Working with

Affinity Water

from Southern Water

South East Strategic Reservoir Option (SESRO) Public Consultation 2024

Technical brochure June 2024

Contents

Chapter 1 – Introduction

Overview

We have prepared a preliminary master plan – our Interim Master Plan – for the South East Strategic Reservoir Option (SESRO), a proposed new reservoir that would be located to the south west of Abingdon. This Interim Master Plan sets out how we could integrate the technical elements of the reservoir infrastructure within the local environment and include opportunities for public access and recreation.

We are holding a non-statutory public consultation on the Interim Master Plan and design options. This consultation document is part of a suite of documents that we have prepared on our proposals, as follows:

- Summary brochure
- Technical brochure (this document)
- Interim Master Plan
- Options appraisal reports
- Draft design principles
- Map book
- Questionnaire
- Factsheets

All of these documents are available on our website at **thames-sro.co.uk/supportingdocuments**.

In this consultation we are seeking your feedback on our preferred options, our draft design principles and our Interim Master Plan. We've set out a series of questions on our proposals for consideration and these are included in the questionnaire.

Public consultation details

You can respond to the public consultation in the following ways:

- Online: **ipsos.uk/SESRO**
- By email: **SESRO@ipsos.com**
- By post: **Freepost SESRO CONSULTATION**

If you would like a hard copy of the consultation questionnaire, please email us at **info.SESRO@thameswater.co.uk** or phone our customer service helpline on **0800 316 9800**.

The public consultation will close at 11:59PM on 28 August 2024.

Once the public consultation has closed, we'll read all of the responses received, review the feedback and respond, highlighting changes that have been made to our proposals as a result.

We're planning to hold a further public consultation to seek views on our proposals in 2025, before submitting an application for development consent under the Planning Act 2008 to the Secretary of State for the Environment, Food and Rural Affairs in 2026.

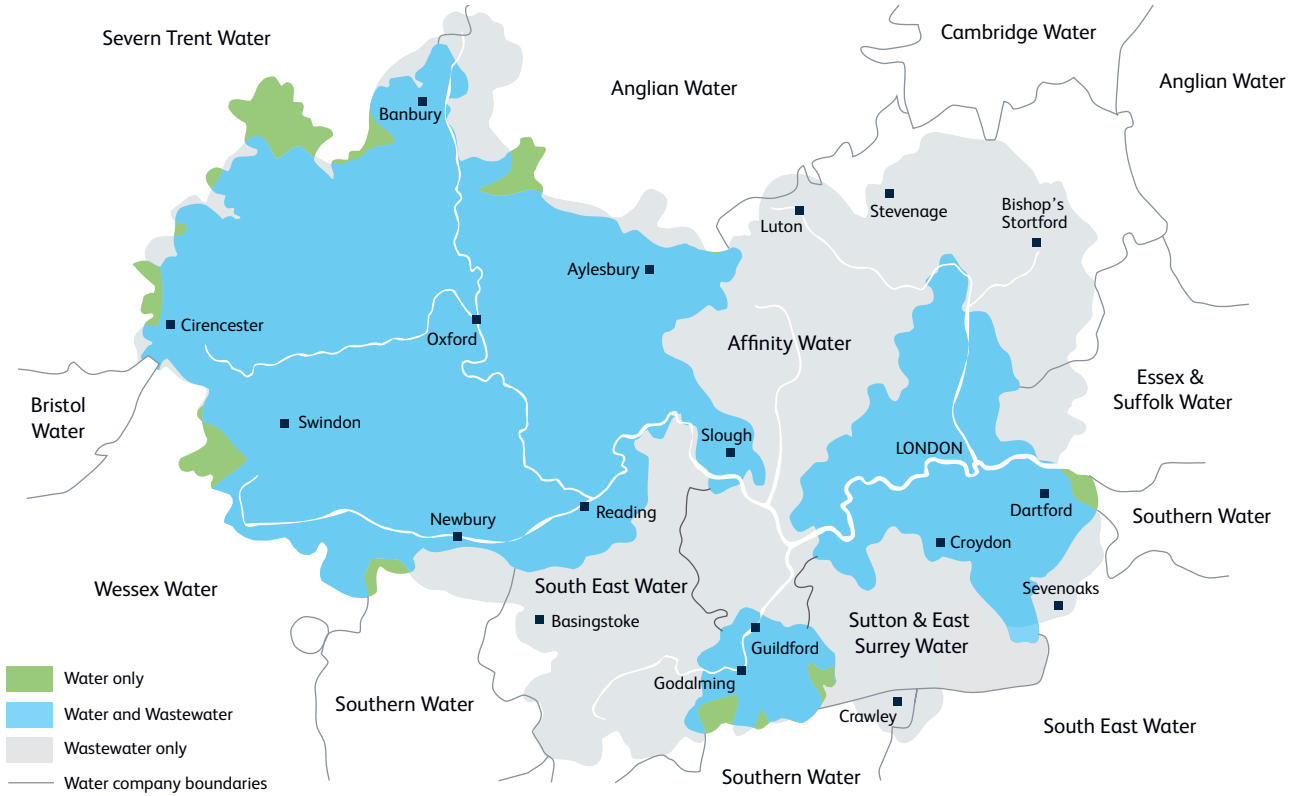
About us

A secure water supply is essential for public health, the environment and the economy. Water companies have a statutory duty to develop and maintain efficient and economical systems of water supply which will provide security of supply for customers.

Our water supply area extends from Cirencester in the west to Dartford in the east and from Banbury in the north to Guildford in the south, covering over 13,000 square kilometres. Every day, we supply around 2,600 million litres of water to around 10 million people and 220,000 businesses.

We take water from rivers and natural underground sources called groundwater, using a process called abstraction. The Environment Agency regulates how much water we can take from the environment.

We store water from rivers in large reservoirs until we need it, treating it to a high standard before distributing it to homes and businesses through our 20,000-mile network of pipes. Once it goes down the drain, we treat it again before it's returned to rivers.



The project

The proposed new reservoir would play a crucial role in protecting local and regional public water supplies during drought. When there's plenty of water during the winter months, the reservoir would be filled from the River Thames. When river levels drop or demand for water increases, water would be released from the reservoir back into the river for re-abstraction downstream.
The proposed new reservoir would supply water to local customers, as well as homes and businesses across London and the South East.

The reservoir would be located within the area bounded by the A34 and the village of Steventon to the east, the Great Western Main Line railway (London to Bristol) to the south, the A338 and village of East Hanney to the west, and the River Ock to the north.

Although the core purpose for the reservoir is to secure future water supplies, our ambition is to create a natural space which would be sensitively landscaped to fit in with the surrounding countryside, with new habitats to encourage greater biodiversity. There would be new green spaces for people to explore and enjoy, with accessible leisure and recreational facilities such as walking, nature trails, cycling, fishing, birdwatching and water sports.

You can find out more about the background to this project on our website at **thames-sro.co.uk/SESRO**.

Project development progress

Our proposals for the new reservoir have been overseen by the Regulators Alliance for Progressing Infrastructure Development (RAPID), a consortium of water industry regulators (Ofwat, Environment Agency and the Drinking Water Inspectorate). RAPID has implemented a 'gated' regulatory process to ensure that all new strategic water supply options are considered in a fair and consistent way, with transparency, and that our customers' money is spent wisely. More information about RAPID and the gated process can be found on our website via **thames-sro.co.uk/SESRO**, where you will also find the technical reports, additional information provided to RAPID and feedback from RAPID to date relating to the project.

We are now developing our reservoir proposals and seeking the necessary planning, land and environmental consents through a Development Consent Order (DCO) under the Planning Act 2008. Find out more about the DCO process in our factsheets in the Document Library on our website via **thames-sro.co.uk/supportingdocuments**. More information is also available on the Planning Inspectorate website planninginspectorate.gov.uk.

Over the next couple of years, we'll be developing designs for the proposed new reservoir, undertaking surveys and detailed environmental impact assessments and preparing mitigation plans.

Recently we've been focusing on developing our understanding of the site's geology – which would be critical to the design and operation of the new reservoir – carrying out ground investigations and archaeological trials. This summer we're also starting a clay compaction trial.

We've also been discussing our early plans with stakeholders, preparing an Interim Master Plan and looking at several key parts of the reservoir's design, which are the focus of this public consultation.

In this document:

- **Chapter 2** outlines how we have evaluated the potential options for the infrastructure needed to operate the reservoir
- **Chapter 3** introduces our design vision and principles, and describes the Interim Master Plan
- **Chapter 4** sets out what happens next and includes how we will consider your feedback as we continue to develop our plans.

The key components of our proposals for SESRO

The core purpose of the proposed reservoir is to store water to ensure a secure and sustainable water supply for the south-east. The following key components or assets are required to deliver the project:

- Provision of a fully bunded raw water storage reservoir in Oxfordshire, approximately 5km south west of Abingdon.
- Pumping station at the toe (base) of the embankment (on the north-east side of the reservoir).
- Conveyance tunnel to transfer flows via the pumping station to and from the water intake/outfall structure on the River Thames near Culham.
- Infrastructure to link the reservoir to the River Thames to facilitate drawdown of the reservoir in an emergency scenario.
- 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. (As the rail sidings would be removed at the end of construction, they are not illustrated on the Interim Master Plan).
- Public access, parking, recreational facilities, public education facilities, landscape and biodiversity habitat proposals.
- Local stream channel diversion to both the east and the west of the reservoir and construction of compensatory floodplain.
- Inclusion of reserved space for future development of the Thames to Southern Transfer Water Treatment Works (T2ST WTW) for Southern Water.

The Interim Master Plan seeks to integrate all of these proposed features into a landscape and environment led design. It incorporates embankment earthworks with varied slopes, combined with proposals for woodland belts and copses, hedgerows and pasture, which would help to integrate the reservoir into the surrounding landscape and to mitigate for loss of existing habitats. Watercourse diversions and associated wetlands, and replacement floodplain storage areas are proposed to the west and east of the reservoir to manage flood risk, contribute to biodiversity net gain and ensure Water Framework Directive (WFD) compliance. Extensive and ambitious habitat creation and enhancement is proposed to significantly improve the terrestrial and aquatic habitat available for wildlife locally and deliver biodiversity net gain.

We are also proposing extensive opportunities for visitors, including from the local community, to access new high-quality green space associated with the reservoir, via a network of Public Rights of Way (PRoW) and permissive paths including access for walkers/wheelers, cyclists and horse riders. New active travel provision is proposed along the Steventon to East Hanney road diversion.

In addition to its core purpose, the proposed reservoir provides an opportunity to deliver new recreational and educational facilities for people to enjoy. Our proposals include nature trails, a visitor centre, cafés, a water sports centre, recreational lakes and an education centre.

Chapter 2 – Emerging options

Key constraints determining the reservoir size, form and function

Building a reservoir is a major infrastructure project which requires an iterative design development process that considers the core purpose of the reservoir and its potential to deliver environmental gain and social value.

Regional and company Water Resources Management Plans (WRMPs) have identified the need for a 150 million cubic metres (Mm^3) reservoir to supply water across the south east.

Our revised draft WRMP can be found on our website, **thames-wrmp.co.uk**.

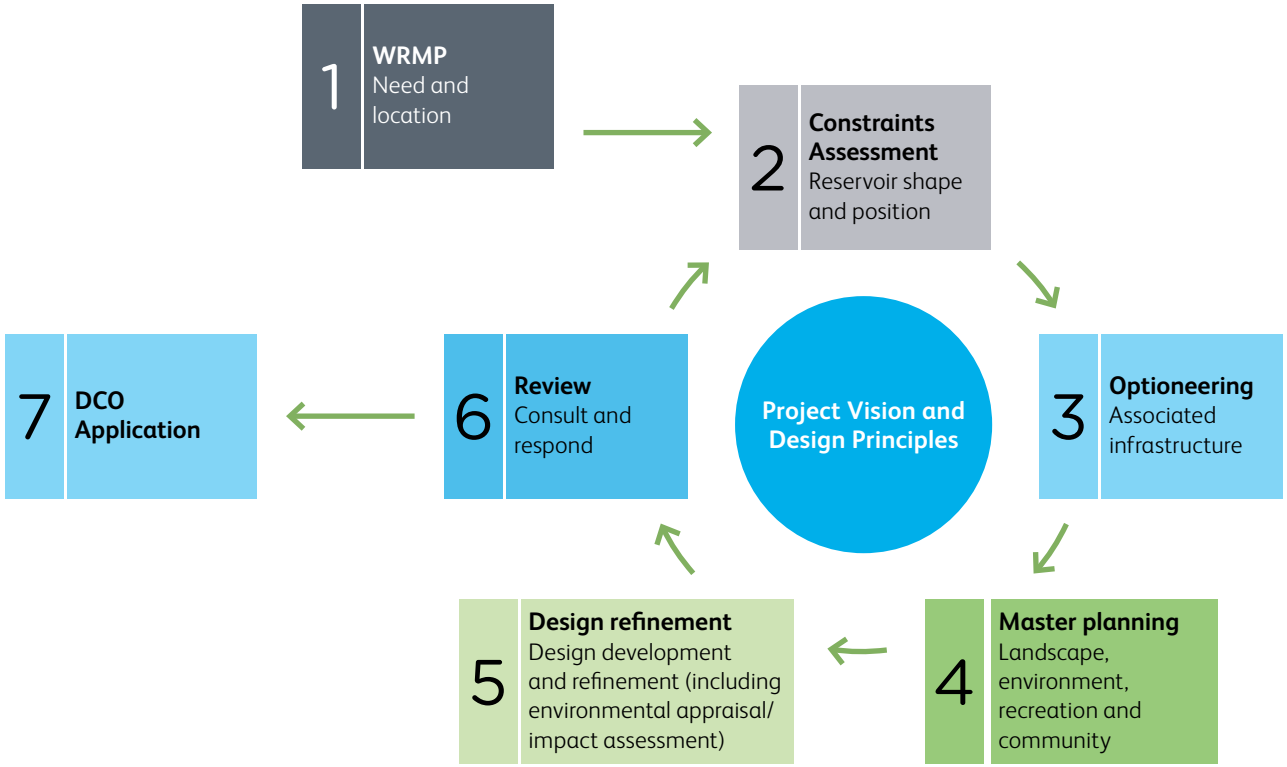
The location selected for SESRO through the WRMP process is close to the River Thames, has reasonably flat land, and has the right geology and ground conditions for a reservoir. Key constraints, including the spatial constraints of surrounding land uses and the engineering constraints associated with the underlying geology, have then been assessed to develop the reservoir shape and position.

