



# South East Strategic Reservoir Option (SESRO)

Technical Supporting Document B4  
Habitats Regulations Assessment

## 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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# 1. Introduction

## 1.1 Overview

- 1.1 This report provides an update to the informal Habitats Regulations Assessment (HRA) Stage 1 Screening report produced for the South East Strategic Reservoir Option (SESRO) at Gate 1 of the Regulators' Alliance for Progressing Infrastructure Development (RAPID) process.
- 1.2 There is no statutory requirement to undertake a HRA for Gate 2, but this informal HRA is being provided further to the requirements of RAPID (and explain and reference those requirements). This assessment has been undertaken following the principles of an HRA, to inform the development of the scheme and identify and reduce risk of non-compliance at a later stage of the process. A formal HRA will be undertaken as part of the consenting process (Development Consent Order (DCO)), based on more detailed information once the final option is confirmed.
- 1.3 Located south west of Abingdon, the SESRO provides water storage in a fully bunded reservoir and a resilient supply of raw water to the River Thames during periods of low flow, for release and subsequent re-abstraction.
- 1.4 Six reservoir capacity options are being considered including the 150 Mm<sup>3</sup> capacity reservoir, the largest SESRO option.

## 1.2 RAPID Gate 2

- 1.5 This report presents the informal HRA Stage 1 screening report of the SESRO options at RAPID Gate 2. Following the principles of HRA, as described in the sections below, it sets out the potential for likely significant effects (LSE), during construction and operation, on National Network Sites (See Section 1.2.2), as a result of SESRO. Reference is made to any potential LSE in relation to the six considered reservoir capacity options, alone, and in combination with other plans and projects in accordance with All Companies Working Group (ACWG) guidance<sup>1</sup> and which is aligned to the expectations and rationale for the level of assessment at Gate 2 of the RAPID process<sup>2</sup>.

### 1.2.2 National Network Sites

- 1.6 The 'Natura 2000' network of sites were established under EU law<sup>3</sup> by Member States to protect particular habitats and species of conservation importance<sup>4</sup>. As a former member of the EU, the UK has maintained this protected network and refers to the sites within it as National Network Sites. These sites comprise Special Areas of Conservation (SACs)<sup>5</sup> for habitats and species and Special Protection Areas (SPAs) for birds<sup>6</sup>.

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<sup>1</sup> Mott MacDonald, 2020, "ACWG, WRMP environmental assessment guidance and applicability with SROs

<sup>2</sup> OFWAT (2022), Regulators' Alliance for Progressing Infrastructure Development (RAPID) Strategic regional water resource solutions guidance for gate two

<sup>3</sup> Article 6 of the "Habitats Directive" and Article 4 of the "Wild Birds Directive"

<sup>4</sup> Those habitats and species listed in Annex I and II of the "Habitats Directive" and Annex I of the "Wild Birds Directive"

<sup>5</sup> Designated under the "Habitats Directive"

<sup>6</sup> Designated under the "Wild Birds Directive"

1.7 In addition, UK Government policy<sup>7</sup> dictates that all Ramsar sites, proposed Ramsar sites, possible SACs and potential SPAs are treated as though they were statutory National Network Sites and they will be treated as such in this HRA process. In this document, these sites are referred to collectively as “National Network Sites”.

### 1.3 Legislative context

#### 1.3.1 Requirements

1.8 The Conservation of Habitats and Species Regulations 2017 (as amended) (“the Habitats Regulations”) transposed the Habitats Directive and Wild Birds Directives into English and Welsh law. Regulations 63(1) - (9), 64 and 68 of the Habitats Regulations set out the requirements for assessment of impacts on National Network Sites.. The general provisions at 63, 64 and 68 of the Habitats Regulations guides the assessment of implications for National Network Sites:

- ‘63. (1) A competent authority, before deciding to undertake, or give any consent, permission or other authorisation for, a plan or project which –
  - (a) is likely to have a significant effect on a National Network Site or a European offshore marine site (either alone or in-combination with other plans or projects), and
  - (b) is not directly connected with or necessary to the management of that site<sup>8</sup>,must make an *Appropriate Assessment of the implications for that site in view of that site’s conservation objectives.*’
- 64. (1) If the competent authority is satisfied that, there being no alternative solutions, the plan or project must be carried out for imperative reasons of overriding public interest (which, subject to paragraph (2), may be of a social or economic nature), it may agree to the plan or project notwithstanding a negative assessment of the implications for the National Network Site or the European offshore marine site (as the case may be).
- 68. Where in accordance with regulation 64 —
  - (a) a plan or project is agreed to, notwithstanding a negative assessment of the implications for a National Network Site or a European offshore marine site, or
  - (b) a decision, or a consent, permission or other authorisation, is affirmed on review, notwithstanding such an assessment,the appropriate authority must secure that any necessary compensatory measures are taken to ensure that the overall coherence of Natura 2000 is protected.

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<sup>7</sup> Ministry of Housing, Communities and Local Government (2021) National Planning Policy Framework available at [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/779764/NPPF\\_January\\_2022\\_web.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779764/NPPF_January_2022_web.pdf)

<sup>8</sup> If the project is directly connected with or necessary to the management of a National Network Site then according to regulations 63(1)(b) the requirement for a competent authority to make an Appropriate Assessment is not required

### 1.3.2 The HRA Process

- 1.9 The HRA process is multi-staged to ensure the requirements of Regulations 63, 64 and 68<sup>9</sup> are fulfilled if the plan or project is not directly connected with or necessary to the management of the National Network Site(s) and are described as follows<sup>10</sup>:
- Stage 1 Screening, the process to determine if there are any LSE on National Network Site either alone or in combination with other plans or projects.
  - Stage 2 Appropriate Assessment, to determine whether it can be ascertained, in view of the conservation objectives, that the plan or project (either alone or in combination with other projects and plans) would have any adverse effect on the integrity of a National Network Site. If the potential for adverse effects on the integrity of a National Network Site cannot be ruled out, potential mitigation measures to alleviate those adverse effects should be proposed and assessed. Stages 1 and 2 would provide the information to allow the competent authority to fulfil Regulation 63.
  - Stage 3 Derogations includes the assessment of alternatives, imperative reasons of overriding public interest and compensatory measures. Where it is not possible to rule out no adverse effect on the integrity of a National Network Site, the decision maker may only grant consent if satisfied that there are no alternative solutions; that the plan or project must be carried out for imperative reasons of overriding public interest; and that compensatory measures have been secured. Stage 3 Derogations would provide the information to allow the competent authority to fulfil Regulations 64 and 68 and ensure the overall coherence of the National Network Site is protected.
- 1.10 National Network Sites include Special Protection Areas (SPAs) and potential SPAs, Special Areas of Conservation (SACs) and proposed SACs, Ramsar sites (listed and proposed) and areas secured as sites compensating for damage to a National Network Site
- 1.11 The outcome of each stage determines whether or not the next stage is required to allow a competent authority to grant permission for a project.
- 1.12 If following screening the project is likely to have significant effects on a National Network Site then an 'appropriate assessment' must be undertaken to ascertain whether the proposal will adversely affect the integrity of the site. If it is assessed that the project would adversely affect the integrity of the site then consideration must be given to alternative solutions, and if there are no alternative solutions, whether an IROPI case can be made. Consideration is therefore usually given to HRA matters at the options appraisal stage of a project, as well as at the consenting stage.
- 1.13 The implication of this is that a report of the HRA process is generally only required when a permission decision is made. However, screening is often used at earlier stages in a project at a high level to ensure decisions with regards to project detail have due regard to the Habitats Regulations.

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<sup>9</sup> The Conservation of Habitats and Species Regulations 2017 (as amended)

<sup>10</sup> August 2022 – Planning Inspectorate Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects

1.14 An informal HRA was completed at Gate 1 and this informal HRA report supports the Gate 2 submission.

#### 1.4 Stakeholder engagement

1.15 A draft version of this report has been shared with Natural England and the Environment Agency and due regard has been made to the feedback received from both organisations.

1.16 Methodology and assessment outcomes were discussed on a Technical Liaison Group call held on the 5 April 2022, attended by Natural England, Environment Agency, Oxfordshire County Council and Thames Water.

