan="2">Number of water bodies</th> <th colspan="5">Ecological Status or Potential</th> <th colspan="2">Chemical Status</th> </tr> <tr> <th>Bad</th> <th>Poor</th> <th>Moderate</th> <th>Good</th> <th>High</th> <th>Fail</th> <th>Good</th> </tr> </thead> <tbody> <tr> <td>498</td> <td>19</td> <td>116</td> <td>333</td> <td>30</td> <td>0</td> <td>498</td> <td>0</td> </tr> </tbody> </table>   | Number of water bodies | Ecological Status or Potential    |            |                  |                 |   | Chemical Status |    | Bad | Poor | Moderate | Good | High | Fail | Good | 498     | 19 | 116 | 333 | 30 | 0         | 498 | 0 | Yes | This must now be dRBMP3 data. | N/A         |    |   |   |    |       |     |    |     |     |     |   |     |
| Number of water bodies   | Ecological Status or Potential  |                        |                                   |            |                  | Chemical Status |   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
|  | Bad   | Poor                   | Moderate                          | Good       | High             | Fail            | Good                                      |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |
| 498  | 19  | 116                    | 333                               | 30         | 0                | 498             | 0   |                 |    |     |      |          |      |      |      |      |         |    |     |     |    |           |     |   |     |                               |             |    |   |   |    |       |     |    |     |     |     |   |     |

| Section (Gate 1) Gate 1 Text   |   | Changes Needed? | Reason why change is/isn't needed | Next steps |      |                |   |     |      |       |      |      |       |                   |
|--|---|-----------------|-----------------------------------|------------|------|----------------|---|-----|------|-------|------|------|-------|-------------------|
| <b>Table A-12 - Operational Catchment Ecological and Chemical Status Objectives for the Thames River Basin</b> | Ecological status or potential  |                 | Chemical status                   |            |      | Yes            | This must now be dRBMP3. Note that the 'beyond 2027' category now has specific actual dates to it e.g. 2063 etc. It will be determined if 'beyond 2027' is a suitable summary at subsequent project stages. | N/A |      |       |      |      |       |                   |
|  |   | Bad             | Poor                              | Moderate   | Good |                |   |     | High | Total | Fail | Good | Total |                   |
|  | By 2015   | 7               | 27                                | 143        | 39   |                |   |     | 0    | 216   | 2    | 493  | 495   |                   |
|  | By 2021   | 0               | 0                                 | 1          | 11   |                |   |     | 0    | 12    | 0    | 0    | 0     |                   |
|  | By 2027   | 0               | 2                                 | 29         | 239  |                |   |     | 0    | 270   | 0    | 3    | 3     | Extended deadline |
|  | Beyond 2027   | 0               | 0                                 | 0          | 0    |                |   |     | 0    | 0     | 0    | 0    | 0     |                   |
|  | Total   | 7               | 29                                | 173        | 289  |                |   |     | 0    | 498   | 2    | 496  | 498   |                   |
|  | Less stringent  |                 |                                   |            |      | Less stringent |   |     |      |       |      |      |       |                   |
| <b>Table A-13 - Operational Catchment Sectors contributing to deterioration of the Thames River Basin</b>      | <i>refer to G1 SEA</i>  |                 |                                   |            |      | -              |   | N/A |      |       |      |      |       |                   |
| <b>A.9.2. Local Water Characteristics</b>  | <p>The River Ock and the River Thames form the central landscape features in the vale landscapes within the Vale of White Horses District. The River Ock flows west through the centre of the District until it reaches the Thames at Abingdon. Numerous streams and brooks flow from the foot of the downs, and from the ridge to the north, across the vale and into the Ock. The Thames and its broad floodplain wrap around the eastern and western edges of the District. To the east of Abingdon,</p> |                 |                                   |            |      | No             |   | N/A |      |       |      |      |       |                   |

| Section (Gate 1) | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed                                  | Next steps |
|------------------|--|-----------------|--|------------|
|                  | and to the north of Buckland, the Thames valley floor extends into the District on river terraces of sand and gravel elevated just above the alluvium of the floodplain.   |                 |  |            |
|                  | <p>Within the study area, there are multiple river crossings, including:</p> <ul style="list-style-type: none"> <li>• The River Ock and its tributaries, including Land Brook confluence to the Thames;</li> <li>• Ginge Brook and Mill Brook;</li> <li>• Sandford Brook (source to the river Ock);</li> <li>• Cow Common Brook and Portobello Ditch;</li> <li>• Childrey Brook and Norbrook at Common Barn;</li> <li>• Letcombe Brook;</li> <li>• Childrey and Woodhill Brooks; and</li> <li>• Frilford and Marcham Brook.</li> </ul>   | Yes             | Assume this is river crossings in general i.e. not scheme related? | Clarify    |
|                  | The River Floodplain consists of low-lying river terraces and valley bottoms following the courses of a number of rivers and streams that flow through the District. In particular, the landscape type includes the River Thames as it winds along the northern and north-eastern boundaries of the district, and the River Ock which flows west to east through the centre of the Vale towards the River Thames. Boundaries are generally determined by the edge of the floodplain, as defined by the Environment Agency's Flood Zone 2, which equates to land having between 1 in 100 and 1 in 1000 annual probability of river flooding. The majority of the proposed site is situated within Flood Zone 3. | No              | N/A  | N/A        |

| Section (Gate 1) | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed  | Next steps              |
|------------------|---|-----------------|--|-------------------------|
|                  | <p>Low-lying level areas of floodplains situated on alluvial deposits are the main characteristics of the surrounding landscape. There is the presence of open water in the form of rivers, with channels, streams and brooks. Land use is generally pastoral, often with wet meadows, including those used for grazing, with tree species including willow and alder. Woodland is limited within the floodplain. Sections of the Thames Path National Trail cross through the District. Farmoor reservoir is the closest water body to the proposed site, situated 7 km north of the study area, filled from the adjacent River Thames, which provides further opportunities for waterborne recreation. In some instances, there are surrounding urban influences, including housing, roads and utilities associated with settlements such as Abingdon and Kennington. Gravel extraction has occurred within the Thames floodplain at the north-eastern edges of the District, resulting in water filled pits. Elsewhere, such as along the majority of the River Ock, the route of watercourses are peaceful, semi-enclosed and sparsely settled other than at river crossings.</p> | Yes             | Farmoor Reservoir technically not the closest waterbody.   | Updated in EAR baseline |
|                  | <p>Source Protection Zones (SPZ) provide additional protection to safeguard drinking water quality. This is achieved through constraining the proximity of an activity that may impact upon drinking water abstraction. They are defined around large and public potable groundwater abstraction sites, and the groundwater travel time to an abstraction. The closest source protection zone (zone 1, 2 and 3) is located 3km southwest of the study area. In addition, the proposed site lies within the Lower Thames (Cookham Egham Teddington) Drinking Water Safeguard Protection Zone, as shown on Figure B-7.</p>  | Yes             | Need to be clear on what the original water of the SPZ is, presume deep groundwater. Needs to be clearer on risk of pollution or aquitard. | See EAR baseline.       |
|                  | <p>Surface and ground water quality is predicted to increase, though significant challenges remain as noted in the River Basin Management Plan. In the UK, as of</p>  | Yes             | These are old statistics.  | Update with 2019        |

| Section (Gate 1)              | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed  | Next steps   |
|-------------------------------|---|-----------------|--|--|
| <b>A.9.3. Future Baseline</b> | 2015, 35% of surface water bodies assessed under the Water Framework Directive (WFD) were in high or good status. There has been small decrease in the number of water bodies awarded high or good surface water status between 2010 and 2015. Comparatively more estuarine and coastal waters are in high or good status than lakes, rivers and canals. It is anticipated that overall water quality will improve as the UK aims to ensure that the objectives of the WFD (all aquatic ecosystems and terrestrial ecosystems and wetlands to reach good chemical and ecological status by 2027). |                 |  | (dRBMP3) - understand that no waterbody in England is 'good' or 'high' |
|                               | Climate change and a growing population will increase pressure on water resources. New development will place additional requirements on water resources for water supply have the potential to deteriorate water quality through wastewater discharges.  | Yes             | Amend grammar in this sentence. Add 'and will' between 'supply' and 'have' | Updated in EAR baseline  |
| <b>A.9.4 Key Issues</b>       | There are considerable pressures on water resources with resulting major impacts on many of the waterbodies across the region. As with most water bodies in England, there are a range of significant water management issues manifested in the Thames RBD, such as pollution from towns, cities and transport which are noted as being issues for 17% of the water bodies in the Thames RBD.   | Yes             | Update statistics, as appropriate, for dRBMP3.                             | Updated in EAR baseline  |

## A.4 Soil

Table A-4 – Soil baseline update from Gate 1 to Gate 2

| Section (Gate 1)     | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed   | Next steps   |
|----------------------|--|-----------------|---|--|
| <b>A.8.1 Geology</b> | Geological sites maybe sensitive to changes in water quality, water levels (for example waterlogged deposits), pollution and land use practices. The River Thames catchment is geologically diverse and includes a number of major aquifers. The Thames Valley includes areas of limestone in the Cotswolds as well as Chalk and drift deposits in the Thames floodplain. The London area includes major Chalk aquifers and to the south of London, there are Greensand aquifers (towards the North Downs).  | Yes             | Should be changed to reflect the geology and aquifers directly under the site and of the immediate surrounding area - this is reflected in Supporting Document B2, Environmental Appraisal Report (terrestrial) | No new information needed - see Supporting Document B2, Environmental Appraisal Report (terrestrial) |
|                      | Geological Conservation Review (GCR) sites relate to geologically important sites, and are important on a national and international level. GCR are also designated as SSSI. Several geological SSSI are found within the catchments, however some are not directly designated because of geology, although the geological variation does impact on the flora present. The main reasons for a geological citation for an SSSI are related to disused quarries and geological important sites such as gravels used to reconstruct climate change. There are 117 GCR within the Thames catchment. No GCR fall within the study area, however a Dry Sandford Pit GCR Site is identified approximately 160m north. See Figure B-6 in Gate 1 SEA for further information. | Yes             | Text should be changed to reflect extent of Gate 2 buffer from the indicative location for SESRO (250m), i.e. no GCR or SSSI. Gate 1 buffer is 2km from the indicative location for SESRO.                      | No new information needed - see Supporting Document B2, Environmental Appraisal Report (terrestrial) |
| <b>A.8.2. Soils</b>  | The Soil Map of England and Wales identifies dominant soil subgroups. In terms of agricultural land quality, planning policy seeks to protect best and most versatile  | No              | N/A   | N/A  |

| Section (Gate 1) | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed  | Next steps   |
|------------------|---|-----------------|--|--|
|                  | agricultural land (defined as land in Grades 1, 2 and 3a of the Agricultural Land Classification).  |                 |  |  |
|                  | The majority of land in the Thames river basin is farmed, and it is noted that agricultural practices have a major influence on soil quality. Good soil structure is beneficial to water retention and crop yield. It can be seen from Figure B-6 that the majority of agricultural land within the study area is classified as Grade 3 and Grade 4, with smaller pockets of Grade 2, Non-Agricultural and Urban also intersecting. Soil quality and structure is affected by changes in land use, groundwater levels and farming practices. Soil quality can influence run-off rates and therefore flooding and water quality. | Yes             | Text should be updated to reflect the recent detailed soil survey which has been used for the Gate 2 report. Also state that the majority of soil is mapped as best and most versatile, though some small pockets of land were not surveyed. | No new information needed - see Supporting Document B2, Environmental Appraisal Report (terrestrial) |
|                  | Contaminated land is defined as land where substances could cause significant harm to people or protected species; or significant pollution of surface waters or groundwaters. Some types of contaminated land can be designated as special sites for a variety of reasons, including land that seriously affects drinking water, surface waters (e.g. lakes and rivers) and important groundwater sites. Data on contaminated land are compiled by the British Geological Society. Of note, both historic and active landfill sites are recorded as being within the study area. See Figure B-6 for further details.           | Yes             | The text is mostly correct, however should be updated to cover the Gate 2 buffer area.   | No new information needed - see Supporting Document B2, Environmental Appraisal Report (terrestrial) |

| Section (Gate 1)             | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed  | Next steps   |
|------------------------------|---|-----------------|--|--|
|                              | Minerals Safeguarding Areas (MSA) are designated by Mineral Planning Authorities for areas that include known deposits of minerals which are desired to be kept safeguarded from unnecessary sterilisation by non-mineral development. Mineral Safeguarding Areas are designated within the study area towards the north under Policy M8 and M3 (Mineral Strategic Resource Area).  | Yes             | Text should be updated to reflect Gate 2 buffer and MSA within i.e. none   | No new information needed - see Supporting Document B2, Environmental Appraisal Report (terrestrial) |
|                              | With respect to Control of Major Accident Hazard (COMAH) sites, no sites have been identified within 2km of the study area.   | No              | N/A  | N/A  |
| <b>A.8.3 Future Baseline</b> | In the absence of strategic policy, it is likely that greenfield sites will experience increasing pressure for development in preference to the complexities of redeveloping previously developed and potentially contaminated sites. This could reduce available high quality soil resources and fail to realise the potential of existing capacity within existing urban and previously developed areas.  | No              | N/A  | N/A  |
| <b>A.8.4 Key Issues</b>      | There are areas considered Best and Most Versatile (Agricultural Land) within the study area. There are also areas of historic and active landfill within the study area. More generally it is noted that many areas of land in the UK have been contaminated by past industrial and other human activities, including former factories, storage depots and landfills. Transportation infrastructure is also a frequent source of land contamination. Land at the full range of potentially contaminated sites could be contaminated by a wide range of harmful substances such as oils and tars, heavy metals, asbestos and chemicals. | Yes             | Text should include unexploded ordnance risk based on recent detailed survey identifying high density of unexploded ordnance on site in a specific area - see Chapter 8 of terrestrial | No new information needed - see Supporting Document B2, Environmental Appraisal Report (terrestrial) |

| Section (Gate 1) | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed | Next steps   |
|------------------|---|-----------------|-----------------------------------|--|
|                  |   |                 | EAR (supporting document B2).     |  |
|                  | <p>While there are no special sites of contamination noted within study area, by its nature, it is often very difficult to know where land has been contaminated previously or is currently suffering ongoing contamination. As such the number of known sites of contamination is likely to be only a very small fraction of the overall number of potentially contaminated sites. Given the present and historic levels of industrial, commercial and transportation activity across the wider area, as well as the wide range of potential activities undertaken it is suggested that there could be a number of areas of contaminated land present.</p> | No              | N/A                               | <p>See Gate 2 potential sources of contamination plan included in report. GI targeting these sites to characterise potential contamination across the site - see Chapter 8 of Gate 2 terrestrial EAR (supporting document B2).</p> |