Alongside these constraints, the opportunities of the site to provide valuable habitats, visitor facilities and recreation have been considered.

The infrastructure associated with the proposed reservoir, including access roads and reservoir connectivity to the River Thames, has been subject to options appraisals to refine what we consider, based on the available assessments, to be the preferred solutions as described later in this chapter.

An Interim Landscape and Environmental Master Plan has been developed for the project (see Chapter 3) which presents our preferred configuration of these solutions for consultation. Further design work and environmental appraisal is ongoing and feedback from this consultation (and future consultations and engagement) will inform review and development of the design.

The diagram below summarises the design process as a series of steps that are repeated in an iterative process as the design development progresses and increasing design data (including survey work, environmental assessment and consultation feedback) becomes available. The process is underpinned by the Design Vision and Design Principles discussed in Chapter 3.



Indicative view of the proposed new reservoir

Spatial Constraints

The proposed location for SESRO is constrained by the River Ock and its floodplain to the north, the village of East Hanney and the A338 to the west, the Great Western Main Line railway to the south and the village of Steventon and the A34 to the east, as shown on the image. The reservoir has been designed to fit within these constraints.

Geotechnical and embankment height constraints

The ground within the proposed location for SESRO consists of a layer of topsoil and permeable material underlain by clay that is suitable for construction of the reservoir embankments. During construction the top layer of soil would be removed and stored for landscaping, and the reservoir would be formed by digging a large deep hole and using the excavated bedrock clay to form embankments. The reservoir would store water both below and above existing ground level. The following issues are key considerations in development of the reservoir footprint and embankment height.

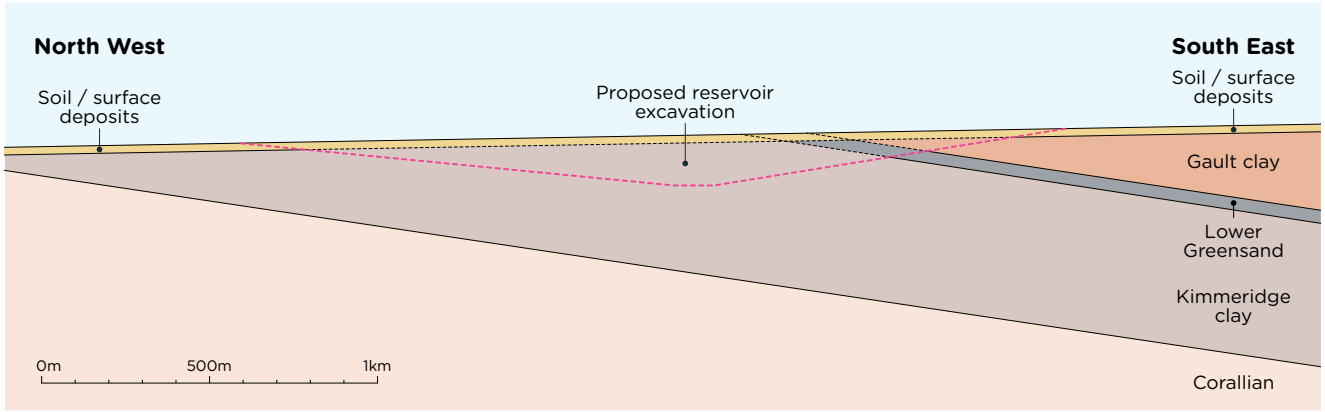
Underlying Ground – A large deep hole would be formed by the clay extraction, referred to as a borrow pit. The location, size and orientation of the borrow pit would form the basis of the reservoir footprint. The reservoir arrangement is constrained by the thickness and alignment of the clay strata on site.

Embankment Stability – The reservoir shape is also constrained by the need for the borrow pit excavation to be a sufficient distance from the reservoir embankment to avoid affecting the embankment stability.

Embankment Foundation – The slopes of the structural perimeter embankment are designed to maintain embankment stability and are a function of the properties of the clay at the site.

The embankment would be constructed on the bedrock clay, which would form its foundation. The properties of the underlying geology and bedrock clay will be evaluated through ground investigation and our understanding of these properties will increase as more data is collected and the design is developed.

Embankment Height – Whilst higher embankments than those proposed can be engineered, an increase in height has a corresponding increase in the width of the embankment base to deliver structurally sound embankment slopes. Additionally, a higher embankment would require more clay material. Lower embankment heights, if retaining the same storage volume, would require either an increase in reservoir plan area or an increase in storage depth below the current ground level (i.e. a deeper hole). Neither of these are possible. The reservoir plan area is restricted by spatial constraints as outlined above and the storage depth is limited by the depth of clay.



Cross-section illustrating geology of the SESRO site

Our preferred options for the infrastructure associated with the reservoir

Our methodology

We have developed a consistent methodology for identification and assessment of options that considers engineering, environmental, land and planning issues to identify our preferred options. Our methodology is summarised in the diagram below and the initial outcomes are presented on the subsequent pages in this chapter. Steps 7 and 8 of our methodology have been addressed through development of the Interim Master Plan described in Chapter 3. If you require more detail about how we carried out our optioneering, the options appraisal context and methodology report is available on our website via thames-sro.co.uk/SESRO.

To deliver an operational reservoir at this site, we have identified a number of options for the associated infrastructure including:

- A location for a construction rail siding;
- New roads, including an access road and diversion of the existing road between East Hanney and Steventon;
- Locations for water treatment works; and
- Connections to the River Thames.

We have considered the potential options for each of these and our preferences are shown on the following pages. If you'd like more detail, this can be found in our individual options appraisal reports and our map book, all of which are available on our website via thames-sro.co.uk/supportingdocuments.

In this consultation we are asking for your views of the options we have considered and identified as preferred.

1 Define Scope and Objectives of Appraisal

1 Describe overarching aim of optioneering for SESRO
2 Identify individual option appraisals
3 Consider interactions between appraisals and consider sequencing
4 Define scope / objectives for each individual appraisal

2 Define Constraints on Option Definition

1 Identify and describe constraints that set the study area options that can be considered
2 Define approach to assessment. Consider whether a staged assessment is required for each appraisal (such as screening of longlist to shortlist before detailed assessment)

3 Develop Appraisal Criteria

1 Develop master list of assessment criteria
2 Identify bespoke criteria for specific appraisals
3 Develop RAG definitions and criteria assessment methodology

4 Define Options

1 Develop options
2 Agree information needed for assessment
3 Provide option definition packs for assessors

5 Undertake Individual Assessments

1 Confirm assessors
2 Undertake assessments
3 Adopt staged approach if required by Step 2
4 Document assessments and reasoning for each criteria and option

6 Workshop to Agree Preferred Option

1 Workshop of specialists to agree the preferred option, balancing expert judgements of different specialists
2 Capture reasoning and narrative for preferred options

7 Review against other SESRO appraisals

1 Consider interaction with other SESRO appraisals and review for combined effects that would impact individual assessments
2 Back-check for implications on preferred option selection
3 Ratify preferred options

8 Master planning and Consultation

1 See Master Plan Process
2 Develop material for non-statutory public consultation on options appraisal

Q Consultation question:

Do you have any comments on the process we undertook to develop our preferred options for the infrastructure associated with the reservoir?

Preferred indicative locations for infrastructure following our options appraisals:

1. Rail sidings and material handling area during construction
2. Steventon to East Hanney road diversion
3. Alternative options for the Thames to Southern Transfer (T2ST) Water Treatment Works
4. Main access road
5. Connectivity to the River Thames (conveyance tunnel/ emergency discharge channel)
6. River Thames intake/ outfall structures

Rail siding

At the start of this chapter, we explained that the reservoir embankments would be formed using clay extracted on site; however other materials such as stone, sand and gravel would also be needed to construct the reservoir.

The use of rail for delivery for these bulk materials would help to reduce the volume of road traffic required to construct the reservoir. Our interim design includes provision to import these materials by rail at a dedicated rail siding.

A material handling area would be constructed alongside the rail siding to allow materials to be off-loaded from the trains and stored until needed for construction.

At this stage it is expected that the rail siding would be used for construction and then demolished and landscaped or returned to agriculture when construction of the reservoir is complete.

The Great Western Main Line railway runs along the southern boundary of the proposed location for SESRO and the search area for siding locations has focussed on three sections of land adjacent to the railway between the A338 and A34.

The Great Western Main Line is a busy and strategically important national rail route that is owned and maintained by Network Rail. Any future connection to this railway has the potential to impact the existing infrastructure and rail operations, and would need approval from Network Rail.

Search Area and Constraints

There are various constraints that influence the potential location of a rail siding and materials handling area, as follows:

- **Topographic, environmental and location** – existing topography, including watercourses, ponds and flood zones, as well as environmental and location features that would otherwise be unaffected by the SESRO project.
- **SESRO proposals and external schemes** – the proposed Steventon to East Hanney Road Diversion (see below) as part of the SESRO proposals and possible future plans for a new passenger railway station at Wantage and Grove (not part of the SESRO project) were also identified for consideration in the options appraisal of the rail siding area.

The topographic, environmental and location constraints above lead to two areas alongside the Great Western Main Line that could be considered for detailed options – the west and east areas, as shown on the plan. The central area was discounted for the following reasons:

- The area contains flood zones which would require both mitigation and replacement flood storage volume if a railway siding and materials handling area were constructed in this location.
- The area includes large areas of woodland (Hutchin's Copse).
- As part of the reservoir construction, several watercourses would require diversions in this area and introducing a railway siding would add to the complexity during construction.
- Lack of space in the north of the area, due to the presence of the proposed reservoir embankment.

For further detail on the specific constraints which informed the option appraisal for the rail siding, please refer to the rail options appraisal report in our document library on our website via **thames-sro.co.uk/supportingdocuments**.

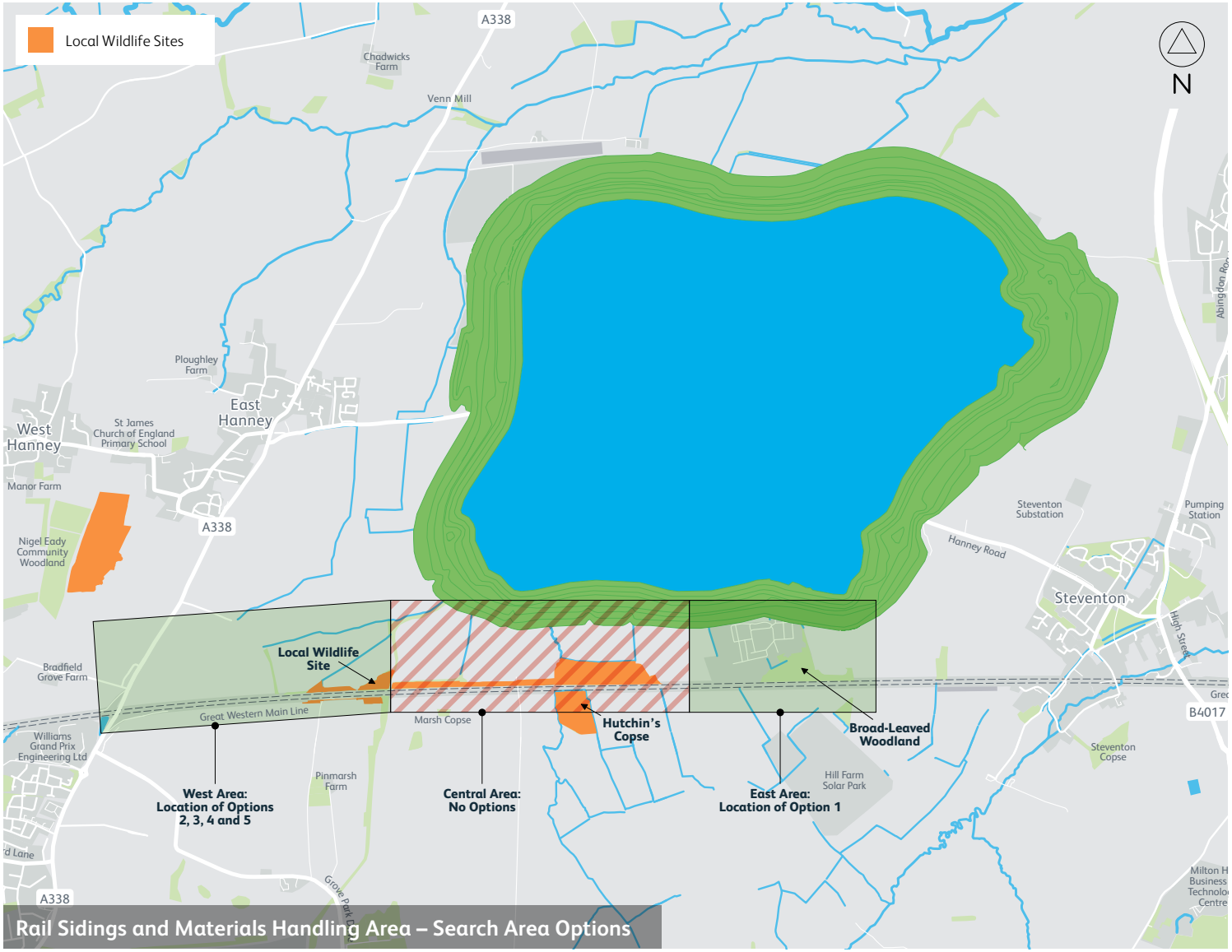
The necessary space estimated for the rail siding area is based on indicative initial estimates of the stockpile volume needed for materials delivered by rail. Two indicative stockpile volumes were used to consider potential area locations (a larger volume of storage based on one year's stockpiled material (370,000m^3) and a small volume of storage based on the rate of delivery of materials versus the rate of placement of material (220,000m^3). Options were assessed using both stockpile volumes.