#### 1.5 Project Impacts applicable to this assessment

1.17 Table 1.1 provides a list and description of the potential impacts on National Network Sites as a result of the construction and operation of SESRO, adapted from UK Water Industry Research (UKWIR)<sup>11</sup> guidance. Consideration has been given to the nature of the proposed options, is based on the literature and guidance referenced within Table 1.1, whilst also drawing on professional judgement.

*Table 1.1: Potential Impacts during construction and operation of SESRO, adapted from UK Water Industry Research (UKWIR) guidance<sup>11</sup>. The table lists the broad categories for potential impacts and provides brief descriptions of these.*

Broad Categories of Potential Impacts on National Network Sites	Description of potential impacts
<b>Physical loss/ damage:</b> <ul style="list-style-type: none"> <li>• Destruction (removal)</li> <li>• Smothering</li> <li>• Sedimentation / silting</li> <li>• Prevention of natural processes</li> <li>• Habitat degradation</li> <li>• Erosion</li> <li>• Fragmentation</li> <li>• Severance/barrier effect</li> <li>• Edge effects</li> </ul>	<p>Development of built infrastructure associated with SESRO e.g. reservoir embankments, water treatment plants, pipelines, pumping stations, access routes. Indirect effects from a reduction in flows e.g. drying out marginal habitat.</p> <p>Physical loss/ damage (permanent and temporary) is only likely to be significant where the boundary of the option extends within the boundary of the National Network Site or within/ adjacent to an offsite area (also referred to as functionally linked land) of known foraging, roosting, breeding habitat (that supports species for which a National Network Site is designated).</p>
<b>Non-physical disturbance:</b> <ul style="list-style-type: none"> <li>• Noise</li> <li>• Visual presence</li> </ul>	<p>Noise from vehicular traffic during construction of SESRO.</p> <p>Noise from construction traffic is only likely to be significant where the transport route to and</p>

<sup>11</sup> UK WIR (2012). *Strategic Environmental Assessment and Habitats Regulations Assessment- Guidance for Water Resources Management Plans and Drought Plans (12/WR/02/7)*. UK Water Industry Research, 2012.

Broad Categories of Potential Impacts on National Network Sites	Description of potential impacts
<ul style="list-style-type: none"> <li>• <b>Human presence</b></li> <li>• <b>Light pollution</b></li> </ul>	<p>from the option is within 300m<sup>12</sup> of the boundary of the National Network Site.</p> <p>Plant and personnel involved in construction and operation of the option e.g. for maintenance, plus non-operational activities such as recreation associated with the scheme</p> <p>Noise /human presence are only likely to be significant where the boundary of the option is within 300m<sup>12</sup> of the boundary of the National Network Site or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a National Network Site is designated).</p> <p>Development of built infrastructure associated with the option, which includes artificial lighting.</p> <p>Effects from light pollution are only likely to be significant where the boundary of the option is within 500m<sup>13</sup> of the boundary of the National Network Site if the Habitats Site or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a National Network Site is designated).</p>
<p><b>Water table/availability:</b></p> <ul style="list-style-type: none"> <li>• <b>Drying</b></li> <li>• <b>Flooding / stormwater</b></li> <li>• <b>Changes to surface water levels and flows</b></li> <li>• <b>Changes in groundwater levels and flows</b></li> </ul>	<p>Change to water levels and flows due to water abstraction, storage and drainage interception associated with inland option.</p> <p>These effects are only likely to be significant where the boundary of the option extends within the same ground or surface water catchment as the National Network Site. However, these effects are dependent on hydrological continuity between the option and the National Network Site, and whether the option is up or down stream from the National Network Site.</p>
<p><b>Toxic contamination:</b></p> <ul style="list-style-type: none"> <li>• <b>Water pollution</b></li> <li>• <b>Soil contamination</b></li> </ul>	<p>Reduced dilution in downstream or receiving waterbodies due to changes in abstraction or reduced compensation flow releases to river systems.</p>

<sup>12</sup> Highways England (2020), LA 111 Noise and vibration

<sup>13</sup> Institute of Lighting Professionals (2011) Guidance Notes for the Reduction of Obtrusive Light GN01:2011

Broad Categories of Potential Impacts on National Network Sites	Description of potential impacts
<ul style="list-style-type: none"> <li><b>Air Pollution</b></li> </ul>	<p>These effects are dependent on hydrological continuity between the option and the National Network Site (where the boundary of the option extends within the same ground or surface water catchment as the National Network Site), and whether the option is up or down stream from the National Network Site.</p> <p>Contamination of soil due to leaching of contaminated waters, ingress of dust/air emissions or pollution events.</p> <p>This effect is only likely to be significant where the boundary of the option extends within the same ground or surface water catchment as the National Network Site.</p> <p>Air emissions associated with vehicular traffic during construction and operation of options. This effect is only likely to be significant where the transport route to and from the option also referred to as the 'Affected Road Network (ARN)' is within 200 m<sup>14 15</sup> of the boundary of the National Network Site.</p> <p>Emissions of dust during earthworks, construction plant and tunnel/ pipeline construction associated with options are only likely to be significant where the construction work for the scheme are within 50 m of the boundary of the National Network Site, and up to 50 m from the edge of the local construction route at a distance of up to 500 m from the main construction site exit(s)<sup>16</sup>.</p>
<p><b>Non-toxic contamination:</b></p> <ul style="list-style-type: none"> <li><b>Nutrient enrichment (e.g. of soils and water)</b></li> <li><b>Algal blooms</b></li> <li><b>Changes in thermal regime</b></li> </ul>	<p>Changes to water salinity, nutrient level, turbidity, thermal regime due to water abstraction, storage, or inter catchment transfers.</p> <p>These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water</p>

<sup>14</sup> Institute of Air Quality Management (IAQM), 2020, A Guide to the assessment of air quality impacts on designated nature conservation sites. V1.1

<sup>15</sup> Natural England, 2018, Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001)

<sup>16</sup> Institute of Air Quality Management (IAQM), 2016, Guidance for assessing dust from demolition and construction (Version 1.1)

Broad Categories of Potential Impacts on National Network Sites	Description of potential impacts
<ul style="list-style-type: none"> <li>• <b>Changes in turbidity</b></li> <li>• <b>Changes in sedimentation/silting</b></li> <li>• <b>Changes in salinity</b></li> </ul>	<p>catchment as the National Network Site. However, these effects are dependent on hydrological continuity between the scheme and the National Network Site, and sometimes, whether the scheme is up or down stream from the National Network Site.</p>
<p><b>Biological disturbance:</b></p> <ul style="list-style-type: none"> <li>• <b>Direct mortality</b></li> <li>• <b>Changes to habitat availability</b></li> <li>• <b>Out-competition by non-native species</b></li> <li>• <b>Introduction of disease</b></li> <li>• <b>Introduction of non-native invasive species</b></li> </ul>	<p>Potential for changes to habitat availability, e.g. reductions in wetted width of rivers leading to desiccation of macrophyte beds due to changes in abstraction or reduced compensation flow.</p> <p>This effect is only likely to be significant where the receiving water for the option is the National Network Site or a tributary of the National Network Site.</p>

## 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>17</sup> or else to support TW's Swindon and Oxfordshire supply zone<sup>18</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>19</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;
  - 30+100 Mm3 capacity phased reservoir; and

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<sup>17</sup> Thames to Southern Transfer, another SRO project, jointly funded by Thames Water and Southern Water

<sup>18</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>19</sup> Thames Water WRMP24, Reservoir Feasibility Report Update.

- 80+42 Mm<sup>3</sup> 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>20</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.
  - 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

<sup>20</sup> Further information may be found in Supporting Document G: Planning and Consents Strategy

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</p>

Design Philosophy	Indicative Gate 2 Master Plan 'response'
	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.

- 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>21</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>21</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>22</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.

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<sup>22</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).