## A.5 Air and Noise

Table A-5 – Air and Noise baseline update from Gate 1 to Gate 2

| Section (Gate 1)                  | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed  | Next steps |
|-----------------------------------|--|-----------------|--|------------|
| <b>A.1. Air Quality and Noise</b> | A local authority declares an AQMA when UK National air quality objectives are unlikely to be met. There are 81 AQMA in total within the Thames River Basin. The figure demonstrates that the two main pollutants of concern are NO <sub>2</sub> and PM <sub>10</sub> . The majority of the AQMAs in the UK have been declared because of emissions from road transport. | No              | Unable to identify whether there are 81 AQMA's within the basin.<br><a href="https://www.thameswater.co.uk/media-library/home/about-us/regulation/drought-plan/strategic-environmental-assessment/draft-drought-plan-sea-environmental-report-appendices.pdf">https://www.thameswater.co.uk/media-library/home/about-us/regulation/drought-plan/strategic-environmental-assessment/draft-drought-plan-sea-environmental-report-appendices.pdf</a> (written in 2016) reports 81. However, if this number is correct, it seems unlikely that this number would have changed significantly between 2016 to now. | N/A        |
|                                   | This latest air quality strategy does not remove any of the objectives set out in the previous strategy or its addendum, apart from replacing the provisional 2010 PM10 objective with the exposure reduction approach and anew ozone (O <sub>3</sub> ) objective to protect ecosystems, in line with the EU target value set out in the Third Daughter Directive.       | No              | Text remains valid   | N/A        |

| Section (Gate 1) | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed  | Next steps |
|------------------|---|-----------------|--|------------|
|                  | <p>In April 2015, the Supreme Court ruled that the UK Government must redraft the national nitrogen dioxide (NO<sub>2</sub>) air quality action plan, as well as 16 regional action plans, including Greater London, with the aim of ensuring that these areas reach compliance with legal NO<sub>2</sub> limits as soon as possible. In response, the Mayor of London has been engaging with the Government to highlight priorities for action in London, and provide support, data and other information to support the redrafting of the national and Greater London regional NO<sub>2</sub> air quality action plans to achieve relevant EU limit values in Greater London.</p> | Yes             | <p>The London Environment Strategy was published in May 2018. It sets out the Mayor's overall vision to protect and improve London's environment. It also sets a direction of travel for the Mayor and his partners who need to collaborate to achieve these ambitions. The Mayor also published an Implementation Plan, which set out those actions that the Mayor has prioritised to take forward directly between 2018 and 2023 to help implement the policies and proposals in the strategy. Specific actions include introducing the world's first Ultra Low Emission Zone (ULEZ) in April 2019 and is extending it up to the North and South Circular in October 2021 and introducing tougher standards for heavy vehicles operating in the London wide Low Emission Zone (LEZ) in March 2021.</p> |            |

| Section (Gate 1)       | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed | Next steps |
|------------------------|---|-----------------|-----------------------------------|------------|
|                        | <p>Locally, air quality in the Vale of White Horse district is generally very good. There are however air pollution hotspots where nitrogen dioxide (NO<sub>2</sub>) associated with traffic emissions is higher and where it has been necessary to declare an Air Quality Management Area (AQMA). These areas are typically where houses are close to busy roads and pollution can be worsened by problems with congestion. There are currently three AQMA designated within the Vale of White Horse district: Abingdon AQMA, Botley AQMA and Marcham AQMA. These are areas where the levels of pollutants in the air have reached those identified by the government as harmful to health and are in breach of what is called the 'national air quality objectives. Figure B-1 shows the location of AQMA in proximity to the study area.</p> | No              | Text remains valid                | N/A        |
| <b>A.1.1. Abingdon</b> | <p>Air pollution levels have been monitored in Abingdon since 1995 and due to levels of NO<sub>2</sub> exceeding the national air quality objectives, an AQMA was declared in 2006.</p>   | No              | Text remains valid                | N/A        |
|                        | <p>The air pollution problem in Abingdon is not unlike many others across the country in that it comprises a busy road network and relatively narrow streets which serve to prevent the dispersion of pollutants therefore trapping the pollution at street level.</p>  | No              | Text remains valid                | N/A        |

| Section (Gate 1)     | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed   | Next steps   |
|----------------------|--|-----------------|---|--|
| <b>A.1.2. Botley</b> | Air pollution here has also been monitored since 1995. An AQMA was declared in 2008 again as a result of NO <sub>2</sub> levels exceeding the national objectives.   | No              | Text remains valid  | N/A  |
|                      | The air pollution problem in Botley is attributed to the volume of traffic on the A34. Air pollution levels are high where there are houses close to the A34.  | No              | Text remains valid  | N/A  |
| <b>A.1.3 Marcham</b> | Air pollution monitoring in Marcham commenced in 2009 with an AQMA designated in 2015 due to NO <sub>2</sub> exceedances.  | No              | Text remains valid  | N/A  |
|                      | The air pollution problem in Marcham is due to the volume of traffic on the A415 which passes through Marcham, congestion caused by the narrowness of the roads and the fact that some houses are very close to the road.  | No              | Text remains valid  | N/A  |
|                      | The monitoring results recorded in 2019 show a decrease in pollution levels from 2018 in most areas of the District, following the static trend identified in the previous year. In Botley and Marcham exceedances of the annual objective for NO <sub>2</sub> continue to be recorded albeit at lower levels than 2018. In Abingdon levels at facades are now below 36µg/m <sup>3</sup> , low enough for serious consideration to be given to revoking the AQMA. The highest levels of nitrogen dioxide recorded were in Botley close to the A34. Results from kerbside | Yes             | In Marcham, monitoring results in 2020 show a continued decrease in annual mean NO <sub>2</sub> concentrations. No exceedances recorded in Marcham during 2020. In Botley, exceedances were recorded in 2020. | See Supporting Document B2, Environmental Appraisal Report (terrestrial) |

| Section (Gate 1) | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed   | Next steps   |
|------------------|---|-----------------|---|--|
|                  | <p>monitoring predict levels at the nearest facades of residential properties would be above the national air quality objective, however actual measurements at these facades were high but fell below this objective.</p>  |                 |   |  |
|                  | <p>In 2019, four exceedances of the annual objective of NO<sub>2</sub> were identified in the council district, within Botley and Marcham AQMAs, at monitoring sites that had registered exceedances in previous years. Over the last five years NO<sub>2</sub> levels in the district show a gradually decreasing trend. In Abingdon, monitoring has demonstrated that for another year there have been no exceedances of the objective at sensitive receptors. Consideration may now be given to revoking the AQMA which would involve a consultation exercise. A reduction in monitored levels is also exhibited in Botley and Marcham however the Air Quality Objective (AQO) continues to be breached in these two AQMA. The council priorities for the following reporting year include starting the process of updating the Air Quality Action Plan, finalising and publishing the updated AQ Developers Guidance document, give detailed consideration to the</p> | <p>Yes</p>      | <p>In 2020, no exceedances in Marcham, two exceedances in Botley. No exceedances in Abingdon.</p> | <p>See Supporting Document B2, Environmental Appraisal Report (terrestrial).</p> |

| Section (Gate 1)   | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed | Next steps |
|--------------------|--|-----------------|-----------------------------------|------------|
|                    | <p>revocation of the Abingdon AQMA and re-scheduling those anti-idling campaign actions that were planned for the Spring/Summer 2020 but have been delayed due to the current pandemic.</p>  |                 |                                   |            |
| <b>A.1.4 Noise</b> | <p>With respect to noise, seven Noise Action Planning Important Areas have been identified within the study area (See Figure B-1). Six of these are designated from road sources (the A338 and Frilford/Marcham Road) at locations including East Hanney, Marcham and Abingdon and one from rail (Great Western Rail Line) which intersects the study area at Steventon.</p> | No              | N/A                               | N/A        |
|                    | <p>Also shown on Figure B-1 are the associated road and rail noise contours which indicate a number of primary noise sources within the study area including the Great Western Rail Line, A34, A338, Frilford/Marcham Road and Abingdon Road.</p>  | No              | N/A                               | N/A        |

| Section (Gate 1)              | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed | Next steps |
|-------------------------------|---|-----------------|-----------------------------------|------------|
| <b>A.1.5. Future Baseline</b> | At the national level air quality is generally improving as industrial practices, energy sources and tighter environmental legislation have contributed to reductions in pollutants. However, there are local issues with air quality – interventions outside the reservoir proposal will seek to address some of these issues, but opportunities exist for the reservoir to influence this issue.  | No              | N/A                               | N/A        |
| <b>A.1.6. Key Issues</b>      | Air quality has improved in the UK over the last sixty years as a result of the switch from coal to gas and electricity for heating of domestic and industrial premises, stricter controls on industrial emissions, higher standards for the composition of fuel and tighter regulations on emissions from motor vehicles. However, poor air quality – particularly from motor vehicles – remains a significant issue for community health and for biodiversity, especially in/downwind of urban areas and major transport networks. It is also to be noted that the use of solid fuels (including for 'lifestyle' fuel such as wood burners in homes) are recognised as being a major contributor to poor air quality in towns, particularly during winter months. | No              | N/A                               | N/A        |

| Section (Gate 1) | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed | Next steps |
|------------------|--|-----------------|-----------------------------------|------------|
|                  | <p>There are currently three AQMA designated within the Vale of White Horse district: Abingdon AQMA, Botley AQMA and Marcham AQMA. Seven Noise Action Planning Important Areas have been identified within the study area. Associated road and rail noise contours which indicate a number of primary noise sources within the study area including the Great Western Rail Line, A34, A338, Frilford/Marcham Road and Abingdon Road.</p> | No              | N/A                               | N/A        |

## A.6 Climate Factors

An update of the Climate Factors assessment has been undertaken at Gate 2 and there are no anticipated changes from the Gate 1 assessment and SEA scoring to be made. See Gate 1 baseline below:

Table A-6 – Climate baseline (Gate 1)

| Section (Gate 1)               | Gate 1 Text   |
|--------------------------------|---|
| <b>A.3. Climate Change</b>     | Earth’s climate is changing due to emissions of greenhouse gases (GHGs) resulting from human activities and the effects are felt at a global scale. Climate change within the UK has the potential to pose significant risks to population, the economy and ecosystems through changes in environmental conditions, including increased frequency of severe flooding and storm events, increased temperatures, loss of habitats and increased pressure on water resources. The bulk of emissions which contribute to climate change are derived from demand for energy, with the largest contributor being carbon dioxide (CO <sub>2</sub> ) emitted when fossil fuels are burnt. As of 2015, emissions from the energy supply, business and transport sectors accounted for 70% of the UK’s total net direct GHG emissions.  |
| <b>A.3.1 UK Carbon Budgets</b> | <p>National policy on climate change is underpinned by the Climate Change Act 2008 and the UK’s international commitments to reduction of greenhouse gas emissions, in particular the Paris Agreement. The Climate Change Act 2008 established a legally binding target to reduce the UK’s ‘net’ greenhouse gas emissions by at least 80% below base year (1990) levels by 2050 and contribute to global emission reductions to limit global temperature rise to as little as possible above 2°C.</p> <p>The UK statutory target for reducing GHG emissions was strengthened in May 2019 to Net Zero by 2050 meaning that the level of emissions in 2050 must 100% lower than the 1990 baseline. The strengthened target reflects the necessity of limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. The imperative of limiting global warming to within these parameters was outlined in the Paris Agreement and reinforced by the Intergovernmental Panel on Climate Change (IPCC) in their Special Report on Global Warming of 1.5°C.</p> |

Section (Gate 1) Gate 1 Text

Under the UK Climate Change Act 2008, the UK has so far set six “carbon budgets” (see table). These set interim five-year caps on emissions from 2008 to 2037. The UK is currently in the third budget period (2018 to 2022). Targets are set by Government through consultation with the Committee on Climate Change (CCC), who suggest levels of emissions reductions and mechanisms to make these reductions. The UK has succeeded in meeting the first and second budget periods and is on track to meet the third. However, it is not on track to meet the fourth and fifth budget. This has resulted in the recently announced Government revised interim target to cut emissions by 68% before 2030 (as opposed to 57%). The sixth carbon Budget has also been recently announced by the CCC and with it a new interim target of 78% reduction by 2035.

Since the Climate Change Act was enacted, the Paris Agreement has been signed and ratified by the majority of the world’s Governments. This reflects more recent scientific evidence and commits signatories “to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels” as opposed to 2°C above pre-industrial levels as set out in the Act.

In June 2019, The UK became the first major economy in the world to pass laws to end its contribution to global warming by 2050. The target will require the UK to bring all greenhouse gas emissions to net zero by 2050, compared with the previous target of at least 80% reduction from 1990 levels. Net zero means any emissions would be balanced by schemes to offset an equivalent amount of greenhouse gases from the atmosphere, such as planting trees or using technology like carbon capture and storage. The UK has already reduced emissions by 42% while growing the economy by 72% and has put clean growth at the heart of its modern Industrial Strategy. This could see the number of “green collar jobs” grow to 2 million and the value of exports from the low carbon economy grow to £170 billion a year by 2030.

**Section (Gate 1) Gate 1 Text**

Following on from this, the UK Government released a Ten Point Plan in November 2020 to illustrate how net zero will be targeted and achieved. The Ten Point Plan for a Green Industrial Revolution includes the following:

- Point 1 – Advancing Offshore Wind;
- Point 2 – Driving the Growth of Low Carbon Hydrogen;
- Point 3 – Delivering New and Advanced Nuclear Power;
- Point 4 – Accelerating the Shift to Zero Emission Vehicles;
- Point 5 – Green Public Transport, Cycling and Walking;
- Point 6 – Jet Zero and Green Ships;
- Point 7 – Greener Buildings;
- Point 8 – Investing in Carbon Capture, Usage and Storage;
- Point 9 – Protecting Our Natural Environment; and
- Point 10 – Green Finance and Innovation.

**Table A-1 UK Carbon Budgets**

**Table A-1 - UK Carbon Budgets**

| Budget number | Time-period | Carbon Budget Level       | Reduction below 1990 levels          |
|---------------|-------------|---------------------------|--------------------------------------|
| 1             | 2008-2012   | 3,018 MtCO <sub>2</sub> e | 25%                                  |
| 2             | 2013-2017   | 2,782 MtCO <sub>2</sub> e | 31%                                  |
| 3             | 2018-2022   | 2,544 MtCO <sub>2</sub> e | 37% by 2020                          |
| 4             | 2023-2027   | 1,950 MtCO <sub>2</sub> e | 51% by 2025                          |
| 5             | 2028-2032   | 1,725 MtCO <sub>2</sub> e | 57% (revised to 68% in 2020) by 2030 |
| 6             | 2033-2037   | 965 MtCO <sub>2</sub> e   | 78% by 2035                          |

Targets are set by Government through consultation with the Committee on Climate Change

**A.3.2. Regional estimates of**

Table A-2 illustrates the regional estimates of CO<sub>2</sub> emissions per sector in the South East of England as of 2018.

| Section (Gate 1)   | Gate 1 Text   |        |  |                                   |              |          |              |           |              |                 |      |
|--|---|--------|--|-----------------------------------|--------------|----------|--------------|-----------|--------------|-----------------|------|
| <b>carbon dioxide emissions</b>  | <p>This amounts to a total of 42.7 million tonnes CO<sub>2</sub> and represents a change of -2% from the previous year. At the national level, there was a 2.0% decrease in emission totals between 2017 and 2018 due to a decrease in the use of coal and gas for electricity generation. Coal-fired power generation is being phased out, this is shown with coal production reaching a record low in the January to March quarter of 2020, down 26% on the same period in 2019 .</p>   |        |  |                                   |              |          |              |           |              |                 |      |
| <b>Table A-2<br/>Regional estimates of CO<sub>2</sub> emissions per sector</b> | <table border="1" data-bbox="411 490 1220 672"> <caption>Table A-2 - Regional estimates of CO<sub>2</sub> emissions per sector</caption> <thead> <tr> <th>Sector</th> <th>CO<sub>2</sub> emissions (million tonnes of CO<sub>2</sub>)</th> </tr> </thead> <tbody> <tr> <td>Industrial, Commercial and Public</td> <td>11.7 (27.4%)</td> </tr> <tr> <td>Domestic</td> <td>13.3 (31.1%)</td> </tr> <tr> <td>Transport</td> <td>19.7 (46.1%)</td> </tr> <tr> <td>Land Use Change</td> <td>-1.9</td> </tr> </tbody> </table>  | Sector | CO <sub>2</sub> emissions (million tonnes of CO <sub>2</sub> ) | Industrial, Commercial and Public | 11.7 (27.4%) | Domestic | 13.3 (31.1%) | Transport | 19.7 (46.1%) | Land Use Change | -1.9 |
| Sector   | CO <sub>2</sub> emissions (million tonnes of CO <sub>2</sub> )  |        |  |                                   |              |          |              |           |              |                 |      |
| Industrial, Commercial and Public  | 11.7 (27.4%)  |        |  |                                   |              |          |              |           |              |                 |      |
| Domestic   | 13.3 (31.1%)  |        |  |                                   |              |          |              |           |              |                 |      |
| Transport  | 19.7 (46.1%)  |        |  |                                   |              |          |              |           |              |                 |      |
| Land Use Change  | -1.9  |        |  |                                   |              |          |              |           |              |                 |      |
| <b>A.3.3. Regional precipitation and temperatures</b>                          | <p>The site at Abingdon falls into the Southern region as defined by the Met Office. As noted for this region, the mean annual temperature over the region varies from around 11.5 °C (central London and along the south coast) to 9.5 °C (over higher ground inland). Temperature shows both seasonal and diurnal variations. January is the coldest month with mean daily minimum temperatures across the region varying from 3 °C in London and along the coast to about 0.5 °C on higher ground. July is the warmest month, with mean daily maximum temperatures around 21 °C over the higher ground along the south coast. Extreme maximum temperatures can occur in July or August and are usually associated with heat waves lasting several days.</p> <p>The wettest areas are therefore the South Downs and the higher parts of Dorset, with an average of over 950 mm per year. In contrast, the Thames Valley, London and the north Kent coast normally receive less than 650 mm of rain per year, and less than 550mm around the Thames Estuary. These values can be compared with annual totals around 500 mm in the driest parts of eastern England and over 4000 mm in the western Scottish Highlands.</p> <p>Over much of Southern England, the number of days with rainfall totals of 1 mm or more ('wet days') tends to follow a pattern similar to the monthly rainfall totals. In winter (December to February), there are 35 to 40 wet days on average over the Downs and the higher parts of the west, decreasing to less than 30 days around the Thames Estuary. In summer (June to August) there are about 25 wet days, with the North Downs and western areas being most prone.</p> |        |  |                                   |              |          |              |           |              |                 |      |