A view of the Great Western Railway line looking east from the A338 north of Grove

For more details of all of the options that have been considered for the rail sidings, including the location and layout of each option, please go to our Rail Siding options appraisal report in our document library on our website via thames-sro.co.uk/supportingdocuments

Q Consultation question:

We are considering options for the rail links to the site. Our preferred option is Option 5. Do you have any comments on these plans?



Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Options

A number of options have been identified and assessed in the west and east areas.

Three options were initially considered as follows:

- **Option 1** – located in the east area approximately 1.5km west of Steventon and 260m south of the southern edge of the proposed reservoir embankment at the existing commercial estate. All but one of the options being considered for the Steventon to East Hanney Road Diversion (see below) pass through the area between the reservoir embankment and Option 1. Option 1 was the only option located off the two-track section of the railway (other options are located off the four-track section of railway). Option 1 would provide the required signalling and track modifications for trains to either exit to the east or the west.
- **Options 2 and 3** – these options, located in the west area, were also considered but each had constraints and initial screening of the options determined that Options 2 and 3 should be amalgamated for assessment into Option 4.
- **Option 4** – located in the central part of the west area between Options 2 and 3. Option 4 is located approximately 1km south of East Hanney and 400m from the proposed Steventon to East Hanney Road Diversion and 1km southwest of the proposed reservoir. The option avoids the flood zones, is further from the sensitive residential units and is able to accommodate an embankment for the railway in and out of the sidings to the west of the Collins underbridge.
- Two variants of Option 4 were developed, in the same location and with the same dimensions, but with differing signalling meaning freight trains for Option 4a can exit the sidings both east and west but can only exit east for Option 4b.

Three options (Option 1, 4a and 4b) were therefore developed for assessment against the appraisal criteria.

- Option 1 was discounted as the preferred option due to the much higher risk of being rejected by Network Rail than Options 4a and 4b, given the anticipated impact on the Great Western Main Line (a busy, strategically important national rail route).
- It was, however, acknowledged that Option 1 largely performs better than both Options 4a and 4b on an environmental basis due to the land take and potential impacts upon the Cuttings and Hutchin's Copse Local Wildlife Site and local receptors from Options 4a and 4b. Further work was therefore undertaken to investigate alternative layouts that reduce the potential environmental impact of Options 4a and 4b by avoiding the Cuttings and Hutchin's Copse Local Wildlife Site.
- Option 5 was therefore subsequently developed from Option 4b (which requires less complex signalling modifications than Option 4a, and although not considered a material differentiator, Option 4b has a lower capital cost and carbon associated with it than Option 4a). We rotated the layout of Option 4b away from the main line to increase the distance between the rail siding area and Local Wildlife Site to reduce the impact on the Local Wildlife Site.

Option 5 is approximately 1km south of East Hanney, 400m from the proposed Steventon to East Hanney Road Diversion and 900m southwest of the proposed reservoir. As noted, as with Option 4b, Option 5 would only provide the required signalling and track modifications to allow the trains to exit the site to the east (although an option could be developed in the location of Option 5 that uses the signalling principles of either Options 4a or 4b).

The detailed assessment of the performance of each Option can be found in the Rail options appraisal report in our document library via **thames-sro.co.uk/supportingdocuments**.

Our Preferred Option

Option 5 has been identified as our preferred option; it performs better than Option 4b against several environmental themes, and the option of having an additional spur off the main rail siding provides extra flexibility to refine the design. Further refinement would identify the optimum configuration of the Option 5 design, balancing operational requirements with local wildlife and habitats and local properties.

Road appraisal

Two new roads will be needed as part of the reservoir proposals – (1) a temporary and permanent main access road to the site and (2) a permanent diversion of the existing Steventon to East Hanney Road.

Main Access Road

A new main access road to the reservoir site would provide both of the following accesses:

- A primary temporary construction access from the strategic road network for material import by road during construction. This will be supported by temporary haul roads around the SESRO site for construction activities and the construction workforce, which need to be linked and accessible.
- A permanent access to SESRO for operational, maintenance and recreational purposes, which will be accessible by the public.

Search Area and Constraints

The following were identified as constraints on the alignment options for the main road access:

- The location of the reservoir in the wider context of the A34 to the east, the River Ock. the A415 to the North, the A338 to the west and the Great Western Railway to the south.
- There is also a need to ensure that the access road is designed so that it is above the flood level.
- The main access road alignment is strongly constrained by policies which restrict connections onto the strategic road network (the A34) for construction related traffic.
- Proximity to a junction on the A34 must be considered, to ensure the reservoir site access road prevents or minimises adverse delay impacts on the surrounding strategic road network.
- Using existing roads is not possible for the temporary construction access, as traffic would need to pass through Steventon which would impact the local community. As such the A415 has been identified as a suitable road on which to create a junction that can provide access to the reservoir but taking into consideration the Air Quality Management Area (AQMA) at Marcham, any junction should be located to the east of Marcham.

For further detail on the specific constraints which informed the option appraisal for the main access road, please refer to the road options appraisal report in our document library via **thames-sro.co.uk/supportingdocuments**.

Options

We considered four options for the main access road, each joining the A415 with a new roundabout near the Marcham interchange with the A34. These options are set out in the table.

The detailed assessment of the performance of each Option can be found in sections 5 and 6 of the road options appraisal report in our document library via **thames-sro.co.uk/supportingdocuments**.

Our Preferred Option

Option B was identified as preferred at this stage and is shown in the Interim Master Plan for consultation. Option B was preferred for the following reasons:

- The A415 junction and the road alignment are located closest to the A34 (with allowance for distance from the Marcham Interchange for highway safety and to avoid traffic queuing, and avoiding the area where the allotments are located).
- When considering potential landscape and visual impacts of the required road, it would be located within the context of the existing highways infrastructure and traffic on the A34.
- It falls fully within the area safeguarded for the proposed reservoir in the current Vale of White Horse District Council's Local Plan and requires the least land to be included in the scope of the DCO application. Safeguarding is a formal process when land required for major projects is protected from competing developments.

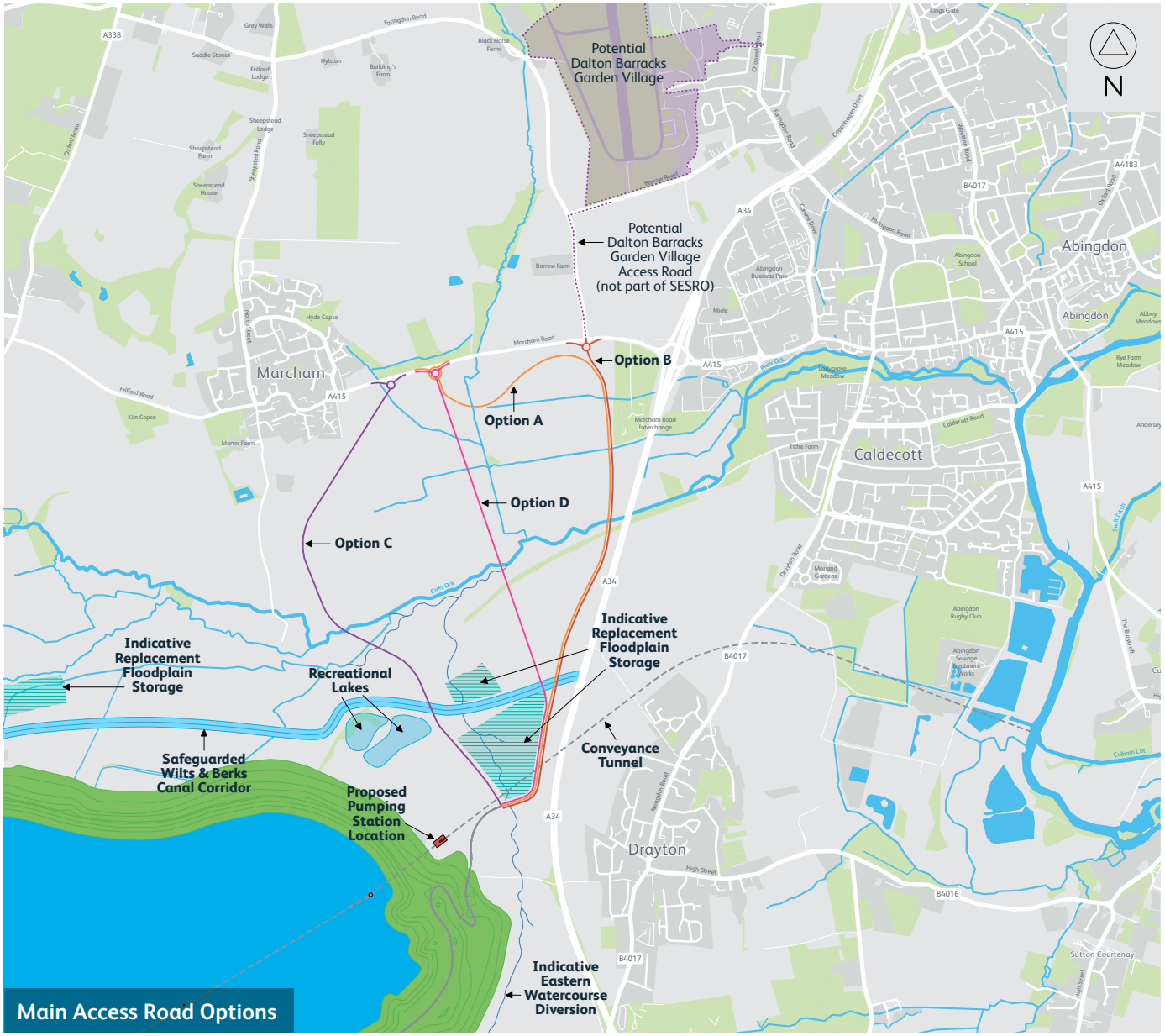
Option B could also provide opportunities to work in a coordinated way with potential future developments by other parties so that the impacts are reduced.

These could include the potential Dalton Barracks Garden Village residential development, the possible future South Abingdon Movement Corridor and the Environment Agency's possible future Abingdon Flood Alleviation Scheme.

Option	Description
Option A	Option A connects to the A415 with a roundabout junction approximately 1.2km west of the Marcham Interchange (A415/A34) and to the east of the village of Marcham outside of the AQMA. Option A is approximately 5.12km long and initially routes east (parallel to the A415) and then south (parallel to the A34) to reach the reservoir crest. This option was developed with the possibility for the road embankment to also be used as a flood alleviation scheme.
Option B	Largely the same as Option A but the junction on the A415 is located approximately 440m west of the Marcham Interchange (A415/A34), so the total length of Option B is approximately 4.27km, which is shorter than Option A. The roundabout junction for Option B was located to align with an existing unnamed road which leads to Gozzards Ford (via Farringdon Road) because this unnamed road is likely to be used for access to the proposed housing development at Dalton Barracks so the roundabout may be able to serve both SESRO and Dalton Barracks.
Option C	Approximately 4.41km including a section of the Marcham bypass. It was included to consider whether the Main Access Road could connect to the A415 (Marcham Road) via the eastern section of a possible future South Marcham Bypass (accounting for 1km of the proposed route).
Option D	The most direct alignment to the reservoir. It is approximately 4.05km long and uses the same junction as Option A.