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

Interaction	Implication for SESRO
STT	<p>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 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, <b>but the current approach reflects the timing of the schemes within the draft WRMP.</b></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. Approach

#### 3.1 Scale and scope of the assessment

- 3.1 The aim of this report is to assess the potential for LSEs on National Network Sites from each of the six potential SESRO options alone and, if relevant, in combination with other plans and projects.
- 3.2 Information required to inform the HRA Stage 1 Screening utilised desk-based reviews of the following typical sources:
- MAGIC (Multi-Agency Geographic Information for the Countryside) website<sup>23</sup> for National Network Site locations;
  - Joint Nature Conservation Committee (JNCC) website for National Network Site information<sup>24</sup>, including the Natura 2000 Standard Data Form and citation; and
  - Natural England website for Conservation Objectives documents, Site Improvement Plans and supplementary advice<sup>25</sup>
- 3.3 The information used and the modelling that has been undertaken to date is initial modelling and assessment, suitable for the current stage and this will be defined and updated in the context of the consenting process.
- 3.4 National Network Sites were identified using reasonable parameters based on the nature of the potential impact or using criteria such as that set out in the Design Manual for Roads and Bridges (DMRB) guidance LA 115 Habitats Regulations Assessments<sup>26</sup>, and information contained in Planning Inspectorate Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects<sup>27</sup> and Natural England standing guidance on HRA<sup>28</sup>. Consideration has also been given to the guidance contained in the All Companies Working Group WRMP environmental assessment guidance and applicability with SROs<sup>29</sup>.
- 3.5 Professional judgement has been used when determining the potential effect pathways that could result in LSEs at National Network Sites which includes consideration of functionally linked land, mobile species, hydrological linkages and potential hydrogeological linkages.

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<sup>23</sup> <http://magic.defra.gov.uk>

<sup>24</sup> <http://jncc.defra.gov.uk>

<sup>25</sup> Natural England's Access to Evidence website, available at:  
<http://publications.naturalengland.org.uk/publication/5815888603250688>

<sup>26</sup> Design Manual for Roads and Bridges (DMRB), 2020, LA 115 Habitats Regulations Assessment

<sup>27</sup> August 2022 – Planning Inspectorate Advice Note Ten: Habitat Regulations Assessment relevant to Nationally Significant Infrastructure Projects

<sup>28</sup> February 2021, DEFRA, NE, NRW, WG - Habitats regulations assessments: protecting a European site - How a competent authority must decide if a plan or project proposal that affects a European site can go ahead.

<sup>29</sup> Mott MacDonald, 2020, "ACWG, WRMP environmental assessment guidance and applicability with SROs

- 3.6 Sites of Special Scientific Interest (SSSI) Impact Risk Zones (IRZs)<sup>30</sup><sup>31</sup> have been used as a tool to help identify potential effect pathways, and makes use of all available data specific to the National Network Sites but does not replace the consideration of the other screening criteria mentioned in Section 2.2, and the consideration of functionally linked land associated with the National Network Sites.
- 3.7 The approach for this stage of assessment is necessarily proportionate and aligned to the current RAPID gated process<sup>2</sup>. It is based on environmental and project information currently available and builds on the HRA produced at Gate 1. It assesses the potential impacts on National Network Sites taking into account the developing project design.

### 3.2 Identifying sites

- 3.8 National Network Sites have been identified for each SESRO option using the following criteria.
- Is the SESRO option within 10km<sup>11</sup> of a National Network Site?
  - Is SESRO option within 30 km<sup>32</sup> of a SACs where bats are one of the qualifying features?
  - Does the SESRO option cross or lie adjacent to, upstream or downstream, of a watercourses designated in part or wholly as National Network Sites? Consideration was given to National Network Sites located up to 20km downstream of any option element.
  - Does the SESRO option have a potential hydrological or hydrogeological linkage (within the same surface and groundwater catchments) to a National Network Site containing water dependent features?
  - Does the SESRO option have an affected road network (ARN) and if so are there any National Network Sites within 200m<sup>33</sup> of the ARN?
  - Does the SESRO option overlap any relevant SSSIs IRZs associated with a National Network Site?

### 3.3 Identifying and assessing likely significant effects

- 3.9 Following identification of the National Network Sites using the criteria in Section 3.2, the assessment of LSE was undertaken by considering the potential for effects at each National Network Site based on the potential project impacts described in Table 1.1 and the specific vulnerabilities identified for each site as detailed in the Natura 2000 Standard Data Form and citation, Conservation Objectives documents

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<sup>30</sup> IRZs have been used as a proxy to identify functionally linked land associated with a National Network Site with species qualifying features

<sup>31</sup> Natural England IRZs are as displayed on the MAGIC website (<https://magic.defra.gov.uk/MagicMap.aspx>)

<sup>32</sup> Design Manual for Roads and Bridges (DMRB), 2020, LA 115 Habitats Regulations Assessment

<sup>33</sup> Natural England, 2018, Natural England's approach to advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (NEA001)

and the Site Improvement Plans<sup>34</sup>. The assessment has been carried out for each National Network Site to identify potential LSEs of each of the packages alone.

- 3.10 The Habitats Regulations require that proposals are assessed as to the effects alone and in combination with other plans or projects. The approach to the in-combination assessment was to identify other plans and projects where risks of in combination effects may exist for the packages i.e. those where interactions (pathways to effect) between the packages and the National Network Site have been identified within the alone assessment. Effects were considered to be potentially acting in combination where spatial and temporal overlaps of Project effects with similar effects from other projects on relevant receptors were identified.

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<sup>34</sup> <http://publications.naturalengland.org.uk/>

## 4. Screening

### 4.1 Identification of National Network Sites

- 4.1 The project does not include works that are connected with or necessary to the management of any National Network Site.
- 4.2 Table 4.1 details the identification of relevant National Network Sites for each package screened into the assessment in accordance with the methodology outlined in Section 3.2. The National Network Sites identified are shown on Figure 1 and are characterised in Section 4.2.
- 4.3 All six of the SESRO options are within 10 km of and or have potential hydrological or hydrogeological links to three National Network sites, the:
- Cothill Fen SAC;
  - Hackpen Hill SAC; and,
  - Little Wittenham SAC.
- 4.4 No National Network Sites that are over 10 km from the SESRO options but could be hydrologically linked to the Scheme were identified. The River Lambourn SAC is located approximately 15.7 km south of the Scheme. There was no evidence of any hydrological link, based on the information reviewed, as it lies within a different management catchment<sup>35</sup> (Kennet and Tributaries) to the options. Also, the presence of The Ridgeway and Lambourn Downs between the SAC and the SESRO options is also taken as evidence that no hydrological link could exist, based on the information reviewed.
- 4.5 The Oxford Meadows SAC is approximately 11km to the north of the SESRO options and is located to the north of the Ock operational catchment, within the Thames (Evenlode to Thame) water body<sup>36</sup>. The SESRO options are also within the Ock operational catchment, primarily within the Cow Common Brook and Portobello Ditch water body and with abstraction for the reservoir from the Thames (Evenlode to Thame) water body. The River Thames upstream of the SAC would not be affected by abstraction of water from the proposed abstraction point to the east of SESRO and approximately 18km downstream of the SAC. The proposed abstraction is not considered to have an impact on ground water levels and winter surface water inundation in the SAC (see Supporting Document B1, Environmental Appraisal Report (aquatic)). Therefore, given the extremely large size of the Ock catchment area and the Oxford Meadows SAC position in it relative to the SESRO options and abstraction point it is considered that no feasible impact pathway exists between SESRO and the SAC.