| Section (Gate 1)                                 | Gate 1 Text   |
|--|---|
|  | <p>The region can be subject to dry periods that place demands upon water supplies and require conservation measures such as summer hosepipe bans. If a period with below average rainfall includes winter months as well as the high-demand summer months, then conditions can become severe as the winter is the normal recharge time not only for reservoirs but the chalk aquifers upon which much of the region relies for water supplies. Examples include the period November 2004 to February 2006, when about 75% of the normal rainfall occurred over the area, making it the driest such period since 1932/34.</p>   |
| <p><b>A.3.4. Predicted Future Conditions</b></p> | <p>Central estimates of average summer temperature increase through time, for a medium emissions scenario, for the South East of England in the 2020s, 2040s and 2080s. Projections of central estimates of average summer temperature change in the South East get larger over time. Projected increases in average summer temperatures are 1.6°C (0.6-2.7°C) during the 2020s, 2.3°C (1.0-4.0°C) by the 2040s and 3.9°C (2.0-6.4°C) by the 2080s. In the past 30 summers, there were 4 days above 25°C per month on average. If global temperatures rise by 2°C, this could increase to 9 days and with a 4°C temperature rise globally, the number of days above 25°C per month could reach 18 days.</p> <p>Precipitation in the South East of England is predicted to decline over time for a medium emissions scenario. On the wettest summer day of the past 30 years, 56mm of rainfall was recorded in the South East region. With a 2°C rise in global temperatures, rainfall in the South East could reduce to 54mm, while a temperature rise of 4°C globally could reduce local precipitation to 53mm, which is 5% less than now.</p> |
| <p><b>A.3.5. Key Issues</b></p>                  | <p>The release into the atmosphere of greenhouse gases (e.g. CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, O<sub>3</sub>) resulting from fossil fuel usage, agriculture, land use change and other human activities has been linked with atmospheric warming and global climate change. The regional estimates of carbon dioxide (CO<sub>2</sub>) emissions illustrate that the transport sector and domestic sector contribute 40.8% and 30.6% respectively of CO<sub>2</sub> emissions. With increased summer temperatures and reduced rainfall predicted for the region, it is clear that climate action will be required at the local level to minimise the impacts of climate change in the future and ensure that national targets are achieved.</p>  |

## A.7 Historic Environment

Table A-7 – Historic Environment baseline update from Gate 1 to Gate 2

| Section (Gate 1)              | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed   | Next steps   |
|-------------------------------|---|-----------------|---|--|
| <b>A.4. Cultural Heritage</b> | Archaeological remains are sensitive to changes in water quality, water levels (for example waterlogged deposits), pollution and land use practices. The Thames River Basin includes internationally recognised World Heritage Sites (for example, the Tower of London, Blenheim Palace, the Royal Botanic Gardens at Kew, the Palace of Westminster, Westminster Abbey and St. Margaret's Church, Maritime Greenwich). | Yes             | Existing information is correct, but the major impacts to archaeological remains come from removal, part-removal and other damage during the enabling works phase of SESRO. | Additional text needed to balance the source of potential impacts to archaeological remains. See Supporting Document B2, Environmental Appraisal Report (terrestrial). |
|                               | Nationally important archaeological sites are statutorily protected as Scheduled Monuments (SM). There are currently around 19,850 entries in the Schedule for the UK. There are approximately 1765 SM located within the Thames Management Catchment and approximately 1,298 SM. Registered Parks and Gardens also make up part of the UK's cultural heritage of national importance (1,633 in 2015 in                 | Yes             | Nationally important archaeological remains are not all scheduled. Non-designated archaeological remains can qualify as nationally important.                               | Suggest slight re-wording. See Supporting Document B2, Environmental Appraisal Report (terrestrial).   |

| Section (Gate 1) | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed | Next steps |
|------------------|--|-----------------|-----------------------------------|------------|
|                  | England). There are approximately 428 sites designated as such in the Thames Management Catchment.   |                 |                                   |            |
|                  | Conservation Areas are usually designated by the local planning authority (England and Wales), or Historic England (previously known as English Heritage) can designate them in London (in consultation with London Boroughs). They are designated for their special architectural and historic interest. Conservation Areas can include historic town and city centres, fishing and mining villages, 18 <sup>th</sup> and 19 <sup>th</sup> century suburbs, model housing estates, country houses set in historic parks and/or historic transport links and their environment. There are over 8,000 conservation areas in England, and 500 in Wales. Individual local authorities provide details on specific conservation areas. | No              | Nothing to add                    | None       |
|                  | Historic England collects data on buildings at risk. There were 5,534 designated assets on the Heritage at Risk (HAR) register in 2015. 604 were removed from the Register since 2014, and 327 added. One third of sites on the 2010 Register have now been removed from the Register.   | No              | Nothing to add                    | None       |

| Section (Gate 1) | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed | Next steps |
|------------------|---|-----------------|-----------------------------------|------------|
|                  | For other types of heritage assets, the long-term trends are not yet firmly established but a very small reduction in the number of sites on the Register between 2009 and 2010 has been reported. The source of risk to SM resulting from water abstraction or dewatering is 1.71% nationally. However, other assets such as those composed of organic material and preserved in waterlogged or anaerobic conditions are proportionately more at risk (e.g., paleoenvironmental deposits).   | No              | Nothing to add                    | None       |
|                  | Historic Environment Record (HER) databases linked to a Geographic Information System (GIS) are held by County Councils, District Councils or Unitary Authorities. They represent unique repositories of, and signposts to, information relating to landscapes, buildings, sites and artefacts spanning from the Palaeolithic period to modern times. Presenting this wealth of information for the Thames Water supply area would be difficult, however, it can be interrogated where the WRMP options have the potential to affect such assets. | No              | Nothing to add                    | None       |

| Section (Gate 1) | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed | Next steps |
|------------------|---|-----------------|-----------------------------------|------------|
|                  | <p>In relation to unknown assets, there are a number of floodplains within the Thames Water supply region which are either known or suspected to be of high importance for waterlogged archaeology. Such evidence includes both material (wooden artefacts and structures such as trackways) and evidence of past environmental change from the deposits themselves. The waterlogged conditions that preserve these remains may be rain-fed or groundwater fed. If the latter, then clearly abstraction levels can be a critical factor in maintaining conditions in which preservation of the remains is viable. In addition, there are waterlogged deposits that are specifically associated with chalk, such as springs and their intimately associated wetlands which again can contain important archaeological information, especially palaeoenvironmental evidence. Approximate locations of areas important for palaeoenvironmental deposits were identified according to a spreadsheet supplied by English Heritage.</p> | No              | Nothing to add                    | None       |
|                  | <p>Locally the Vale of White Horse benefits from substantial heritage assets the make a positive contribution towards the district's local character and distinctiveness. Conservation Areas are also described as forming an important and visible part of the Vale's cultural heritage and enhance the attractiveness of individual settlements for residents and visitors.</p>   | No              | Nothing to add                    | None       |

| Section (Gate 1) | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed                                     | Next steps   |
|------------------|--|-----------------|---|--|
|                  | <p>There are 539 Listed Buildings within the Study Area of which 14 are Grade I, 486 are Grade II and 139 are Grade II*. There are 9 Scheduled Monuments within the Study Area, including a number of Settlement Sites, Abingdon, Ock and Culham Bridges and the remains of Abingdon Abbey. There are two Registered Parks and Gardens within the study area, Sutton Courtenay Manor and Albert Park. Milton Manor House, a listed building, has been identified on the Heritage At Risk register and is situated within the study area.</p> | Yes             | Listed building totals need amending.                                 | Total of 536 listed buildings: 14 at Grade I, 39 at grade II* and 483 at Grade II. See Supporting Document B2, Environmental Appraisal Report (terrestrial). |
|                  | <p>There are nine Conservation Areas within or intersecting the Study Area, as follows:</p> <ul style="list-style-type: none"> <li>• Abingdon Town Centre;</li> <li>• Abingdon – Albert Park;</li> <li>• Drayton Conservation Area;</li> <li>• East Hanney;</li> <li>• Marcham;</li> <li>• Milton;</li> <li>• Steventon;</li> <li>• Sutton Courtenay; and</li> <li>• West Hanney.</li> </ul>   | Yes             | Expansion of study area has added conservation areas to the baseline. | Addition of Culham, Abingdon Northcourt and Grove Conservation Areas. See Supporting Document B2, Environmental Appraisal Report (terrestrial).              |

| Section (Gate 1)              | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed | Next steps  |
|-------------------------------|--|-----------------|-----------------------------------|---|
|                               | See Figure B-2 in Gate 1 SEA for further information on the location of cultural heritage assets within the study area. Also see Chapter 3 (Historic Environment) of Annex B1 Environmental Assessment Report for further information.   | No              | No information to add.            | Historic environment figures being prepared for desk study. See Supporting Document B2, Environmental Appraisal Report (terrestrial). |
| <b>A.4.1. Future Baseline</b> | The NPPF was introduced in 2012 to replace the Planning Policy Statements and revised in 2019. The NPPF aimed to make the planning system less complex and more accessible and changed the emphasis on planning to have a presumption in favour of development. However, core planning principles include those aiming to protect heritage assets, including “conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations”. | No              | No information to add.            | None  |

| Section (Gate 1)         | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed  | Next steps  |
|--------------------------|---|-----------------|--|---|
|                          | Recent and ongoing national economic difficulties may have a negative effect on removing heritage assets from the heritage at risk register. Climate change could have variable impacts on heritage assets in the future. Some types of assets and landscapes have already experienced and survived significant climatic changes in the past and may demonstrate considerable resilience in the face of future climate change. However, many more historic assets are potentially at risk from the direct impacts of future climate change. | No              | No information to add.   | None  |
| <b>A.4.2. Key Issues</b> | <p>The key sustainability issue arising from the baseline assessment for archaeology and cultural heritage is:</p> <ul style="list-style-type: none"> <li>The need to conserve or enhance sites of archaeological importance and cultural heritage interest, particularly those which are sensitive to the water environment.</li> </ul>  | Yes             | Should be expanded to include conservation through the creation of an archive from the physical remains. | Wording could be expanded to include preservation by record i.e. archaeological mitigation. See Gate 2 SEA. |

## A.8 Landscape and Visual

Table A-8 – Landscape and Visual baseline updates from Gate 1 to Gate 2

| Section (Gate 1)      | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed                    | Next steps |
|-----------------------|--|-----------------|--|------------|
| <b>A.5. Landscape</b> | Natural England defines landscape character as 'a distinct, recognisable and consistent pattern of | No              | Nothing to add to this explanatory introduction text | None       |

| Section (Gate 1)      | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed  | Next steps               |
|-----------------------|--|-----------------|--|--------------------------|
|                       | <p>elements in the landscape that makes one landscape different from another, rather than better or worse'. Some landscapes are special because they have a particular amenity value, such as those nationally designated Areas of Outstanding Natural Beauty (AONB). Others may have an intrinsic value as good examples or be the only remaining examples of a particular landscape type. Some landscapes are more sensitive to development whereas others have a greater capacity to accommodate development. Assessments of landscape character and landscape sensitivity enable decisions to be made about the most suitable location of development to minimise impacts on landscapes.</p> |                 |  |                          |
| <b>A.5. Landscape</b> | <p>Nationally designated landscape sites (including AONBs, National Parks and Green Belt) and Natural England National Character Areas (NCA) are shown on Figure B-4 in the Gate 1 SEA.</p>  | No              | <p>The NCA and green belt shown align with those shown in the Landscape and Visual Appraisal (LVA) figures.</p> <p>For Gate 2, the relevant figure references are as follows:</p> <p>Figure 6.5 Landscape context and planning constraints in Technical Supporting Document B2.2, Environmental Appraisal Report (terrestrial) Figures</p> | Update Figure reference. |

| Section (Gate 1)                         | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed  | Next steps  |
|--|--|-----------------|--|---|
|  |  |                 | Figure 6.6 Published landscape character types and areas in Technical Supporting Document B2.2, Environmental Appraisal Report (terrestrial) Figures   |   |
| <b>A.5.1 Nationally Designated Sites</b> | An AONB is an area of land protected by the Countryside and Rights of Way Act 2000 (CROW Act) to conserve and enhance its natural beauty. Natural England are responsible for advising local planning authorities in relation to development and AONB.     | No              | Statement is true. However, please note that this statement further down in A.5.1 is not right, as the North Wessex Downs AONB falls within the Gate 2 LVA study area, as illustrated on Figure 6.1 in Technical Supporting Document B2.2, Environmental Appraisal Report (terrestrial) Figures:<br><br>While no AONB fall within the study area, there are five AONB within, or partially within, the Thames Water supply area, which are identified in Table A-3. Of note the North Wessex Downs AONB lies just south of the study area. See Figure B-4 for further information. | Should include North Wessex Downs AONB                            |
| <b>A.5.1 Nationally Designated Sites</b> | The Vale of White Horse and Oxford Green Belts have been identified as intersecting the study area towards the north and north east (see Figure B-4 in Gate 1 SEA). Of note the main characteristics of Green Belt is their openness and their permanence. | Yes             | Gate 2 baseline studies have only identified the 'Oxford Green Belt'. There is no reference to another green belt within the Vale of White Horse Local Plan.   | Baseline text should be updated to align with Gate 2 LVA baseline |

| Section (Gate 1)                                  | Gate 1 Text                             | Changes Needed? | Reason why change is/isn't needed  | Next steps   |
|---|---|-----------------|--|--|
| <p><b>Table A-3 - AONBs within Thames WRZ</b></p> | <p><i>Refer to Gate 1 document.</i></p> | <p>Yes</p>      | <p>Haven't undertaken study of other AONBs within the Thames WRZ so can only comment on the North Wessex Downs.</p> <p>References to Pewsey Meadows and Neolithic stone circle at Avebury are not particularly relevant, as they are not located within the study area for the LVA.</p> <p>May be more relevant to list the special qualities of the AONB rather than the key characteristics. (Refer to Section 6.2 of terrestrial EAR)</p> | <p>More could be listed in the key characteristics to reference the chalk downs, dramatic scarp slopes and prehistoric monuments/time depth.</p> <p>Text from LVA baseline which could be included instead:</p> <p>The North Wessex Downs forms a 'remote, expansive and tranquil landscape in the heart of Southern England, 'with high, open arable sweeps of chalk downs and dramatic scarp slopes with their prehistoric monuments and beech knolls'. The long scarp and elevated downs of the AONB landscape form a distinctive feature on the horizon to the south of the indicative location for SESRO.</p> |

| Section (Gate 1)  | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed  | Next steps  |
|---|---|-----------------|--|---|
| <b>A.5.2. Natural England National Character Areas</b>                                | Natural England National Character Areas (NCA) also take account of landscape (also referred to in the Biodiversity, Flora and Fauna topic). These are shown geographically in Figure B-4 and Table A-4 summarises the key features. It is noted that 116 Berkshire and Marlborough Downs NCA overlaps with the North Wessex Downs AONB as shown on Figure B.4 and therefore this NCA has been included in Table A-4. | No              | For Gate 2, the relevant figure reference is as follows:<br><br>Figure 6.6 Published landscape character types and areas in Technical Supporting Document B2.2, Environmental Appraisal Report (terrestrial) Figures   | Update Figure reference.  |
| <b>Table A-4 - National Character Areas within or immediately adjacent Study Area</b> | <i>Refer to Gate 1 document.</i>  | Yes             | 'Key objectives' should be changed to 'Key Characteristics'. Agree with list of characteristics for 116. More could be included for 109 and 108. Update all relevant key characteristics to refer to those characteristics listed in LVA appendix 'published sources of landscape character'. NCA 108 should be listed in the first row, as this would be the directly affected NCA. | Update text in Table 2.1 of LVA appendix 'published sources of landscape character' |
| <b>A.5.3. Future Baseline</b>   | With the pressures for housing in many parts of the Thames river basin, there are likely to be some threats to visual amenity more broadly beyond designated landscape areas (including within Green Belt). Climate change and land use change (e.g. due to agricultural reform associated with the UK's exit from the EU and Common Agricultural   | No              | None.  | None  |