Q Consultation question:

We are proposing to build a new access road to the site for construction vehicles. Once the reservoir is built the road could be used as the access for visitors for recreational use. Our preferred option is Option B. Do you have any comments on these plans?



Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Steventon to East Hanney Road Diversion

The reservoir footprint would interrupt the route of the existing road that connects Steventon and East Hanney and therefore a road diversion is required as part of the project. The existing road connection is approximately 5.5km long and does not include a cycleway or footway.

Search Area and Constraints

The following were identified as constraints on the alignment options for the road diversion:

- The necessity to retain the east-west connection between Steventon and East Hanney for trips by all travellers, including vehicular travellers and other road users.
- The location of the proposed reservoir embankment which means that the road diversion must be routed either north or south of the proposed reservoir footprint.
- Constraints that made routing the diversion north of the reservoir infeasible, including but not limited to the River Ock floodplain.
- The Great Western Main Line railway south of the proposed reservoir.

On the basis of these constraints, options were considered to the south of the reservoir footprint.

Options

Four road alignment options were identified and are set out on the plan and described in the table.

The detailed assessment of the performance of each Option can be found in sections 9 and 10 of the road options appraisal report in our document library via thames-sro.co.uk/supportingdocuments.

Option	Description
Option A	Approximately 5.1km long. Outside of Steventon, the road is diverted to the south from its current alignment from Hanney Road and then routed west along the southern extent of the reservoir embankment. At the western end of Option A, there is a new roundabout junction with the A338, which is around 800m south of the existing junction and approximately mid-way between the centre of East Hanney and the A338 bridge over the Great Western Main Line. At its eastern end, Option A uses part of the existing Hanney Road to link into Steventon.
Option B1	Only differs from Option A at the eastern end as a new junction with the B4017 is proposed to the north of Steventon. This alignment has been included to consider the potential benefits or drawbacks of the junction location, which could reduce traffic passing through Steventon. Alignment B1 is routed north of the existing sub-station and has a total length of approximately 6.4km.
Option B2	Only differs from Option A at the eastern end as a new junction with the B4017 is proposed to the north of Steventon; however, Option B2 is routed south of the sub-substation and it is in closer proximity to existing properties. Option B2 has a total length of approximately 6.2km.
Option C	Option C shifts the road diversion south of the Great Western Main Line. At the Option's eastern end, the existing junction of the B4017 (High Street) and the A4130 would be upgraded to a roundabout due to the additional traffic that would be introduced. The eastern end of the route would require some cutting of the road into the hillside because it is relatively steep, falling approximately 30m in 800m. At the western end of the alignment the road connects into the existing roundabout on the A338 in North Grove. Option C is approximately 7.2km in length.

Our Preferred Option

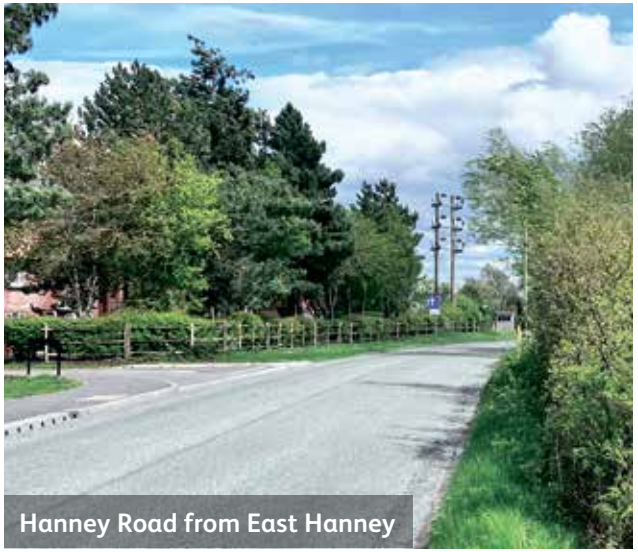
Option A was identified as preferred at this stage and is shown in the Interim Master Plan for consultation which can be found in our document library on our website via thames-sro.co.uk/supportingdocuments.

The option maintains a direct road link between the two villages (with potential to provide a new active travel route), it would retain the bus route through Steventon (with potential to provide bus stops alongside the reservoir), it requires fewer utility diversions than Options B1 and B2 and would have less of an effect on visual amenity to Steventon.

For more details of all of the options that have been considered for the roads, including the location and layout of each option, please go to our Road options appraisal report in our document library on our website via thames-sro.co.uk/supportingdocuments

Q Consultation question:

Several routes have been considered to replace the existing road between East Hanney and Steventon. Our preferred option is Option A. Do you have any comments on these plans?



Hanney Road from East Hanney

Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Water treatment works

The proposed reservoir does not currently include treatment for potable water supply as part of the core project; however, the reservoir could provide water to Southern Water, Thames Water and South East Water customers via the Thames to Southern Transfer (T2ST). The T2ST project has identified a need for a Water Treatment Works (WTW) to be located at the SESRO reservoir site. Therefore, the two project teams from Thames Water and Southern Water have worked together to identify provisional areas that could be 'reserved' for construction of a WTW for the T2ST project.

Thames Water and Southern Water are liaising closely on the consenting requirements for T2ST. The current assumption is that the Water Treatment Works would be designed, consented and constructed by Southern Water.

The WTW would have a capacity of 120 Megalitres per day (Ml/d) and have above ground facilities in buildings and below ground tanks. The total land area needed for the WTW would be approximately 5 to 6 hectares and there are a number of pipelines that would need to link to the WTW (e.g. raw water pipeline for water extracted from the reservoir via a raw water pumping station and potable water pipeline from the WTW for onward transmission).

Thames Water and Southern Water have produced a factsheet providing information on the proposed T2ST project and the WTW. The factsheet can be found in our Document Library at **thames-sro.co.uk/supportingdocuments** on our website.

Search Area and Constraints

A staged assessment was undertaken whereby firstly the extent of the study area was defined and then split into zones with similar characteristics and secondly a constraints mapping exercise was undertaken. The constraints mapping excluded areas of land within the study area, based upon constraints which would likely present significant challenges to delivering or securing the development consent for the WTW. One of the design criterion established for the WTW is that the selected location must not adversely impact the delivery of the proposed reservoir; therefore, we considered the ease or difficulty with which SESRO or third party assets may be repositioned if necessary.

We identified eight potential areas for a WTW within the study area. Our initial screening showed that six of these areas were unsuitable. An area to the south of the proposed reservoir (area 6) and an area to the north east (area 3) were taken forward for further consideration. The outputs of both the constraints mapping and zoning exercise were then used together to identify potential WTW land parcels for further investigation (within areas without major design constraints and within zones that passed initial screening). Two potential layouts for the WTW were developed for consideration (Layout 1 – 338m x 167m and Layout 2 – 515m x 120m). The land parcels that passed through this stage were then considered further.

Options

Four options were identified for the location of the proposed WTW. Pipeline corridor routes were developed for these options and were assessed in conjunction with the WTW and the construction compound that would also be needed. The locations of the WTW options are shown on the plan and are summarised in the table.

The indicative pipeline corridors to and from each WTW option are shown in the Water Treatment Works options appraisal report available in our document library via **thames-sro.co.uk/supportingdocuments**. The detailed assessment of the performance of each Option can also be found in sections 5 and 6 of the Water Treatment Works options appraisal report.

Option	Description
Option 1	This positions the WTW along the northern edge of the outer reservoir embankment, approximately 1,900m south of Marcham. The Wilts and Berks Canal corridor lies immediately to the north of this option. By avoiding the northeast corner of the site, this option effectively reduces potential interactions with the pumping station, tunnel, potential recreational facilities associated with lakes, café and public parking. The WTW is assumed to be accessed for construction and operational purposes via the main SESRO access road, with a total length from Marcham Road of approximately 6,400m. Option 1 has been developed based on the dimensions of Layout 1 (but Layout 2 is also suitable for this land parcel if required).
Option 2	This positions the WTW within the northeast corner of the SESRO site, approximately 700m west of Drayton. This location places the WTW near the reservoir embankment, the main access road, the pump house and the tunnel. The WTW is assumed to be accessed for construction and operational purposes via the main SESRO access road, with a total length from Marcham Road of approximately 4,000m. The option has been developed based on the dimensions of Layout 1. Layout 2 would not fit within this land parcel unless the Auxiliary Drawdown Channel (ADC) is omitted, and the land parcel extended. The proximity of this option to the raw water pumping station minimises the length of raw and contingency pipeline, providing the most direct route from the WTW to the pump house.
Option 3	This option places the WTW on the southern edge of the study area, approximately 1,600m west of Steventon. This location positions the WTW within a narrow corridor of land between the Great Western Main Line railway and the Steventon to East Hanney Road Diversion. Notably, this option avoids the northeast corner of the site, effectively minimising interactions with recreational facilities and public parking. The land is currently used as a commercial warehousing and open storage facility under the name of Steventon Depot. Access to the WTW during construction is assumed to be via the main SESRO access road, with a total length from Marcham Road of approximately 8.1km. For operational purposes, direct access would be achieved from the Steventon to East Hanney Road Diversion. The option has been developed based on the dimensions of Layout 2. Layout 1 would not fit within this land parcel due to the restricted width of the parcel, bordering both the railway and Steventon to East Hanney Road Diversion. It may be feasible to reroute the watercourse and road diversion to create additional space. The proximity of this option away from the raw water pumping station and Abingdon STW increases the overall length of raw, contingency and foul pipework lengths required, however, offers a reduction in required potable pipework.
Option 4	This option positions the WTW near the entrance of the SESRO site, approximately 600m northwest of Drayton. This location is within a relatively spacious land parcel, situated 1,000m northeast of the reservoir. However, the localised higher elevation of this section of the site would likely require landscape mitigation and additional earthworks to reduce the visual impact of a WTW and integrate it into the landscape. The WTW is assumed to be accessed for construction and operational purposes via the main SESRO access road, with a total length from Marcham Road of approximately 4,000m. The option has been developed based on the dimensions of Layout 1, however, the land parcel assessed within Option 4 would cater to both layouts with ease.

Our Preferred Options

Two options have been identified as preferred at this stage.

Options 2 and 4 were considered to perform better in the assessment for the following reasons:

- Option 2 – performs slightly stronger overall than the other options in areas such as:
  - Cost and Carbon – Option 2 performs best as it requires the shortest length of pipework due to it being situated closest to the raw water pumping station.
  - Environmental – Option 2 is preferred on landscape grounds and is not situated in a potential contamination zone.
  - Consenting – Option 2 is ranked first alongside Option 1 as both options are within the expected area of SESRO works.
- However, the construction complexity risk associated with Option 2 is higher, particularly if the ADC is constructed (see below).

Option 4 is also preferred and may become even more so should the ADC progress.

Option 4 also scores strongly in a few areas, such as:

- Constructability – Option 4 performs strongest, being located away from the majority of other SESRO construction activities and has the largest available space.
- Cost and Carbon – Option 4 is second, due to reductions in pipeline length due to moderate proximity to the raw water pumping station, alongside the shortest length of foul pipe required.
- However, Option 4 is slightly elevated and potentially most visible in its surroundings.

For more details of all of the options that have been considered for the Water Treatment Works, including the location and layout of each option, please go to our Water Treatment Works options appraisal report in our document library on our website via **thames-sro.co.uk/supportingdocuments**

Q Consultation question:

We need to identify a location for a proposed Water Treatment Works, which is currently proposed to be consented, built and operated by Southern Water. Our preferred options for the location of the Water Treatment Works are Option 2 and Option 4. Do you have any comments on these plans?

Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Connectivity to the River Thames

The proposed reservoir requires connectivity to the River Thames for the following reasons:

- During normal operating conditions, water would be abstracted from the River Thames to fill the reservoir (typically when flow is high in the river) and at other times water would be discharged to the river to augment flows for water supply abstraction downstream (typically during drier periods when river flows are low).
- In an emergency event the water level in the reservoir would be drawn down and discharged to the river at a higher rate than the normal operational discharges.

To achieve these two requirements, two specific pieces of operational infrastructure will be required – an Intake/Outfall Structure and Emergency Discharge Infrastructure. This section presents the various options for each of the Intake/Outfall Structure and the Emergency Discharge Infrastructure that were assessed as part of our Connectivity to Thames options appraisal report, which can be located in our document library and accessed via thames-sro.co.uk/supportingdocuments.

Intake/Outfall Structure

The purpose of the intake/outfall structure is to abstract water from the River Thames for reservoir filling, and, when required, discharge to the River Thames for downstream water supply abstraction. The location of the structure would set the end point of the underground conveyance tunnel that would start close to the reservoir embankment at the SESRO pumping station.

Search Area and Constraints

The following were identified as constraints on the alignment options for the Intake/Outfall Structure:

- The structure needs to be located adjacent to the River Thames to facilitate abstraction and discharge, ensuring water quality which means that the structure will be in the floodplain.
- As the structure will require screens and control penstocks, it will need electrical power and control systems, which will need to be located above flood level. Similarly, ventilation pipework for the shafts and tunnels must terminate above flood level. As a result there will be a visible presence on or near the riverbank.
- Environmental acceptability of the intake and discharge flows within local river reaches.
- The structure needs to be near to the main reservoir site.