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<sup>35</sup> Environment Agency Catchment Data Explorer - <https://environment.data.gov.uk/catchment-planning/>

<sup>36</sup> [Ock Operational Catchment | Catchment Data Explorer](#)

- 4.6 No SACs designated for which bats are a qualifying feature are present within 30 km of the SESRO options.
- 4.7 A desk based assessment of emissions from road traffic during construction has been undertaken (see Supporting Document B2, Environmental Appraisal Report (terrestrial) Chapter 3 Air Quality), and changes in traffic flows associated with the construction of the SESRO project do not meet the criteria for requiring the need for an assessment, and no 'Affected Road Network' (ARN) has been defined. An assessment of emissions to air from construction plant and machinery (i.e. non-road vehicles) during construction was also considered. Based on the likely duration and relatively low number of diesel-powered plant and machinery items that are likely to be required to operate simultaneously at the same location, the potential impact on local air quality at sensitive ecological locations in the vicinity of the project site is considered to be imperceptible. Therefore, no significant effect on air quality is anticipated (see Supporting Document B2, Environmental Appraisal Report (terrestrial) Chapter 3 Air Quality) and no National Network Sites have been identified.
- 4.8 The desk-based air quality study was based on information available at the time of writing and may be subject to change as the final design details are developed. However, where required, a precautionary approach has been taken and at this stage, it is considered that the information provided is sufficient to identify the likely risks due to changes in air quality. Further assessment may include air quality monitoring survey(s) and the production of a construction dust risk assessment more specific to the proposals and more accurately reflecting SESRO construction activities.
- 4.9 As SESRO develops and construction related traffic data is finalised, working with the traffic modellers, it would be necessary to understand the construction vehicle distribution north and south of the A34 interchange as this, in addition to the finalised traffic data, would determine whether there is a need for a more detailed air quality assessment at the next stage of the RAPID Gated process.
- 4.10 No operational air quality assessment is being undertaken at Gate 2. It is anticipated there would be no significant air quality effects associated with the operation phase of the SESRO, therefore, the operational phase is not considered further from an air quality perspective for this Gate 2 appraisal.
- 4.11 One National Network Site was identified where the SESRO options are within relevant SSSIs IRZs<sup>37</sup>. All six SESRO options are located within the SSSI IRZ for the Cothill Fen SAC. Cothill Fen SAC does not have any qualifying mobile species, and therefore this IRZ is highly unlikely to be functionally linked land<sup>38</sup>. The absence of

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<sup>37</sup> Natural England IRZs are as displayed on the MAGIC website (<https://magic.defra.gov.uk/MagicMap.aspx>)

<sup>38</sup> Functionally linked land has been defined in the Natural England commissioned report 207 (Chapman & Tyldesley, 2016) as follows: 'The term "functional linkage" refers to the role or "function" that land or sea beyond the boundary of a National Network Site might fulfil in terms of ecologically supporting the populations

other SACs designated for mobile species and SPAs within the search area means the scheme location is considered highly unlikely to be functionally linked land. The location of the proposed site is primarily composed of arable land, and not pasture/lowland meadow, which could be used by waterfowl or wading bird species for foraging or nesting. No hydrological impact pathway has been identified in relation to the Cothill Fen SAC, despite the connectivity to the scheme via the Sansford Brook, as the SAC is upgradient of any impacts from the scheme, and this is covered in more detail in Section 4.3.

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*for which the site was designated or classified. Such land is therefore “linked” to the National Network Site in question because it provides an important role in maintaining or restoring the population of qualifying species at favourable conservation status*

Table 4.1: Identification of National Network Sites

Screening criteria	150mm3 capacity reservoir		125Mm3 capacity reservoir		100Mm3 capacity Reservoir		75mm3 capacity reservoir		30+100Mm3 capacity – two phase		80+42Mm3 capacity – two phase	
	Yes/No	Site identified	Yes/No	Site identified	Yes/No	Site identified	Yes/No	Site identified	Yes/No	Site identified	Yes/No	Site identified
<b>Is the SESRO option within 10km of a National Network Site?</b>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> <li>Hackpen Hill SAC- approx. 8.9 km southwest</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> <li>Hackpen Hill SAC- approx. 8.9 km southwest</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> <li>Hackpen Hill SAC- approx. 8.9 km southwest</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> <li>Hackpen Hill SAC- approx. 8.9 km southwest</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> <li>Hackpen Hill SAC- approx. 8.9 km southwest</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> <li>Hackpen Hill SAC- approx. 8.9 km southwest</li> </ul>
<b>Is SESRO option within 30 km of a SACs where bats are one of the qualifying features?</b>	No	-	No	-	No	-	No	-	No	-	No	-
<b>Does the SESRO option cross or lie adjacent to, upstream or downstream, of a watercourse designated in part or wholly as National Network Sites? Consideration was given to National Network Sites located up to</b>	No	-	No	-	No	-	No	-	No	-	No	-

Screening criteria	150mm3 capacity reservoir		125Mm3 capacity reservoir		100Mm3 capacity Reservoir		75mm3 capacity reservoir		30+100Mm3 capacity – two phase		80+42Mm3 capacity – two phase			
	Yes/No	Site identified	Yes/No	Site identified	Yes/No	Site identified	Yes/No	Site identified	Yes/No	Site identified	Yes/No	Site identified		
<b>20km downstream of any option element.</b>														
<b>Does the SESRO option have a potential hydrological or hydrogeological linkage (within the same surface and groundwater catchments) to a National Network Site containing water dependent features?</b>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> </ul>	Yes	<ul style="list-style-type: none"> <li>Cothill Fen SAC – approx. 2.7 km north</li> <li>Little Wittenham SAC – approx. 7.1 km east</li> </ul>
<b>Does the SESRO option have an affected road network (ARN) and if so are there any National Network Sites within 200m of the ARN?</b>	No	-	No	-	No	-	No	-	No	-	No	-		
<b>Does the SESRO option overlap any relevant Sites of Special Scientific Interest (SSSIs) impact risk zones (IRZs) associated with a National Network Site?</b>	Yes	SSSI IRZ associated with Cothill Fen SAC.	Yes	SSSI IRZ associated with Cothill Fen SAC.	Yes	SSSI IRZ associated with Cothill Fen SAC.	Yes	SSSI IRZ associated with Cothill Fen SAC.	Yes	SSSI IRZ associated with Cothill Fen SAC.	Yes	SSSI IRZ associated with Cothill Fen SAC.		

## 4.2 Characteristics of the National Network Sites

### 4.2.1 Cothill Fen SAC

4.12 Cothill Fen SAC contains one of the largest surviving examples of alkaline fen vegetation in central England, a region where fen vegetation is rare<sup>39</sup>. The characteristics of the site are summarised in Table 4.2 based on information available in the Natura 2000 Standard Data Form and citation, Conservation Objective document, Conservation Objectives supplementary advice documents and the Site Improvement Plan, on Natural England’s Access to Evidence website<sup>40</sup>. The IRZs associated with the underlying SSSI provide an indication of the functionally linked land associated with the SAC. However, in this case the SAC does not include any qualifying species that would require functionally linked land.

Table 4.2: Cothill Fen SAC. This table summarises the characteristics of the Cothill Fen SAC, including information relating to the key features for its selection as a National Network Site and its listed vulnerabilities.

Cothill Fen SAC	
<b>Name of National Network Site and its code</b>	Cothill Fen - UK0012889 SSSI components – Cothill Fen SSSI
<b>National Network Site size</b>	43.39 ha
<b>Key features of the National Network Site including the primary reasons for selection and any other qualifying interests</b>	<b>Annex I habitats that are a primary reason for selection of this site</b> <b>7230. Alkaline fens (Calcium-rich springwater-fed fens)</b> This lowland valley mire contains one of the largest surviving examples of alkaline fen vegetation in central England, a region where fen vegetation is rare. The M13 <i>Schoenus nigricans</i> – <i>Juncus subnodulosus</i> vegetation found here occurs under a wide range of hydrological conditions, with frequent bottle sedge <i>Carex rostrata</i> , grass-of-Parnassus <i>Parnassia palustris</i> , common butterwort <i>Pinguicula vulgaris</i> and marsh helleborine <i>Epipactis palustris</i> . The alkaline fen vegetation forms transitions to other vegetation types that are similar to M24 <i>Molinia caerulea</i> – <i>Cirsium dissectum</i> fen-meadow and S25 <i>Phragmites australis</i> – <i>Eupatorium cannabinum</i> tall-herb fen and wet alder <i>Alnus spp.</i> wood.