| Section (Gate 1)              | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed  | Next steps  |
|-------------------------------|--|-----------------|--|---|
|                               | Policy) may also, in the longer term, lead to changes to landscape character.  |                 |  |   |
| <b>A.5.3. Future Baseline</b> | It is envisaged that the landscape character of the Vale of White Horse and wider landscape context, including that of the Green Belts, will be maintained and enhanced for the enjoyment of the public through green infrastructure and access opportunities.   | Yes             | References to enhancement to green infrastructure is not very clear, but I assume this means with SESRO, so suggest rewording.<br><br>Suggest removing reference to 'Green Belts' here, as we are not impacting on this directly and the 'openness' of the Green Belt would therefore not be affected - see above. We do not normally discuss any other aspects of the landscape character of Green Belts in LVA/LVIA. | Suggested rewording:<br><i>'Opportunities for strategic green infrastructure enhancements, linkages and creation identified in the South &amp; Vale Green Infrastructure Strategy for priority landscape scale strategic green and blue corridors, could, if implemented, reinforce and enhance key landscape characteristics.'</i> |
| <b>A.5.3. Future Baseline</b> | Settlement expansion, associated infrastructure development, mineral extraction, and renewable energy will continue to be key drivers in 108 Upper Thames Clay Vales NCA and 109 Midvale Ridge NCA. While flooding of rural and urban environments will remain a key challenge on the flood plain. Land use and the management of watercourses and ditches will be influenced by flood risk. | Yes             | Aligns with the NCA 108 profile from Natural England. Could add some more detail which aligns with SESRO proposals within NCA 108.<br><br>The NCA 109 profile doesn't seem to mention renewable energy as a key driver, it does mention greater demands on agriculture. Suggest rewording to separate the two NCA's out.   | Suggested rewording:<br><i>'Settlement expansion, associated infrastructure development, mineral extraction, and renewable energy are likely to continue to be key drivers for change in NCA 108 Upper Thames Clay Vales. Flooding of rural and urban</i>   |

| Section (Gate 1)              | Gate 1 Text   | Changes Needed? | Reason why change is/isn't needed  | Next steps   |
|-------------------------------|---|-----------------|--|--|
|                               |   |                 | Noted also the footnote has a link to the 108 profile and not the 109 profile. | <p><i>environments would remain a key challenge on the flood plain. Land use and the management of watercourses and ditches would therefore be influenced by flood risk. Within NCA 108, this could lead to implementation of further wet woodland to slow water run-off and new floodwater storage areas with associated wetland habitats.</i></p> <p><i>Within NCA 109 Midvale Ridge NCA, urban expansion, mineral extraction and increased agricultural demands could also lead to changes to landscape character.'</i></p> |
| <b>A.5.3. Future Baseline</b> | Agricultural and forestry economics will continue to shape the character for the rural landscape within the 116 Berkshire and Marlborough Downs NCA although climate change, recreation pressures | Yes             | Reword.  | Reword:<br><i>'Agricultural and forestry economics would continue</i>  |

| Section (Gate 1)         | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed   | Next steps  |
|--------------------------|--|-----------------|---|---|
|                          | could impact on visitor destinations and access routes vulnerable to damage. Potential negative impacts relating to future development could affect the rural sense of place or natural beauty recognised by the North Wessex Downs AONB impacting on experiences of high tranquillity, dark skies and far reaching views, and sustainable resource use. |                 |   | <i>to shape the character for the rural landscape within the 116 Berkshire and Marlborough Downs NCA. Agricultural practices along with climate change and recreation pressures could impact on visitor destinations, historic features, habitats diversity and access routes vulnerable to damage. Potential negative direct or indirect impacts relating to future development could affect the rural sense of place or natural beauty of the North Wessex Downs AONB, impacting on tranquillity, dark skies and far reaching views, and sustainable resource use.'</i> |
| <b>A.5.4. Key Issues</b> | The key sustainability issues arising from the baseline assessment in terms of landscape character and visual amenity are:   | Yes             | Expand to include the setting of the AONB and the ability to indirectly influence the views from the AONB scarp. The word 'sustainability' should be removed. Also, | The key issues arising from the baseline assessment in terms of landscape   |

| Section (Gate 1) | Gate 1 Text  | Changes Needed? | Reason why change is/isn't needed  | Next steps  |
|------------------|--|-----------------|--|---|
|                  | <ul style="list-style-type: none"> <li>• The need to protect and improve the natural beauty of the North Wessex Downs AONB</li> <li>• The need to protect and improve the character of landscapes and townscapes.</li> </ul> |                 | <p>prefer to use the terms 'conserve' and 'enhance' rather than 'protect' and 'improve', as the former ties in better with published policy and recommendations. Ref to 'townscape' is not really relevant, as SESRO would not affect urban areas.</p> <p>Suggested rewording:</p> | <p>character and visual amenity are:</p> <ul style="list-style-type: none"> <li>• The need to conserve and enhance the natural beauty of the North Wessex Downs AONB and it's setting, including views from and towards the elevated scarp of the AONB</li> <li>• The need to conserve and enhance local landscape character</li> </ul> |

*Note. The Gate 1 SEA baseline text is very focused on landscape character despite being under the header of only 'landscape'. At Gate 2 this is 'Landscape and Visual', as the SEA objective for landscape also refers to visual amenity. The Gate 2 LVA baseline text covers more than landscape character, but the detail for this is contained within the EAR. The landscape within the indicative location for SESRO and the wider vale landscape is generally flat and low lying, with higher ground to the north and south associated with the Midvale Ridge and North Wessex Downs AONB respectively. While hedgerows, tree belts and smaller blocks of woodland limit the distance of views within the Vale to some extent, there are middle-distance to distant views available towards the scarp of the AONB and also views from the AONB towards the Vale. The Midvale Ridge is also visible in views from the Vale and from the AONB, looking across the Vale. However, due to more extensive tree cover on the Midvale Ridge compared with the scarp of the AONB which is often more open, local middle-distance views towards the low-lying landscape of the Vale tend to be generally filtered or screened when looking from the Midvale Ridge, although the higher ground of the AONB is visible in the distance.*

## A.9 Material Assets

An update of the Material Assets assessment was not undertaken at Gate 2 and there are no anticipated changes from the Gate 1 assessment and SEA scoring to be made. See Gate 1 baseline below:

Table A-9 – Material Assets Baseline (Gate 1)

| Section (Gate 1)                       | Gate 1 Text  |
|--|--|
| <b>A.7 Resources and Raw Materials</b> | <i>Blank</i>   |
| <b>A.7.1 Water</b>                     | <p>In 2015/16, Thames Water put 2,643 million litres of water per day (Ml/d) into its supply system. Leakage from the water distribution system for 2015/16 was reported as an annual average of 642Ml/d. This is below the Business Plan and WRMP14 performance commitment target of 649Ml/d. In 2016/17, Thames Water missed its leakage target for the first time in 11 years. Leakage was 677Ml/d, compared to a target of 630Ml/d in 2016/17. Average water consumption per capita in the Thames Water supply area is 149litres/day (2015/16) compared to a national average in England and Wales of 147litres/day. Thames Water has ongoing programmes to reduce leakage from its network and to encourage more efficient use of water by customers. Thames Water has agreements in place to transfer raw water or treated water to neighbouring water companies (Essex and Suffolk Water, Affinity Water, Sutton and East Surrey Water): the largest transfer is to Essex and Suffolk Water, with an agreement to supply raw water up to 91Ml/d on average and 118Ml/d as a peak. The total amount of water transferred to other water companies and through inset agreements amounts to around 25 Ml/d.</p> <p>The Vale of White Horse District is located in the TWUL Swindon and Oxfordshire Water Resource Zone (WRZ) and is expected to experience a significant increase in housing provision and economic growth over the period 2011 and 2031. TWUL’s assessment of available water identifies that SWOZ WRZ does not have sufficient water for the whole of the 25 year planning period to meet its customers’ need. This growth is noted as representing a challenge in ensuring that both the water environment and water services infrastructure has the capacity to sustain this level of growth and development proposed. It is also noted that four Wastewater Treatment Works (Didcot, Kingston Bagpuize, Oxford and Wantage) do not have sufficient flow capacity.</p> |
| <b>A.7.2. Resource use and waste</b>   | There is an ongoing need for society to reduce the amount of waste it generates, by using materials more efficiently, and improving the management of waste that is produced.  |

| Section (Gate 1) Gate 1 Text   |  |               |                 |   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
|--|--|---------------|-----------------|---|------------|----------------------------|--|-----------|--------|-------|--------|--|---------|-----|------|-----|--------------------------------|------|------|------|------|
|  | <p>Waste going to landfill has more than halved over the period 2004/5 to 2014/15 (19,822 thousand tonnes to 6,361 thousand tonnes) and a rate of 24%; household recycling rates have climbed to nearly 44% (2014/15); waste generated by businesses declined by 29% in the six years to 2009 and business recycling rates are above 50%. In line with the widely adopted 'waste hierarchy', best practice for waste management is to reduce, re-use, recycle and recover, and only then should disposal (or storage) in landfill be considered.</p> <p>Data on waste arisings is collected in a range of categories. The activities of the water industry contribute to construction, demolition and excavation waste, through construction of new infrastructure. The water industry also contributes to several waste streams through the operation of facilities. Waste streams include commercial and industrial waste (C&amp;I) (statistics include waste arisings from the power and utilities sector, which includes water supply and sewage removal), and also hazardous wastes. Tables A6 – A9 provide further baseline information regarding waste. Table A6 shows waste according to waste type in the UK in 2012 (and by region in 2006).</p> |               |                 |   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| <b>Table A-6 - Waste arisings by management and Sector</b>                                   | <table border="1"> <thead> <tr> <th>Waste Figures</th> <th>East of England</th> <th>London</th> <th>South East</th> <th>South West</th> </tr> </thead> <tbody> <tr> <td>Commercial and Industrial (C&amp;I) waste arisings produced in region (million tonnes)</td> <td>6.3</td> <td>7.0</td> <td>8.3</td> <td>5.3</td> </tr> <tr> <td>Construction &amp; Demolition Environmental Waste (CDEW)</td> <td>11.5</td> <td>8.0</td> <td>14.1</td> <td>9.4</td> </tr> <tr> <td>Total waste produced by region</td> <td>23.5</td> <td>18.7</td> <td>30.9</td> <td>44.5</td> </tr> </tbody> </table>  | Waste Figures | East of England | London  | South East | South West                 | Commercial and Industrial (C&I) waste arisings produced in region (million tonnes) | 6.3       | 7.0    | 8.3   | 5.3    | Construction & Demolition Environmental Waste (CDEW) | 11.5    | 8.0 | 14.1 | 9.4 | Total waste produced by region | 23.5 | 18.7 | 30.9 | 44.5 |
| Waste Figures  | East of England  | London        | South East      | South West                                    |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| Commercial and Industrial (C&I) waste arisings produced in region (million tonnes)           | 6.3  | 7.0           | 8.3             | 5.3   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| Construction & Demolition Environmental Waste (CDEW)   | 11.5   | 8.0           | 14.1            | 9.4   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| Total waste produced by region   | 23.5   | 18.7          | 30.9            | 44.5  |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| <b>Table A-7 - Waste generation split by NACE economic activity in England ('000 tonnes)</b> | <p><b>Table A-7 - Waste generation split by NACE economic activity in England ('000 tonnes) <sup>74</sup></b></p> <table border="1"> <thead> <tr> <th>Waste Figures</th> <th>2012</th> </tr> </thead> <tbody> <tr> <td>Commercial and Industrial (C&amp;I) ('000 tonnes)</td> <td>38,976</td> </tr> <tr> <td>Construction ('000 tonnes)</td> <td>85,240</td> </tr> <tr> <td>Household</td> <td>22,744</td> </tr> <tr> <td>Other</td> <td>16,291</td> </tr> <tr> <td>Total</td> <td>163,252</td> </tr> </tbody> </table>  | Waste Figures | 2012            | Commercial and Industrial (C&I) ('000 tonnes) | 38,976     | Construction ('000 tonnes) | 85,240   | Household | 22,744 | Other | 16,291 | Total  | 163,252 |     |      |     |                                |      |      |      |      |
| Waste Figures  | 2012   |               |                 |   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| Commercial and Industrial (C&I) ('000 tonnes)  | 38,976   |               |                 |   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| Construction ('000 tonnes)   | 85,240   |               |                 |   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| Household  | 22,744   |               |                 |   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| Other  | 16,291   |               |                 |   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |
| Total  | 163,252  |               |                 |   |            |                            |  |           |        |       |        |  |         |     |      |     |                                |      |      |      |      |

Section (Gate 1) Gate 1 Text

**Table A-8 - Waste from households in England 2010-2014**

| England | Waste arisings ('000 tonnes) | Recycled ('000 tonnes) | Recycling rate |
|---------|------------------------------|------------------------|----------------|
| 2010    | 22,131                       | 9,112                  | 41.2           |
| 2011    | 22,170                       | 9,596                  | 43.3           |
| 2012    | 21,956                       | 9,684                  | 44.1           |
| 2013    | 21,564                       | 9,523                  | 44.2           |
| 2014    | 22,355                       | 10,025                 | 44.8           |

**Table A-9 - Municipal waste and Biodegradable Municipal Waste (BMW) to landfill in England 2010-2013**

| England | Municipal waste to Landfill ('000 tonnes) | Of which BMW to Landfill ('000 tonnes) | BMW to Landfill as % of 1995 target baseline |
|---------|---|--|--|
| 2010    | 20,298                                    | 10,339                                 | 36%  |
| 2011    | 18,421                                    | 9,360                                  | 32%  |
| 2012    | 16,187                                    | 8,129                                  | 28%  |
| 2013    | 14,780                                    | 7,347                                  | 25%  |

Note: 1995 baseline for England 29,030,000 – no greater than 50% baseline by 2013 and 35% baseline by 2020.

**A.7.3. Energy Use**

The publication of the UK Industrial Strategy and its Grand Challenge of Clean Growth, and the subsequent Clean Growth Strategy have provided the impetus for local areas to focus on their role in helping the UK meet its agreed target of reducing carbon emissions by 80% by 2015, against a 1990 baseline.

| Section (Gate 1)                  | Gate 1 Text  |
|-----------------------------------|--|
|                                   | <p>Oxfordshire’s Energy Strategy (2018) lists three main objectives:</p> <ul style="list-style-type: none"> <li>• Secure a smart, modern, clean energy infrastructure – including increased electricity grid capacity – which supports planned housing, industrial and commercial growth, and changing energy requirements;</li> <li>• Lead nationally and internationally to reduce countywide emissions by 50% compared with 2008 levels by 2030 and set a pathway to achieve zero carbon growth by 2050.</li> <li>• Enhance energy networking and partnership working across Oxfordshire to focus on the low carbon energy challenges and funding opportunities created through the Clean Growth Strategy and the Oxfordshire Industrial Strategy</li> </ul> <p>Oxfordshire’s homes, businesses and transport used 6,800GWh of energy in 2015. Energy used for transport has increased and it remains the highest energy consumer across the county (40% of total energy used) including at Vale of White Horse. Domestic demand is relatively consistent across the county (30% of total energy use). Industry and Commercial represents a slightly lower proportion in Vale of White Horse, as it does in South Oxfordshire.</p> <p>The majority of energy used in the county in 2015 was derived from fossil fuels, 70% by natural gas, petroleum and coal however the contribution of bioenergy and energy from waste has increased.</p> <p>There are 37 operational or consented large scale renewable installations in Oxfordshire representing an installed capacity of around 370 MW. PV totals 85% of installed capacity and it is noted that multiple PV farms including Landmead Farm (46 MWe), Steventon Solar Park (10 MWe) and Goose Willow Farm (18.5 MWe) reside within the study area, as shown on Figure B-5 of Gate 1 SEA.</p> |
| <p><b>A.7.4. Built Assets</b></p> | <p>There are a broad range of built assets which are within or intersect the study area. There are two allotment sites within the study area, with Westend Allotments located off Marcham Road and the other site on Peep-O-Day Lane. There are also two golf courses and two sports pitches which include Abingdon Rugby Club, Drayton Park Golf Club, Frilford Health Golf Club.</p> <p>The northern boundary of the study area is intersected by Abingdon Airfield which may be adopted for use as Dalton Barracks. There are also a number of primary roads travelling through the study area such as A34, A338, A4130 Abbington Road and A415 Frilford Road. A railway line travels east to west towards the south of the study area.</p>   |

| Section (Gate 1)              | Gate 1 Text   |
|-------------------------------|---|
| <b>A.7.5. Future Baseline</b> | Continued growth within the region will contribute towards a trend of increased waste and resource use. Interventions outside the planning system are helping to shift towards greater efficiencies in resource use and adherence to the waste hierarchy, but underlying waste generation volumes are anticipated to increase cumulatively,   |
| <b>A.7.6. Key Issues</b>      | <p>New development will impact on and interact with a wide range of resources such as energy (fuel) use, use of construction materials (aggregate, concrete, etc.), waste generation and disposal etc. Construction will contribute to increases in the levels of waste generated, if building materials are not efficiently used / reused. With more waste being produced, trip kilometres to transport such waste for disposal will result in greater transport trip generation and increased emissions of air pollutants or greenhouse gases. Increased population and housing numbers will also inevitably lead to increased waste production</p> <p>Transport remains the highest energy consumer across the country at 40%, while domestic demand is consistent around 30%. Industry and Commercial represents a slightly lower proportion of energy consumption in the Vale of White Horse, as it does in South Oxfordshire. Baseline investigation finds that private property, agricultural and other land uses including Solar PV farms as well as allotments and sports pitches, lie within or intersect the study area. It is evident that there are a wide range of built assets and infrastructure that have the potential to be directly and indirectly impacted by the project.</p> |

Appendix B Illustrative Environmental Masterplan Figure

Figure 5-1 – Illustrative Environmental Masterplan (Landscape and Environmental Design Strategy Plan) (Figure 2.1 in Technical Supporting Document B2.2, Environmental Appraisal Report (terrestrial) Figures)



Appendix C Assessment Table

Only the assessment table for the largest SESRO option, 150Mm<sup>3</sup>, has been included in this appendix. It is considered that this still reflects the alternative, smaller reservoir option assessments due to its greater extent.

