

# Havant Thicket Reservoir Project

**Environmental Statement Volume 4 - Appendices**

**Appendix A4 Alternatives Considered**

**A4.1 Site Alternatives Assessment, April 2020**

Portsmouth Water Ltd.

September 2020

## **Appendix A4.1 Site Alternatives Assessment**





# Havant Thicket Reservoir Site Alternatives Assessment April 2020

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# 1 Background<sup>1</sup>

With the population in the South East expected to grow by 4.1 million people by 2045 it's widely recognised that as well as helping reduce demand for water, companies must develop infrastructure to secure the resilient supplies required to meet growing demand, with the right balance between the needs of society and the environment. According to the National Infrastructure Commission, without such action, there is a 1 in 4 chance over the next 30 years that large numbers of households will have their water supply "cut off" for extended periods in an extreme drought.

The Havant Thicket Reservoir Resilience Project involves the construction of a new winter storage reservoir – the first new reservoir to be built in the South East since the 1970s. It is a collaboration between Portsmouth Water and Southern Water, through the Water Resources in the South East group, to provide resilient water supplies to the region. It supports reduced abstraction on chalk rivers, has an overall biodiversity net gain and will provide a new community leisure facility for the area.

The project's innovative approach to collaboration and water trading sets a precedent for the water industry and fulfils the recommendations of the National Infrastructure Commission's 'Preparing for a drier future' report as well as being in line with the Government's 25-year environment plan.

The reservoir, will be filled with surplus spring water in winter and allow Portsmouth Water to provide a flexible bulk transfer of around 21 Ml/d to Southern Water, as part of an overall commitment to supply 60 Ml/d from a range of sources by 2029. This will help meet a deficit created by Southern Water's imminent reduction of its abstraction licences on the Rivers Test and Itchen.

It is part of a twin-track approach and both companies have ambitious plans to reduce leakage, help customers use less water and increase metering. A key part of these plans is to engage with partners on catchment solutions.

The project, which is supported by and developed with customers and stakeholders, forms one part of a package of solutions which can provide the best value resilient water supplies with the lowest bill impact, compared to other strategies.

Portsmouth Water and Southern Water are also committed to further exploring ways to increase resilience through additional enhancements, such as two-way transfers, to reduce risks from outage and events such as extreme droughts, heatwaves, freeze/thaw and pollution.

It is viewed as the first phase of a longer-term plan to increase water trading opportunities through ambitious demand reduction and the development of further regional infrastructure

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<sup>1</sup> All information taken from Southern Water's Business Plan: TA 11.5 – Havant Thicket Reservoir Resilience Project – Technical Annex – September 2018; <https://www.southernwater.co.uk/media/1914/ta-115-havant-thicket-reservoir-resilience-project.pdf>

## 1.1 Purpose and Structure of this Report

Havant Thicket has been identified as the preferred location for a new reservoir within the Portsmouth Water supply area by numerous studies conducted over the past 53 years. The primary aim of this report is to set out the assessment process to demonstrate why the current Havant Thicket Reservoir site is considered to be the most optimal location and design of reservoir across the Portsmouth Water and south Hampshire area. The need for the scheme is also stated, however several other documents contain more detailed justification for the wider need for the scheme and these are summarised in Section 2.

The report utilises a three stage appraisal process in order to identify the optimal location and design of a reservoir within the Portsmouth Water area.

Stage One identifies all potential reservoir sites and then assesses these sites against pass/fail criteria to identify which sites are feasible locations for a reservoir.

Stage Two assesses these feasible sites against more detailed criteria in order to identify the preferred location for a reservoir.

Stage Three assesses potential alternative designs for a reservoir at the preferred location in order to identify the optimal design for the reservoir.

## 1.2 Summary of Findings

In all, 72 potential sites have been assessed across the Portsmouth Water and south Hampshire area in a comprehensive study. These potential reservoir sites were screened in a three-stage process to evaluate their feasibility. In Stage One, defined criteria were set for assessing whether a reservoir could be physically constructed upon the site and whether a sustainable source of water for filling was available. 67 of the 72 sites were rejected at this stage, primarily due to the fact that the proposed source of abstraction was protected under an Abstraction Licensing Strategy (2013) under the Water Framework Directive (formerly the Catchment Abstraction Management Strategy (CAMS)) and/or Habitat Directive which did not allow for additional abstraction beyond that currently undertaken. In other cases, previously identified sites have been developed or designated as a protection area.

This resulted in five sites being progressed to Stage Two. The potential sites were: Lumley Farm, Havant Thicket, Southleigh Forest, Southleigh Farm and Loveders Farm. Scrutinising these options under a variety of environmental, socio-economic and engineering criteria showed that there were positives and negatives associated with each site. However, utilising the criteria chosen, it was possible to balance impacts and benefits in order to rank the potential sites and this led to the conclusion that Havant Thicket is the preferred site to be progressed to Stage Three.

In Stage Three, eight reservoir design proposals for Havant Thicket were evaluated against further criteria. Seven of these designs had been developed by Entec and consulted upon with stakeholders. Of these eight options, there were again contrasting benefits and impacts, especially with regards to the consideration of impact upon heritage and landscape and the potential for biodiversity and recreational benefits. Cost and stakeholder feedback were also key criteria. Based on stakeholder consultation a final plan has been developed which incorporates the benefits of the best three options, namely minimising the impact on the historic Grade II listed park and garden, ancient woodland, reducing visual impact and optimising opportunities for recreation and biodiversity.

## 2 Wider Options Appraisal<sup>2</sup>

In order to demonstrate that HTR is the optimal solution to the needs of the South East of England, the costs and benefits of the scheme have been assessed as part of a mix of potential options as part of Portsmouth Water's Water Resource Management Plan 2019 (WRMP19), Southern Water's WRMP19 and WRSE's options appraisal.

The Havant Thicket Reservoir project was chosen in both companies' revised draft WRMPs and WRSE scenarios as part of a preferred strategy when considering all factors – construction, operating costs, customer preferences, environmental and social impact and deliverability.

### 2.1 Portsmouth Water's WRMP19

Portsmouth Water's 25-year WRMP takes a twin-track approach, featuring demand-side options, alongside new infrastructure and catchment management initiatives. It has revised its planning for climate change and planned for a wider range of droughts.

By 2045, Portsmouth Water expects to supply a similar amount of water but to more people (further detail is set out in the company's final WRMP). It will cater for this growth by reducing leakage (20% by 2025 and 30% by 2040) and aiming for a reduction in personal water use (PCC) to 100 litres per day by 2050.

This water-saving programme will include:

- developing a smart network of sensors and using 'big data' and artificial intelligence to detect leaks – a first step towards a smart and remotely operated network
- adoption of supply pipes, with wall-mounted boundary boxes
- the installation of 5,000 meters each year for customers who choose to opt for a meter and on change of occupancy or in empty buildings
- providing evidence to support a Government review of metering policy to support more widespread metering for all customers
- trialling smart meters with next generation technology to encourage awareness of water use and increase meter optants and reduce PCC, with a long-term smart network in mind
- currently Portsmouth Water cannot introduce a programme of compulsory metering for its customers, because it is not in an area designated by the Department for Environment, Food and Rural Affairs (DEFRA) as being in water stress

On the supply-side, the company's plan promotes:

- the Havant Thicket Reservoir and associated infrastructure to facilitate a bulk supply to Southern Water of 21 MI/d from March 2029
- groundwater enhancements (20.3 MI/d)
- a drought permit in West Sussex.

The final WRMP was published by Portsmouth Water on 4 December 2020 following Defra approval.

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<sup>2</sup> All information taken from Southern Water's Business Plan: TA 11.5 – Havant Thicket Reservoir Resilience Project – Technical Annex – September 2018; <https://www.southernwater.co.uk/media/1914/ta-115-havant-thicket-reservoir-resilience-project.pdf>

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## 2.2 Southern Water's WRMP19

Southern Water's 50-year WRMP takes a multiple track approach to securing long-term water resources, using a 'real-options' methodology to forecast for a wide range of future scenarios based on variations in population growth, climate change and licence reductions.

The plan also used a multi criteria assessment in its option selection, incorporating customer views at its core.

The bulk supply from Portsmouth Water (which is enabled by the construction of HTR) was selected in Southern Water's WRMP as one of a set of core options to meet the deficit resulting from its agreement to licence changes in Hampshire to protect flows on the River Itchen and the River Test. The increased transfer is a key component of a range of options Southern Water has put forward, which also include metering, leakage reduction, a wastewater recycling scheme and a bulk transfer from South West Water. The residual deficit following the implementation of these options will be made up by a desalination plant. This portfolio of options informs the best-value solution for customers.

## 2.3 Water Resources in the South East Strategy

The selection of the bulk supply from Portsmouth Water as a preferred option for Southern Water arose out of modelling by the Water Resources in the South East (WRSE) group.

WRSE is a sector-wide partnership which develops a regional strategy every five years to inform water companies' individual WRMPs. It includes six water companies working alongside the Environment Agency, Ofwat, the Consumer Council for Water, Natural England, Defra, the Canal and River Trust and the Greater London Authority.

Its modelling work for the region in 2017-18 identified the development of Havant Thicket reservoir as a 'prevalent' strategic option to help meet future demand in the majority of the option portfolios and it is identified in the WRSE's From Source to Tap: The south east strategy for water as one of eight preferred 'big ticket' items which each deliver more than 15 Ml/d of water.

The work of WRSE and its option selection and promotion are set to become more critical to regional and national planning in the near future as the Environment Agency develops a national water resources framework to meet the expectations of customers and the Government.

The bulk supply from Portsmouth Water to Southern Water, enabled by the construction of the Havant Thicket reservoir, has therefore been selected as a key cost-effective solution to contribute to meeting the sustainability reductions in Southern Water's Hampshire zones and for its potential to play a wider role in an expanded regional grid.

In addition to this, the Water Resources Long Term Planning Framework<sup>3</sup> from Water UK and a report from the National Infrastructure Commission<sup>4</sup> have identified that new water supply infrastructure is likely to be required to ensure water security, including provision of reservoirs.

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<sup>3</sup> Water Resources Long Term Planning Framework, Water UK, July 2016

<sup>4</sup> Preparing for a Drier Future, National Infrastructure Commission, April 2018

## 3 Reservoir Site Selection

### 3.1 Previous Reports and Studies Utilised

The following historical reports and studies were utilised in the production of this report:

1. Southampton Corporation Waterworks Department and Portsmouth Water Company, 'Potential Resources and Conservation of Water', Herbert Lapworth Partners, 1965.
2. Southern Water Authority, 'General Report on Reservoir Site Investigations, East Hampshire 1975-78, Mander, Raikes & Marshall, 1978.
3. Southern Water Authority 'Technical Report on Reservoir Site Investigations, East Hampshire 1975-78, Mander, Raikes & Marshall, 1977-78.
4. Southern Water Authority, 'Reservoir Investigation – Hampshire Report on Engineering Studies', Mander, Raikes & Marshall, 1980.
5. Portsmouth Water Limited, 'Phase 2 Engineering Study Report', Entec, 2006.
6. Portsmouth Water Limited, 'Havant Thicket Winter Storage Reservoir Engineering Study: Stakeholder Consultation Document for Reservoir Masterplan Options', Entec, 2006.
7. Portsmouth Water Limited, 'Havant Thicket Winter Storage Reservoir Embankment Material Investigations', Entec, 2007.
8. Portsmouth Water Limited, 'Havant Thicket Winter Storage Reservoir Public Consultation Report - Volume 1', Arup, 2008.
9. Portsmouth Water Limited, 'Havant Thicket Winter Storage Reservoir Interim Report on Community and Stakeholder Involvement', Arup, 2008.

Previous studies looking to identify potential water resources in the Southern Water Authority area (which included the Portsmouth Water supply area) in the 1960s and 70s identified ~72 potential reservoir sites. These sites are marked on Figure 3.1, with a heat map showing clusters of sites related to locations of feasible sources and geology (Figure 3.2) and are listed in detail in Appendix A.

It is worth noting that Havant Thicket was a preferred option in these studies and on this basis, Portsmouth Water were advised by the River Board to purchase the land in the 1960s. As such the site was procured as two parcels in 1965 and 1966. Planning permission was obtained in 1964 for a ~6800 Ml reservoir on a land area of 172 ha. A further planning application was made in 1980 and consent agreed in principle subject to agreeing access. However, construction didn't proceed as there was not considered to be a pressing need for additional water supply infrastructure at the time.