For further detail on the specific constraints which informed the option appraisal for the Intake/Outfall structure, please refer to the Connectivity to Thames options appraisal report in our document library via thames-sro.co.uk/supportingdocuments.

Options

Eight options were assessed as shown in the plan and as presented in the table.

The detailed assessment of the performance of each Option can be found in sections 5 and 6 of the Connectivity to Thames options appraisal report in our document library via thames-sro.co.uk/supportingdocuments.

For more details of all of the options that have been considered for the intake and outfall infrastructure, including the location and layout of each option, please go to our intake and outfall options appraisal report in our document library on our website via thames-sro.co.uk/supportingdocuments

Q Consultation question:

We are proposing Option B as our preferred option for our intake/outfall structure. Do you have any comments on these plans?

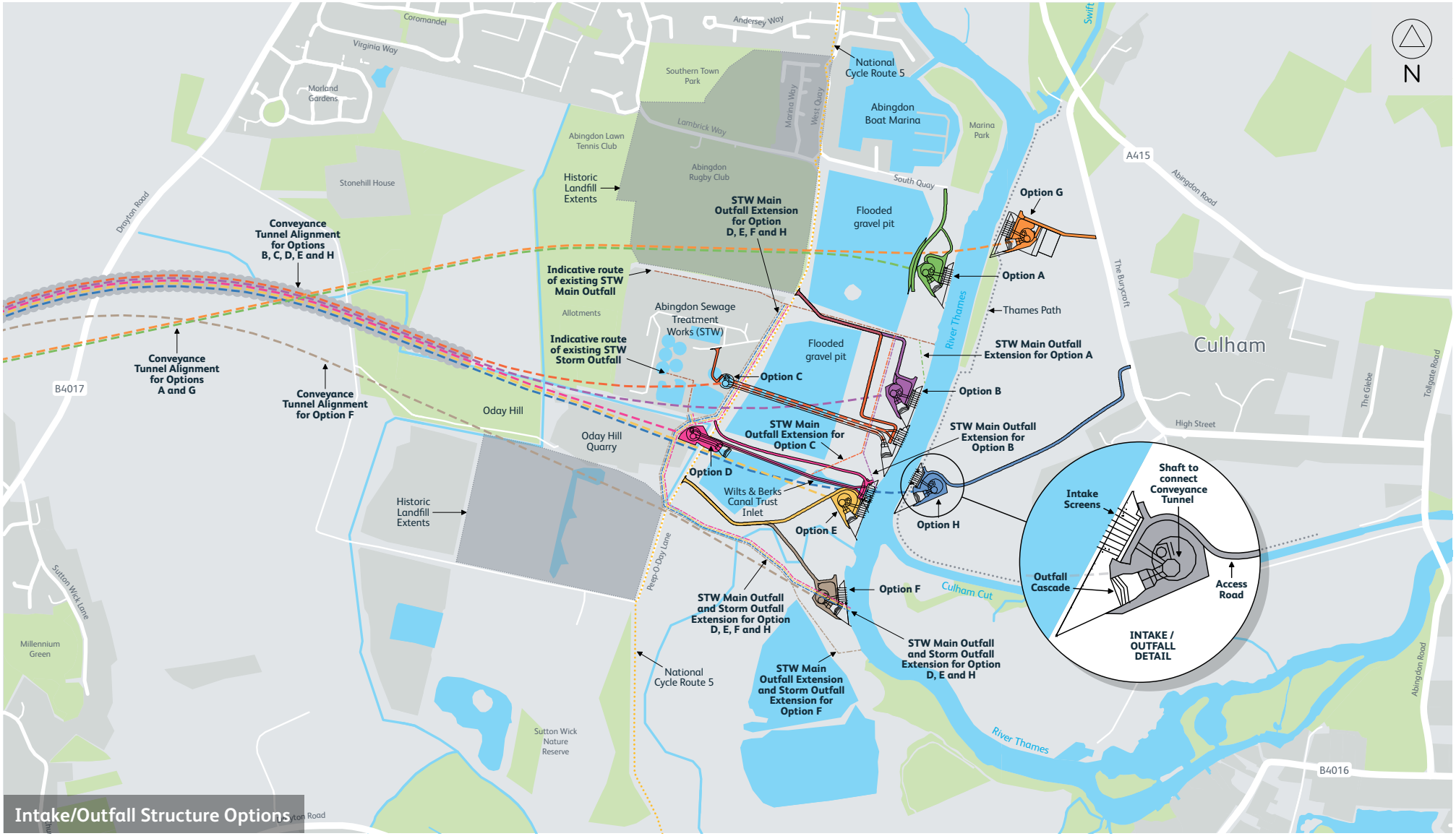
View of River Thames at Culham

Option	Description
Option A	A combined Intake/Outfall structure. Intake and Outfall located together on the right bank of the River Thames, upstream of the Abingdon STW outfall, south of Abingdon Marina. The shaft location is in the same location.
Option B	A combined Intake/Outfall structure. Intake and Outfall located on the right bank of the River Thames, upstream of the Wilts & Berks Canal Trust Inlet. The shaft location is in the same location.
Option C	A combined Intake/Outfall structure. Intake and Outfall located on the right bank of the River Thames, upstream of the Wilts & Berks Canal Trust Inlet. The shaft location is within Abingdon STW.
Option D	The Intake/Outfall structures are separated. Intake location is on the right bank of the River Thames, south of Abingdon STW. The Outfall location is in the right bank of the River Thames, upstream of Wilts & Berks Canal Inlet. The shaft location is south of Abingdon within an existing quarry site.
Option E	A combined Intake/Outfall structure. Intake and Outfall located on the right bank of the River Thames, immediately downstream of the Wilts & Berks Canal Inlet. The shaft location is in the same location.
Option F	A combined Intake/Outfall structure. Intake and Outfall located on the right bank of the River Thames, downstream of Culham Cut. The shaft location is in the same location.
Option G	A combined Intake/Outfall structure. Intake and Outfall located on the left bank of the River Thames, upstream of Abingdon STW outfall, south of Abingdon Marina. The shaft location is in the same location.
Option H	A combined Intake/Outfall structure. Intake and Outfall located on the left bank of the River Thames, upstream of Culham Cut. The shaft location is in the same location.

Our Preferred Option

Option B was identified as preferred at this stage and is shown in the Interim Master Plan for consultation which can be found in our document library on our website via **thames-sro.co.uk/supportingdocuments**.
It is preferred for the following reasons:

- It provides sufficient space during construction, it requires fewer structures (compared to Options C and D as it incorporates the end of the tunnel with the intake/ outfall structure) and less complex construction techniques.
- It has one of the shorter tunnel lengths and one of the shorter diversions for the Abingdon STW outfall, leading to less programme risk.
- Unlike Options G and H, it avoids directly impacting the Thames Path, and is located further from the Culham Conservation Area with less potential for impact on heritage setting.
- In common with Options A to F, access during construction may affect National Cycle Route 5; but this is no greater a constraint for Option B.
- In common with Options E, F and H there is little risk of landfill disturbance.



Intake/Outfall Structure Options

Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Emergency Discharge Infrastructure

The design of the proposed reservoir needs to include infrastructure to safely draw-down the water level in the reservoir during an emergency event. Water removed from the reservoir would need to be conveyed to a watercourse with sufficient hydraulic capacity to safely receive this flow during normal conditions without causing flooding. The engineering solutions for this conveyance would be either an Auxiliary Drawdown Channel (ADC) (which is a surface-level channel of water connecting the reservoir to the River Thames) or a sub-surface tunnel between the two.

The only watercourse with sufficient capacity within the vicinity of the proposed reservoir is the River Thames.

In common with the Intake/Outfall Structure study above, the Culham reach of the River Thames has been assessed for emergency drawdown options.

Search Area and Constraints

Constraints on potential options include:

- The extent of the River Thames floodplain
- Local historical landfills (and potential sub-surface contamination), gravel pits and general topography
- Properties in Drayton and south of Abingdon
- The need for an ADC would require crossing the existing local and strategic road network – including the A34
- Existing utilities including underground water pipes, gas mains, and electricity cables that may require diversion
- Geological constraints
- Minimum acceptable cover depth for tunnel options

Options

Three options were identified and considered as set out in our options appraisal report.

Study work was undertaken to investigate the behaviour of the River Thames floodplain in the vicinity of the options and understand the likely impact of an above-ground drawdown channel on flood risk. This work identified that the Option A would have an unacceptable adverse impact on flooding.

On this basis Option A was screened out and not taken forward to full assessment.

Option	Description
Option A	Includes two elements: • An Auxiliary Drawdown Channel (ADC) consisting of a surface channel capable of transferring 45m^3/s to the River Thames via gravity. The channel would have raised levees on either side in the section approaching the river to retain water in the channel in a drawdown scenario. • A conveyance tunnel capable of transferring 30m^3/s via gravity to the River Thames.
Option B	This option consists of an ADC and conveyance tunnel similar to Option A; however, the ADC design has been adjusted to remove the levees and introduce a gated structure on the section approaching the river to prevent backflow of River Thames flooding.
Option C	Does not include the ADC and instead utilises the conveyance tunnel alone to transfer 75m^3/s to the River Thames in an emergency.

Our Preferred Option

Assessment of Options B and C has indicated a preference for Option C, the tunnel only option, for the following reasons:

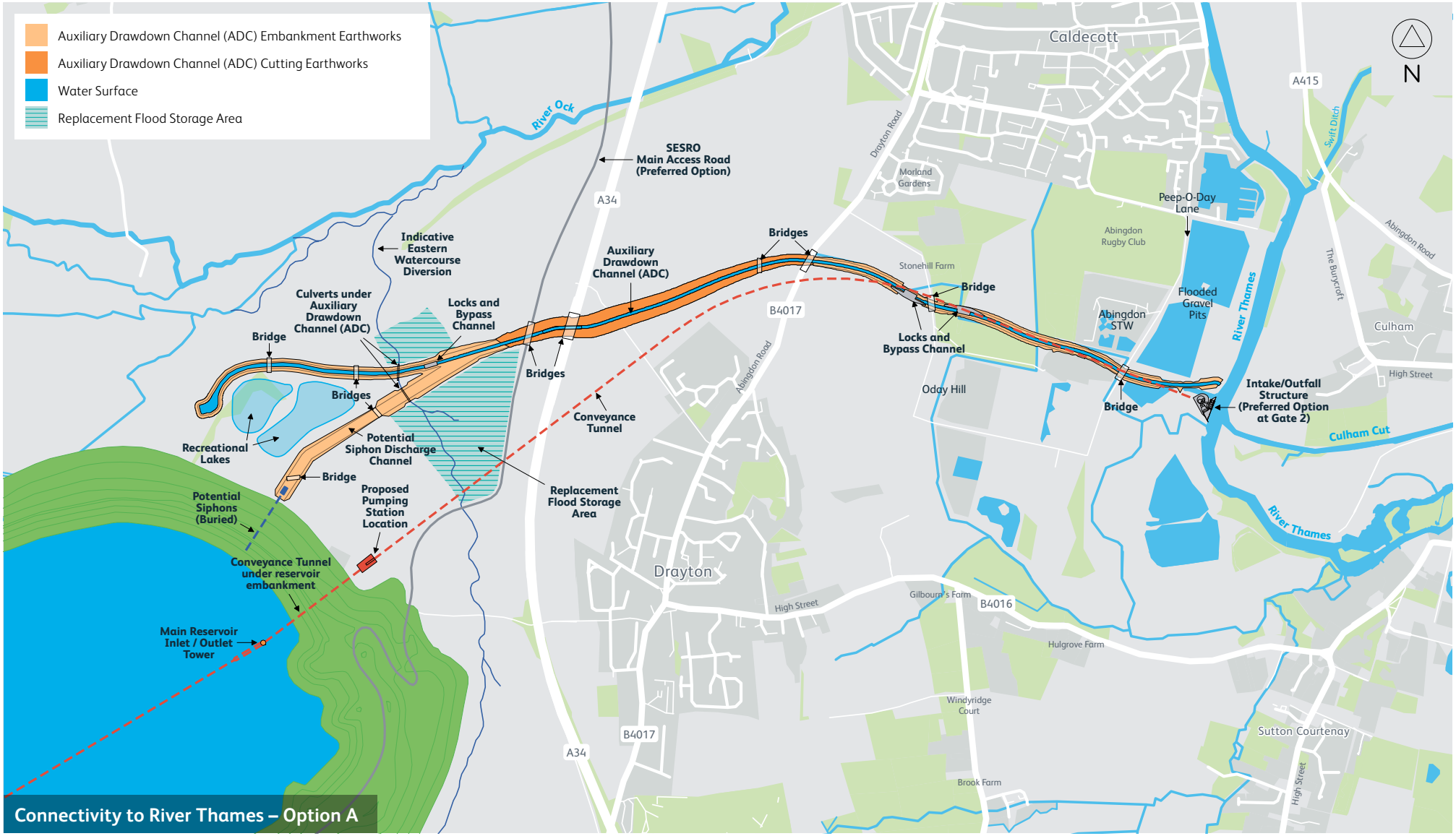
- From an engineering perspective, Option C is preferred because although it requires a large tunnel, it avoids a complex crossing of the A34 which could have significant implications for the regional highway network.
- Option C is also preferred as it avoids a number of construction phase community impacts that are present with Option B, most notably impacts on the local road network.
- Option C is the preferred option for most environmental topics as this option would have the least impact upon vegetation clearance, priority habitats and noise receptors.
- Option C avoids complex hydraulic structures being built in the floodplain
- Option C is a clear preference from a land perspective as it minimises surface land take.