Table A-10 - Abingdon 150Mm<sup>3</sup> Gate 2 SEA Assessment

| WRSE Option ID     |   | TWU_SWX_HI-RSR_RE1_CNO_abingdon150(lon)   |    |                     |   |   |  |                               |    |                              |   |
|--------------------|---|---|----|---------------------|---|---|--|-------------------------------|----|------------------------------|---|
| Option Name        |   | New Reservoir Abingdon 150Mm <sup>3</sup> - 283 MLD (Lon only) - Construction   |    |                     |   |   |  |                               |    |                              |   |
| Option Description |   | Provision of a new fully bunded reservoir at Abingdon with live capacity of 150Mm <sup>3</sup> . Associated conveyance tunnel and intake / discharge structure at Culham on the River Thames to (i) fill reservoir by abstracting raw water from the River Thames, and (ii) support flows in River Thames by discharging water stored within the reservoir. |    |                     |   |   |  |                               |    |                              |   |
| SEA Topic          | SEA Objective   | Construction Effects  |    | Operational Effects |   | Comment   | Mitigation   | Residual Construction Effects |    | Residual Operational Effects |   |
|                    |   | +   | -  | +                   | - |   |  | +                             | -  | +                            | - |
| Biodiversity       | To protect designated sites and their qualifying features | 0   | -- | ++                  | - | <p>Without mitigation, the option would have an adverse impact on non-statutory designated sites for nature conservation, priority habitats and protected and priority species. However, it is considered that the implementation of appropriate mitigation measures (including protected species development licences, where required) and compensation for habitat losses, would avoid/reduce potentially adverse impacts on these ecological features.</p> <p>Barrow Farm Fen SSSI / Groundwater Dependant Terrestrial Ecosystems (GWDTE) (100.00% unfavourable - recovering), Frilford Heath, Ponds and Fens SSSI / GWDTE (100.00% unfavourable - recovering), and Culham Brake SSSI (100.00% favourable) are within 2km of the indicative location for SESRO. There may be negative effects during the construction phase on these sites from disturbance. No direct land take from these designated sites is required. However, the sites have or are adjacent to rivers/streams which could be affected by the reservoir (see water quality objective). The effects of the mitigation proposed such as river diversions would need to be further investigated in terms of effects on the SSSIs.</p> <p>The HRA ToLS identified three European Protected sites which could be affected: Cothill Fen SAC (2.66km), Little Wittenham SAC (7.05km), and Hackpen Hill SAC (8.89km). The HRA ToLS concluded no LSE for Cothill Fen SAC, Little Wittenham or Hackpen Hill SAC.</p> <p>The reservoir option has the potential to result in direct impacts upon The Cuttings CWS and indirect impacts upon Hutchin's Copse CWS due to its situation within and immediately adjacent</p> | <p>Actions such as early planting to maintain habitat connectivity around the indicative location for SESRO during construction must be considered during the drafting of mitigation proposals. Specific mitigation measure to address typical construction impacts, such as dust and suspended sediment from earthworks, air quality impacts linked to access routes, disturbance impacts from noise and vibration, and potential for entrapment of animals.</p> <p>Best practice methods to be implemented to minimise disturbance effects, however potential for residual effects on Barrow Farm Fen SSSI, Frilford Heath, Ponds and Fens SSSI and Culham Brake SSSI remains. The effects of the mitigation proposed such as river diversions would need to be further investigated in terms of effects on the SSSIs.</p> <p>No HRA Appropriate Assessment is anticipated to be required but it would be necessary to update the HRA as SESRO progresses and more details become available.</p> | 0                             | -- | +++                          | 0 |

|   |   |    |    |    |  |   |   |    |     |   |
|---|---|----|----|----|--|---|---|----|-----|---|
|   |   |    |    |    | to the reservoir footprint respectively. Further assessment is required to determine impacts.  | Further assessment required to determine impacts on The Cuttings CWS and Hutchin's Copse CWS. Determine whether the CWS's are considered to be ancient woodland. Undertake a full arboricultural assessment and ancient woodland indicator species assessment.  |   |    |     |   |
| To avoid a net reduction, and where reasonably practicable enhance, in non-monetised natural capital assets | 0 | -  | 0  | -- | The overall commitment to 10% Biodiversity Net Gain would need to be met across SESRO. This splits components to area (grouped together) and linear based features. Version 2 had hedgerows and rivers under the linear based part of the metric. Version 3 includes ditches as a linear based component. 10% Biodiversity Net Gain would need to be met on each component of the metric.<br><br>Of the benefits (ecosystem services) provided by natural capital assets, only water regulation (provision of supply) was assessed in non-monetised terms. This is considered under the SEA objective to increase water efficiency and increase resilience of Public Water Supply and natural systems to droughts. | Mitigation is sought actively within the indicative location for SESRO and a commitment to sourcing outside the indicative location for SESRO the necessary mitigation as required. Residual impacts is still negative as this may well be hard to achieve.   | 0 | -  | 0   | - |
| To protect and enhance biodiversity, priority species and vulnerable habitats such as chalk rivers          | 0 | -- | ++ | -  | There is Priority Habitat and non-priority woodland within the footprint of the reservoir which would be permanently lost. Supporting Document A1, Concept Design Report states that aquatic, woodland and grassland habitats would be created around the reservoir perimeter. Ecological mitigation is likely to include the retention and enhancement of Priority Habitat, ecological connectivity and other notable features e.g. veteran trees, where possible. Alternative habitat would be provided for species impacted and habitats of higher nature conservation value than those lost would be created. Biodiversity Net Gain would be calculated, and a 10% gain is sought.                             | Retention and enhancement of priority habitats where reasonably practicable within the indicative location for SESRO; however, permanent loss of priority habitat and woodland from reservoir. Ecological surveys required.<br><br>A Mitigation and Compensation Strategy to be developed and agreed with EA.   | 0 | -- | +++ | 0 |
| To avoid and, where required, manage invasive and non-native species (INNS)                                 | 0 | -- | 0  | -- | Japanese knotweed, Himalayan balsam, rhododendron, giant hogweed and New Zealand pigmyweed are known to be present. Construction work may result in INNS being transferred across the site or result in the introduction of INNS not already present on the site.<br><br>Operationally there are risks associated with a range of planned recreational and operational activities which may transfer INNS to and from the reservoir as well as across the reservoir site footprint.<br><br>There are also operational risks associated with the raw water transfer to and from the River Thames.   | Invasive species surveys undertaken in the River Thames would require extension to the River Ock. UKhabs survey would also record any INNS already present within the reservoir footprint.<br><br>For construction work, Supporting Document A1, Concept Design Report outlines that invasive species on site are to be identified and removed in advance of construction, removing the risk associated with construction and providing a biodiversity benefit by | 0 | +  | 0   | 0 |

|                             |   |   |     |    |     |  |  |   |    |    |    |
|-----------------------------|---|---|-----|----|-----|--|--|---|----|----|----|
|                             |   |   |     |    |     | <p>removing any species already present.</p> <p>Operational risks associated with recreational activities to be managed through implementation of biosecurity measures, resulting in an overall negligible risk.</p> <p>Operational risks associated with raw water transfers to be managed through the review and implementation of suitable mitigation measures to move risk of transferring larval, juvenile and adult animal life stages; plant seeds and fragments to and from the reservoir.</p>   |  |   |    |    |    |
|                             | To meet WFD Objectives relating to biodiversity   | 0 | -   | 0  | --- | <p>The plan as currently shown demonstrates a significant impact on Cow Common Brook WFD water body with regard to length loss of main watercourse and many contributing ditches. As a result, SESRO as it stands has the potential to cause deterioration in WFD status. SESRO would also impact Childrey Brook and the River Ock and contributing watercourses by virtue of water diversions joining at different locations and also SESRO's footprint reduced water supply to these watercourses.</p> <p>Finally, due to abstraction and discharge into the River Thames a variety of water bodies have the potential to be impacted downstream although it is equally possible SESRO may offer flow benefits during low flow conditions as a result of the River Thames release.</p>   | <p>Area within the indicative location for SESRO needs to be maximised for watercourse benefits but additional mitigation is likely to be required and even then, the risk of potential deterioration cannot be ruled out at this stage.</p> <p>Design and operation of abstraction/discharge structure on the River Thames is subject to a 'hands off flow' (so only abstracts at higher river flows) whilst the discharge is perpendicular to the flow to minimise scour. Risk of potential 'wash out' during discharge minimised through 'ramping up' discharge regime.</p> | 0 | -  | 0  | -- |
| Population and Human Health | To maintain and enhance the health and wellbeing of the local community, including economic and social wellbeing. | + | --- | ++ | -   | <p>The reservoir appears to directly impact allotments and sports facilities towards the east which would likely result in the loss of these. There are also golf courses, schools, public parks or gardens, playfields, churches and religious grounds and play spaces within 500 m of the option. There is likely to be minor and temporary effects to the local community and users of these facilities during the construction phase. There are buildings, residential and commercial properties, roads and solar farms located within the indicative location for SESRO which would be permanently lost and therefore major negative effects are identified. Construction of the reservoir may bring employment opportunities for people in the local area with the potential for longer term job opportunities once the reservoir is operational. Supporting Document A1, Concept Design Report commits to</p> | <p>Best practice mitigation measures would likely be implemented to minimise effects during construction. However, minor and temporary effects are likely to still occur during the construction phase. There may need to be compensatory measures for affected residents and/or realignment of the indicative location for SESRO where commercial and other properties are affected but potential for moderate negative effects to</p>  | + | -- | ++ | -  |

|  |   |   |     |   |  |   |   |   |     |   |
|--|---|---|-----|---|--|---|---|---|-----|---|
|  |   |   |     |   | recreational facilities as part of SESRO which would result in moderate positive effects given these facilities could contribute to improved health and wellbeing as well as community cohesion. IMD deciles range from 6 to 10.   | remain. Opportunities to integrate facilities such as a water sports club house and associated facilities (pier, slipway, boat park) as well as land based formal outdoor sports areas would act to compensate for any areas lost. Additional facilities such as an events area, Wildlife Education Centre, visitor and school study centre should also be considered.  |   |   |     |   |
| To maintain and enhance tourism and recreation.  | 0 | - | +++ | 0 | There is likely to be severance of public rights of way. The reservoir also impacts directly on a national cycle route, and a national trail is within 500m. As such, there is likely to be disruption to recreation. There is potential for impacts on existing recreational facilities, however aspects included within the option would likely compensate and go beyond what is existing. Supporting Document A1, Concept Design Report outlines that recreational, public education, landscaping and creation of aquatic / grassland habitats would form part of SESRO. The Natural Capital demonstrated there would be a net improvement in the recreational value of the site. | Best practice mitigation measures would likely be implemented to minimise effects during construction, however some disruption likely to remain during the construction phase.<br><br>Opportunities to integrate coarse game fishing and angling, cycle hire, equestrian centre and associated bridleways, artist's studio and sculptures, and increased footpath network should be explored as part of future phases of SESRO design.      | 0 | - | +++ | 0 |
| To secure resilient water supplies for the health and wellbeing of customers.  | 0 | - | +++ | 0 | The reservoir lies almost entirely within a Drinking Water Surface Water Safeguard Zone. Construction therefore has the potential to impact on quality of raw water at hydrologically connected abstraction points.<br><br>The reservoir option is anticipated to provide a maximum benefit for London WRZ of 150Mm <sup>3</sup> and therefore would make a significant contribution to securing water supplies for the health and wellbeing of customers  | Appropriate mitigation to minimise risk of e.g. sediment loading and occurrence of pollution incidents into receiving watercourses during construction should be documented within Pollution Prevention Plan or Construction Environmental Management Plan  | 0 | 0 | +++ | 0 |
| To increase access and connect customers to the natural environment, provide education or information resources for the public | 0 | - | +++ | 0 | Supporting Document A1, Concept Design Report commits to recreational and public education facilities as part of SESRO which, when operational, is anticipated to result in major beneficial effects.  | Ensure opportunities to integrate recreation and public education facilities are realised, maximising potential to contribute to public learning. Opportunities to integrate environmental provisions presented by Jacobs as part of the Conservation, Access and Recreation workshop should be considered as part of future phases of SESRO design. Resources include a visitor centre with facilities to accommodate schools study centre | 0 | - | +++ | 0 |

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|-------|---|---|----|---|---|---|---|---|---|---|---|
|       |   |   |    |   |   |   | and outdoor educational water science park.   |   |   |   |   |
| Water | To reduce or manage flood risk, taking climate change into account. | 0 | -- | 0 | - | The introduction of woodland habitat the Natural Capital Assessment identified that there would be a slight improvement in the contribution of natural assets to the Natural Hazard Regulation (flooding) service relative to the existing predominantly arable land cover however there are large areas of FZ2 and FZ3 within the indicative location for SESRO and within close proximity. As such there is potential flood risk during the construction and operational phases. Supporting Document A1, Concept Design Report outlines that the reservoir would lead to the loss of flood plain, and therefore the reservoir may contribute to flood risk. This includes impacts to water bodies to the north such as Hanney Ditch, Childrey Brook and the River Ock. However compensation measures would be implemented to minimise effects.<br><br>In operation, the presence of the reservoir would create a small reduction in potential flood flow under the A34 into Abingdon.   | Measures to reduce the impact of flooding during the construction phase (including the creation of flood compensation areas during enabling works) is likely to be implemented, however potential residual flood risk likely to remain.   | 0 | - | 0 | 0 |
|       | To enhance or maintain groundwater quality and resources            | 0 | 0  | + | 0 | The reservoir does not lie within any Source Protection Zone or Drinking Water Safeguard Zone (Groundwater).<br><br>Operationally the reservoir may alleviate pressures on groundwater resources by reducing the dependence and need for abstraction from these resources during prolonged dry periods.   | N/A   | 0 | 0 | + | 0 |
|       | To enhance or maintain surface water quality, flows and quantity    | 0 | -- | + | - | During construction, there is potential for water quality impacts within the River Ock catchment. Potential impacts could occur due to increase sediment loads from surface water runoff within the construction site and potential increased pollution from construction machinery and accidental spillages. The construction phase could result in negative effects on waterbodies within or adjacent to the indicative location for SESRO including Letcombe Brook chalk river (with 500m and hydrologically connected to rivers within the reservoir footprint). Supporting Document A1, Concept Design Report outlines embedded mitigation such as agreement with the EA on watercourse diversion to ensure no WFD status deterioration or effects on river environment, appropriate drainage for earthworks, fully bunded chemical / oil storage amongst others. As per Supporting Document A1, Concept Design Report, water would be abstracted from the River Thames to fill the reservoir and then released back into the river to be re-abstracted further downstream. The abstraction and release has the potential to have an effect on water levels, flows and quality during the operational phase. However, to minimise water quality effects, embedded mitigation measures such as regular water testing, treatment of drainage water, discharge permit application, amongst others would be implemented for the operational phase. There may be some minor negative effects during operation although embedded | Best practice construction measures would likely be implemented to mitigate effects therefore residual construction. Further WFD assessment required for waterbodies with the SESRO footprint and the surrounds as well as the River Thames downstream. Additional mitigation would likely be required to prevent decrease to water quality due to algal growth. This includes:<br>Artificial mixing;<br>Intermittent artificial mixing;<br>Microfiltration & Surface Skimmers;<br>Draw-off Control (Variable Draw-off); and/or,<br>Sonication.<br><br>Design and operation of abstraction/discharge structure on the River Thames is subject to a 'hands off flow' (so only abstracts at | 0 | - | + | - |