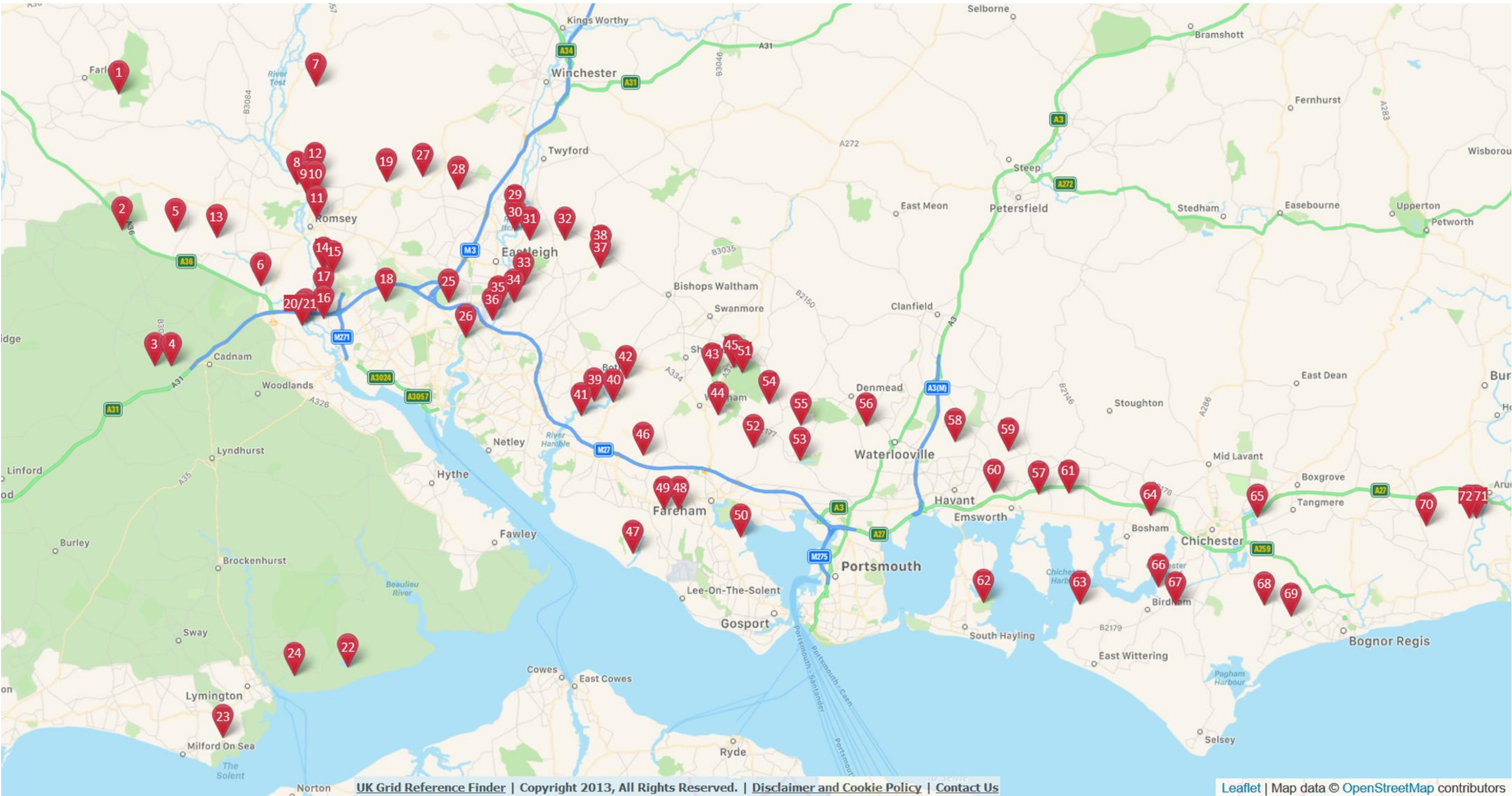


Figure 3.1: Potential reservoir sites identified in previous studies. [Link to web map](#)

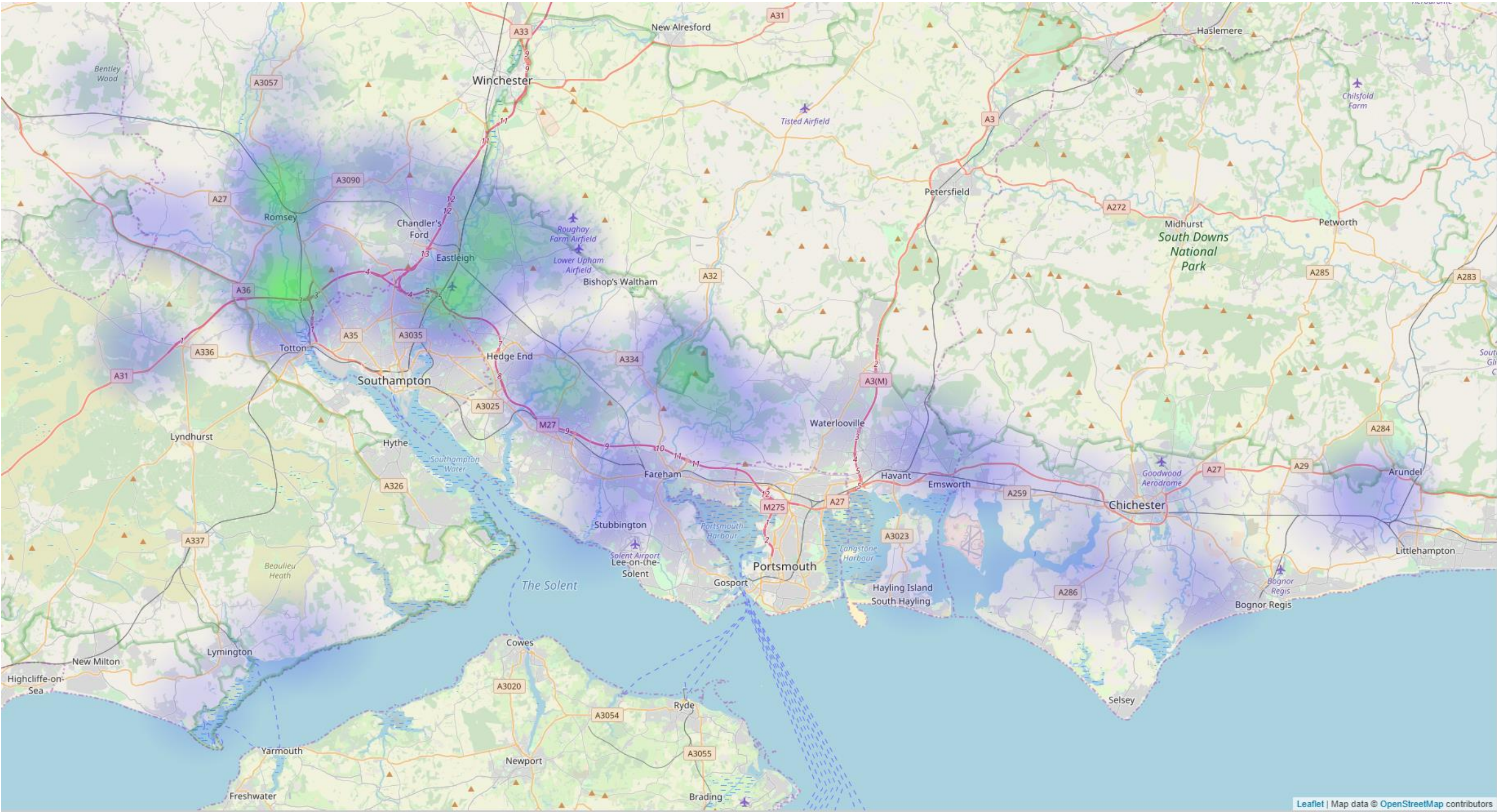


Figure 3.2: Heat map of the 72 potential reservoir sites screened showing areas which have both a feasible abstraction source and suitable underlying geology.

## 3.2 Stage One – Identification of Feasible Sites

Detailed investigations were commissioned by the Southern Water Authority in the 1960's and 1970's to identify potential reservoir sites. At the time, the criteria for identifying sites revolved largely around engineering concerns such as suitable geological conditions including ground investigations at potentially feasible sites. These conditions will not have materially changed over a timescale of around 50 years. In addition to this, the region was less developed and environmental concerns will have played a less prominent role and therefore the site identification process will have been broader than if such an investigation was commissioned in the present. As can be seen in Figures 3.1 & 3.2, a broad area in and around the Portsmouth Water region was assessed. This report therefore proceeds on the basis that commissioning a new site identification study is unnecessary and the Southern Water Authority studies are sufficiently exhaustive.

The aim of Stage One is to reduce the number of potential sites by analysing each one against key constraints. If a site fails on any of these constraints then it is rejected, only sites that pass all criteria will be assessed in Stage Two. The aim is to screen out unfeasible options allowing more detailed analysis of potential sites to be performed.

The following key constraints are applied to the unconstrained reservoir options list:

- 1) **Land development**– sites that have been heavily developed with infrastructure such as airports, roads and towns will fail.

Reason: Some of the sites previously identified as having geological potential have since experienced substantial development, such as the construction of significant housing and associated infrastructure which significantly diminishes their potential as reservoir sites as there is little or no area left for the construction of a reservoir.

- 2) **Permeability of the ground surface** – sites that do not consist of impermeable ground surfaces such as clays will fail.

Reason: There would be a very high cost associated with importing the majority of material for both the base and embankments of a reservoir of this scale. The construction complexity would also be unprecedented and prohibitive for a project of this type due to the level of bulk material import that would be required. Finally, the environmental impact and carbon footprint of importing the material required for construction would be very significant.

- 3) **Feasibility of abstraction from water source** – sites reliant on abstraction from sources that have little to no headroom for additional abstraction, such as the Rivers Test, Itchen, Meon, Hamble, Wallington and their tributaries, will be discounted. Impounding reservoirs were also rejected at this stage.

Reason: The Abstraction Licencing Strategies (2013) restrict the available abstraction licenses at many rivers located in the region in order to protect the environment and natural habitats to comply with the European Union's Water Framework Directive (WFD) and EC Habitats Directive (implemented into UK law by the Conservation of Habitats and Species Regulations 2017, as amended). This limits the volume of water that can be abstracted for water storage and supply and would therefore lead to an unsustainable yield from any proposed reservoir reliant upon them. Impounding reservoirs were rejected due to their impact on ecosystems onsite and further downstream.

It is acknowledged that there are other potential pass/fail criteria that could be applied to the Stage One process, such as impacts upon Sites of Special Scientific Interest (SSSI). However, for the purposes of stage one screening, these criteria were deemed to be appropriate as they are related to the fundamental considerations of whether there is available land upon which to locate a reservoir, suitable geology to ensure that it is safe and practicable to construct and a water source with sufficient available volume to store and provide a reliable yield.

Further and more detailed environmental and social considerations are appraised in Stages Two & Three in order to assess and compare the costs and benefits associated with potential sites.

Appendices A and B contain more detailed descriptions on the characteristics of each site. Table 3.1 shows the results of the Stage One option assessment process.