<sup>39</sup> EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora, Citation for Special Area of Conservation (SAC), Cothill Fen, available at:

<http://publications.naturalengland.org.uk/publication/5691343946907648> - accessed February 2022

<sup>40</sup> Natural England’s Access to Evidence website, available at:

<http://publications.naturalengland.org.uk/publication/5691343946907648>

Cothill Fen SAC	
	<p><b>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site</b></p> <p><b>91E0 Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>)</b> * Priority feature</p> <p><b>Annex II species that are a primary reason for selection of this site</b></p> <p>Not Applicable</p> <p><b>Annex II species present as a qualifying feature, but not a primary reason for site selection</b></p> <p>Not Applicable</p>
<b>Vulnerability of the National Network Site – any information available from the standard data forms on potential effect pathways</b>	<p>Based on the Natura 2000 Standard Data Form and Site Improvement Plan (including supplementary advice), threats to this site, which are reflected in the SSSI IRZs, include:</p> <ul style="list-style-type: none"> <li>• human induced changes in hydrological conditions; pollution to ground water (point sources and diffuse sources); and</li> <li>• air pollution (impact of atmospheric nitrogen deposition).</li> </ul>
<b>National Network Site conservation objectives</b>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>• the extent and distribution of qualifying natural habitats;</li> <li>• the structure and function (including typical species) of qualifying natural habitats; and</li> <li>• the supporting processes on which qualifying natural habitats rely.</li> </ul>

#### 4.2.2 Little Wittenham SAC

- 4.13 Little Wittenham SAC contains one of the largest known populations of GCN in southern England, with the number of adult newts counted in detailed surveys consistently in excess of 200 individuals<sup>41</sup>. The characteristics of the site are summarised in Table 4.3 based on information available in the Natura 2000 Standard Data Form and citation, Conservation Objectives document, Conservation Objectives supplementary advice and the Site Improvement Plan, on Natural England’s Access to Evidence website<sup>41</sup>.
- 4.14 The IRZs associated with the underlying SSSI provide an indication of the functionally linked land associated with the SAC. Great Crested Newt are considered mobile species, and the connectivity of the wider local landscape including the supporting terrestrial habitat to the SAC may therefore be important in helping to ensure the survival of the overall population. Given the typical distance GCN is known to travel from breeding ponds is approximately 500m<sup>42</sup>, and taking into account the distance of the SAC from the indicative location for SESRO, as well as major infrastructure barriers (A34 and the rail line between Didcot and Oxford) to the movement of GCN, there is no impact pathway that could affect functionally linked land related to this SAC.

*Table 4.3: Little Wittenham SAC. This table summarises the characteristics of the Little Wittenham SAC, including information relating to the key features for its selection as a National Network Site and its listed vulnerabilities.*

Little Wittenham SAC	
<b>Name of National Network Site and its code</b>	Little Wittenham SAC - UK0030184 SSSI components – Little Wittenham SSSI
<b>National Network Site size</b>	68.65 ha
<b>Key features of the National Network Site including the primary reasons for selection and any other qualifying interests</b>	<b>Annex I habitats that are a primary reason for selection of this site</b> Not Applicable  <b>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site</b> Not Applicable

<sup>41</sup> Natural England’s Access to Evidence website, available at <http://publications.naturalengland.org.uk/publication/6104670577623040> - accessed March 2022

<sup>42</sup> English Nature 2001 Great Crested Newt Mitigation Guidelines

Little Wittenham SAC	
	<p><b>Annex II species that are a primary reason for selection of this site</b></p> <p><b>Great crested newt <i>Triturus cristatus</i></b></p> <p>Little Wittenham comprises two main ponds set in a predominantly woodland context (broadleaved and conifer woodland is present). There are also areas of grassland, with sheep grazing and arable bordering the woodland to the south and west. The River Thames is just to the north of the site, and a hill fort to the south. Large numbers of great crested newts <i>Triturus cristatus</i> have been recorded in the two main ponds, and research has revealed that they range several hundred metres into the woodland blocks.</p> <p><b>Annex II species present as a qualifying feature, but not a primary reason for site selection</b></p> <p>Not Applicable</p>
<b>Vulnerability of the National Network Site – any information available from the standard data forms on potential effect pathways</b>	Based on the Natura 2000 Standard Data Form and Site Improvement Plan (including supplementary advice), threats to this site include introduction of invasive non-native species, habitat fragmentation and changes in the quality and quantity of water supply to their supporting wetland habitats.
<b>National Network Site conservation objectives</b>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring, for example:</p> <ul style="list-style-type: none"> <li>• the abundance of the population;</li> <li>• as necessary the connectivity of the SAC population to any associated meta-populations (either within or outside of the site boundary);</li> <li>• the distribution and continuity of the feature and its supporting habitat and the total extent of the habitats which support the feature; and</li> <li>• an overall Great Crested Newt Habitat Suitability Index score of no less than 0.8.</li> </ul> <p>the permanence of water within ponds in the site; and ensure fish are absent in all breeding ponds.</p>

### 4.2.3 Hackpen Hill SAC

4.15 Hackpen Hill SAC is an extensive area of unimproved chalk grassland in the North Wessex Downs. The characteristics of the site are summarised in Table 4.4 based on information available in the Conservation Objectives document, Conservation Objectives supplementary advice and the Site Improvement Plan, on Natural England’s Access to Evidence website<sup>43</sup>. The IRZs associated with the underlying SSSI provide an indication of the functionally linked land associated with the SAC. However, in this case as the SAC does not include any qualifying species that would require functionally linked land.

Table 4.4: Hackpen Hill SAC. This table summarises the characteristics of the Hackpen Hill SAC, including information relating to the key features for its selection as a National Network Site and its listed vulnerabilities.

Hackpen Hill SAC	
<b>Name of National Network Site and its code</b>	Hackpen Hill SAC - UK0030162 SSSI components – Hackpen, Warren and Gramp’s Hill Downs SSSI
<b>National Network Site size</b>	35.83
<b>Key features of the National Network Site including the primary reasons for selection and any other qualifying interests</b>	<p><b>Annex I habitats that are a primary reason for selection of this site</b> Not Applicable</p> <p><b>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site</b> <b>6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>)</b> (* important orchid sites)</p> <p><b>Annex II species that are a primary reason for selection of this site</b> <b>1654 Early gentian <i>Gentianella anglica</i></b> Hackpen Hill is an extensive area of unimproved chalk grassland in the Downs. The site has a variety of aspect and gradients, with the grassland dominated by red fescue <i>Festuca rubra</i> and upright brome <i>Bromus erectus</i>. The herb flora includes a significant population of early gentian <i>Gentianella anglica</i>, as well as autumn gentian <i>Gentianella amarella</i>, fragrant orchid <i>Gymnadenia conopsea</i>, frog orchid <i>Coeloglossum viride</i>, horseshoe vetch <i>Hippocrepis comosa</i>,</p>

<sup>43</sup> Natural England’s Access to Evidence website, available at: <http://publications.naturalengland.org.uk/publication/5182475147935744> - accessed March 2022

Hackpen Hill SAC	
	<p>common rock-rose <i>Helianthemum nummularium</i> and dwarf thistle <i>Cirsium acaule</i>.</p> <p><b>Annex II species present as a qualifying feature, but not a primary reason for site selection</b></p> <p>Not Applicable</p>
<b>Vulnerability of the National Network Site – any information available from the standard data forms on potential effect pathways</b>	<p>For this site, no vulnerabilities are listed on the Natura 2000 Standard Data Form and Site Improvement Plan.</p> <p>Based on information from the Supplementary advice document for this SAC threats to this site include changes in air quality and introduction of Invasive non-native species and increases in undesirable species (coarse and aggressive native species such as False oat grass <i>Arrhenatherum elatius</i> and Tor grass <i>Brachypodium pinnatum</i>).</p>
<b>National Network Site conservation objectives</b>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:</p> <ul style="list-style-type: none"> <li>• The extent and distribution of qualifying natural habitats and habitats of qualifying species;</li> <li>• The structure and function (including typical species) of qualifying natural habitats;</li> <li>• The structure and function of the habitats of qualifying species;</li> <li>• The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;</li> <li>• The populations of qualifying species; and</li> <li>• The distribution of qualifying species within the site.</li> </ul>

### 4.3 Assessment of likely significant effects

4.16 The following sections report the consideration of the potential for LSEs on the National Network Sites identified and characterised in Section 4.2 of this report, taking into account the potential impacts of the SESRO options (see Table 1.1), the screening criteria triggered (see Table 4.1) and vulnerabilities of the National Network Sites (refer to Table 4.2, Table 4.4 and Table 4.3).