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|  |  |  |  |  | <p>mitigation has been implemented. This option could create a sufficient surplus to facilitate a reduction in abstractions in other areas such as vulnerable chalk streams and in the River Thames at times of low flow. However, capacity to achieve this would need to be investigated. There are also impacts on Cow Common Brook water body with regard to length loss of main watercourse and many contributing ditches. Watercourses to the north such as Childrey Brook, Landmead ditch, Mere Dyke and River Ock would also be impacted as a result of watercourse realignments leading to changing flow patterns. The footprint of SESRO would also reduce water supply to the smaller tributaries to the north. Finally, the River Thames would be impacted to some degree by the abstraction and discharge.</p> | <p>higher river flows) whilst the discharge is perpendicular to the flow to minimise scour. Risk of potential 'wash out' during discharge minimised through 'ramping up' discharge regime.</p> <p>A Construction Environment Management Plan (CEMP) should be undertaken to prevent impacts from sediment and chemical pollution from construction activities. Many of these measures are likely to be associated with good site practice and the preparation of robust method statements (e.g. Pollution Prevention and Incident Control Plan).</p> <p>Further potential impacts during operation are expected, therefore, the proposed mitigation measures listed below are expected to still be appropriate:</p> <p>Water stored in and released from the reservoir would be subject to regular testing to avoid releasing poor quality water back to the river;</p> <p>Drainage water from the operational site would be subject to treatment as required to avoid pollution of watercourses;</p> <p>Discharge from the reservoir to the River Thames to regulate river flows would be subject to a discharge permit granted by the Environment Agency;</p> <p>Watercourse diversions are to be designed using a 'naturalised' form to enhance water quality;</p> <p>An overflow from the site could potentially be connected to the Reservoir Auxiliary Drawdown channel. Water from the treatment works could also be released via this overflow back to the river provided it has not been chlorinated; and,</p> |  |  |  |  |
|--|--|--|--|--|--|---|--|--|--|--|

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|      |   |   |    |    |    | Emergency shutdown valves should be included in the plant in order to stop operation   |   |   |    |    |   |
|      | To meet WFD objective and support the achievement of environmental objectives set out in RBMPs  | 0 | -  | 0  | -- | The plan as currently shown demonstrates a significant impact on Cow Common Brook WFD water body with regard to length loss of main watercourse and many contributing ditches. As a result, SESRO as it stands has the potential to cause deterioration in WFD status. SESRO would also impact Childrey Brook and River Ock and contributing watercourses by virtue of water diversions joining at different locations and also SESRO's footprint reduced water supply to these watercourses. Finally, due to abstraction and discharge into the River Thames a variety of water bodies have the potential to be impacted downstream.  | Area within the indicative location for SESRO needs to be maximised for watercourse benefits but additional mitigation is likely to be required and even then, the risk of potential deterioration cannot be ruled out at this stage. Other mitigation is likely to include<br><br>Employ effective geomorphological and biodiversity design principles for the new (diversion) channels.<br><br>Embed biodiversity net gain principles into SESRO such that there is sufficient mitigation/compensation for the net loss of river habitat.<br><br>Ensure appropriate construction phasing to allow new diversion channels to 'bed in' prior to connection. | 0 | -  | 0  | - |
|      | To increase water efficiency and increase resilience of Public Water Supply and natural systems to droughts.                              | 0 | 0  | ++ | 0  | Option would increase capacity therefore improving resilience for supply. It would also help reduce abstractions in more vulnerable areas and during times of low flow increasing the resilience of water supply.  | N/A   | 0 | 0  | ++ | 0 |
| Soil | To protect and enhance the functionality and quality of soils, including the protection of high-grade agricultural land, and geodiversity | 0 | -- | 0  | 0  | Based on a recent detailed survey of the reservoir footprint, it is predominately within Grade 2 and 3a agricultural land The reservoir would lead to the permanent loss of this best and most versatile agricultural land and there would likely be short-term negative effects resulting from loss of topsoil during construction phase. This would reduce for smaller reservoir options but not substantially.<br><br>Historic and authorised landfills are within 500m of the indicative location for SESRO with two historic landfills immediately adjacent.<br><br>The development has the potential to cause sterilisation of resources which are currently being quarried in the eastern part of the site with plans to expand this. | Ground would be reinstated where possible, however the reservoir would lead to permanent loss of agricultural land. The option to integrate arable farming on reservoir embankments should be explored. Best practice methods for working near landfill sites likely to be implemented.<br><br>Remediation of contaminated land and removal of unexploded ordnance would be undertaken either before or during construction.<br><br>It may be possible to programme the resource extraction works currently being undertaken in the eastern area of the site so that they are complete before construction  | + | -- | +  | 0 |

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|                 |   |   |    |    |   |   | works impact this. Alternatively, excavation of the minerals could be undertaken in small zones to reduce the potential impacts  |   |    |    |   |
| Air             | To reduce and minimise air and noise emissions  | 0 | -- | 0  | - | <p>The option does not fall within an AQMA, however the Marcham AQMA is within 500m, and Abingdon AQMA is within 2000m of the option location. Construction likely to have minor and temporary impact on air quality. It is expected that SESRO would prioritise use of modern plant equipment, dust control, and other measures such as limiting vehicle speeds. More visitors to the reservoir and its facilities may affect air quality in the local area from increased vehicle emissions and may have an impact on noise.</p> <p>The Natural Capital Assessment identified there would be an improvement in the potential for vegetation at the site to remove air pollutants relative to the existing predominantly arable landcover. This is mainly through introduction of additional woodland and grassland.</p> <p>There are no Noise Action Planning Important Areas within the indicative location for SESRO however these are present immediately adjacent from both road and rail sources. While Supporting Document A1, Concept Design Report commits to screening mounds early in the construction phase and scheduling that would further minimise noise construction traffic associated with the reservoir is likely to compound noise issues at noise sensitive locations.</p> | Best practice mitigation measures likely to be implemented during construction phase, however minor and temporary impacts on the air and noise environment are likely to still occur. The car park should include electric vehicle charging and emissions from visitor vehicles would decrease as electric car uptake continues. | 0 | -- | +  | - |
| Climate Factors | To introduce climate mitigation where required and improve the climate resilience of assets and natural systems | 0 | 0  | ++ | - | <p>Further abstraction may have a negative effect on the environment if not properly monitored and licenced. However, the option would increase resilience of the environment by having capacity to release water into river during low flow and drought conditions and reducing abstraction in more vulnerable areas that would be exacerbated by drought conditions.</p> <p>Construction of the reservoir is anticipated to result in the loss of PV Solar Farms situated within the site and therefore remove a renewable energy source from power supply locally and contributions to renewable energy goals at a wider scale.</p>  | <p>Monitoring to reduce risk of effects on the environment due to abstraction.</p> <p>Explore opportunities to incorporate renewable energy technology in design.</p>  | 0 | 0  | ++ | - |
|                 | To reduce embodied and operational carbon emissions   | 0 | -  | 0  | - | <p>Carbon would be generated from materials used to construct the reservoir (embodied carbon), construction activities and from operation of the reservoir. The relative carbon scale identified that the options has minor construction and operation carbon emissions (relative to other WRSE Regional Plan options). Supporting Document A1, Concept Design Report includes consideration of installing Energy Recovery Turbines which would act to offset construction and operational energy requirements and contribute to decarbonising energy supply.</p>   | Investigate use of renewables during construction and operation for energy supply and use of materials with lower embodied carbon including Energy Recovery Turbines. Carbon footprint study could help identify areas for carbon savings or alternative materials. As   | 0 | -  | +  | - |

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|                      |  |   |    |   | <p>The natural capital assessment identified that natural assets at the site would provide enhancement potential for carbon sequestration relative to existing predominantly arable land cover through the introduction of additional trees and grazing marsh.</p> | <p>the electricity grid is decarbonised, greener energy would be available.</p> <p>The Carbon Report (July 2022) has identified the following opportunities for mitigation: electric/hybrid powered plant, automated plant, reuse of materials, reuse of existing solar panels, low carbon construction materials, hydropower turbines, decarbonised electricity procurement, and EV charging provision.</p>   |  |   |    |   |   |
| Historic Environment | To conserve/protect and enhance historic assets/cultural heritage and their setting, including archaeological important sites. | 0 | -- | + | 0  | <p>There are listed buildings and scheduled monuments within 500 m of the reservoir. The indicative location for SESRO is also immediately adjacent to a listed building. There is potential for the setting of these historic assets to be affected during the construction phase. Embedded construction mitigation is expected to prioritise minimising these effects through consideration of the siting of temporary and permanent works. Past archaeological assessment and investigation by geophysical survey, evaluation trenching and limited areas of excavation have identified the presence of numerous archaeological sites of varying dates (some of considerable significance) across the area of the reservoir and connector routes to the Thames. The scale of these works has so far been very limited, compared to the total footprint of the reservoir. There is a certainty for further unknown archaeology (some likely to be significant) to be present within the footprint of the reservoir and the associated works.</p> | <p>Best practice mitigation measures would likely be implemented to minimise setting effects during construction and to minimise operational effects.</p> <p>A best practice staged programme of archaeological assessment and evaluative fieldwork would be required to establish the nature and significance of the archaeological resource across the footprint of the reservoir and associated works. This pre-consent evaluative programme at a minimum to inform consent would involve:</p> <ol style="list-style-type: none"> <li>1) Updated Detailed Desk Based Assessment</li> <li>2) Geoarchaeological deposit modelling utilising historic geotechnical info as well as purposive geoarchaeological investigations</li> <li>3) A suite of geophysical techniques to identify areas of archaeological sensitivity and to inform the deposit modelling</li> <li>4) Programme of archaeological trial trenching in all areas.</li> </ol> <p>The evaluative works would inform a staged programme of archaeological mitigation which should be developed to respond to an archaeological mitigation</p> | 0 | -- | + | 0 |

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|           |  |   |     |   |     | <p>strategy tied to research aims referencing regional archaeological research frameworks as well as national thematic studies. This would allow a targeted approach by the archaeological programme to achieve meaningful and quality for money results through to public dissemination and publication.</p> <p>The archaeology of SESRO can easily be developed as a good news item to link to local communities and ensure good community and outreach outcomes.</p> <p>Capacity to integrate a heritage/archaeological centre as part of SESRO should be considered as part of future phases of the SESRO design.</p>  |  |   |     |   |     |
| Landscape | To conserve and enhance local landscape character and visual amenity | 0 | --- | + | --- | <p>Note: Please note that this initial assessment includes the 'essential mitigation' illustrated on the landscape and environmental strategy plan. We have not assessed the proposals without any mitigation at all, in line with normal convention for L&amp;V assessment in England. As there is insufficient certainty regarding potential additional mitigation measures at this stage, the residual assessment scores are the same as the effects in the columns to the left.</p> <p><u>North Wessex Downs AONB and it's setting, including views from and towards the elevated scarp of the AONB:</u></p> <p>The indicative location for SESRO is within the setting of the North Wessex Downs AONB, more than 2km north of the AONB. The long scarp and elevated downs of the AONB landscape form a distinctive feature on the horizon to the south of the indicative location for SESRO. There are views available from the Vale towards the scarp of the AONB and also views from the AONB towards the Vale.</p> <p>During construction, indirect effects on the AONB would potentially result from intervisibility with the largescale construction activities for the reservoir in the landscape of its setting to the north. Amongst others, this would affect elevated views from the Ridgeway National Trail which is one of the key landscape characteristics of the distinctive north-facing scarp (a special quality) of this part of the AONB. Characteristic views towards the scarp of the AONB from its setting would also be affected. As such, the landscape character of the AONB would be eroded as the views from and towards the AONB form an important, valued aesthetic component of the AONB.</p> | <p>During construction, the following additional mitigation measures to reduce landscape and visual impacts are recommended:</p> <p>Siting temporary and permanent compounds, cabins, and car parks away from sensitive receptors such as residential areas and public rights of way.</p> <p>Where practicable, maintaining existing views to minimise disturbance to visual amenity through appropriate siting of compounds and haul routes.</p> <p>Exploring opportunities for advance planting and phased planting prior to and during construction, including on permanent bunding, to establish mitigation planting as early as practicable.</p> <p>Softening temporary noise bunding with advance planting located between sensitive visual receptors and the bunding.</p> <p>Where practicable, storing stripped soil in bunds around the perimeter</p> | 0 | --- | + | --- |

At night, localised construction lighting could affect the northern extent of the AONB's dark skies, which is another of the AONB special qualities. However, the construction lighting would not be likely to have a discernible impact on the darkest skies of the AONB.

Overall, the construction activities within the setting of the AONB would temporarily erode some of the key characteristics of the AONBs component Landscape Character Areas, as well as the special qualities of the AONB, including its sense of remoteness and tranquillity. However, this impact would be relatively localised, limited to the north facing part of the escarpment that overlooks the indicative location for SESRO, and forms a relatively small part of the extensive AONB. The effect on the part of the AONB that falls within the study area could potentially be significant during construction. However, the effect on the AONB considered as a whole is unlikely to be significant.

Essential landscape mitigation for operation is illustrated on Figure 2.1 Illustrative Environmental Masterplan in Technical Supporting Document B2.2, Environmental Appraisal Report (terrestrial) Figures. By summer year 15 of operation, the established landscape mitigation would help to integrate and soften the reservoir and associated traffic and infrastructure into the Vale landscape within the setting of the AONB to the north. The impact on elevated valued views from the AONB would therefore have reduced, mainly affecting views from a limited section of the Ridgeway National Trail, directly south of the indicative location for SESRO. It is also possible that the reservoir could become an accepted feature of the AONB setting in such views due to the passage of time. Overall, the indirect impact on the key characteristics and special qualities of the AONB, including its sense of remoteness and tranquillity, would have materially reduced and would only affect a very limited part of the AONB within the study area. As such, despite the high sensitivity of the AONB, **it is unlikely that the effect on the part of the AONB that falls within the study area, as well as the AONB as a whole, would be significant.**

Local landscape character and visual amenity:

The indicative location for SESRO is located within the Vale of White Horse, which is characterised by relatively flat and open clay vale lowland farmland, interspersed by small woodland blocks, hedgerows and tree belts which are often associated with other linear features such as watercourses, public rights of way, roads and the GWR Main Line. It is in close proximity to the Oxford Green Belt but would not affect the openness of the green belt.

Construction activity for the reservoir would include major earthworks movements, material handling at the rail sidings, as well as construction of a number of features associated with the

of the construction areas to provide temporary screening.

Selecting hoarding for site security fencing capable of providing an additional temporary screening function at key locations near sensitive visual receptors in close proximity to the indicative location for SESRO, such as near the South Oxfordshire Crematorium and Memorial Park.

Scheduling the reservoir embankment construction so that the outer parts are constructed first, thereby screening inner parts of the site during subsequent construction operations.

Specifying back light shields and cowls at detailed design such that the potential adverse effects of lighting are reduced.

It is also recommended to develop the operational design further, including the landscape and environmental design, to reduce landscape and visual effects. Such development should be carried out in line with the high-level landscape mitigation principles set out in the Technical Supporting Document B2, Environmental Appraisal Report (terrestrial). Examples include, but are not limited to, using 'soft' engineering solutions in preference to 'hard', avoiding features that introduce lighting, and, sensitive design of buildings and structures, including through careful use of colours, materials and non-reflective surfaces.