### 3.2.1 Results of Stage One Assessment

**Table 3.1** Stage One Appraisal of Potential Sites Against Key Constraints.

| Constraint                             | Site 1 – West Dean | Site 2 – Landford | Site 3 – Stoney Cross 1 | Site 4 – Stoney Cross 2 | Site 5 – Plaitford | Site 6 – Wellow | Site 7 - Compton Parnholt | Site 8 - N of Romsey 1 | Site 9 - N of Romsey 2 | Site 10 - N of Romsey 3 | Site 11 - N of Romsey 4 | Site 12 - Fairbourne Copse | Site 13 - Sherfield English | Site 14 - Lee House | Site 15 - Upper Ashfield | Site 16 - Nursling 1 | Site 17 - Nursling 2 | Site 18 - Rownhams | Site 19 - Sleepy Hollow | Site 20 - B/C  | Site 21 - B+C  | Site 22 - Sowley Pond | Site 23 - Keyhaven 1 | Site 24 - Pylewell | Site 25 - Stoneham Park Golf | Site 26 - South Stoneham |
|----------------------------------------|--------------------|-------------------|-------------------------|-------------------------|--------------------|-----------------|---------------------------|------------------------|------------------------|-------------------------|-------------------------|----------------------------|-----------------------------|---------------------|--------------------------|----------------------|----------------------|--------------------|-------------------------|----------------|----------------|-----------------------|----------------------|--------------------|------------------------------|--------------------------|
| Abstraction from water source feasible | x                  | x                 | x                       | x                       | x                  | x               | x                         | x                      | x                      | x                       | x                       | x                          | x                           | x                   | x                        | x                    | x                    | x                  | x                       | x              | x              | x                     | x                    | x                  | x                            | x                        |
| Impermeable ground surface             | ✓                  | ✓                 | ✓                       | ✓                       | ✓                  | x               | ✓                         | ✓                      | ✓                      | ✓                       | x                       | ✓                          | ✓                           | ✓                   | ✓                        | x                    | x                    | ✓                  | ✓                       | ✓              | ✓              | ✓                     | ✓                    | ✓                  | ✓                            | ✓                        |
| Pumped storage reservoir               | ✓                  | ✓                 | ✓                       | ✓                       | ✓                  | x               | ✓                         | ✓                      | ✓                      | ✓                       | ✓                       | ✓                          | x                           | ✓                   | ✓                        | ✓                    | ✓                    | ✓                  | ✓                       | ✓              | ✓              | x                     | ✓                    | ✓                  | ✓                            | ✓                        |
| Land undeveloped                       | ✓                  | ✓                 | ✓                       | ✓                       | ✓                  | ✓               | ✓                         | ✓                      | ✓                      | ✓                       | ✓                       | ✓                          | ✓                           | ✓                   | ✓                        | x                    | ✓                    | ✓                  | ✓                       | x <sup>a</sup> | x <sup>a</sup> | x                     | ✓                    | ✓                  | ✓                            | x                        |
| Outcome                                | FAIL               | FAIL              | FAIL                    | FAIL                    | FAIL               | FAIL            | FAIL                      | FAIL                   | FAIL                   | FAIL                    | FAIL                    | FAIL                       | FAIL                        | FAIL                | FAIL                     | FAIL                 | FAIL                 | FAIL               | FAIL                    | FAIL           | FAIL           | FAIL                  | FAIL                 | FAIL               | FAIL                         | FAIL                     |

<sup>a</sup> Sites have since been developed as the Testwood Lakes Reservoir as part of Southern Water's SRN plan with the reservoir included in their Water Resources Management Plan (WRMP).

| Constraint                             | Site 27 - Knapp Hill | Site 28 - Hocombe | Site 29 - Bugle Farm | Site 30 - Highbridge Farm | Site 31 - Fisher's Pond 1 | Site 32 – Colden Common Reservoir | Site 33 - E of Eastleigh Airport 1 | Site 34 - E of Eastleigh Airport 2 | Site 35 - E of Eastleigh Airport 3 | Site 36 - SE of Eastleigh Airport | Site 37 - Lower Upham 1 | Site 38 - Lower Upham 2 | Site 39 - Curbridge 1 | Site 40 - Curbridge 2 | Site 41 - Curbridge 3 | Site 42 - Kitnocks Gully | Site 43 - Wickham 1 | Site 44 - Wickham 2 | Site 45 - Rookesbury Park, West Walk | Site 46 - Titchfield Park Farm | Site 47 - Titchfield Haven | Site 48 - West End Fareham 1 | Site 49 - West End Fareham 2 | Site 50 - SE of Fareham | Site 51 - Forest of Bere, N of Wickham | Site 52 - Boarhunt |
|----------------------------------------|----------------------|-------------------|----------------------|---------------------------|---------------------------|-----------------------------------|------------------------------------|------------------------------------|------------------------------------|-----------------------------------|-------------------------|-------------------------|-----------------------|-----------------------|-----------------------|--------------------------|---------------------|---------------------|--------------------------------------|--------------------------------|----------------------------|------------------------------|------------------------------|-------------------------|----------------------------------------|--------------------|
| Abstraction from water source feasible | x                    | x                 | x                    | x                         | x                         | x                                 | x                                  | x                                  | x                                  | x                                 | x                       | x                       | x                     | x                     | x                     | x                        | x                   | x                   | x                                    | x                              | x                          | x                            | x                            | x                       | x                                      | x                  |
| Impermeable ground surface             | ✓                    | ✓                 | ✓                    | ✓                         | ✓                         | ✓                                 | ✓                                  | ✓                                  | ✓                                  | ✓                                 | ✓                       | ✓                       | ✓                     | ✓                     | ✓                     | x                        | ✓                   | ✓                   | ✓                                    | ✓                              | x                          | ✓                            | ✓                            | ✓                       | ✓                                      | ✓                  |
| Pumped storage reservoir               | ✓                    | ✓                 | ✓                    | ✓                         | ✓                         | ✓                                 | ✓                                  | ✓                                  | ✓                                  | ✓                                 | ✓                       | ✓                       | ✓                     | ✓                     | ✓                     | ✓                        | ✓                   | ✓                   | x                                    | ✓                              | ✓                          | ✓                            | ✓                            | ✓                       | ✓                                      | x                  |
| Land undeveloped                       | ✓                    | ✓                 | ✓                    | ✓                         | ✓                         | ✓                                 | ✓                                  | ✓                                  | ✓                                  | ✓                                 | ✓                       | ✓                       | ✓                     | ✓                     | ✓                     | ✓                        | ✓                   | ✓                   | ✓                                    | ✓                              | x                          | x                            | x                            | ✓                       | x                                      | ✓                  |
| Outcome                                | FAIL                 | FAIL              | FAIL                 | FAIL                      | FAIL                      | FAIL                              | FAIL                               | FAIL                               | FAIL                               | FAIL                              | FAIL                    | FAIL                    | FAIL                  | FAIL                  | FAIL                  | FAIL                     | FAIL                | FAIL                | FAIL                                 | FAIL                           | FAIL                       | FAIL                         | FAIL                         | FAIL                    | FAIL                                   | FAIL               |

| Constraint                             | Site 53 - Southwick Park | Site 54 - Boarhunt-Denmead 1 | Site 55 - Boarhunt-Denmead 2 | Site 56 - Boarhunt-Denmead 3 | Site 57 - Lumley Farm | Site 58 - Havant Thicket | Site 59 - Southleigh Forest | Site 60 - Southleigh Farm | Site 61 - Loveders Farm | Site 62 - Hayling Island | Site 63 - West Wittering | Site 64 - W of Chichester | Site 65 - Lavant Gravel Pits | Site 66 - Birdham Mill | Site 67 - E of Birdham | Site 68 - South of Runcton | Site 69 - Lagness | Site 70 - Walberton | Site 71 - Arundel 1 | Site 72 - Arundel 2 |
|----------------------------------------|--------------------------|------------------------------|------------------------------|------------------------------|-----------------------|--------------------------|-----------------------------|---------------------------|-------------------------|--------------------------|--------------------------|---------------------------|------------------------------|------------------------|------------------------|----------------------------|-------------------|---------------------|---------------------|---------------------|
| Abstraction from water source feasible | x                        | x                            | x                            | x                            | ✓ <sup>b</sup>        | ✓                        | ✓                           | ✓                         | ✓ <sup>b</sup>          | x                        | x                        | x                         | x                            | x                      | x                      | x                          | x                 | x                   | x                   | x                   |
| Impermeable ground surface             | ✓                        | ✓                            | ✓                            | ✓                            | ✓                     | ✓                        | ✓                           | ✓                         | ✓                       | ✓                        | ✓                        | ✓                         | ✓                            | ✓                      | ✓                      | ✓                          | ✓                 | ✓                   | ✓                   | ✓                   |
| Pumped storage reservoir               | ✓                        | ✓                            | ✓                            | ✓                            | ✓                     | ✓                        | ✓                           | ✓                         | ✓                       | ✓                        | ✓                        | ✓                         | ✓                            | ✓                      | ✓                      | ✓                          | ✓                 | ✓                   | ✓                   | ✓                   |
| Land undeveloped                       | ✓                        | ✓                            | ✓                            | ✓                            | ✓                     | ✓                        | ✓                           | ✓                         | ✓                       | ✓                        | ✓                        | ✓                         | ✓                            | x                      | ✓                      | ✓                          | ✓                 | ✓                   | ✓                   | ✓                   |
| Outcome                                | FAIL                     | FAIL                         | FAIL                         | FAIL                         | PASS                  | PASS                     | PASS                        | PASS                      | PASS                    | FAIL                     | FAIL                     | FAIL                      | FAIL                         | FAIL                   | FAIL                   | FAIL                       | FAIL              | FAIL                | FAIL                | FAIL                |

<sup>b</sup> Assuming site can be filled sufficiently solely from Bedhampton Springs (the original proposal was to fill from the Rivers Ems and the Springs).

The outcome of the Stage One assessment is that only sites that can be supplied by the Havant and Bedhampton Springs are considered to be feasible. This is largely due to there being sufficient excess capacity from the Havant and Bedhampton Springs, which has been assessed under the EC Habitats Directive and the licence varied with Minimum Residual Flow (MRF) conditions, to allow for abstraction and storage that can provide a sustainable and reliable yield from a new reservoir, and the licence agreed with the Environment Agency. This volume is shown in Figure 3.3 below.