#### 4.3.2 Cothill Fen SAC

4.17 The qualifying features of Cothill Fen SAC are alluvial forests and alkaline fen.

4.18 Vulnerabilities identified for this site (see Table 4.2) that are relevant to this assessment, are human induced changes in hydrological conditions and pollution of ground and surface waters which could all result in the degradation of qualifying features. Therefore, potential LSEs are likely to be limited to changes in hydrology or hydrogeology resulting in a reduction in condition of qualifying habitat and/or the loss of qualifying features.

4.19 Cothill Fen SAC lies approximately 2.7 km to the north of the six SESRO options and there would be no direct habitat loss from the SAC. Table 4.5 sets out the potential effect pathways for Cothill Fen SAC and the assessment as to whether or not they would result in LSE at Cothill Fen SAC is presented in the paragraphs following it.

Table 4.5: Potential impact pathways to Cothill Fen SAC.

Project Impacts (from Table 1.1)	Potential effect pathway
<b>Physical loss/ damage</b>	There would be no direct loss from the SAC
<b>Non-physical disturbance</b>	Cothill Fen SAC does not have qualifying features that would be vulnerable/ sensitive to changes in noise, visual or human presence and light pollution.
<b>Water table/availability</b>	Construction of the reservoir and abstraction of water from the River Thames could result in changes in surface or ground water levels resulting in habitat loss or degradation
<b>Toxic contamination</b>	Construction of the reservoir and abstraction of water from the River Thames could result in changes in surface or ground water quality resulting in habitat loss or degradation
<b>Non-toxic contamination</b>	Construction of the reservoir and abstraction of water from the River Thames could result in changes in surface or ground water quality resulting in habitat loss or degradation
<b>Biological disturbance</b>	Cothill Fen SAC does not have qualifying features that would be vulnerable/ sensitive to impacts such as direct mortality or changes to habitat availability.

#### 4.3.2.2 *Surface water changes*

- 4.20 The surface water feature in Cothill Fen SAC is the Sandford Brook, which rises approximately 2 km to the north-north-west of Cothill, flows through the SAC and discharges to the River Ock, approximately 4km south of the SAC boundary. The River Ock meets the River Thames 3.5km downstream and approximately 1km north of the proposed SESRO options abstraction point.
- 4.21 Sandford Brook and Cothill Fen SAC are not directly connected to, and are effectively upstream of, the area affected by any of the SESRO reservoir options and are located upstream of the proposed abstraction point at the River Thames. The Cothill Fen SAC is located within a different surface waterbody catchment to SESRO. Cothill Fen is within the Sandford Brook (source to Ock) water body catchment and SESRO is within the Cow Common Brook and Portobello Ditch water body catchment<sup>44</sup>. This coupled with the fact that the Sandford Brook flows south, from the Cothill Fen SAC, into the River Ock whereas the Cow Common and Portobello Ditch flows north into the River Ock, no surface water related connection is feasible. Therefore, there is no surface water pathway that could influence water availability, toxic or non-toxic contamination within the SAC and no LSE on the qualifying habitats of the Cothill Fen SAC is predicted to occur.

#### 4.3.2.3 *Ground water changes*

- 4.22 Groundwater bodies were reviewed as part of the Water Framework Directive (WFD) screening assessment. Two groundwater bodies exist close to the site, namely 1) Shrevenham Corallian (GB40602G60060) which is located north of the footprint (boundary around Marcham and Shippon) and, 2) Vale of White Horse Chalk (GB40601G601000) which is located south of the footprint (boundary south of the railway line). However, no groundwater body is located within the indicative location of SESRO within the immediate underlying deposits and hence groundwater bodies have been screened out from further assessment (see Supporting Document Annex B5, WFD Assessment).
- 4.23 At Gate 1, following comments from the Environment Agency regarding the risk of saline intrusion to areas surrounding the proposed reservoir location, a review of the hydrogeological conditions in proximity to the proposed SESRO options and the Cothill Fen SAC was undertaken<sup>45</sup>. The hydrogeological conditions were described in the Gate 1 appropriate assessment and a schematic hydrogeological conceptual site model developed to support that assessment. The model<sup>46</sup> clearly illustrated the groundwater beneath the Cothill Fen SAC flowed southward towards the River Ock Valley and would be unaffected by any changes to groundwater conditions as a result of the load of the proposed reservoir.

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<sup>44</sup> [Ock Operational Catchment | Catchment Data Explorer](#)

<sup>45</sup> Atkins (2021) South East Strategic Reservoir Option Gate 1 Submission – Technical Annex B2 - Habitats Regulations Assessment - Thames Water Utilities - Ltd 28 June 2021

<sup>46</sup> Figure 5-4 in Atkins (2021) South East Strategic Reservoir Option Gate 1 Submission – Technical Annex B2 - Habitats Regulations Assessment - Thames Water Utilities - Ltd 28 June 2021

4.24 Therefore, there is no ground water pathway that could influence the water table, toxic or non-toxic contamination within the SAC and no LSE on the qualifying habitats of the Cothill Fen SAC is predicted to occur.

4.3.2.4 *Summary*

4.25 The assessment of LSEs of the project on the Cothill Fen SAC for each of the packages has concluded no LSEs would occur on the Cothill Fen SAC as a result of habitat degradation via pollution of ground water and changes in hydrogeology or habitat degradation via pollution of surface water and changes in hydrology as no pathways are considered present for LSE as a result of the construction and operation of the SESRO option at this stage of the assessment process.

4.3.3 *Little Wittenham SAC*

4.26 The qualifying features of Little Wittenham SAC are Great crested newt *Triturus cristatus*.

4.27 Vulnerabilities identified for this site include (see Table 4.3) the introduction of invasive non-native species, specifically fish species, habitat fragmentation, changes in air quality and changes in the quality and quantity of water supply to their supporting wetland habitats.

4.28 Potential LSEs are limited to project impacts that would result in the introduction of invasive non-native species and changes in surface water availability and quality which may reduce the suitability of the habitat to support the species.

4.29 Little Wittenham SAC lies approximately 7.1 km (from the designation boundary) to the east of the site of the six SESRO options, and approximately 13km downstream of the proposed discharge point into the River Thames (and approximately 2.1km to the outermost IRZ boundary). Table 4.6 sets out the potential effect pathways for Little Wittenham SAC and the assessment as to whether or not they would result in LSE at Little Wittenham SAC is presented in the paragraphs following it.

Table 4.6: Potential impact pathways to Little Wittenham SAC.

Project Impacts (from Table 1.1)	Potential effect pathway
<b>Physical loss/ damage</b>	There would be no direct loss from the SAC
<b>Non-physical disturbance:</b>	Little Wittenham SAC does not have qualifying features that would be vulnerable/ sensitive to changes in noise, visual or human presence and light pollution.
<b>Water table/availability:</b>	Construction of the reservoir and abstraction of water from the River Thames could result in changes in surface water levels resulting in habitat loss or degradation

Project Impacts (from Table 1.1)	Potential effect pathway
<b>Toxic contamination</b>	Construction of the reservoir and abstraction of water from the River Thames could result in changes in surface water quality resulting in habitat loss or degradation
<b>Non-toxic contamination:</b>	Construction of the reservoir and abstraction of water from the River Thames could result in changes in surface water quality resulting in habitat loss or degradation
<b>Biological disturbance</b>	Construction of the reservoir could result in the spread of Invasive non-native species to the Little Wittenham SAC resulting in habitat degradation

#### 4.3.3.2 Risk of introduction of invasive non-native species

4.30 The distance between the SAC and the proposed discharge point (approximately 7.1 km from the designation boundary, approximately 13km downstream of the proposed discharge point into the River Thames) precludes the feasibility of this pathway, particularly as the GCN population, for which the SAC is designated, as well as most of its functionally linked woodland habitat is concentrated around one of the larger ponds which is not located within existing flood risk zones for the River Thames<sup>47</sup>. Therefore, no LSE, as a result of the introduction of non-native species, on Little Wittenham SAC are predicted to occur.

#### 4.3.3.3 Surface water changes

4.31 The closest surface water feature to the Little Wittenham SAC is the River Thames which runs directly north of the National Network Site. The SAC is predominantly woodland which includes a number of ponds, streams, flushes and damp hollows fed by springs<sup>48</sup>. The GCN population, as well as most of its functionally linked woodland habitat is concentrated around one of the larger ponds in the woodland and are not located within existing flood zones<sup>47</sup> identified in the area.