For more details of all of the options that have been considered for the emergency discharge, including the location and layout of each option, please go to our intake and outfall options appraisal report in our document library on our website via **thames-sro.co.uk/supportingdocuments**

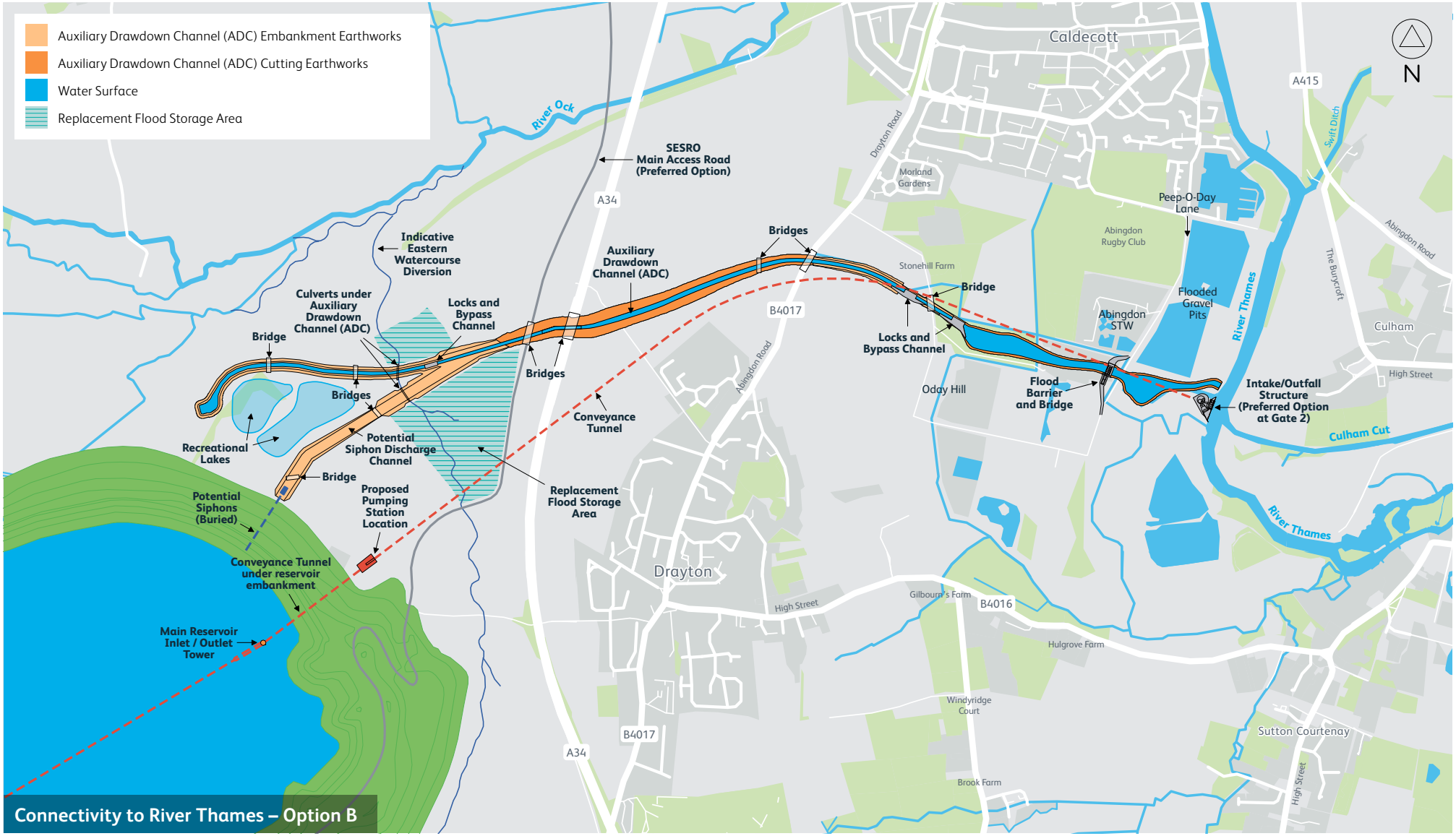
Q Consultation question:

We have considered several options for the Emergency Discharge and Option C is our preferred option. Do you have any comments on these plans?

View of River Thames at Culham



Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri



Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Map data © OpenStreetMap contributors, Microsoft, Facebook, Inc. and its affiliates, Esri Community Maps contributors, Map layer by Esri

Next steps for our preferred options

We have identified preferred options to support development of the Interim Master Plan (discussed in Chapter 3). We're now seeking your views on the configuration of the developing design. Ongoing engineering and environmental work will continue to create more certainty in the underlying engineering design.

The table on the right summarises the next steps for the individual appraisal studies.

Study	Next Steps
Rail Siding	Engineering feasibility and refinement will be taken forward including constraints mapping in the western area, further consideration of the sizing of the materials handling area and more detailed discussions with Network Rail to agree the design of the siding and integration with the GWR. The option appraisal will be reviewed in light of consultation feedback and if new information becomes available from design work or environmental assessment.
Road Appraisal	The appraisal will be reviewed in light of consultation feedback and if new information becomes available from design work or environmental assessment.
Water Treatment Works Location	Two potential locations are shown on the Interim Master Plan and the option appraisal has not yet concluded a preference. Option 2 is close to the reservoir in an area that will be used very heavily during the reservoir construction, whereas Option 4 is further away but slightly elevated and potentially more visible. We are asking for views as part of this consultation and in addition further work is ongoing to understand the SESRO construction phasing and space requirements for the WTW to support selection of a preferred option.
Connections to the River Thames	**Intake / Outfall** –The appraisal will be reviewed in light of consultation feedback and if new information becomes available from design work and environmental assessment. **Emergency Discharge** – Further work is ongoing to develop the design of the larger tunnel required to discharge all emergency flow to the River Thames (Option C). The appraisal will be reviewed in light of consultation feedback and if new information becomes available from design work and environmental assessment.

More details on the options appraisals we have carried out can be found in our individual Options Appraisal reports and in our map book, available on our website via **thames-sro.co.uk/supportingdocuments**.

Watercourse diversions and flood replacement storage

The reservoir footprint would interrupt the route of existing watercourses and cover an area of existing floodplain, so there is a need to divert the watercourses around the perimeter of the reservoir embankments and replace the area of floodplain lost. Watercourses on the site generally flow from the south to the north and form tributaries of the River Ock, and diversions would be required to the east and west of the reservoir.

There is limited land available within the spatial constraints described above for the replacement flood storage and so its location has been identified primarily through constraints assessment rather than a full options appraisal. The replacement flood storage must be hydraulically connected to the watercourses that may flood, and is also constrained by the following:

- The need to divert watercourses to both the east and west of the reservoir;
- Existing ground levels; and
- Sufficient land area.

Consideration of these constraints indicates that the area to the west of the reservoir between the reservoir embankment and the A338 provides sufficient space and flexibility to adjust ground levels to provide the necessary flood storage capacity. This would form the main area for replacement flood storage; however, some smaller areas are also identified to the north-east, as shown on the Interim Master Plan presented in Chapter 3.

Within the main replacement flood storage area would be the diverted Cow Common Brook and Portobello Ditch, which would flow alongside a realigned East Hanney Ditch. To meet Water Framework Directive (WFD) and Biodiversity Net Gain (BNG) requirements, both watercourses would be improved as they are diverted.

Water Framework Directive

The WFD is an EU directive that establishes a framework for the protection of inland surface waters, transitional waters, coastal waters, and groundwater. It aims to prevent and reduce pollution, promote sustainable water use, protect and improve the aquatic environment and mitigate the effects of floods and droughts.

Biodiversity Net Gain

BNG ensures that habitats for wildlife are left in a measurably better state than they were before the proposed development takes place. In England, BNG is mandatory for certain planning applications under the Town and Country Planning Act 1990 and this will be extended to include applications in respect of nationally significant infrastructure projects, such as the proposed reservoir, under the Planning Act 2008.

Indicative view of the reservoir watercourses

Chapter 3 – Our Interim Master Plan

Introduction

The proposed new reservoir is one of several strategic projects in the UK being developed by water companies across the country to address predicted water shortages over the next 50 years and beyond. All these projects should comply with good design requirements, including those set out by the National Infrastructure Commission (NIC), to help create effective and sustainable infrastructure systems.

Indicative view across the reservoir

Our design vision

Strategic projects require a design vision to set the direction and ambitions of the project. The vision helps to guide the development of the design principles.

Our reservoir design vision:

- We will deliver a reservoir for the south east which will help to protect customers, communities and the environment from drought.
- We will provide a safe, sustainable and resilient water supply for future generations whilst delivering new high-quality spaces for nature and recreation, creating a lasting legacy for communities and the environment.

First and foremost, the proposed new reservoir would provide drought protection for people who live in the south east. However, the reservoir project isn't only about providing vital new water infrastructure, it's also about delivering an invaluable resource for local communities to use, and creating a space for all to enjoy. One of our priorities is for the reservoir to have a lasting positive legacy for communities and the environment for many generations to come.

Our design principles

Design principles provide a structured framework for guiding the development of major infrastructure projects, ensuring that they are well planned, functional, safe, sustainable, resilient and cost-effective. Many major infrastructure projects such as the Thames Tideway Tunnel and the Lower Thames Crossing have developed design principles to guide the projects, from the earliest stages through to construction and operation.

The NIC's Design Principles for National Infrastructure sets out a framework for design and it is intended that all the design elements of the new reservoir (engineering, landscape and architecture) will follow this guidance.

Further design principles have been developed by the All Company Working Group (ACWG), a group of water companies set up to ensure a consistent approach across new water projects. These principles ensure the projects are safe to build and operate, and that they are designed specifically for their context and surroundings. In addition, Natural England is in the process of developing guidance on preparing design principles specifically for new reservoirs which we will need to take into account.

Our proposed reservoir design principles are based on the NIC themes of Safe and Well, Climate, People, Place, and Value.

Q Consultation question:

We have presented our draft design principles for the SESRO Master Plan. Do you have any comments on our draft design principles?

Our design principles are summarised below:

Safe and Well

- Consistently maintaining reservoir water quality during operation
- Designing reservoir operational infrastructure so that it is constructed, commissioned and operated safely
- Considering construction safety as an essential component during design development
- Ensuring no increased risk of flooding during construction and operation
- Supporting infrastructure and site facilities are safe to maintain, efficient to operate and resilient
- Designing public areas sensitively with safety of visitors as a priority
- Acknowledging the power of blue spaces on mental wellbeing
- Balancing the need for lighting for safety along highways with the desire to reduce the impact on the night sky and wildlife

Climate

- Preventing and minimising whole-life carbon emissions throughout design development and supporting water industry operational net zero ambitions
- Encouraging the supply chain, customers and the wider public to reduce climate impacts in construction
- Re-using of materials on site, avoiding waste and using resources efficiently
- Designing for climate resilience

People

- Working with local community, organisations and stakeholders in the development of the project
- Developing an inclusive, accessible and multifunctional recreational facility
- Encouraging active travel and use of public transport
- Designing to encourage active travel between buildings and recreational areas within the reservoir site to encourage exploration, as well as seeking to enhance existing rights of way
- Considering locations for operational and recreational areas which minimise noise to the surroundings
- Aiming to reduce construction impacts on local communities and transport network through design

Place

- Encouraging a strong sense of identity through landscape-led design
- Seeking to achieve environmental benefits
- Retaining valuable habitat wherever possible
- Providing an attractive landscape for people, that is well integrated and is sympathetic to the local landscape and sensitive to the setting of the North Wessex Downs National Landscape
- Enhancing green infrastructure network and connectivity
- Incorporating high quality building design and sensitive positioning

Value

- Seeking to facilitate or deliver multi-sector or non-public water supply benefits
- Seeking out synergies and opportunities to integrate with other infrastructure projects
- Using common data environments and other digital tools

Our proposed design principles apply to the whole project and will guide the way the reservoir is designed in terms of its function and appearance.

We have also developed site specific design principles for each of the seven Master Plan zones as set out over the next few pages. These site specific design principles provide more specific detail for how the design vision and overarching design principles will be implemented.

You can find all the details about our design principles in our design principles report, available on our website via **thames-sro.co.uk/supportingdocuments**.

Introducing our Interim Master Plan

In 2022, we produced an indicative landscape and environment-led Master Plan for the proposed reservoir, to illustrate how the engineering requirements for the project could be integrated with environmental mitigation and potential recreational uses of the site. In October 2022, the indicative Master Plan was included in the Gate 2 submission[1] to RAPID as part of the regulatory 'gated' process.

Since then, we have developed an Interim Landscape and Environmental Master Plan (referred to as the Interim Master Plan in this document), based on our preferred project configuration of infrastructure features. We want to ensure that the design is sensitive to the surrounding context, well integrated into the landscape and contributes to the delivery of benefits for landscape, nature and people.