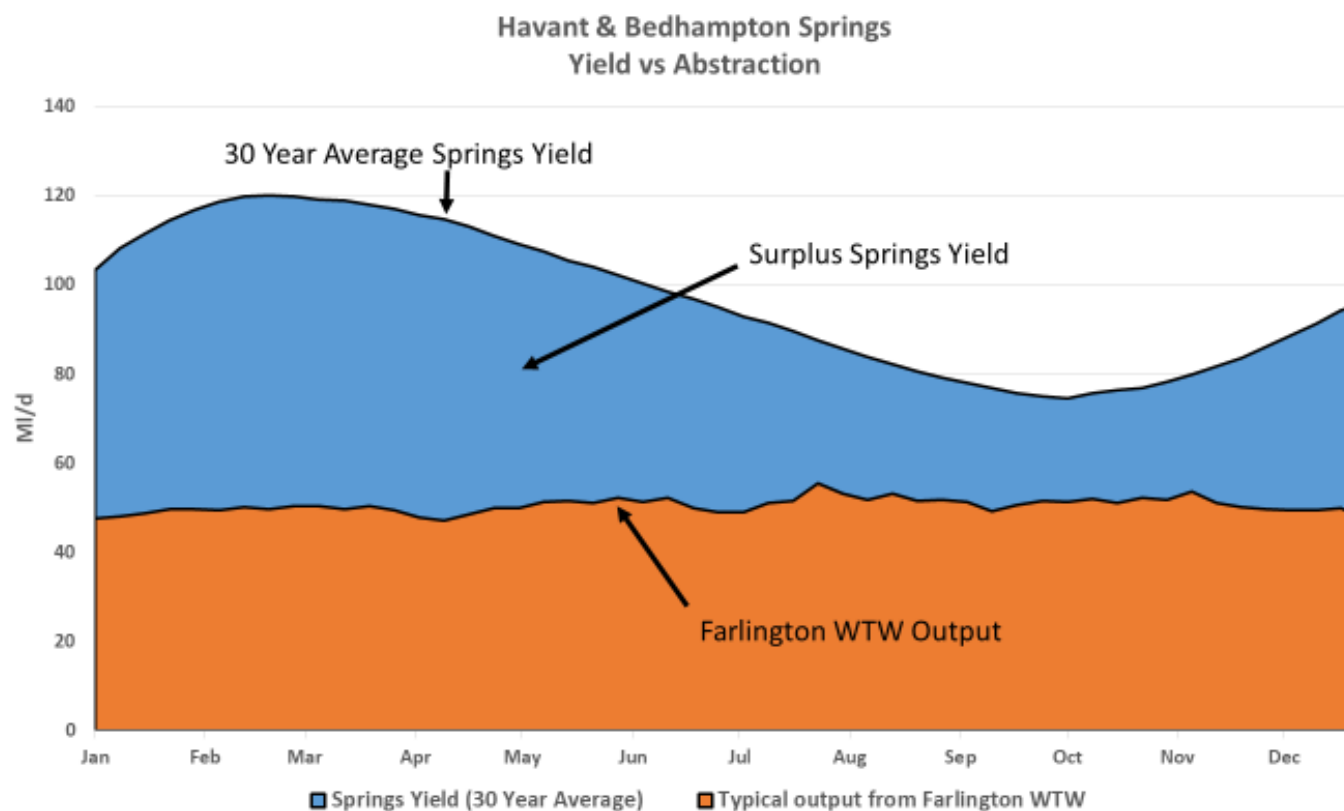
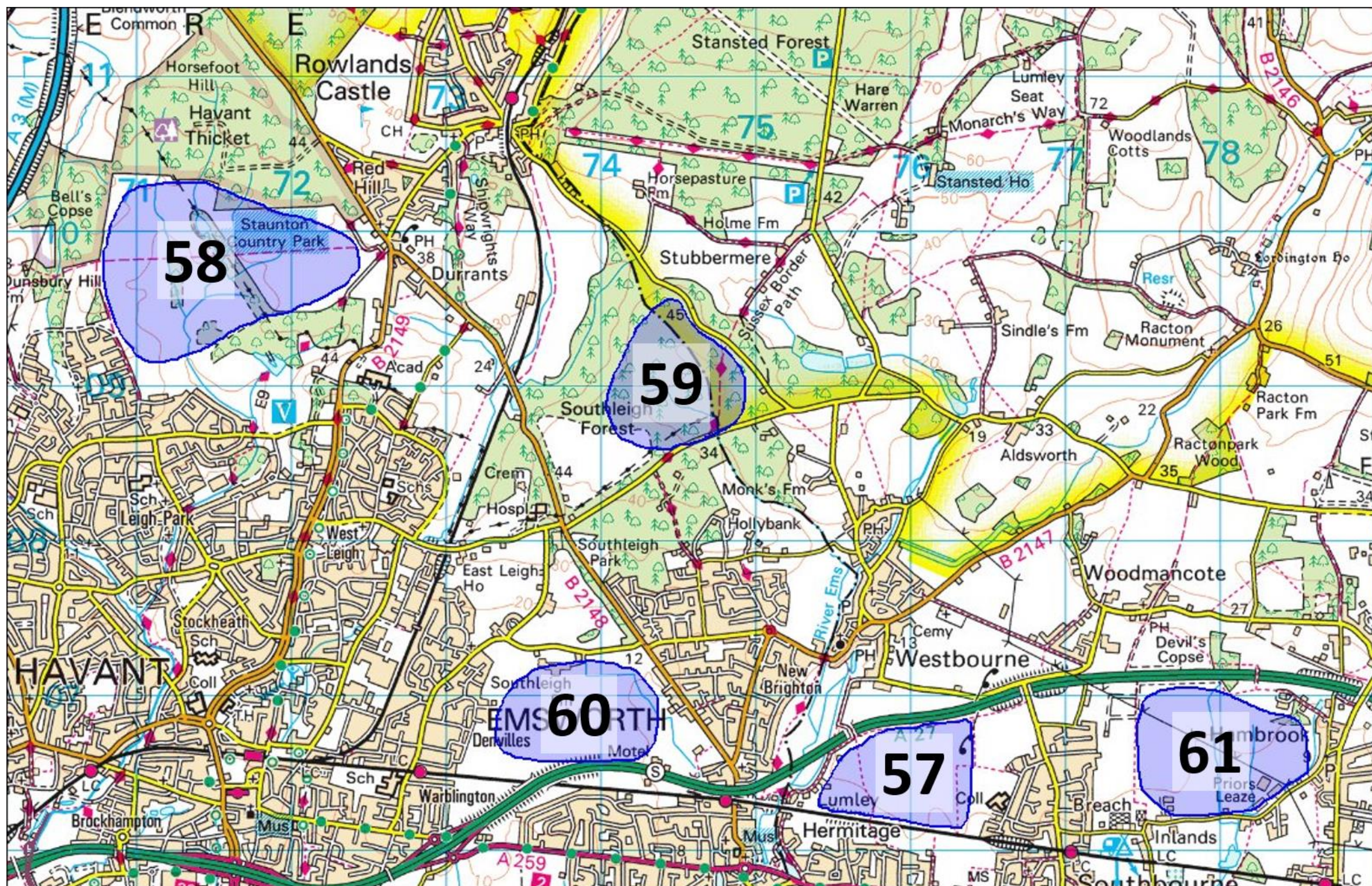


Figure 3.3 Surplus yield of Bedhampton Springs

This leaves five feasible sites for the development of a new reservoir, namely Site 57: Lumley Farm, Site 58: Havant Thicket, Site 59: Southleigh Forest, Site 60: Southleigh Farm and Site 61: Loveders Farm. These sites are illustrated in Figure 3.4 below.

*Note: Since the assessment was completed the allocation of the Southleigh Farm site in the Local Plan was confirmed, which means that the site is no longer available.*



Map produced by MAGIC on 9 January, 2019.

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Figure 3.4: Map of potential reservoir sites assessed at Stage Two. Site 57 - Lumley Farm, Site 58 - Havant Thicket, Site 59 - Southleigh Forest, Site 60 - Southleigh Farm and Site 61 - Loveders Farm (DEFRA Magic Map <https://magic.defra.gov.uk/MagicMap.aspx>, OS Copyright licence no. 2019 100018036).



Figure 3.5: Aerial view of potential reservoir sites assessed at Stage Two (Google Earth).

### **3.3 Stage Two - Assessment of Feasible Sites**

In Stage Two, the five sites that have been progressed following Stage One are evaluated against the environmental, socio-economic and engineering criteria shown in Table 3.2 in order to determine the preferred site (Tables 3.3 and Appendix C). This process allows for the advantages and disadvantages of each site to be considered before selecting a preferred site for the development. It is recognised that there are no sites that have no significant environmental and social impact and that this process is to select the site that has the least impact overall, whilst also providing the most potential positive benefits to all stakeholders and the environment. The impacts of the chosen site must always also be balanced against consideration of the fact that should nothing be done, there would be a negative impact upon stakeholders and the environment in the wider region.

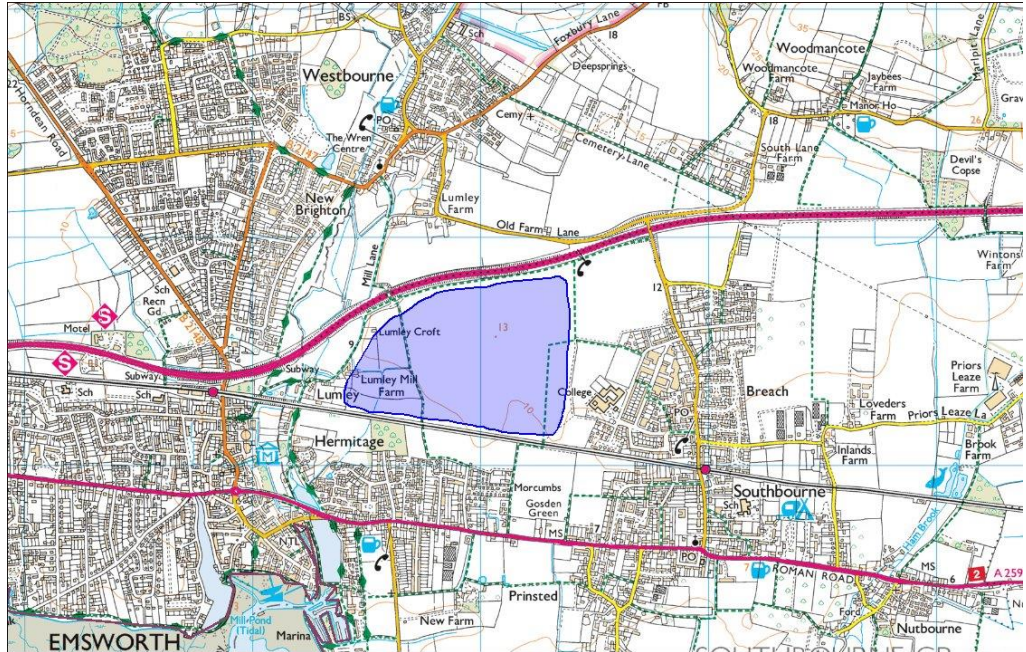
**Table 3.2** Assessment criteria at Stage Two

| Criteria                                 | Description                                                                             | Green                                                                                                                                                                             | Amber                                                                                                                                                                                                                                                            | Red                                                                                                                                                                                         |
|------------------------------------------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land ownership and purchase cost         | Who and how many people own the land?                                                   | Land already owned by Portsmouth Water.                                                                                                                                           | Few land owners, costs expected to be reasonable, agricultural land with a few isolated properties.                                                                                                                                                              | Multiple land owners, cost expected to be high. Local/regional businesses or statutory agencies.                                                                                            |
| Area of proposed site                    | What area of land is available?                                                         | >150 ha of land available.                                                                                                                                                        | 75-150 ha of land available.                                                                                                                                                                                                                                     | <75 ha of land available.                                                                                                                                                                   |
| Reservoir capacity?                      | What is the capacity of the reservoir proposed?                                         | Capacity is >8,000 MI.<br>Volume of water available is able to support the need in the wider region.                                                                              | Capacity is 6,000-8,000 MI.<br>Volume of water available unlikely to be sufficient to support the need in the wider region.                                                                                                                                      | Capacity is <6,000 MI<br>Volume of water available will not be sufficient to support the need in the wider region.                                                                          |
| Land use, land quality & planning policy | Will best and most versatile (BMV) agricultural land be affected?<br>Proposed land use? | No part of the site is designated as Grade 1 or 2 Best and Most Valuable land.<br>Positive planning policy that supports the reservoir.                                           | Part of the site is designated as Grade 1 or 2 Best and Most Valuable land.<br>No planning policy allocation.                                                                                                                                                    | All of the site is designated as Grade 1 or 2 Best and Most Valuable land.<br>Land allocated for a different use in the Local Plan.                                                         |
| Flood plain encroachment                 | What percentage of the site is covered by a floodplain?                                 | Less than 25% of the land is designated as a flood zone.                                                                                                                          | 25-50% of the land is designated as a flood zone.                                                                                                                                                                                                                | Over 50% of the land is designated as a flood zone.                                                                                                                                         |
| Landscape                                | Are there any landscape designations that will be affected?                             | No designations likely to be affected or effect likely to be positive. Site unlikely to affect a national landscape designation and not covered by a local landscape designation. | Designation of regional or local importance likely to be affected. The site lies within a locally designated landscape (e.g. Strategic Landscape Area).                                                                                                          | Designation of national importance likely to be affected. Site lies wholly or partly within or is likely to impact the setting of a national landscape designation (National Park or AONB). |
| Views                                    | Will any visually sensitive areas be affected by location and reservoir design?         | Not visible from SDNP.<br>No recognised viewpoints from dwellings, trails etc. Visual impact of reservoir can be minimised.                                                       | Views from SDNP distant or obscured by existing landscaping. Site overlooked by some but not housing or local trails. Some visual impact of the reservoir cannot be avoided due to the requirement for some embankments (space for opportunity to reduce slope). | Site clearly visible in views from SDNP.<br>Site significantly overlooked by housing and/or National Trails. Requirement for fully bunded reservoir with steep embankments.                 |

| Criteria                             | Description                                                                                                                                                | Green                                                                                                                                                                                                                                   | Amber                                                                                                                                                                                                                                                              | Red                                                                                                                                                                                                                                             |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Nature conservation and biodiversity | Are any designated areas important to nature conservation or biodiversity affected?<br>Are European Protected Species (EPS) known or likely to be present? | No national, regional or local designations likely to be adversely affected, or effect likely to be positive. Site does not contain sites of nature conservation importance.<br>Not aware of any EPS present. May be some bat activity. | Designation of regional or local importance likely to be adversely affected. Site includes or lies within a regionally designated site (County Wildlife Site, Local Nature Reserve).<br>Not aware of EPS present, but potential for area to be used by Brent geese | Designation of European or national importance; Special Area of Conservation (SAC), Special Protection Area (SPA), RAMSAR site, Site of Special Scientific Interest (SSSI) likely to be adversely affected.<br>EPS known to be present on site. |
| Ancient Woodland                     | Are any areas of ancient woodland affected?                                                                                                                | No areas of ancient woodland on site.                                                                                                                                                                                                   | Ancient woodland adjacent to the site which may be indirectly impacted.                                                                                                                                                                                            | Ancient woodland is present at the site and will be directly impacted.                                                                                                                                                                          |
| Archaeology and historic development | Are any heritage sites affected?                                                                                                                           | Heritage interest low. Site has heritage assets of low sensitivity or no records present.                                                                                                                                               | Designation of regional or local importance likely to be adversely affected.<br>Listed Building(s) likely to be impacted on or adjacent to the site                                                                                                                | Nationally Designated Heritage Assets will be affected. Site includes a national heritage asset (Grade II Registered Historic Park or Garden, Listed battlefield site, conservation area).                                                      |
| Impact on recreation                 | Are any recreational sites or public rights of way affected?                                                                                               | No recreational resource/right of way disrupted or affected. Sites with no formal recreational activities.                                                                                                                              | Recreational resource/right of way of local importance disrupted or affected. The site is likely to affect public rights of way.                                                                                                                                   | Recreational resource/right of way of national or regional importance disrupted or affected e.g. long distance path.                                                                                                                            |
| Recreational benefits                | Will people benefit from recreational resource?                                                                                                            | Over 20,000 people reside within 1.5km of the proposed site and/or links to major trails can be made and reservoir design allows development of significant areas for recreation.                                                       | 10,000-20,000 people live within 1.5 km of the proposed site and/or reservoir design provides some access through local trails and allows development of some recreational areas.                                                                                  | Less than 10,000 people live within 1.5 km of the proposed site and reservoir design restricts access and development of recreational areas.                                                                                                    |