4.32 When operational SESRO would discharge water into the River Thames approximately 13km upstream from the National Network Site. The Gate 2 water quality impact assessment (See B1 EAR Aquatic) indicates that the impacts of SESRO on water quality in the River Thames are largely positive: improving or making no change in river concentrations compared to the WFD thresholds. This is primarily the result of SESRO 'improving' water quality during the long period of storage compared to the influent water from the River Thames, due to normal reservoir attenuation, biological uptake, and sedimentation processes. In addition, the released water

<sup>47</sup> As shown on the "extent of flooding from rivers or the sea" at the location of the SAC <https://check-long-term-flood-risk.service.gov.uk/map>

<sup>48</sup> <https://designatedsites.naturalengland.org.uk/PDFsForWeb/Citation/2000429.pdf>

provides greater dilution of downstream inputs from other tributaries and discharges.

4.33 Taking into consideration the distance of the SAC from the discharge point, the fact that water would be released into the River Thames upstream of the SAC during periods of low flow and the results of the Gate 2 water quality impact assessment it is considered that the construction of SESRO and operational discharge of water into the River Thames, would have no influence on the hydrological regime supporting the aquatic features of the site. Therefore, it is concluded that no feasible pathway to effect exist, and no LSEs would occur.

4.3.3.4 *Summary*

4.34 The assessment of LSEs of the project on the Little Wittenham SAC for each of the packages has concluded no likely significant effects would occur as a result of habitat degradation via pollution of surface water and changes in hydrology, and the introduction of invasive non-native species as a result of the construction and operation of the SESRO option at this stage of the assessment process.

4.3.4 *Hackpen Hill SAC*

4.35 The qualifying features of Hackpen Hill SAC are semi-natural dry grasslands and scrubland facies on calcareous substrates, as well as Early gentian *Gentianella anglica*.

4.36 Vulnerabilities identified for this site (see Table 4.4) are the introduction of invasive non-native species and increases in undesirable species (coarse and aggressive native species such as False oat grass *Arrhenatherum elatius* and Tor grass *Brachypodium pinnatum*) which could result in the degradation of qualifying features. Therefore, potential LSEs are likely to be limited to the introduction of non-native species as a result of the construction and operation of the project.

4.37 Hackpen Hill SAC lies approximately 8.9km to the southwest of the six SESRO options.

4.38 Table 4.7 sets out the potential effect pathways for Hackpen Hill SAC and the assessment as to whether or not they would result in LSE at Hackpen Hill SAC is presented in the paragraphs following it.

Table 4.7: Potential impact pathways to Hackpen Hill SAC.

Project Impacts (from Table 1.1)	Potential effect pathway
<b>Physical loss/ damage</b>	There would be no direct loss from the SAC.
<b>Non-physical disturbance:</b>	Hackpen Hill SAC does not have qualifying features that would be vulnerable/ sensitive to changes in noise, visual or human presence and light pollution.

Project Impacts (from Table 1.1)	Potential effect pathway
<b>Water table/availability:</b>	There is no hydrological connectivity between the SESRO option sand the Hackpen Hill SAC.
<b>Toxic contamination</b>	There is no hydrological connectivity between the SESRO option sand the Hackpen Hill SAC.
<b>Non-toxic contamination:</b>	There is no hydrological connectivity between the SESRO option sand the Hackpen Hill SAC.
<b>Biological disturbance</b>	Construction of the reservoir could result in the spread of Invasive non-native species to the Hackpen Hill SAC resulting in habitat degradation.

#### 4.3.4.2 Risk of introduction of invasive non-native species

4.39 The distance of the SAC from the proposed SESRO options precludes the feasibility of this pathway and no LSE on the Hackpen Hill SAC, due to the introduction of invasive non-native plant species or undesirable species, is predicted to occur.

#### 4.3.4.3 Summary

4.40 The assessment of LSEs of the project on the Hackpen Hill SAC, from each of the options has concluded no LSEs would occur as a result of habitat degradation via the introduction of invasive non-native species as a result of the construction and operation of the SESRO option at this stage of the assessment process.

### 4.4 Risk of likely significant effects in combination with other projects

4.41 There are a number of other plans and projects that could act in combination with the SESRO options resulting in significant effects on the surrounding environment. These include but are not limited to; Vale of White Horse Local Plan 2031, South Oxfordshire Local Plan 2035, Oxford-Cambridge Arc Spatial Framework (emerging), Oxfordshire Plan 2050 (emerging), and Oxfordshire Minerals and Waste Local Plan. However, the assessment of LSE as a result of the SESRO options alone concluded no LSE because potential effect pathways to the National Network Sites identified were absent at this stage of the assessment process. Therefore, it is not feasible for the SESRO options to act in combination with any other plans and projects to have an LSE on any of the National Network Sites identified.

### 4.5 Conclusion

4.42 The potential for LSE on National Network Sites has been assessed for each of the six SESRO options. The following National Network Sites were identified by applying the screening criteria detailed in Section 3.2 and summarised in Table 4.8:

- Cothill Fen SAC;

- Hackpen Hill SAC; and
- Little Wittenham SAC.

4.43 No LSE on any of the National Network Sites identified as a result of the construction and operation of the project alone or in combination with other plans and projects, was concluded for all six SESRO options, at this stage of the assessment. As a conclusion of no LSE on any of the National Network Sites identified was reached then there is no requirement to progress to Stage 2 Appropriate Assessment to support the Gate 2 submission.

#### 4.5.2 [Continuing Habitats Regulations Assessment process](#)

4.44 As set out in the introduction HRA is an iterative process and it is recommended that potential impacts on National Network Sites continue to be assessed as the design develops. The HRA process will be revisited and updated in the context of the consenting process at Gate 3 to take account of any new information and analysis, revisiting both the screening and, if necessary carrying out further HRA stages as defined in the Planning Inspectorate Advice Note 10 (2022).

Table 4.8: Habitats Regulations Assessment Screening Results Summary

SESRO option	National Network Site Assessed (including approximate distances)	Qualifying features	Potential for effects on qualifying features	Effects alone	Effects in combination with other plans or projects	Screening result	Justification for assessment
<b>150 Mm3 capacity reservoir</b>	Cothill Fen SAC (2.7 km north)	Alkaline fens (Calcium-rich springwater-fed fens) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) * Priority feature	Habitat degradation via pollution of ground water and changes in hydrogeology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via pollution of ground water or changes in hydrogeology as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.3 for further detail.
			Habitat degradation via pollution of surface water and changes in hydrology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via changes quantity or pollution of surface water as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.2 for further detail.
	Little Wittenham SAC (7.1 km east)	Great crested newt <i>Triturus cristatus</i>	Habitat degradation via changes in hydrology (quality and quantity)	No	No	No likely Significant effect	Qualifying features and supporting habitat not located within the flood risk zone so pathway to LSE. Refer to Section 4.3.3.3 for further detail.
			Habitat degradation via spread of invasive non-native species	No	No	No likely Significant effect	No pathway identified for LSE due to the distance of the SAC from proposed option (approx. 13km downstream of the discharge point within the River Thames) and the pond being located out with the flood risk zone. Refer to Section 4.3.3.2 for further detail.
	Hackpen Hill SAC (8.9 km south)	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> )	Habitat degradation via spread of invasive non-native plant species or undesirable species	No	No	No likely Significant effect	No pathway identified for LSE due to the distance of the SAC from proposed construction works. Refer to Section 4.3.4.2 for further detail.