The design development has been informed by the Design Vision and proposed Design Principles for SESRO, as summarised in Chapter 3, and through engagement with key stakeholders at local authorities, as well as Network Rail, National Highways, Natural England and the Environment Agency.

We are now seeking comments on the Interim Master Plan as part of this public consultation.

1 The RAPID 'gated process relates to the funding of investigations and development of water resource solutions. There are four gates.' Gate 2 is the second gate and was focussed on 'investigation and development of solutions' that aligned with water resource management planning.

Ofwat (2023). The RAPID gated process and the proposed water resource solutions. Online. Available at: https://www.ofwat.gov.uk/regulated-companies/rapid/the-rapid-gated-process/. Accessed March 2024.

The Interim Master Plan has also informed the preparation of our Environmental Impact Assessment (EIA) scoping request to the Planning Inspectorate, which will help define how to approach the EIA and what information may be needed to identify the likely significant effects from the development. Further information regarding the EIA scoping request is set out in Chapter 4.

Our Interim Master Plan will be updated to take into account consultation and engagement feedback as it progresses towards the application for development consent.

The Interim Master Plan is shown in our map book, available on our website thames-sro.co.uk/supportingdocuments.

Consultation question:

Our Interim Master Plan is an overall spatial layout of the proposed reservoir site, including wetlands for capturing flood water and introducing diverse ecology, operational areas, such as for treating water or transferring it to and from the reservoir, amenity areas, public access, woodlands, footpaths and others. Do you have any comments on our Interim Master Plan?

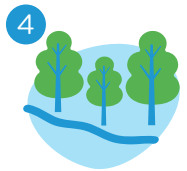
Interim Master Plan Zones

The Interim Master Plan is sub-divided into seven broad zones. An explanation of the key features within each of these zones is set out below, with a map for each zone included in the map book.

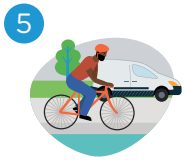
Zone 1

Zone 2

Zone 3



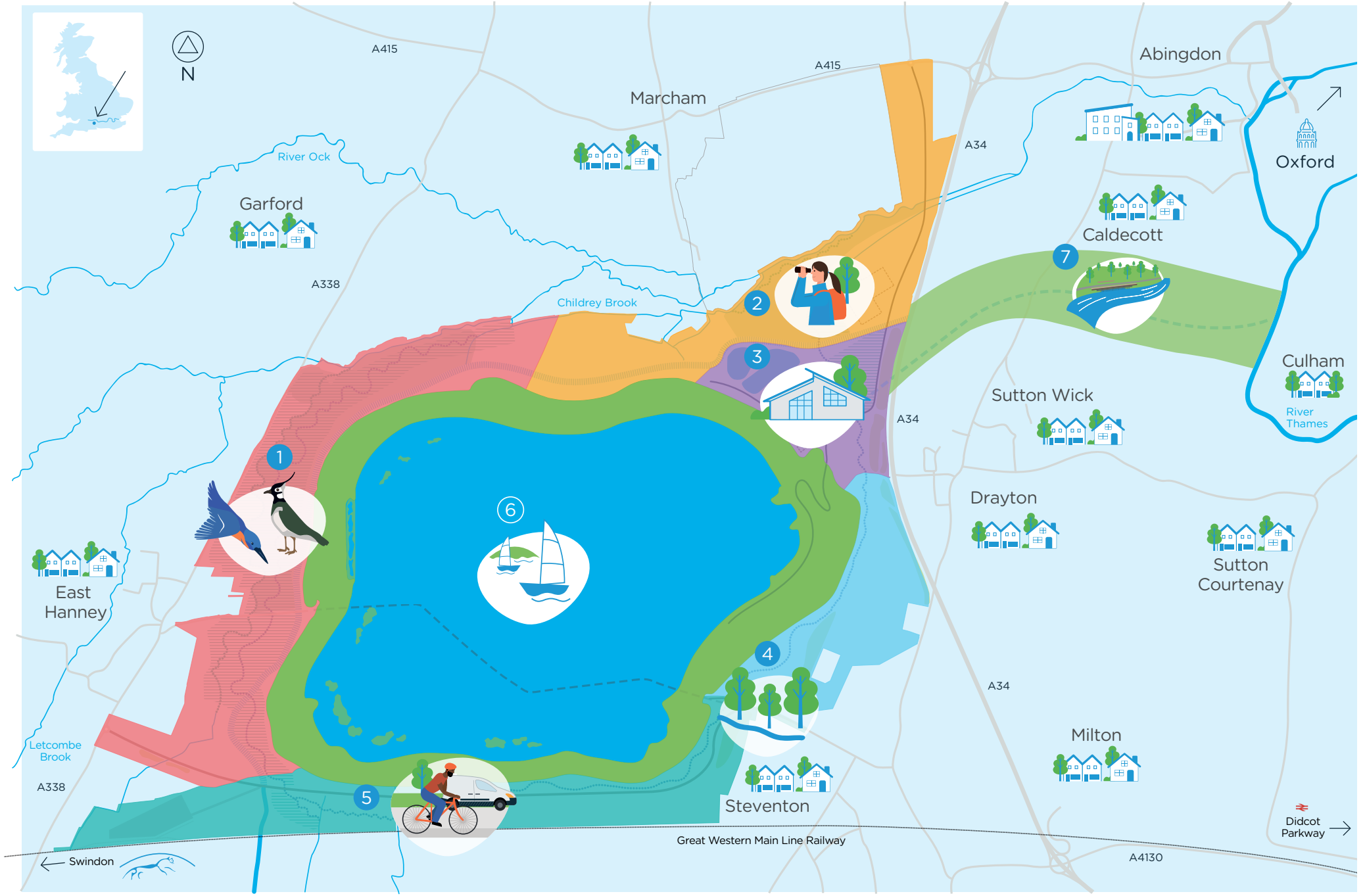
Zone 4



Zone 5

Zone 6

Zone 7


N
A415
A415
Marcham
Abingdon
Oxford
River Ock
Garford
A34
Caldecott
A338
Childrey Brook
2
7
3
Culham
Sutton Wick
A34
River Thames
1
6
Drayton
Sutton Courtenay
East Hanney
4
A34
Milton
Letcombe Brook
A338
5
Steventon
Didcot Parkway
Great Western Main Line Railway
Swindon
A4130

Zone 1

Zone 1 is focussed on a proposed corridor for watercourse diversions and associated replacement floodplain storage. Existing watercourses in this zone would be diverted around the western side of the proposed reservoir and improved / restored compared to the current baseline.

We're proposing two new watercourses along with a large area of wetland habitat with reeds, species-rich wet grassland and floodplain marsh, with localised areas of wet woodland proposed along the curved lines of the watercourse diversions. In addition, a series of wildlife ponds, scrapes and pools are proposed at the far north-eastern extent of the zone, while areas of land to be reinstated and returned to agriculture are suggested at the far south-western extent of Zone 1. Intermittent trees and shrubs, species-rich native hedgerows, enhancement of existing hedgerows and tree belts are proposed to help to integrate the proposals into the surrounding landscape pattern and to provide a green buffer along the eastern fringe of East Hanney.

Intermittent trees and shrubs on environmental bunding are also proposed along part of the new Steventon to East Hanney road once built.

Visitors to SESRO would be able to enjoy the wetlands and associated wildlife from proposed PRoW diversions and other permissive paths, which include links to and from East Hanney for local access. To reduce disturbance to the wildlife, these routes are mainly located around the edges of the wetland habitat mosaic and access by visitors and dogs would be managed sensitively through planting and strategic placement of wet features like ditches.

Indicative view of the reservoir wetlands

There may also be opportunities for bird watching within Zone 1.

A corridor to safeguard the route of the Wiltshire and Berkshire Canal is also identified within this zone, generally located between the wetland habitat mosaic and the proposed reservoir embankment to the east in the adjacent Zone 6.

Zone 2

Zone 2 is focussed on the proposed main visitor and operational access to SESRO from the A415 Marcham Road. This would act as a gateway to the reservoir for visitors arriving both by vehicles and active travel modes of transport. We're proposing accessible paths for walkers/wheelers and cyclists as part of the access road, which would be framed by wide grass verges, ditches and species-rich hedgerows with standard trees, in keeping with the character of the local area.

We'd retain existing tree belts and woodland as far as practicable, and woodland planting is proposed to be extended between the main access road and the existing A34 to the south of the river for landscape integration.

Treated water from the reservoir will be required once commissioned. Therefore, two alternative locations for 'reserved' space for future development of a proposed water treatment works are indicated on the Interim Master Plan.

One of these locations is within Zone 2, to the south of the River Ock and west of the proposed main access road.

Another key feature of Zone 2 is a proposed corridor for a second watercourse diversion, with associated wetland habitat mosaic and wet woodland. A small area of additional replacement floodplain storage is included within the wetland area to replace floodplain storage that would be lost as a result of the new main access road.

Away from the proposed wetlands, a mosaic of species-rich grasslands, wet woodland and land to be reinstated to agriculture are proposed, with species-rich native hedgerows proposed to integrate the proposals into the surrounding landscape pattern. Part of a corridor to safeguard the route of the Wiltshire and Berkshire Canal is also identified within the south-western part of Zone 2, as a continuation of the corridor from Zone 1.

Visitors to the reservoir would be able to enjoy the new green space and associated wildlife within Zone 2, via proposed PRoW diversions and other permissive paths. These could include a nature trail along a series of proposed wildlife ponds, scrapes and pools to the west, which could have the potential to be used for pond dipping.

Zone 3

Zone 3 is the main gateway for recreation and leisure facilities and incorporates the proposed continuation of the main access road from Zone 2, leading to the main visitor car park and one of two possible locations for a visitor centre. The car park and buildings would be at least partially screened by the proposed reservoir embankments as well as proposed woodland planting.

A network of paths is planned to link to this zone with those adjacent, including a stream-side trail through the eastern watercourse diversion corridor. The paths would also provide access to two proposed recreational lakes, incorporating marginal habitat and wet woodland. These lakes would potentially provide visitors with opportunities for angling and swimming, with space between the two lakes that could be used as picnic or barbeque areas.

Other facilities adjacent to the lakes could potentially include a café, angling and/or swimming changing facilities and possible locations for an education centre.

Operational facilities are also proposed in this zone, including a pumping station and infrastructure for emergency release of water to the River Thames.

A corridor to safeguard the route of the Wiltshire and Berkshire Canal is also included in Zone 3, as a continuation of the corridor from Zones 1 and 2.

As mentioned for Zone 2, two alternative locations for reserved space for future development of WTWs are indicated on the Interim Master Plan. One of these locations is within Zone 3, to the north-east of the reservoir embankment in Zone 6, where the embankment would help to partially screen the WTWs in views from the North Wessex Downs National Landscape to the south.

Proposed species-rich native hedgerows and woodland would help to provide some visual separation between the recreational operational facilities in this zone, as well as integrating the proposals into the surrounding landscape.

Zone 4

Zone 4 is focussed on the proposed corridor for the eastern watercourse diversion, incorporating areas of wetland habitat, wet woodland, wildlife ponds, scrapes and pools. It incorporates space to develop a suitable area from which the new channel could flood within a controlled area allowing the watercourse to function more naturally.

This is largely envisaged as a space for natural leisure and play associated with nature trails and opportunities for pond dipping. New accessible PRoW or permissive paths for walkers and/or wheelers, riders and cyclists could provide access to and from Steventon.

To the north of Steventon and west of the B4017 Steventon Road, some land may be reinstated and returned to farmland and a large area of woodland with glades is proposed, on the opposite side of the road to the existing Steventon Community Woodland. The woodland is proposed in order to improve habitat connectivity and landscape integration with the surrounding area. Proposed species-rich native hedgerows would further integrate the proposals with the surrounding landscape pattern.

Species-rich grassland, scrub and a number of habitat ponds are also proposed to the west of the A34 near Drayton. The ponds are proposed to provide compensation for the loss of existing ponds within the indicative location for SESRO and would generally be located away from PRoW and permissive paths, to reduce potential disturbance, and are outside of the floodplain.

Zone 5

This zone includes a diversion of the road between Steventon and East Hanney with a segregated footway and cycleway, which would be linked to existing PRoW to the south of the railway line. The new paths would be a significant improvement, as the existing road between Steventon and East Hanney does not include any segregated walking or cycling provisions.

At the northern fringe of Zone 5, a small car park is proposed at the base of the reservoir embankment just outside of Steventon. Access to the car park would be provided along a section of road connected to the proposed Steventon and East Hanney road diversion, via a junction.

To the north of the proposed Steventon to East Hanney road diversion, the eastern watercourse diversions would originate from Zone 5, flowing east and ultimately entering the River Ock to the north downstream of Marcham Mill. A corridor is set aside for the watercourse diversion to allow space to develop a suitable area from which the new channel could flood into allowing the watercourse to function more naturally. Areas of wetland habitat mosaic and species-rich grasslands are incorporated within the watercourse corridor.

To the south of the proposed Steventon to East Hanney road diversion, woodland with glades with species-rich grassland is proposed alongside the railway. This would increase the woodland habitat in the vicinity of The Cuttings and Hutchins Copse Local Wildlife Site.