| Criteria                                      | Description                                                                   | Green                                                                                                                                                          | Amber                                                                                                                                                                  | Red                                                                                                                                                                   |
|-----------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Construction impact (excluding traffic)       | Will onsite construction impact local residents?                              | Less than 5 residential properties likely to be affected by on-site construction activities.                                                                   | Less than 100 residential properties likely to be affected by onsite construction activities.                                                                          | More than 100 residential properties likely to be affected by on-site construction activities.                                                                        |
| Impact of construction traffic                | Will construction traffic impact local residents?                             | Route largely not through built up areas and/or likely to have limited impacts on local traffic.                                                               | Route partly through built up areas and/or likely to have moderate impacts on local traffic.                                                                           | Route predominantly through built up areas and/or likely to have substantial impacts on local traffic.                                                                |
| Impact on residential dwellings               | Will construction result in the loss of residential dwellings?                | No residential dwellings located within the site.                                                                                                              | Up to 10 residential dwellings located within site.                                                                                                                    | More than 10 residential dwellings located within the site.                                                                                                           |
| Length of pipeline route for water conveyance | Distance of proposed intake/outfall point from site?                          | Less than 5 km from the potential intake/outfall location.                                                                                                     | Between 5 km and 10 km from potential intake/outfall location.                                                                                                         | Over 10 km from potential intake/outfall location.                                                                                                                    |
| Discharge measures                            | How and where will water be discharged in an emergency? Risk to property?     | Water can be drawn down via an existing waterway with minimal pipework required and a low environmental impact or flood risk. No significant risk to property. | Drawdown requires significant pipework but with a relatively low environmental impact. No direct discharge to a European protected site. Some risk to property likely. | Drawdown pipes are required that impact upon, or discharge directly to an environmentally protected site e.g. SPA, SAC, RAMSAR or SSSI. Significant risk to property. |
| Topography and reuse of excavated material    | What is the variation in topography across the site? Can material be re-used? | Very little topographical variation, or the variation is helpful reducing need for embankments, all material can be used on site.                              | Variation on site but not likely to create substantial additional movement of material.                                                                                | High level of topographical variation on site requiring substantial movement of material.                                                                             |
| Potential visitor access to site              | What is the proximity to sustainable transport links (railways, bus routes)?  | Site has good access from sustainable transport infrastructure in the form of both railways and bus routes (within 1 km of site).                              | Site has good access from either a railway or bus route (within 1 km of site).                                                                                         | Difficult to access site by means of sustainable transport (bus routes and railway stations >1 km from site). Most access will be <i>via</i> car.                     |

### 3.4 Stage Two: Site Appraisal Summaries

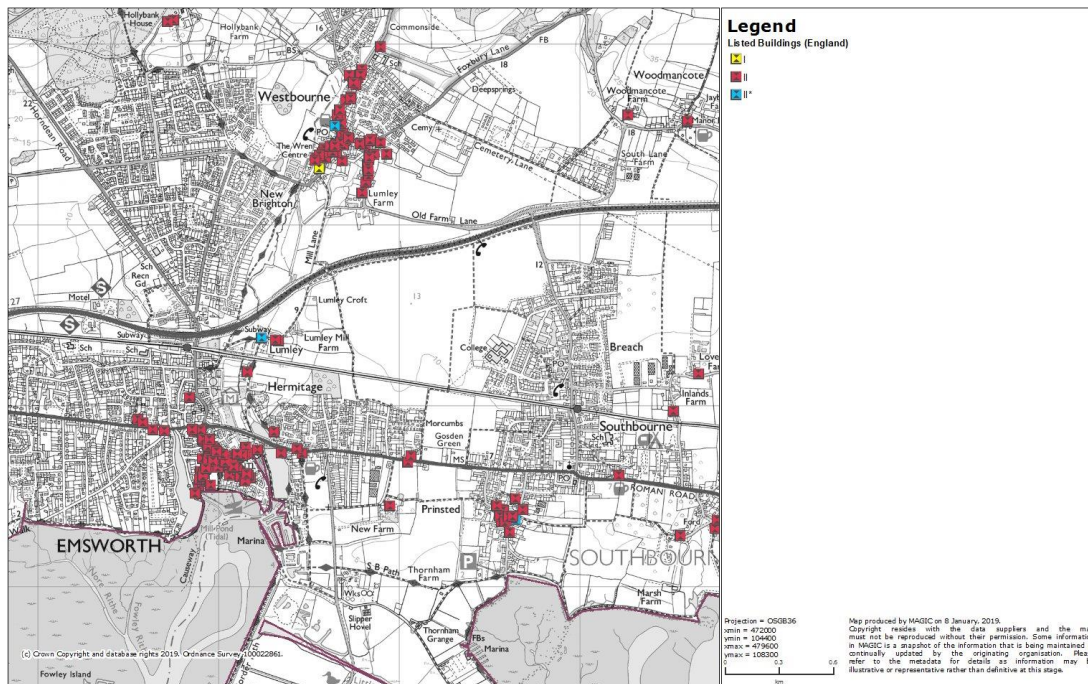
| Site 57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Lumley Farm                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | The site is located to the Northeast of Emsworth between the railway line and A27. The development of the A27 trunk road means it intersects the originally proposed 88 ha site resulting in a 27% reduction in the available site area. The site is agricultural land. |
| Site Size                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 64 ha                                                                                                                                                                                                                                                                   |
| Potential Reservoir Capacity                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 7,800 MI*                                                                                                                                                                                                                                                               |
|  <p>A satellite map from Google Earth showing the Lumley Farm site. The site is outlined in blue and labeled 'Site 57 - Lumley Farm'. It is located between a railway line to the west and a road to the east. The surrounding area includes residential developments and agricultural fields.</p>  <p>An Ordnance Survey map showing the Lumley Farm site in blue. The map includes labels for Westbourne, New Brighton, Hermitage, Southbourne, and Emsworth. It shows the railway line, A27, and various local roads and landmarks. The site is situated between the railway line and the A27.</p> <p>Map produced by MAGIC on 9 January, 2019.<br/> <small>(c) Crown Copyright and database rights 2019. Ordnance Survey 100022861.<br/>         Copyright resides with the data suppliers and the map must not be reproduced without their permission. Some information in MAGIC is a snapshot of the information that is being maintained or continually updated by the originating organisation. Please refer to the metadata for details as information may be illustrative or representative rather than definitive at this stage.</small></p> <p>DEFRA Magic Map <a href="https://magic.defra.gov.uk/MagicMap.aspx">https://magic.defra.gov.uk/MagicMap.aspx</a>, OS Copyright licence no. 2019 100018036</p> |                                                                                                                                                                                                                                                                         |
| Green Criteria                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                         |

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|                       | <ul style="list-style-type: none"> <li>• Site comprised of London Clay which can be used to line the reservoir.</li> <li>• Site almost completely flat all material on site should be usable, but would require embankments on all sides.</li> <li>• No ancient woodland.</li> <li>• Not aware of any EPS present. May be some bat activity.</li> <li>• No current plan for housing development on site. No change of use proposed in the Local Plan.</li> <li>• No flood plain encroachment on site. There is a level 3 flood zone to the West of the site along River Ems channel (Figure 3.7).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Amber Criteria</b> | <ul style="list-style-type: none"> <li>• The volume of water available unlikely to be sufficient to support the need in the wider region.</li> <li>• Located close to Emsworth and Southbourne rail stations. Regular local bus route to the West of the site, however stops are on the wrong side of either the A27 or railway line making access to the site difficult by public transport most likely at a distance &gt; than 1 km.</li> <li>• Privately owned arable land and adjacent farm buildings. Site construction would completely eradicate the business in this area.</li> <li>• Land designated as part of the Southbourne Coastal Plain (SC5).</li> <li>• Multiple public rights of way footpaths pass through the site which would need to be re-routed.</li> <li>• Estimated more than 14,500 people within 1.5 km, 45,000 people within 4.5 km. This is the third lowest within 1.5 km of the five sites and may limit its recreational and educational use, opportunities will be limited by constrained site and need for embankments on all sides.</li> <li>• Housing to South and East is within 350 m of the site boundary and Bourne College is in close proximity to the East of the site. Both the housing and college overlook the site and would be impacted by construction.</li> <li>• Site construction would most likely see the removal of a handful of residential dwellings and farm buildings to the West of the site.</li> <li>• Designated as a Secondary Support Area under the Brent Goose Strategy (<a href="https://solentwbgs.wordpress.com/">https://solentwbgs.wordpress.com/</a>).</li> <li>• The site is located ~5 km from Bedhampton pumping station (3 m height difference). Water would need to be pumped to and from the reservoir. A ~7 km pipe route is proposed would pass in close proximity to Warblington Conservation Area (Warblington Cemetery, Castle (Grade II* listed building and historical monument) and St Thomas a Becket's Church (likely archaeological site). This option requires the second longest pipeline of the five sites assessed.</li> <li>• Lumley Mill is a Grade II* listed building and the surrounding cottages are Grade II listed and would be in very close proximity to the reservoir development (Figure 3.6).</li> </ul> |
| <b>Red Criteria</b>   | <ul style="list-style-type: none"> <li>• Land lost almost entirely greenfield site, arable crops grown for agricultural purposes. Land provisionally characterised as Grade 1 or 2 under Agricultural Land Classification.</li> <li>• The site is surrounded by the A27 road, railway line, Bourne College and housing developments and its flat topography means a fully bunded reservoir with steep embankments would be required to meet capacity requirements and protect existing infrastructure. This will limit access</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