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|-----------------|--|---|----|----|--|--|---|---|---|----|---|
|                 |  |   |    |    | <p>reservoir. There would also be vegetation removal, such as hedgerows and trees along field boundaries, as well as some woodland and one ancient tree. Temporary working areas and noise bunding would be uncharacteristic. Although good practice mitigation measures would be implemented, the construction would erode the generally rural landscape character and levels of tranquillity locally, and potentially result in a significant effect on local landscape character and visual amenity.</p> <p>Essential landscape mitigation for operation is illustrated on Figure 2.1 Illustrative Environmental Masterplan in Technical Supporting Document B2.2, Environmental Appraisal Report (terrestrial) Figures. By summer year 15 of operation, the landscape mitigation planting would have established. The hedgerows, shrubs, scrub, trees, small woodland blocks and copses would help to integrate the reservoir and associated infrastructure into the landscape. However, the loss of one ancient tree could not be mitigated. SESRO would potentially result in a significant change to landscape character and visual amenity due to the impact of the large-scale reservoir, which would permanently alter the landform and character of the Lower Vale Farmlands locally. However, there would be positive contributions to the landscape character within the River Floodplain, including new wetland habitats and enhancements to public rights of way and, waterborne recreation and access.</p> |  |   |   |   |    |   |
| Material Assets | To minimise resource use and waste production            | 0 | -- | 0  | -  | <p>New reservoir and associated infrastructure required for the option would involve materials and resource use. Excavated material would be generated, however Supporting Document A1, Concept Design Report outlines this would be reused on site. All materials excavated from the site are to be used on site, with no materials exported. Earthworks unsuitable for structural use in the embankments would be used for landscaping.</p>  | <p>Opportunity to implement sustainable design measures to reduce the impact, however it is likely that minor negative effects would remain.</p>  | 0 | - | 0  | - |
|                 | To avoid negative effects on built assets/infrastructure | 0 | -- | ++ | 0  | <p>The option has a direct impact on major roads, a national cycle way and other rights of way including bridleways. There is likely to be moderate and temporary impacts during the construction phase from disruption for users (e.g. road closures, diversions). Embedded mitigation measures outlined in Supporting Document A1, Concept Design Report include creating new road diversions and haul roads at the start of the construction, importing main construction materials (drainage stone, rip rap, fuel) by train, and determining access routes and operational hours to minimise traffic through villages avoiding peak road traffic hours. It is anticipated that some roads would need to be permanently diverted to accommodate the reservoir.</p> <p>Loss of private property, agricultural and other businesses including Solar PV farms is anticipated to result in significant adverse impacts during construction.</p> | <p>Best practice mitigation measures would likely be implemented to minimise effects during construction. However, minor and temporary effects are likely to still occur.</p> <p>Supporting Document A1, Concept Design Report outlines opportunities for operational energy recovery, specifically Energy Recovery Turbines, however these would need to be considered further along with use of renewables.</p> | 0 | - | ++ | 0 |

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|  |  |  |  |  | Operationally, the reservoir presents a significant asset in terms of recreation, water resource, attracting development and increasing tourism potential in the local and wider area. |  |  |  |  |  |
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## Appendix D Cumulative Assessment Sift

Table A-11 - Major Allocations within 2km of the indicative location of SESRO. All data collected May 2021. All data within Vale of White Horse District Council. All data listed within Vale of White Horse District Council Local Plan (2031)

| Planning Reference | Name  | Allocation Type                            | Closest distance to SESRO  | Potential receptors effected  | Description  |
|--------------------|---|--|--|---|--|
| VLP096             | North-East of East Hanney                                       | Strategic/Additional Housing Allocations   | Adjacent western edge of the indicative location for SESRO       | Listed Buildings (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC, Flood Zone  | Proposed allocation up to 50 dwellings, subject to masterplanning. It seeks to contribute towards infrastructure improvements along the A338 (Frilford Lights) and elsewhere. A junction capacity assessment is required.  |
| VLP094             | North of East Hanney  | Strategic/Additional Housing Allocations   | Adjacent western edge of the indicative location for SESRO       | Listed Buildings (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC, Flood Zone  | Proposed allocation up to 80 dwellings, subject to masterplanning. It seeks to contribute towards infrastructure improvements along the A338 (Frilford Lights) and elsewhere. A junction capacity assessment is required.  |
| VLP043             | Land for Marcham Bypass improvements to Frilford Lights         | Land Safeguarded for Highways Improvements | 800m North of the indicative location for SESRO                  | Road and Rail Noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC, Flood Zone | In addition to land safeguarded for identified transport schemes set out in Core Policy 12 (Local Plan 2031 Part 1) some other schemes are also safeguarded.   |
| VLP054             | Ashville Trading Estate and Nuffield Way                        | Strategic Employment Sites                 | 200m east of the indicative location for SESRO                   | Road noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC                      | Planning team review showing data of Major Allocations as part of the Committed Development Log review to be done every month (Reviews include all that has occurred in the last 12 months).   |
| VLP095             | South-East of Marcham   | Strategic/Additional Housing Allocations   | 800m North of the indicative location for SESRO                  | Road and Rail Noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC, Flood Zone | Proposed allocation around 90 dwellings, subject to masterplanning. It seeks to contribute towards infrastructure improvements along the A415 (Marcham Bypass, Frilford Lights) and elsewhere and ensure that land safeguarded for Marcham bypass is not affected. |
| VLP093             | Dalton Barracks   | Strategic/Additional Housing Allocations   | 800m North of the indicative location for SESRO                  | Road and Rail Noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC, Flood Zone | Proposed allocation around 1,200 dwellings up to 2031. It seeks to deliver a high quality, exemplar, community focused, landscape-led, sustainable development of 1,200 dwellings on part of the wider Garden Village site.  |
| VLP042             | Land for Abingdon Southern Bypass                               | Land Safeguarded for Highways Improvements | Adjacent North-Eastern edge of the indicative location for SESRO | Road and Rail Noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC, Flood Zone | Planning team review showing data of Major Allocations as part of the Committed Development Log review to be done every month (Reviews include all that has occurred in the last 12 months).   |
| DRT002             | North of Barrow Road  | DRT002                                     | 500m East of the indicative location for SESRO                   | Road noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC                      | This site is located at the north of Drayton. The site comprises 8.17ha in total and is part of the larger 12.3 ha site assessed in the VWHDC SHLAA as DRAY02. The site is currently used for arable agriculture.  |
| DRT003             | Manor Farm  | DRT003                                     | 500m East of the indicative location for SESRO                   | Road noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC                      | The Manor Farm site is located at the heart of Drayton. The site is assessed as site DRAY11 in the VWHDC SHLAA. The site is currently unused with the exception of occasional grazing by livestock.  |
| DRT001             | South of the High Street  | DRT001                                     | 500m East of the indicative location for SESRO                   | Road noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC                      | This site is located at south of the High Street in Drayton. The site was initially proposed for designation as a strategic site in the VWHDC emerging Local Plan Part 1 but was not taken forward as a strategic site.  |
| VLP034             | Land for improvements to Featherbed Lane and Steventon Junction | Land Safeguarded for Highways Improvements | 1.5km south-east of the indicative location for SESRO            | Road and Rail Noise, Upper Thames Clay Vale NCA, Grade 3/4 ALC  | Scheme is part of the Strategic Highway Improvements within the South-East Vale Sub-Area. Land is safeguarded to support and ensure the delivery of housing and employment growth within the Science Vale area.  |

| Planning Reference | Name                           | Allocation Type                            | Closest distance to SESRO                            | Potential receptors effected  | Description  |
|--------------------|--------------------------------|--|--|---|--|
| VLP088             | Milton Heights                 | Strategic/Additional Housing Allocations   | 2km south-east of the indicative location for SESRO  | Road and Rail Noise, Upper Thames Clay Vale NCA, Grade 3/4 ALC                          | The development of this site shall take into account the design and layout of nearby strategic housing sites, including Valley Park and North West Valley Park. Development to contribute towards infrastructure in the Science Vale Area Strategy.  |
| VLP085             | North West Valley Park         | Strategic/Additional Housing Allocations   | 2km south-east of the indicative location for SESRO  | Road and Rail Noise, Upper Thames Clay Vale NCA, Grade 3/4 ALC                          | The development of this site shall take into account the design and layout of nearby strategic housing sites, including Valley Park and Milton Heights. Development to contribute to balanced employment and housing growth in Science Vale.   |
| VLP047             | Land for Grove Railway Station | Land Safeguarded for Highways Improvements | 500m south-west of the indicative location for SESRO | Rail/Road Noise, listed buildings (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC | Scheme is part of the Strategic Highway Improvements within the South-East Vale Sub-Area. Land is safeguarded to support and ensure the delivery of housing and employment growth within the Science Vale area. Land is safeguarded to support the re-opening of the railway station at Grove. |
| VLP086             | Monks Farm                     | Strategic/Additional Housing Allocations   | 1km south-west of the indicative location for SESRO  | Rail/Road Noise, listed buildings (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC | Employment land would also be provided as part of mixed-use strategic site at Monks Farm. Development to deliver a high quality, sustainable and mixed use urban extension which is integrated with Grove so residents can access existing facilities.   |

Table A-12 - Major Planning Applications within 2km of the indicative SESRO location. All data collected February 2022. All data within Vale of White Horse District Council. Applications that have been constructed, or are under construction, have been omitted. All listed allocations have potential construction overlap with SESRO in 2030s. Not enough information at present to determine likely significant effects.

| Planning Reference | Name                              | Application Description | Closest distance to SESRO                                 | Planning status                           | potential receptors effected  | Description   |
|--------------------|-----------------------------------|-------------------------|---|---|---|---|
| P15/V2887 /FUL     | School Road                       | Housing - Residential   | 1km west of the indicative location for SESRO             | Full Planning Application Approved        | Rail/Road Noise, listed buildings (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC                                     | Erection of 15 dwellings and associated works (as amended by Drawings and information accompanying agent's email of 22 March 2016 and further amended by location, site and landscaping plan drawings 2925.100B, 101D, 102F, 113A and 115B and Design and Access addendum received 31 March 2016 and as clarified by updated Flood Risk Assessment accompanying agent's email of 23 June 2016).   |
| P17/V0571 /O       | Bramble Grange                    | Housing - Residential   | Within indicative location for SESRO                      | Outline Planning Application Approved     | Rail/Road Noise, listed buildings (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC                                     | Outline Planning Application (all matters reserved except that of access), in line with the use established at P14/V0121/FUL, to provide for up to 89 bedrooms (comprising 40 bedrooms by virtue of the erection of 10 residential living pods, provision of 3 dormitories within the first floor of the existing property, and 46 bedrooms by virtue of the erection of an extension to the existing property), erection of a Lecture Hall (for up to 360 persons in capacity), and ancillary seminar room (for up to 80 persons capacity), provision of single storey detached building, associated landscaping, vehicle turning area and car park comprising up to 50 spaces, and other ancillary works. |
| P21/V2622 /O       | Land off Abingdon Road Steventon  | Housing - Residential   | Directly adjacent SW of the indicative location for SESRO | Outline Application Pending Consideration | Rail/Road Noise, listed buildings (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC                                     | Outline planning application for up to 80 residential dwellings (including up to 35% affordable housing), and 0.27 hectares for C2 use as a residential care home. The introduction of structural planting and landscaping, public open space and children's play area, sustainable urban drainage system, and associated ancillary works. All matters to be reserved with the exception of the main site access. (as amended and amplified by plans and information received 17 March 2022 & 13 April 2022).   |
| P15/V2077 /O       | Halls Close                       | Housing - Residential   | 800m east of the indicative location for SESRO            | Outline Planning Application Approved     | Road noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC            | Outline application on Land to the Rear of 10 Halls Close, Drayton to provide up to 28 no. dwellings with all matters reserved except access (As amended by Drawing No: 14.070.SK13 (Site Layout) accompanying agent's letter dated 2 November 2015).   |
| P19/V1089 /FUL     | School Of St Helen & St Katharine | Community - Education   | 1.3km north-east of the indicative location for SESRO     | Outline Planning Application Approved     | Road Noise, Listed Buildings (setting), Barrow Farm Fen, Upper Thames Clay Vales NCA, Allotments, Grade 3/4 ALC, Flood Zone | New Sixth Form Centre providing new classrooms, study spaces, cafe and servery, common room, offices and a sixth form garden.   |
| P16/V1088 /FUL     | The Manor Preparatory School      | Community - Education   | 1.2km north-east of the indicative location for SESRO     | Outline Planning Application Approved     | Road Noise, Listed Buildings (setting), Barrow Farm Fen, Upper Thames Clay Vales NCA, Allotments, Grade 3/4 ALC, Flood Zone | Hybrid application comprising a detailed application for a sports hall, AstroTurf pitch and pavilion, relocated netball and tennis courts, new canopy to lower school building, car park extension to rear and rearranged access, car park and drop off at front of school; and an outline application for erection of a swimming pool, two classroom buildings and extension to dining room (all matters reserved except access).  |

|              |                                 |                       |   |                                       |   |   |
|--------------|---------------------------------|-----------------------|---|---------------------------------------|---|---|
| P20/V1388 /O | Land South of A415 Marcham Oxon | Housing - Residential | 500m north of the indicative location for SESRO | Outline Planning Application Approved | Road and Rail Noise, Listed Buildings (setting), Scheduled Monument (setting), Upper Thames Clay Vales NCA, Grade 3/4 ALC, Flood Zone | Outline planning permission for residential development of up to 90 dwellings (Use Class C3) including means of access into the site (not internal roads) and associated highway works, with all other matters (relating to appearance, landscaping, scale and layout) reserved. (As per the updated air quality assessment received on 11 November 2020, drainage technical note 29 March 2021, Frilford Lights technical note 31 March 2021 and Frilford lights mitigation 23 July 2021). |
|--------------|---------------------------------|-----------------------|---|---------------------------------------|---|---|

Table A-13 - Other SROs and known schemes

| Name                                  | Description   | Notes               |
|---------------------------------------|---|---------------------|
| A34 Improvements North and South      | Various road improvements on A34 adjacent eastern edge of indicative location of SESRO.   | Pending Submission. |
| London effluent reuse                 | Beckton effluent reuse would further treat and transfer discharge to the King George V reservoir to supplement the raw water supply to the Lee Valley reservoirs. There are alternative options both utilising Mogden and potentially a smaller option for indirect effluent reuse and river abstraction at Teddington. This results in three potential effluent reuse solutions in the London area with capacities ranging from 50 to 250MI/d. | At Gate 2           |
| River Severn to River Thames transfer | A transfer of water from Lake Vyrnwy (United Utilities) into the River Severn, with additional sources from Severn Trent Water (see Severn Trent sources solution), abstracted from the lower reaches of the River Severn and transferred by pipeline or restored Cotswold canal to the River Thames. This solution ranges from 50MI/d to 180MI/d.  | At Gate 2           |
| Thames – Affinity transfer            | A transfer of water from the River Thames for treatment at a new treatment works or through expansion of a current treatment works. Solution capacity ranges from 50 to 100MI/d.  | At Gate 2           |
| Thames – Southern transfer            | A transfer of water from Thames Water’s area near Oxford to Southern Water. This can make use of current sources or one of the strategic regional solutions being considered for Thames Water. The funding includes a consideration of the source for the transfer but should also investigate a range of sizes and routes. Solution range up to 80MI/d.  | At Gate 2           |

## Appendix E Cumulative effects assessment methodology

Mott MacDonald (27 April 2022). Cumulative effects assessment methodology (Version 3). 100383187-023\_003. T2AT Gate 2 Environmental Assessments

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|                       |   |                        |                   |
|-----------------------|---|------------------------|-------------------|
| <b>Project:</b>       | T2AT Gate 2 Environmental Assessments                 |                        |                   |
| <b>Our reference:</b> | 100383187-023   | <b>Your reference:</b> | 100383187-023_003 |
| <b>Prepared by:</b>   | Clare Le Brecht                                       | <b>Date:</b>           | 27 April 2022     |
| <b>Approved by:</b>   | Jackie Fookes   | <b>Checked by:</b>     | Ian Scott         |
| <b>Subject:</b>       | Cumulative effects assessment methodology (Version 3) |                        |                   |

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## 1 Introduction

### 1.1 Purpose of this technical note

This technical note presents the cumulative effects assessment methodology for the Strategic Resource Option (SRO) Gate 2 Environmental Assessments. A cumulative effects assessment will be undertaken and reported in the Environmental Appraisal Report (EAR) for the preferred option(s) taken forward for the Gate 2 submission. This note covers the Gate 2 environmental appraisal only. The in-combination effects assessment required for the HRA and WFD will be considered separately, once guidance is available from Natural England / Natural Resources Wales and the Environment Agency.

### 1.2 Terminology

The following terms are used in this technical note:

- **In-combination effects** – for the purpose of this technical note, this refers to the assessment of combined effects of SROs and other options within the Regional Plan and WRMP24.
- **Cumulative effects with other developments and plans** – this responds to the requirements of the EIA and SEA Regulations to consider the combined effects of a scheme with ‘other development’ (external to the scheme) and ‘other plans’. These effects are sometimes referred to as ‘inter-project effects.’
- **Interrelationship between effects** – this refers to the combined environmental effects on a resource or receptor (i.e. interaction of environmental factors such as air quality, noise, health etc). These effects are sometimes referred to as ‘intra-project effects.’