Together with proposed species-rich native hedgerows, this would help to integrate the proposals into the surrounding landscape.

In addition, a number of wildlife ponds, scrapes and pools are proposed to the far east, as well as habitat ponds to the east and west of the existing floodplain. The habitat ponds are proposed to provide compensation for the loss of existing ponds within the indicative location for SESRO and are generally indicated away from PRoW and permissive paths, to reduce potential disturbance.

Zone 6

Zone 6 is focussed on the proposed reservoir itself and the associated embankments. As explained in Chapter 2, the shape of the proposed reservoir has been driven by the overall site constraints, such as nearby villages, the main roads, the railway and the river floodplain, as well as the positioning of the reservoir borrow pit perpendicular to the dip of the bedrock strata. The reservoir water surface would be approximately 6.5km^2. This is approximately half the size of Rutland Water, which is the largest reservoir in England by water surface area.

At full capacity, the water depth would be approximately 33m in the deepest part of the reservoir.

A main tower and up to two secondary towers are proposed within the main water body of the reservoir to enable water to be discharged into the reservoir and extracted from it. The internal edges of the reservoir would be formed of natural stone, known as rip-rap, which would protect the inner face of the embankments.

Along the north-east and eastern sides of the reservoir, a low concrete wave wall may also be installed along the inner edge of the crest, providing some separation from the rip-rap on the inner face and a seat for visitors. At some locations, concrete steps or ramps would be provided on the inner face instead of rip-rap to facilitate access to the water.

Wetland lagoons and floating islands are proposed to improve the biodiversity value of the reservoir through habitat creation, which will also contribute to the visual amenity of the reservoir and visually soften the appearance of the reservoir edges without impacting the water storage volume of the reservoir. More wetland lagoons with marginal habitat and wet woodland are proposed to the west. These would be designed to retain water even when the reservoir water levels dropped during drier periods. Floating islands are proposed along the southern, south-western and north-western sides of the reservoir waterbody, which would be planted with a range of different native aquatic species which would also provide further habitat for (nesting) birdlife.

Two possible options for a water sports centre are indicated along the north-eastern reservoir embankment crest, along with a café and a possible alternative location for a combined visitor and education centre. A small car park for the café, for staff, deliveries and disabled access would also be on the embankment crest.

Zone 6 (continued)

New PRoW or permissive paths are proposed on the embankment crest and base which would also have connections to a wider network of walking and cycling routes across the site. Along the path around the crest, indicative vantage points with seating areas are proposed, to allow visitors to enjoy views towards the scarp of the North Wessex Downs National Landscape to the south and the limestone ridge to the north, including Boars Hill.

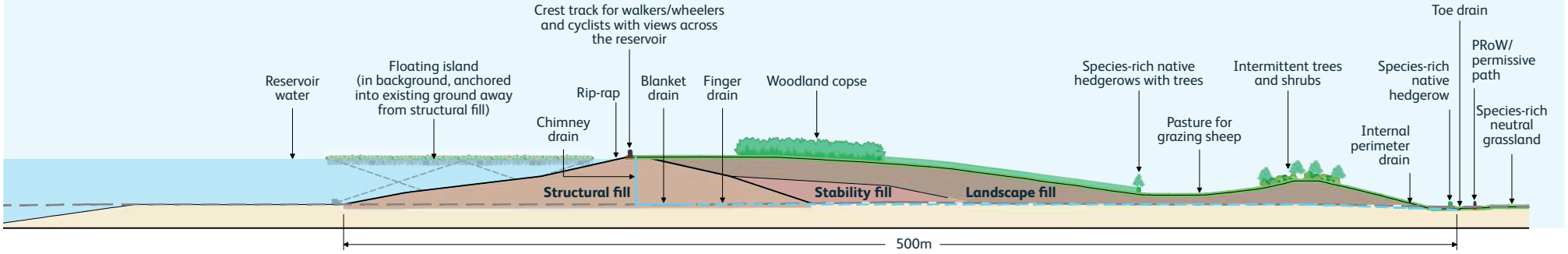
Depending on the varying ground levels around the site, the reservoir embankment would be between approximately 15m and 25m high relative to the existing ground levels, which slope gently downwards from the south to the north. The embankment crest would therefore generally be higher to the north and lower to the south.

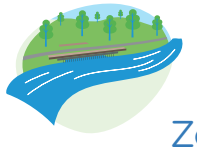
As illustrated on the cross section below, the embankment earthworks design includes landscape fill above the structural and stability fill to slacken the slopes, vary the slope gradients and enable planting. Together with proposed hedgerows, woodland, and pasture for sheep grazing on the embankment, this would help to make the earthworks appear more natural and to integrate them into the surrounding landscape.

A drain formed by an open channel is proposed around the outer toe of the reservoir embankment to receive any water discharging from the internal drainage system of the embankment and to prevent unauthorised vehicular access onto the embankment. The toe drain would connect into the Landmead Ditch to the north as well as the eastern watercourse diversion.

The toe drain would incorporate a range of emergent, submerged and floating-leaved plants, as well as aquatic marginal vegetation which would provide biodiversity habitat and visually soften the drain. A hedgerow is proposed on the embankment side of the toe drain, around the perimeter of the embankment.

Indicative embankment cross-section





Zone 7

Zone 7 incorporates an underground conveyance tunnel to move water between the River Thames and the proposed reservoir, with an intake/outfall structure and control building located on the bank of the River Thames, immediately upstream of the Culham Cut just north of the Jubilee Junction. Water would be pumped from the River Thames to the reservoir when river levels are high and released back into the River Thames when downstream abstraction locations would require this, typically during lower river flows.

Intermittent trees and shrubs are proposed along the riverbank, to reflect the character of existing vegetation along the River Thames and to conserve the relative sense of tranquillity and remoteness along the river which forms part of the visual amenity of the Thames Path National Trail to the east of the river.

In conjunction with the construction of the intake/outfall structure, one of the outfalls from the existing Abingdon Sewage Treatment Works (STW) would need to be extended so that it discharges further downstream of the proposed inlet. For this reason, the Abingdon STW is included within the indicative location for the reservoir, since works may be necessary within the STW to facilitate the extension of the outfall.

Facilities for drawdown of water from the proposed reservoir to the River Thames in an emergency scenario via an underground conveyance tunnel are also included within Zone 7.

Chapter 4 – What happens next

Consultation question:

Do you have any other comments relating to the proposals for SESRO at this stage in the process?

We want your views on the Interim Master Plan, our design principles and our preferred options. Your feedback will help shape our design so it's really important you have your say.

Our questionnaire is available online at:
ipsos.uk/SESRO

You can also respond:

By email:
SESRO@ipsos.com

By post:
Freepost SESRO CONSULTATION

Please send your feedback by 11.59pm on 28 August 2024.

Responding to issues raised during consultation

We'll read and consider all of the feedback that we receive during this public consultation period, and use it to inform our decisions on the preferred design options and the reservoir Master Plan.

We'll then publish a Statement of Response to the issues raised, which will highlight how the feedback received has been considered.

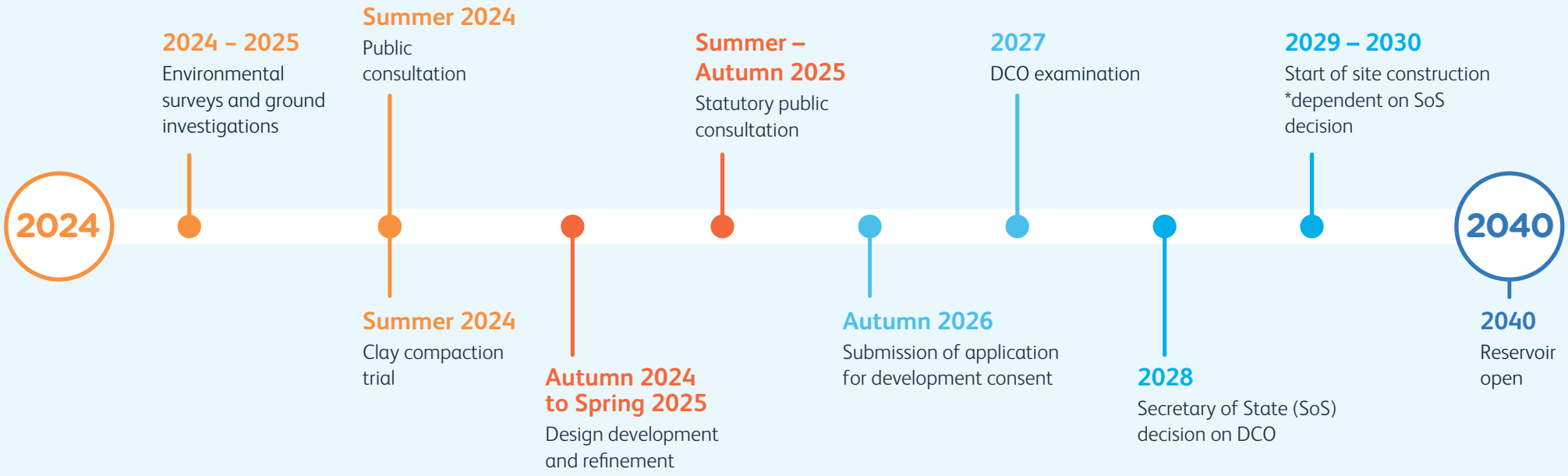
Our privacy notice covering the use of personal data for consultations can be found on our website. To find out more about how we use and protect personal data including your data subject rights please visit our main website.

Our timeline to a new reservoir

Future public consultation

We're planning to hold a further public consultation in 2025, where we will share our more detailed proposals for the new reservoir for comment, as well as our preliminary environmental information.

We will have regard to feedback received during that public consultation, as well as ongoing engagement, as we develop our final proposals for the new reservoir to be submitted as part of our application for development consent in 2026. We aim to have the reservoir constructed and operational by 2040.



Environmental Impact Assessment

We have to consider many different factors when designing the reservoir. This includes the environmental impact of our proposals. We are progressing environmental surveys in the area, as well as undertaking desk studies to inform our understanding of the current environmental baseline and to inform our future design and assessments. We are also undertaking ground investigation works. You may see our consultants and contractors carrying out surveys and ground investigations within your local area and this work will continue through 2024 and beyond.

The information gained from this work will help us to refine our proposals, including our construction techniques, and allow us to complete an Environmental Impact Assessment (EIA) for the project as we move through 2025 and into 2026. We're currently developing an EIA Scoping Report to agree the environmental topics to be studied, the methods of assessment we intend to use and their geographical and temporal coverage.

Once submitted to the Planning Inspectorate (PINS), PINS will consult with consultation bodies and provide their Scoping Opinion, which will form the basis of the design and final assessments for the EIA.

The EIA will consider the current and future development of the baseline environment in and surrounding the proposed reservoir site and assess what effects construction and operation might have, taking account of the sensitivity of environmental features and the magnitude of impacts upon them. It will identify ways to mitigate any significant effects and how the project can improve the local environment.

It is expected that in 2025, surveys, data gathering and assessment work will be advanced enough to produce preliminary environmental information which will identify likely significant environmental effects (positive and negative) and introduce measures to mitigate the negative impacts.

We will then consult on the preliminary environmental information and the results of this consultation will inform our final assessments.

The responses will feed into our Environmental Statement (ES) which will be provided as part of the application for development consent to inform the examination of the project by PINS and the decision by the Secretary of State.

The Environmental Impact Assessment process

2024

EIA Scoping Report

We'll submit an EIA Scoping Report to the Planning Inspectorate, setting out the scope and environmental assessment methods that we intend to use. PINS will consult with statutory bodies and provide a Scoping Opinion – the basis of our subsequent work.

2025

Preliminary Environmental Information

Our preliminary environmental information will identify likely significant environmental impacts and how we might mitigate them.

2026

Environmental Statement

The outcome of the EIA will be published in an Environmental Statement, which will be submitted to PINS as part of our application for development consent.

Developing designs and understanding environmental impacts

Subject to the outcome of our revised draft WRMP, we'll continue to gather environmental data, engage with local and regional stakeholders and develop our design and construction proposals, before submitting an application for development consent to seek the powers necessary for the project to proceed, which we plan to do in 2026. More information about the revised draft WRMP is available on our website at **thames-wrmp.co.uk**.

- We'll continue ground investigations and other surveys to understand the local geology and environment.
- We'll be gathering preliminary environmental information.
- We'll also continue to develop plans for how the reservoir would operate – including transfers to other water supply areas, how it will look, and amenity use for local communities and visitors.
- We'll continue to engage with stakeholders, local communities and affected landowners as part of this process.

Find out more

More information about our proposals for SESRO can be found on our website via **thames-sro.co.uk/SESRO**.

In your community

You can also find out more about the project and meet the team at our community events – for details of these and how to register, please visit **thames-sro.co.uk/events**.

Notice

This document has been produced to support the public consultation on key infrastructure options, draft Design Principles and an Interim Master Plan for the South East Strategic Reservoir Option and to inform scoping of the environmental impact assessment. The information presented represents the current stage of the project design. It comprises material or data which is still in the course of completion, pending consultation, engagement and further design and technical development.

Working with

Affinity Water

from Southern Water

Thames Water Clearwater Court Vastern Road Reading RG1 8DB