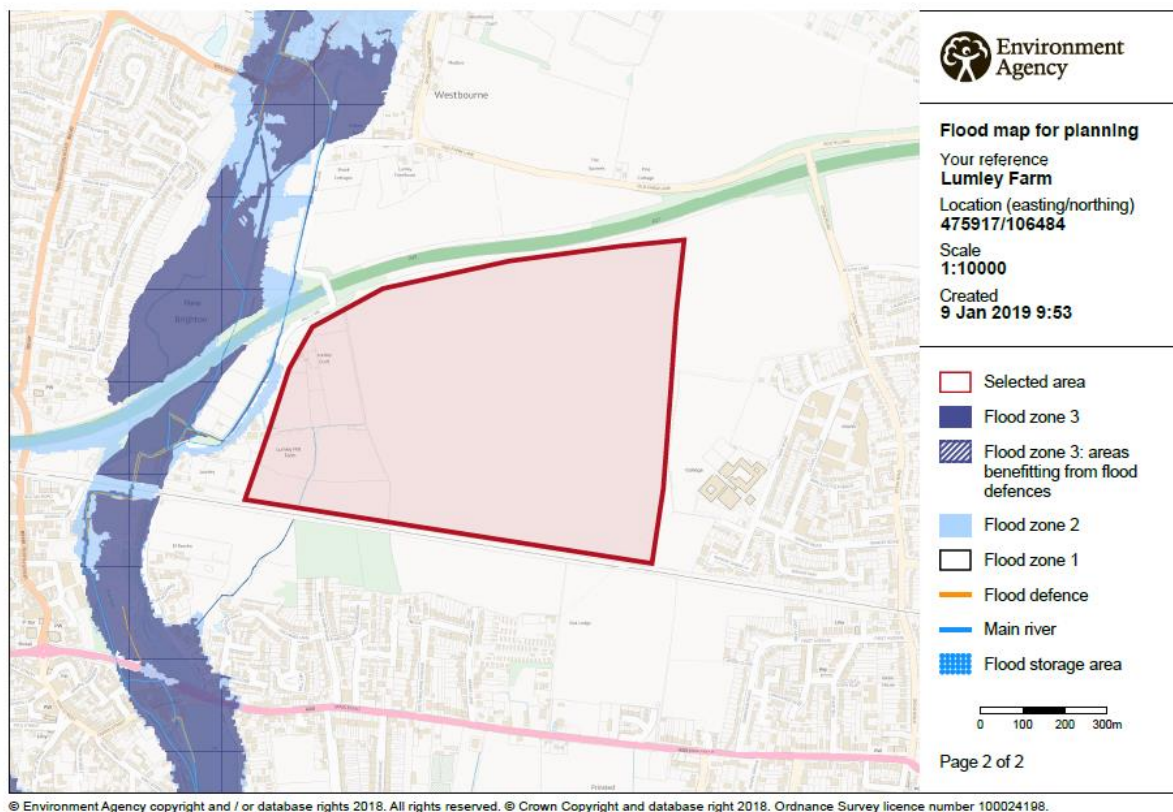
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|                             | <p>and opportunities for recreational activities as well as biodiversity enhancement through wetland habitat creation.</p> <ul style="list-style-type: none"> <li>• High risk of flooding and damage to property/infrastructure in the event of embankment failure.</li> <li>• Water courses downstream would be unable to cope with emergency discharge(ED), requiring construction of a discharge pipe into Chichester Harbour which is an EU protected SPA, SAC, RAMSAR and SSSI site.</li> <li>• Site not visible from the A27 to the North, however the railway line and residential housing to the South, as well as Bourne Community College to the East have clear line of site. Due to the flat topography and size of the site, steep embankments would be required to achieve desired volume which would be visually unappealing.</li> <li>• Currently there is no access to the site directly from the A27. Two-way access would be difficult and costly to construct. Currently, the most viable access from the A27 would be <i>via</i> A259 Main Road then Stein Road. Whilst this avoids small country and residential lanes, it involves passing through residential built up areas.</li> <li>• Water would need to be pumped to and from the reservoir.</li> </ul> |
| <b>Summary</b>              | <p>The volume of water available unlikely to be sufficient to support the need in the wider region. Water needs to be pumped to and from the site. Smaller available area requires a fully bunded reservoir with steep embankments resulting in undesirable views from the surrounding areas and limits access and opportunities for recreation and biodiversity enhancement. Difficult to offset the loss of best and most valuable agricultural land which is a secondary support area for Brent Geese as well as having public rights of way. Significant flood risk to surrounding infrastructure in the event of embankment failure. Finally, the requirement for an ED pipe into the environmentally protected SAC, SPA, RAMSAR, SSSI harbour is also a major concern.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Pass to Stage Three?</b> | NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

\* Potential reservoir size is based on the capacity proposed in previous studies taking into account the reduction in the site size.

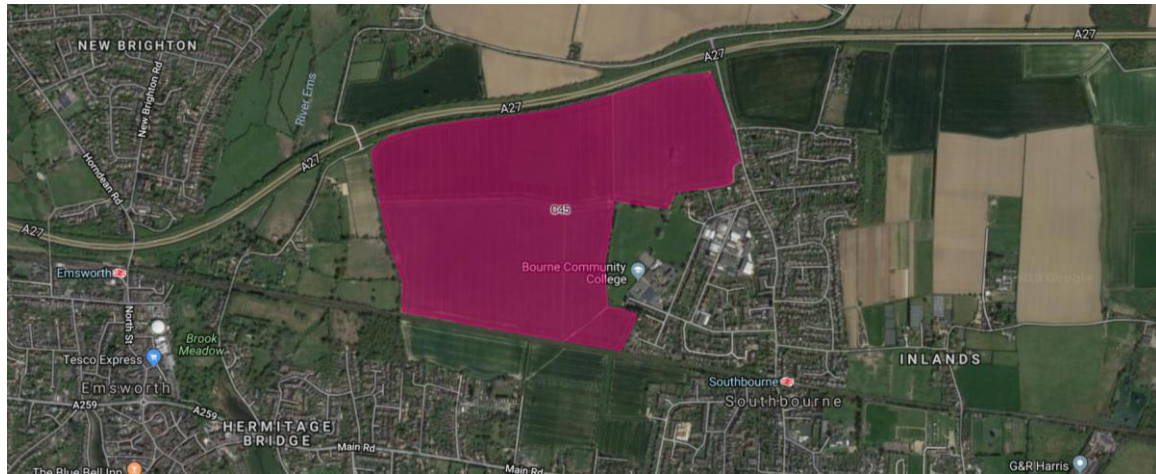
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**Figure 3.6:** Location of listed buildings around Lumley Farm (DEFRA Magic Map <https://magic.defra.gov.uk/MagicMap.aspx>, OS Copyright licence no. 2019 100018036, © Historic England 2019. Contains Ordnance Survey data © Crown copyright and database right 2019 The Historic England GIS Data contained in this material was obtained on 09/01/2019. The most publicly available up to date Historic England GIS Data can be obtained from <http://www.HistoricEngland.org.uk>).

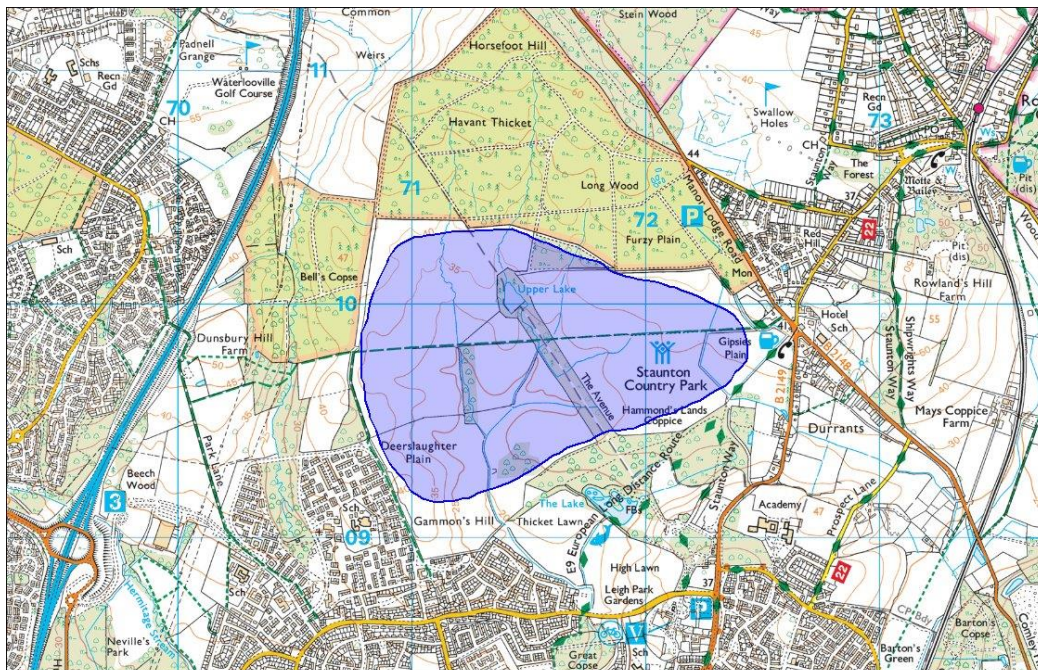


**Figure 3.7:** Flood Plain Map of Lumley Farm (Flood Map for Planning, Environment Agency, <https://flood-map-for-planning.service.gov.uk/>, contains public sector information licensed under the Open Government Licence v3.0., OS Copyright licence no. 2019 100018036).



**Figure 3.8** Brent Goose Strategy site allocation study. Site shown is a Secondary Support Area

|                                     |                                                                                                                                                                                                                                                                                         |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site 58</b>                      | <b>Havant Thicket</b>                                                                                                                                                                                                                                                                   |
| <b>Site Description</b>             | 160 ha site located to the North of Havant, to the East of the A3(M) is leased by Portsmouth Water to Hampshire County Council to be used as part of Staunton Country Park primarily for grazing. The freehold of Havant Thicket to the North of the site is owned by Forestry England. |
| <b>Site Size</b>                    | 160 ha                                                                                                                                                                                                                                                                                  |
| <b>Potential Reservoir Capacity</b> | 8,900 MI <i>(Note: Current 2020 estimate 8,700 MI following adjustment to the embankment to minimise impact on woodland)</i>                                                                                                                                                            |



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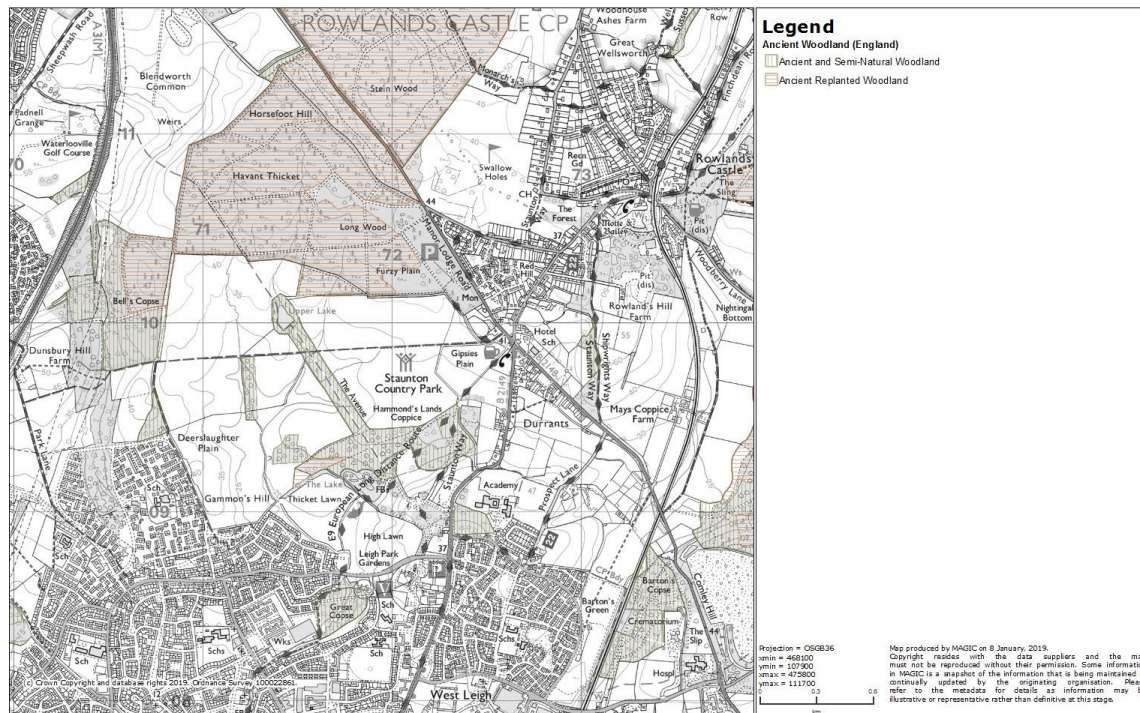
DEFRA Magic Map <https://magic.defra.gov.uk/MagicMap.aspx>, OS Copyright licence no. 2019 100018036

|                       |                                                                                                                                                                                                                         |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Green Criteria</b> | <ul style="list-style-type: none"> <li>• Site owned by Portsmouth Water.</li> <li>• Low quality farmland used for grazing.</li> <li>• Site allocated in the Local Plan as a reservoir (see App C, Table C2).</li> </ul> |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