### 1.3 Requirement for cumulative effects assessment

Although the Gate 2 environmental appraisal is not a regulatory assessment, the requirement to assess cumulative effects is set out in Rapid Gate 2 guidance (Rapid: Strategic regional water resource solutions guidance, February 2022). The following legislation and planning policy guidance has been taken into account to determine a suitable scope for the assessment.

- Paragraph 5 of Schedule 4 of both the [Infrastructure Planning \(Environmental Impact Assessment\) Regulations 2017](#) and the [Town and Country Planning \(Environmental Impact Assessment\) Regulations 2017](#), states that applicants are to provide a description of the likely significant effects of a proposed development on the environment resulting from:

*“(e) the **cumulation of effects with other existing and/or approved projects**, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.”*

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- Regulation 5(2) (e) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and Regulation 4(2) (e) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, which requires that an Environmental Impact Assessment (EIA) must consider the interaction of environmental effects associated with a proposed development. For the purpose of this technical note, this is called ‘interrelationships between effects.’
- Schedule 2 of the [Environmental Assessment of Plans and Programmes Regulations 2004](#) and [Environmental Assessment of Plans and Programmes \(Wales\) Regulations 2004](#) states that Environmental Reports should contain “an outline of the contents and main objectives of the plan or programme, and of its **relationship with other relevant plans and programmes**” and report “the likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, **cumulative and synergistic effects.**”
- The [draft Water Resources Infrastructure National Policy Statement](#) (NPS) provides the following (paras 3.2.5 to 3.2.6):

*“When considering significant cumulative effects, any environmental statement should provide information on how the effects of an applicant’s proposal **would combine and interact with the effects of other development** (including projects for which consent has been granted, as well as those already in existence if they are not otherwise considered as part of the “baseline” conditions).*

*The Examining Authority should consider how significant cumulative effects, and the **interrelationship between effects**, might as a whole affect the environment, even though they may be acceptable when considered on an individual basis or with mitigation measures in place”*

- Paragraph 024 of the [Planning Practice Guidance for Environmental Impact Assessment](#), which explains the requirements of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, states:

*“Each application (or request for a screening opinion) should be considered on its own merits. There are occasions, however, when other existing or approved development may be relevant in determining whether significant effects are likely as a consequence of a proposed development. The local planning authorities should always have regard to the **possible cumulative effects arising from any existing or approved development.***

The Rapid Gate 2 guidance also advises that “Where the solution affects Wales you should consider your duties under the Environment (Wales) Act section 6 & [7] and the Wellbeing of Future Generations (Wales) Act.” Other requirements and legislation relating to Wales (such as the Biodiversity and Resilience of Ecosystems Duty) should be considered for SRO schemes that are in or affect Wales. Applicable requirements and environmental scope should be discussed with Natural Resource Wales.

#### 1.4 Relationship of cumulative effects assessment for Regional Plans, WRMP24 and SROs

A cumulative effects assessment is required for the Regional Plans, WRMP24s (Water Resource Management Plans) and SROs. To avoid duplication and inconsistencies across the assessments, it is proposed that the in-combination and cumulative effects assessments for the Regional Plans and WRMP24s are summarised in the Gate 2 submission and that potential cumulative effects with future developments that are local to the SRO will be reported in the Gate 2 submission.

- **Regional Plan** – the Strategic Environmental Assessment (SEA) will include an in-combination effects assessment of all the selected options in the preferred plan and alternative plans where the regional plan is taking an adaptive planning approach. This will ensure that at a regional level the proposed options and their phasing do not result in significant negative in-combination effects. The assessment will also consider the regional plan in-combination with the other regional water resource plans. However, the programme for this will depend on when other regions have selected their preferred plans, and the assessment will need to be a collaboration between the regions.

- **WRMP24** – the in-combination and cumulative effects assessment for WRMP24s is a statutory requirement and therefore needs to be robust, specific for the WRMP24, and include other relevant plans, programmes and projects. The regional plan in-combination effects assessment will be used as a basis and updated/tailored to reflect the individual WRMP24 (i.e. looking at the in-combination and cumulative effects of the options within the WRMP24 only). The WRMP24 SEA will report the outcomes of the regional plan in-combination effect assessment to demonstrate that there are no adverse in-combination effects of the WRMP24 when considered within the context of the regional plan. As this will already have been undertaken as part of the regional plan assessment, this will not be duplicated but the outcomes will be reported. Due to the geographical scale of the regional plan, and time and resource constraints, additional detail on cumulative effects with other relevant plans, programme and projects will not be covered. Therefore, the WRMP24 cumulative effects assessment will include these elements, including Local Authority level data on Local Plan policies and development sites (e.g., housing, minerals), local transport plans, water company Drought Plans, Natural Resources Wales and Environment Agency Drought Plans etc.
- **SROs** – the SROs will report the outcomes of the regional plan and WRMP24 in-combination and cumulative effects assessments (relevant to their SRO), where timing permits, and will not undertake any further assessment of the in-combination and cumulative effects of the SRO with the other SROs, plans or programmes identified in these assessments. It will be assumed that the Regional Plan and WRMP24 assessments have concluded no significant in-combination and cumulative effects at a plan level, enabling the SRO to progress. The SRO specific cumulative effects assessment will then look in further detail at the site and surrounding area in terms of local and site-specific information including large development allocations within Local Plans and larger planning applications (see Section 2.1 for more information). Section 2 of this note describes the approach to the SRO specific cumulative effects assessment for the purpose of the Gate 2 submission.

## 1.5 Proportionate approach for Gate 2

This technical note proposes an efficient and proportionate approach to the cumulative effects assessment, which is cognisant of the work being undertaken for the Regional Plan and WRMPs (see Section 1.3), the timing of an EIA within the anticipated future consenting programme, the level of design detail that will be available at Gate 2, and the level of environmental appraisal that is proposed for Gate 2.

As described in Section 1.3, for efficiency, where appropriate, the cumulative effects assessment will refer to the cumulative effects assessments undertaken for Regional Plans and Water Company WRMPs and acknowledge that the outcome of such assessments will need to be updated as SROs detailed designs develop and as part of the EIA-stage cumulative effects assessment.

The Gate 1 submissions indicate a future programme for the SROs with development consent applications e.g. Development Consent Orders (DCO) or Town and Country Planning Act (TCPA) applications being submitted at later stages, potentially several years in the future. It is considered therefore that the scope of 'other developments' considered in the cumulative effects assessment for Gate 2 should focus on larger developments foreseen in the long-term rather than smaller developments that are likely to be consented and/or built before the anticipated DCO or TCPA application submission for the SRO or its sub-options, as it is considered that it is these larger, longer-term developments that have the potential for significant cumulative effects that may require additional mitigation. Section 2.1 sets out the approach to defining these.

At Gate 2, the SROs will be at a conceptual design stage and therefore the level of design information will be much less detailed than that available at the EIA stage. Furthermore, the appraisal that will be presented in the EAR will not report on likely significant effects but rather potential environmental effects in terms of risks and opportunities and likely required mitigation. Therefore, a full cumulative effects assessment, as would be reported in an EIA, is not appropriate for Gate 2 but rather the focus will be on identification of risks due to potential cumulative effects of SROs with other plans and projects that will need to be addressed at future gates and for which additional mitigation may be required.

## 2 Approach

This section describes the approach to the cumulative effects assessment for Gate 2. As per the hierarchy described in Section 1.3, the cumulative effects assessment will focus on the larger and longer-term developments that could combine with the SRO to cause an additional or different effects on receptors for the SRO only and will be undertaken for the whole of an SRO scheme regardless of consenting route. E.g. some SROs may be delivered via a combination of DCO and TCPA applications, but the cumulative effects assessment will consider the scheme as a whole.

### 2.1 Cumulative effects with other plans and developments

While there is no standard approach to the assessment of cumulative effects, the Planning Inspectorate has issued [Advice Note Seventeen](#), which provides useful guidance. This guidance has been taken into account in developing a proportionate approach to assessing cumulative effects at Gate 2. SROs should develop an approach, based on the steps set out below, which is appropriate for the maturity of the scheme and scale of development, and provide justification for the approach taken.

The first step will be to identify the other plans and developments that will be considered by establishing a zone of influence (ZOI) for each topic, using GIS, to determine the maximum area within which other developments and plans will need to be identified. A table will be prepared to document the ZOI for each topic (see example table in Appendix A).

The list of other developments and plans could include:

- Large existing and emerging Local Plan allocations e.g. 500 or more dwellings.
- Projects on the Planning Inspectorate's Programme of Projects.
- Hybrid Bills e.g. HS2 Phase One.
- Transport and Works Act Orders for large-scale transport infrastructure.
- Minerals and waste applications, including for landfill and energy from waste.
- Major planning applications made under the Town and Country Planning Act (1990)

As set out in Section 1.3, it is assumed that the Regional Plan will have been subject to an in-combination effects assessment with SROs, and that the WRMPs will be subject to a cumulative effects assessment with adopted and emerging Development Plans therefore these will be excluded from the SRO-specific cumulative effects assessment at Gate 2 with the exception of large existing and emerging site allocations. Other confirmed investments by water companies at sites that form part of the SRO options should also be considered.

Once the list of other plans and developments has been identified, a schedule will be developed providing information for each development including location information, planning status, and programme for construction/operation to determine if there is an overlap in temporal scope and which receptors have potential to experience effects from both the SRO and the other development. An example is provided in Appendix B. This will allow the potential for cumulative effects of two or more developments by virtue of overlaps in temporal or geographical scope or due to the scale and nature of the 'other development'/receiving environment, and whether these could require additional mitigation. The intention is to identify interactions of construction and/or operational effects between developments. This information is not being collected to inform route and/or site selection decisions. Therefore, developments that are likely to be completed prior to construction commencing on the SRO will be excluded from a cumulative effects assessment, as they will instead become part of local, environmental baselines against which broader environmental assessment will be undertaken.

Appendix C provides an example table for reporting the cumulative effects assessment. Potential SRO-specific cumulative effects will be reported within the Environmental Appraisal Report together with any proposed mitigation measures (including how the mitigation could be secured and delivered).

It is noted that as the RAPID process progresses and the scheme is refined at Gates 3 and 4, the topic ZOIs will need to be reviewed and updated as necessary. As the ZOIs change, data collection on 'other developments' will therefore also be reviewed and updated ahead of a future EIA Scoping Opinion request. The list of developments for the EIA-stage cumulative effects assessment will also need to be reviewed and updated, for example, consideration given to applications for NSIPs under the Planning Act (2008) and for major developments under the TCPA (1990).

## 2.2 Interrelationship between effects

There is no standard approach to the assessment of interrelationships between effects. Effects are very rarely additive, but rather a collection of impacts on a receptor that need to be drawn together. Consideration also needs to be given to the potential for 'synergistic' effects whereby different types of impact affecting a receptor may interact together and increase their effect.

A receptor-based approach to the assessment of interrelationships between effects is set out below.

- Step 1: Identify receptor types (e.g. community, ecological habitat or species, a heritage asset, landscape feature or natural feature, waterbody or watercourse) and geographical locations.
- Step 2: Identify receptors and their geographical location.
- Step 3: Screen out receptors where there is no potential for interrelationships between effects or temporal overlap of impacts, or where impacts are anticipated to be negligible.
- Step 4: Assess interrelationships between effects at remaining receptors and report on a receptor basis (within geographical areas) appropriate to the effects identified.

It is considered that climate change can be scoped out of the assessment of interrelationships between effects as topic-specific climate change effects will be considered through topic assessments (and be carried through to the cumulative assessment if appropriate), with no separate input to the cumulative assessment required for the climate change topic. Carbon effects are not location specific within the anticipated ZOI for the SROs and do not interact with other environmental effects therefore will be scoped out of the assessment of interrelationships between effects.

Appendix D provides an example table for reporting the assessment of interrelationships between effects.

## A. Environmental topics and their zones of influence

The table below provides indicative Zones of Influence (Zol); this will vary depending on the nature of the SRO.

| Environmental topic           | Zone of influence explanation  |
|-------------------------------|--|
| Air quality                   | <b>Construction:</b> 350m Zol from anticipated construction activities for effects relating to construction dust and emissions.<br><b>Operation:</b> 1km Zol for construction and operational traffic effects.   |
| Biodiversity, flora and fauna | 2km Zol for both construction and operational effects on national statutory designated sites which will be extended where impacts extend beyond this e.g. where there is a SSSI impact risk zone.<br>1km Zol for both construction and operational effects on habitat and non-statutory designated sites which will be extended where impacts extend beyond this.<br>Habitats Regulations Assessment to define Zol for internationally designated sites. |
| Historic environment          | 500m Zol for both construction and operational effects on the significance of designated heritage assets.<br>200m Zol for both construction and operational effects on the significance of non-statutory heritage assets.  |
| Landscape                     | <b>Construction and operation:</b> 1km Zol for both construction and operational effects on landscape.   |
| Material assets               | <b>Construction and operation:</b> 200m Zol for both construction and operational effects.   |
| Noise                         | <b>Construction and operation:</b> 600m Zol from anticipated construction activities as a worst case.  |
| Population and human health   | <b>Construction and operation:</b> 500m ZOI for assessing impacts on community assets with considering to effects outside of the 500m area where these are likely to occur.  |
| Soils                         | <b>Construction and operation:</b> A 200m Zol for both construction and operational effects.   |
| Transport and access          | <b>Construction and operation:</b> A 1km Zol for both construction and operational effects which will be extended where impacts extend beyond this.  |
| Water                         | <b>Construction and operation:</b> 1km Zol for flood risk which will be extended where impacts extend beyond this.<br>Water Framework Directive Assessment to define Zol for water resource (flow and quality) for construction and operational effect.  |

## B. Example Development Schedule

| No. | Application reference | Planning Authority | Applicant and brief description  | Closest distance from scheme boundary and orientation | Planning status     | Overlap in temporal scope?   | Scale and nature of development likely to have a significant effect? | Potential receptors affected     | Other factors | Progress to cumulative assessment? |
|-----|-----------------------|--------------------|--|---|---------------------|--|--|----------------------------------|---------------|------------------------------------|
| X   | XX/XXXX/OUT           | XX                 | XX: Outline planning permission for development of a mixed use urban extension to include: residential development of up to 2,000 dwellings, 65,000sqm of employment space, landscaping and access improvements. | XXm to the east                                       | Decided – Permitted | Y – the construction of this development is anticipated to commence in 2021 with completion anticipated in 2045. | Y  | Xx SSSI Communities in xx and xx | None          | Y                                  |
|     |                       |                    |  |   |                     |  |  |                                  |               |                                    |
|     |                       |                    |  |   |                     |  |  |                                  |               |                                    |
|     |                       |                    |  |   |                     |  |  |                                  |               |                                    |

## C. Example cumulative effects assessment matrix

| No. | Application Reference | Planning Authority | Applicant and brief description  | Potential for cumulative effects with the scheme   | Potential mitigation   |
|-----|-----------------------|--------------------|--|--|--|
| X   | XX/XXXX/OUT           | XX                 | XX: Outline planning permission for development of a mixed use urban extension to include: residential development of up to 2,000 dwellings, 65,000sqm of employment space, landscaping and access improvements. | <p>The development is located adjacent to the scheme boundary. The construction programme of the development is unknown, but it is unlikely that there would be any overlap between the construction of the scheme and the development.</p> <p>The closest element of the scheme to the development is the pipeline which will not be visible to the nearby residential receptors and will not have any operational noise impacts on nearby residential receptors.</p> <p>The development has not predicted any other significant adverse residual effects, and it is considered unlikely that when combined with the scheme, the reported effects would result in significant cumulative effects.</p> | No additional mitigation has been identified above the measures which would be included within a Construction Environmental Management Plan. |
|     |                       |                    |  |  |  |

## D. Example effect interrelationships assessment matrix

| Receptor type | Receptor                 | Potential cumulative effects  | Mitigation   |
|---------------|--------------------------|---|--|
| Residential   | Communities in xx and xx | Visual – potential for visual effects during construction.<br>Noise – potential for noise during construction.<br>Vibration – potential for vibration during construction.<br>Air Quality – potential for dust and emissions during construction. | No additional mitigation is likely to be required beyond standard good practice construction measures. |
|               |                          |   |  |
|               |                          |   |  |

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