SESRO option	National Network Site Assessed (including approximate distances)	Qualifying features	Potential for effects on qualifying features	Effects alone	Effects in combination with other plans or projects	Screening result	Justification for assessment
		(* important orchid sites) Early gentian <i>Gentianella anglica</i>					
<b>125 Mm3 capacity reservoir</b>	Cothill Fen SAC (2.7 km north)	Alkaline fens (Calcium-rich springwater-fed fens) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, <i>Salicion albae</i> ) * Priority feature	Habitat degradation via pollution of ground water and changes in hydrogeology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via pollution of ground water or changes in hydrogeology as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.3 for further detail.
			Habitat degradation via pollution of surface water and changes in hydrology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via changes quantity or pollution of surface water as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.2 for further detail.
	Little Wittenham SAC (7.1 km east)	Great crested newt <i>Triturus cristatus</i>	Habitat degradation via changes in hydrology (quality and quantity)	No	No	No likely Significant effect	Qualifying features and supporting habitat not located within the flood risk zone so pathway to LSE. Refer to Section 4.3.3.3 for further detail.
			Habitat degradation via spread of invasive non-native species	No	No	No likely Significant effect	No pathway identified for LSE due to the distance of the SAC from proposed option (approx. 13km downstream of the discharge point within the River Thames) and the pond being located out with the flood risk zone. Refer to Section 4.3.3.2 for further detail.
	Hackpen Hill SAC (8.9 km south)	Semi-natural dry grasslands and scrubland facies on calcareous substrates	Habitat degradation via spread of invasive non-native plant	No	No	No likely Significant effect	No pathway identified for LSE due to the distance of the SAC from proposed construction works. Refer to Section 4.3.4.2 for further detail.

SESRO option	National Network Site Assessed (including approximate distances)	Qualifying features	Potential for effects on qualifying features	Effects alone	Effects in combination with other plans or projects	Screening result	Justification for assessment
		( <i>Festuco-Brometalia</i> ) (* important orchid sites) Early gentian <i>Gentianella anglica</i>	species or undesirable species				
<b>100 Mm3 capacity reservoir</b>	Cothill Fen SAC (2.7 km north)	Alkaline fens (Calcium-rich springwater-fed fens) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) * Priority feature	Habitat degradation via pollution of ground water and changes in hydrogeology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via pollution of ground water or changes in hydrogeology as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.3 for further detail.
			Habitat degradation via pollution of surface water and changes in hydrology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via changes quantity or pollution of surface water as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.2 for further detail.
	Little Wittenham SAC (7.1 km east)	Great crested newt <i>Triturus cristatus</i>	Habitat degradation via changes in hydrology (quality and quantity)	No	No	No likely Significant effect	Qualifying features and supporting habitat not located within the flood risk zone so pathway to LSE. Refer to Section 4.3.3.3 for further detail.
			Habitat degradation via spread of invasive non-native species	No	No	No likely significant effect	No pathway identified for LSE due to the distance of the SAC from proposed option (approx. 13km downstream of the discharge point within the River Thames) and the pond being located out with the flood risk zone. Refer to Section 4.3.3.2 for further detail.
	Hackpen Hill SAC (8.9 km south)	Semi-natural dry grasslands and	Habitat degradation via spread of invasive	No	No	No likely significant effect	No pathway identified for LSE due to the distance of the SAC from proposed

SESRO option	National Network Site Assessed (including approximate distances)	Qualifying features	Potential for effects on qualifying features	Effects alone	Effects in combination with other plans or projects	Screening result	Justification for assessment
		scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) Early gentian <i>Gentianella anglica</i>	non-native plant species or undesirable species				construction works. Refer to Section 4.3.4.2 for further detail.
<b>75 Mm3 capacity reservoir</b>	Cothill Fen SAC (2.7 km north)	Alkaline fens (Calcium-rich springwater-fed fens) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) * Priority feature	Habitat degradation via pollution of ground water and changes in hydrogeology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via pollution of ground water or changes in hydrogeology as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.3 for further detail.
			Habitat degradation via pollution of surface water and changes in hydrology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via changes quantity or pollution of surface water as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.2 for further detail.
	Little Wittenham SAC (7.1 km east)	Great crested newt <i>Triturus cristatus</i>	Habitat degradation via changes in hydrology (quality and quantity)	No	No	No likely significant effect	Qualifying features and supporting habitat not located within the flood risk zone so pathway to LSE. Refer to Section 4.3.3.3 for further detail.
			Habitat degradation via spread of invasive non-native species	No	No	No likely significant effect	No pathway identified for LSE due to the distance of the SAC from proposed option (approx. 13km downstream of the discharge point within the River Thames) and the pond being located out with the flood risk zone. Refer to Section 4.3.3.2 for further detail.

SESRO option	National Network Site Assessed (including approximate distances)	Qualifying features	Potential for effects on qualifying features	Effects alone	Effects in combination with other plans or projects	Screening result	Justification for assessment
	Hackpen Hill SAC (8.9 km south)	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) Early gentian <i>Gentianella anglica</i>	Habitat degradation via spread of invasive non-native plant species or undesirable species	No	No	No likely significant effect	No pathway identified for LSE due to the distance of the SAC from proposed construction works. Refer to Section 4.3.4.2 for further detail.
<b>30+100 Mm3 capacity, two phase construction reservoir</b>	Cothill Fen SAC (2.7 km north)	Alkaline fens (Calcium-rich springwater-fed fens) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) * Priority feature	Habitat degradation via pollution of ground water and changes in hydrogeology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via pollution of ground water or changes in hydrogeology as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.3 for further detail.
			Habitat degradation via pollution of surface water and changes in hydrology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via changes quantity or pollution of surface water as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.2 for further detail.
	Little Wittenham SAC (7.1 km east)	Great crested newt <i>Triturus cristatus</i>	Habitat degradation via changes in hydrology (quality and quantity)	No	No	No likely significant effect	Qualifying features and supporting habitat not located within the flood risk zone so pathway to LSE. Refer to Section 4.3.3.3 for further detail.
			Habitat degradation via spread of invasive non-native species	No	No	No likely significant effect	No pathway identified for LSE due to the distance of the SAC from proposed option (approx. 13km downstream of the discharge point within the River Thames) and the pond

SESRO option	National Network Site Assessed (including approximate distances)	Qualifying features	Potential for effects on qualifying features	Effects alone	Effects in combination with other plans or projects	Screening result	Justification for assessment
							being located out with the flood risk zone. Refer to Section 4.3.3.2 for further detail.
	Hackpen Hill SAC (8.9 km south)	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) Early gentian <i>Gentianella anglica</i>	Habitat degradation via spread of invasive non-native plant species or undesirable species	No	No	No likely significant effect	No pathway identified for LSE due to the distance of the SAC from proposed construction works. Refer to Section 4.3.4.2 for further detail.
<b>80+42 Mm3 capacity, two phase construction reservoir</b>	Cothill Fen SAC (2.7 km north)	Alkaline fens (Calcium-rich springwater-fed fens) Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i> , <i>Salicion albae</i> ) * Priority feature	Habitat degradation via pollution of ground water and changes in hydrogeology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via pollution of ground water or changes in hydrogeology as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.3 for further detail.
			Habitat degradation via pollution of surface water and changes in hydrology	No	No	No likely significant effect	No pathways are considered present for LSE from habitat degradation via changes quantity or pollution of surface water as a result of the construction and operation of the SESRO option. Refer to Section 4.3.2.2 for further detail.
	Little Wittenham SAC (7.1 km east)	Great crested newt <i>Triturus cristatus</i>	Habitat degradation via changes in hydrology (quality and quantity)	No	No	No likely significant effect	Qualifying features and supporting habitat not located within the flood risk zone so pathway to LSE. Refer to Section 4.3.3.3 for further detail.

SESRO option	National Network Site Assessed (including approximate distances)	Qualifying features	Potential for effects on qualifying features	Effects alone	Effects in combination with other plans or projects	Screening result	Justification for assessment
			Habitat degradation via spread of invasive non-native species	No	No	No likely significant effect	No pathway identified for LSE due to the distance of the SAC from proposed option (approx. 13km downstream of the discharge point within the River Thames) and the pond being located out with the flood risk zone. Refer to Section 4.3.3.2 for further detail.
	Hackpen Hill SAC (8.9 km south)	Semi-natural dry grasslands and scrubland facies on calcareous substrates ( <i>Festuco-Brometalia</i> ) (* important orchid sites) Early gentian <i>Gentianella anglica</i>	Habitat degradation via spread of invasive non-native plant species or undesirable species	No	No	No likely significant effect	No pathway identified for LSE due to the distance of the SAC from proposed construction works. Refer to Section 4.3.4.2 for further detail.

Appendix A Figure 1 - Environment Designation Plan



**Affinity** Water

Taking care of your water