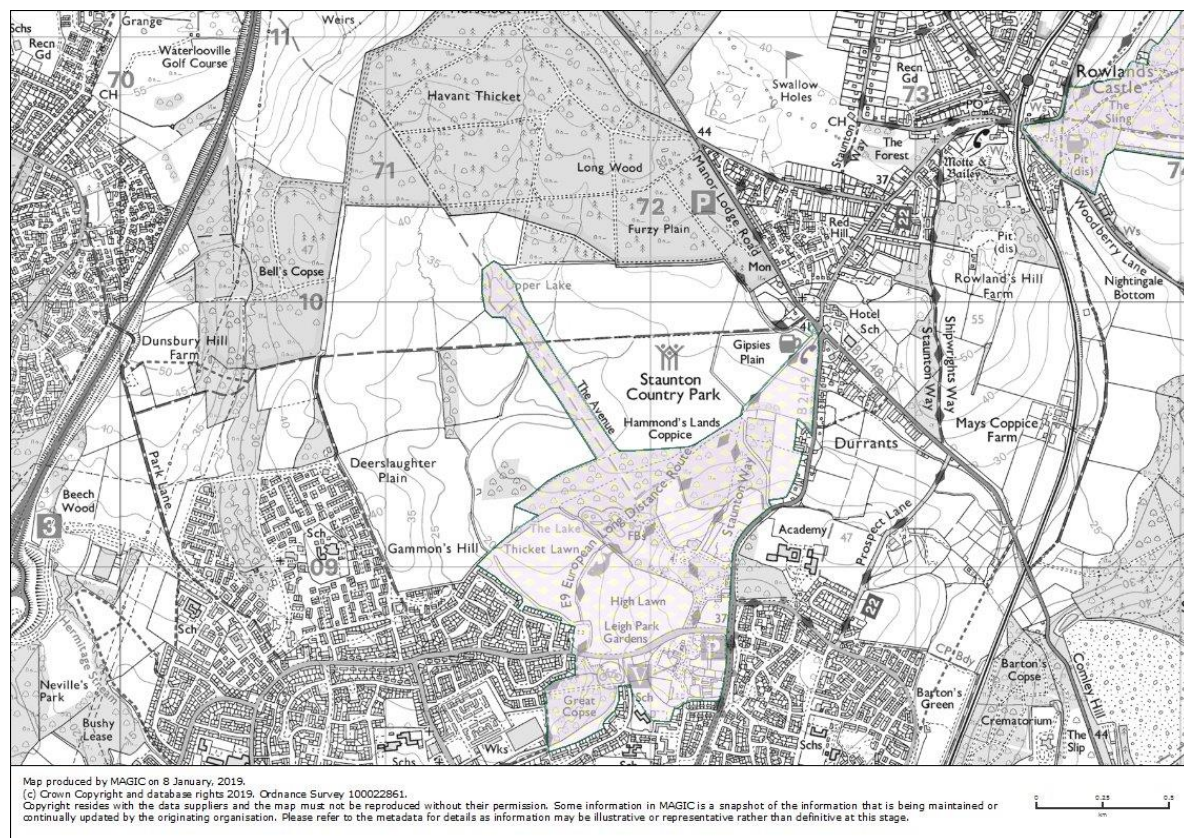
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|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | <ul style="list-style-type: none"> <li>• Site comprised of London Clay with sufficient suitable fill material available onsite for embankment construction.</li> <li>• The volume of water available is able to support the need in the wider region.</li> <li>• Sloping topography removes the need for embankments in the north. Significant opportunity for biodiversity enhancement with creation of wetland habitat along the northern perimeter.</li> <li>• Size of site and lack of embankments in the north provides the opportunity for recreational activities.</li> <li>• The site is located ~3 km from Bedhampton pumping station (16 m incline). Water would be pumped to the site but would return by gravity when required. The pipeline route would be under 5 km in total length.</li> <li>• Very small level 3 floodplain encroachment in South West corner where stream is present (~2% of site) (Figure 3.11).</li> <li>• Water quality modelling has indicated that there will be some benefit in reducing nitrate concentrations entering Langstone Harbour. Overall there will be a benefit to stream water quality, including moderating peaks in iron and manganese that are currently experienced.</li> <li>• There is the opportunity to provide a regular compensation discharge from the reservoir (if supported by the EA) which could improve flows and water quality in the Riders Lane Stream and the Hermitage Stream.</li> <li>• Estimated more than 29,500 people live within 1.5 km and 119,000 people within 4.5 km. This is the largest population within both 1.5 and 4.5 km of the five sites maximising the potential recreational and educational use.</li> <li>• There are no residential dwellings located on the proposed site.</li> <li>• The proposed access route is from Junction 2 of the A3(M) via the B2149 to the north of the site, skirting around the western edge of Havant Thicket utilising an existing track. This route avoids passing through residential areas with a minimal impact on local traffic flows.<br/><i>Note: An alternative southern access route is being considered. If this were selected then the assessment would change to red for traffic, as the construction traffic would then need to pass through a residential area.</i></li> <li>• Good public transport links; Located close to Rowlands Castle railway station (~1.2 km) with regular local bus routes on the roads bordering the site to the East, South and West.</li> </ul> |
| <b>Amber Criteria</b> | <ul style="list-style-type: none"> <li>• The land is part of the South Hampshire Lowlands National Character Area (NCA). To the North East of the site is the boundary of the South Downs National Park. Only the site entrance will be visible from the park boundary due to the presence of dense woodland. There will be no significant impact on the views from the South Downs.</li> <li>• Residential housing adjacent to the site to the Southwest and East. Due to southward sloping nature of the land, embankments to the South will be visible from the housing in the South. Due to the space around the reservoir the embankment gradient can be reduced to landscape the view which will remain similar as a grassy slope. To the East and West existing tree lines greatly restricts sites visibility from dwellings.</li> <li>• The public bridleway crossing the site will be lost. Plan to re-route bridleway and permissive footpaths around periphery of the reservoir</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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|                             | <p>and link site paths to regional trails e.g. Staunton Way and E9 European Long Distance footpaths pass around the Southeast and East of the site.</p> <ul style="list-style-type: none"> <li>• Emergency discharge water can be directed into the Riders Lane and Hermitage stream, which then flows naturally into the harbour area, replicating a storm without the risk of flooding dwellings.</li> <li>• Onsite construction may impact housing to Southwest and East which are within 350 m of the site boundary. Housing to the South also directly overlooks site. The majority of housing to the East is protected by a relatively dense treeline or new tree planting scheme and as a result is further away from the construction area. Housing to the west protected by a belt of woodland. The treeline to the Southwest is significantly thinner.</li> </ul>                                                                                                                                                                                                                                                                                                                                                            |
| <b>Red Criteria</b>         | <ul style="list-style-type: none"> <li>• Land is entirely a green field site to be developed.</li> <li>• The part of the site (7 ha, ~4.4%) known as The Avenue is included within the registered boundary of the Staunton Grade II listed historic Park and Gardens designated as being of Special Historic Interest in England by Heritage England (Figure 3.10). An area of grassland to the south-west of The Avenue woodland peninsula is also designated a historic Conservation Area.</li> <li>• Four small blocks of ancient woodland (irreplaceable habitat) at the site will be lost totalling 13.22 ha (8.3% of the total site area) including; The Avenue Ancient Semi-Natural Woodland (ASNW) (6.87 ha), the oak plantations know as Middle Clearing (ASNW) (2.17 ha) and Round Wood (ASNW) (1.99 ha) and the Corsican Pine Planted Ancient Woodland Site (PAWS) (2.19 ha) (Figure 3.9). The woodland blocks are also designated as SINC (Sites of Importance for Nature Conservations) a County designation.</li> <li>• European protected species are known to be present at the site, including Bechstein's bats and dormice. Great crested newt have been recorded on the FE land within 500m of the site.</li> </ul> |
| <b>Summary</b>              | <p>Large site purchased by Portsmouth Water in 1965 for use as a reservoir site on the advice of the Rivers Board. The volume of water available is able to support the need in the wider region. The existing bowl shaped topography removes the need for a fully bunded reservoir and provides space and opportunities for recreation and biodiversity enhancements. The relative height from the pumping station allows water to be gravity fed on return for public water supply. The Riders Lane and Hermitage Streams can be utilised for safe discharge of emergency drawdown water minimising the impact on the harbour area when compared to other sites. Development would remove significant areas of Ancient Woodland (irreplaceable habitat) and part of the Grade II listed historic park and gardens. European protected species will be impacted (bats and dormice). There is an opportunity to provide a net biodiversity gain by creation of a significant wetland habitat, whilst having space to provide separate recreational opportunities, linking the site to regional and national trails. The site has very good existing transport links via rail and bus routes.</p>                                       |
| <b>Pass to Stage Three?</b> | YES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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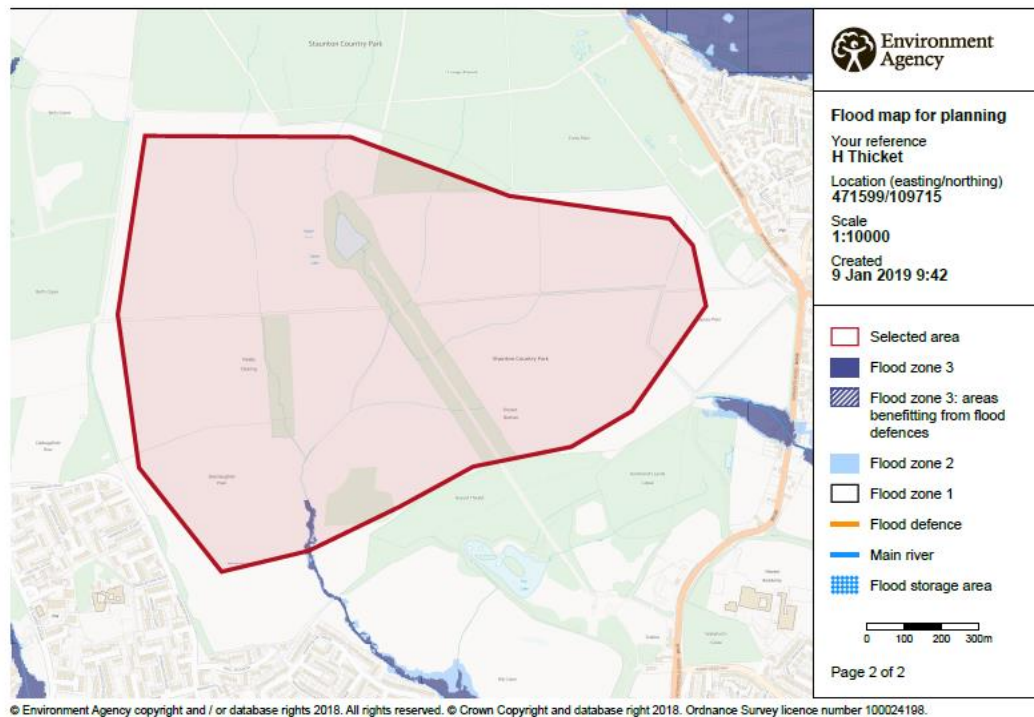


**Figure 3.9:** Ancient and Semi-Natural Woodland (green) and Ancient Replanted Woodland (brown) (DEFRA Magic Map <https://magic.defra.gov.uk/MagicMap.aspx>, OS Copyright licence no. 2019 100018036, Natural England, contains public sector information licensed under the Open Government Licence v3.0.).



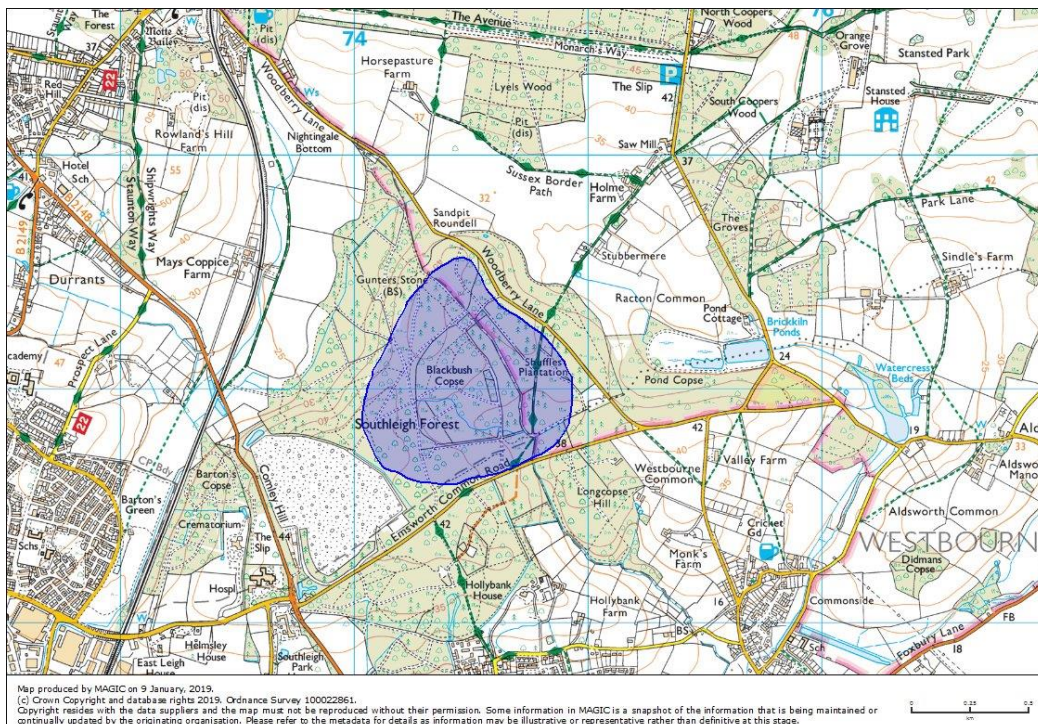
**Figure 3.10:** Registered Parks and Gardens (DEFRA Magic Map <https://magic.defra.gov.uk/MagicMap.aspx>, OS Copyright licence no. 2019 100018036, © Historic England 2019. Contains Ordnance Survey data © Crown copyright and database right 2019 The Historic England GIS

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**Figure 3.11:** Flood Plain Map of Havant Thicket (Flood Map for Planning, Environment Agency, <https://flood-map-for-planning.service.gov.uk/>, contains public sector information licensed under the Open Government Licence v3.0., OS Copyright licence no. 2019 100018036).

| Site 59                             | Southleigh Forest                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site Description</b>             | This woodland site is located to the North East of Havant and comprises a mix of deciduous and conifer plantations. There is a landfill site present in the Southwest corner with a barrier in place to prevent leachate. Gas is extracted from the landfill site and purified for energy use. An older uncontained landfill site is adjacent to this. There is no proposal for a change in land use in the Local Plan. |
| <b>Site Size</b>                    | 60 ha                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Potential Reservoir Capacity</b> | 2,800 MI*                                                                                                                                                                                                                                                                                                                                                                                                               |

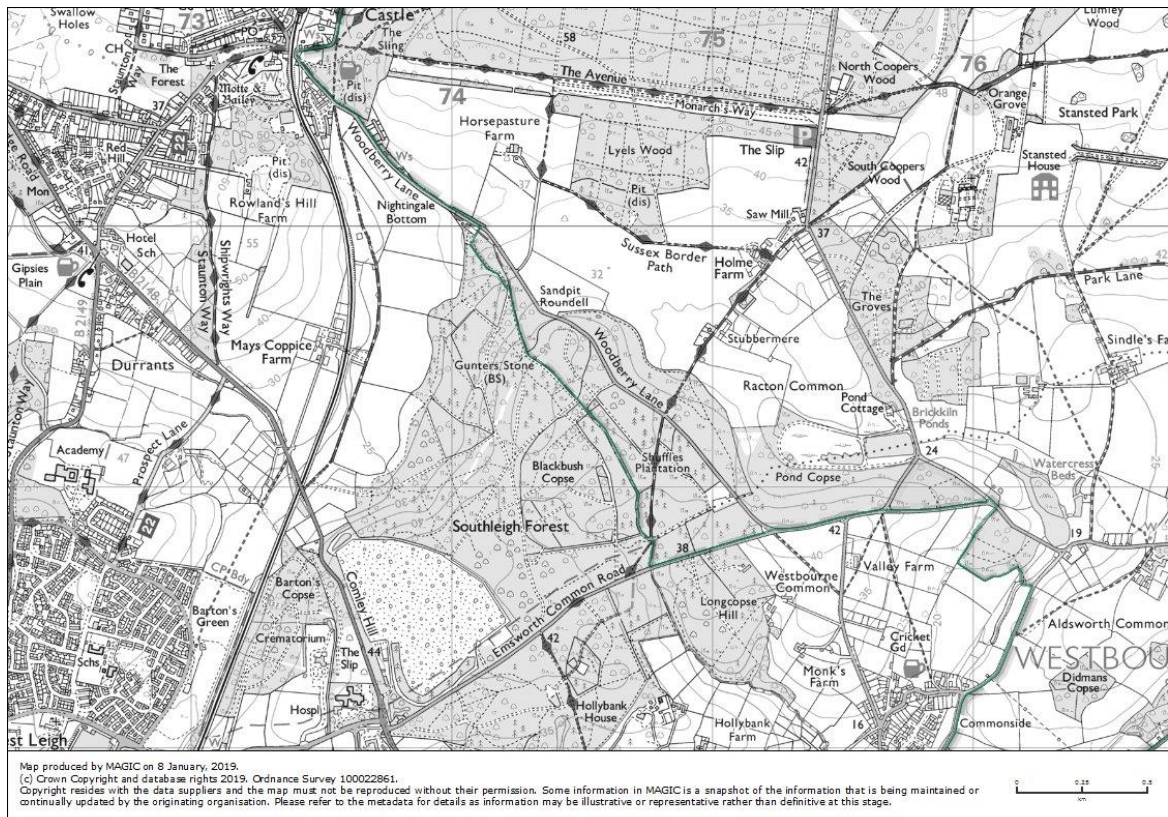


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|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Green Criteria</b> | <ul style="list-style-type: none"> <li>• The site owned by Portsmouth Water.</li> <li>• The site is not utilised for any agricultural purposes.</li> <li>• There is no floodplain encroachment on site (Figure 3.14).</li> <li>• There are no known heritage sites affected on the proposed site.</li> <li>• Two cottages are located alongside the site boundary and would be affected by the construction.</li> <li>• Very little residential or commercial property surrounding the site that would be affected by the view or construction.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Amber Criteria</b> | <ul style="list-style-type: none"> <li>• Part of South Downs National Park and on the route of a National Trail this would have an adverse impact on the views from these locations, but within a woodland setting which would provide some screening.</li> <li>• The site is mainly a green field site, however there are two landfill sites located in the Southwest corner. (see comment below re- risks)</li> <li>• The site is comprised of Plateau Gravel with underlying London Clay. However, there is uncertainty as to whether there is sufficient suitable general fill material available onsite for embankment construction. This would increase costs substantially as suitable material would have to be imported. The gravel would have to be removed from site and sold, if possible.</li> <li>• The site is located 4 km from the pumping station at Bedhampton (16 m height difference). Proposed pipeline route would be ~5 km crossing two streams and the railway line twice. Water would need to be pumped to the site but could be gravity fed back down when required.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Red Criteria</b>   | <ul style="list-style-type: none"> <li>• Volume of water available will not be sufficient to support the need in the wider region.</li> <li>• Only an estimated 7,300 people within 1.5 km and more than 64,000 people within 4.5 km. This is the second smallest population within 1.5 km of the five sites which may limit its recreational and educational use.</li> <li>• The site is located within the South Hampshire Lowlands National Character Area (NCA). Approximately 30% of the proposed site is within the South Downs National Park (Figure 3.12).</li> <li>• All of the site is woodland. The majority of the site (87%, 52 ha) is designated as Ancient Woodland either Ancient Semi-Natural Woodland (ASNW) or Planted Ancient Woodland (PAWS) (Figure 3.13).</li> <li>• About 65% of the proposed site is designated as a Site of Importance for Nature Conservation (SINC).</li> <li>• Bechstein's Bats are known to be present within the woodland and are a European Protected Species. The presence of dormice and badgers which are also protected species is anticipated.</li> <li>• Site size will impede creation of areas for recreational activities, as well as limit biodiversity opportunities, as steep embankments are needed on all sides and the site is enclosed by roads to the South and East, as well as the landfill site in the Southwest.</li> <li>• Care would need to be taken due to the presence of two landfill sites, one of which is uncontained whilst the other collects the natural gas produced which is purified and used for energy purposes. Extensive assessment and engineering measures would be needed to ensure that the reservoir was protected from any leachate and gas risk.</li> <li>• The Sussex Border Path National Trail and a public bridleway pass through the site. These trails have to be re-routed around the site.</li> </ul> |

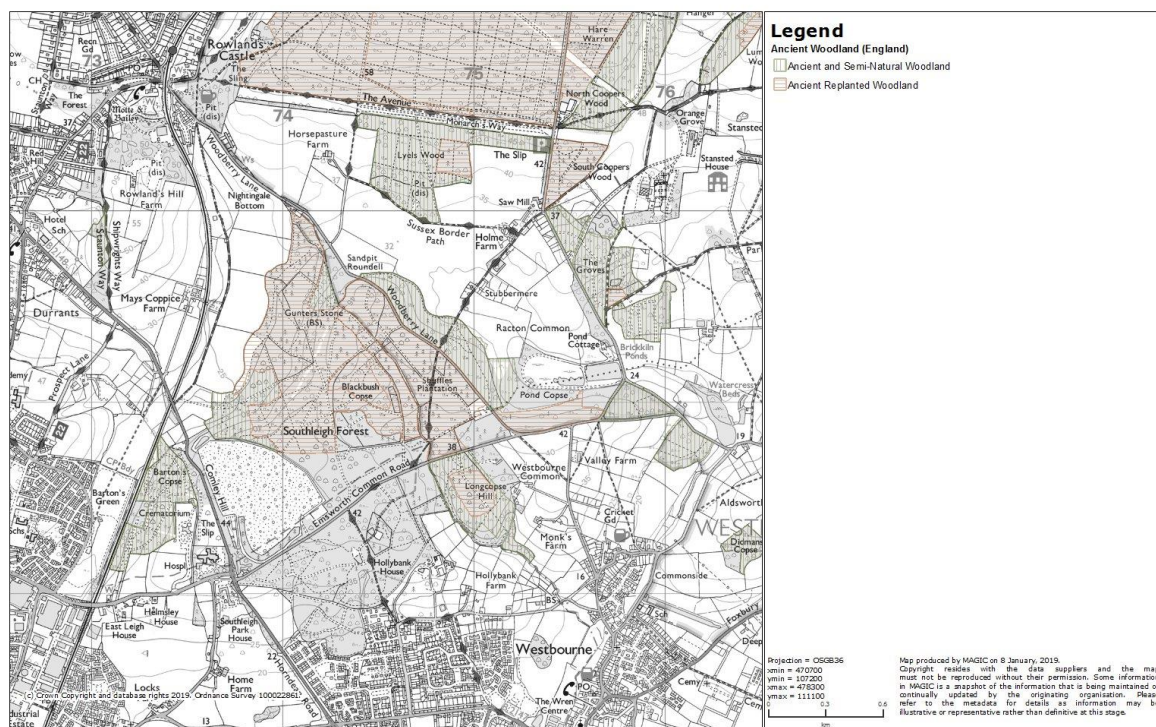
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|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | <ul style="list-style-type: none"> <li>• A fully bunded reservoir is required and due to the relatively small size steep embankments are required to satisfy capacity requirements.</li> <li>• Extensive use of grouting or impermeable fill blankets would be required.</li> <li>• The site is located 3km from the Havant to Horndean main road and to gain access to this route construction traffic would have to pass through built up residential areas.</li> <li>• Surrounding streams would be unable to cope with emergency discharge. This would require construction of an emergency drawdown pipe which would discharge into the Harbour which is an EU protected SAC, SPA, RAMSAR and SSSI site.</li> <li>• Large variation in topographical levels with part of the site residing on a hill. May require the removal of excess material from the site.</li> <li>• In the event of embankment failure properties downhill to the south are likely to be at risk from flooding.</li> <li>• There are poor public transport links to the site, it is located ~2 km from Rowlands Castle railway station with no regular local bus services in close proximity to the site.</li> </ul> |
| <b>Summary</b>              | <p>The site is owned by Portsmouth Water, but the volume of water available from this option will not be sufficient to support the need in the wider region. Water would be able to return by gravity to the Bedhampton PS site. All of the site is woodland. The majority of the site (87%, 52 ha) is designated as Ancient Woodland an irreplaceable habitat.</p> <p>The smaller available area at this site means a fully bunded reservoir with steep embankments would be required resulting in undesirable views from the South Downs National Park and a national trail, which would have to be re-routed. The location and need for bunding also limits access and opportunities for recreation and biodiversity enhancement. European protected species are known to be present. Finally, the requirement for a discharge pipe into the environmentally protected harbour would be a significant concern.</p>                                                                                                                                                                                                                                                                            |
| <b>Pass to Stage Three?</b> | NO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

*\* Potential reservoir size is based on the capacity proposed in previous studies taking into account any reduction to the site size.*

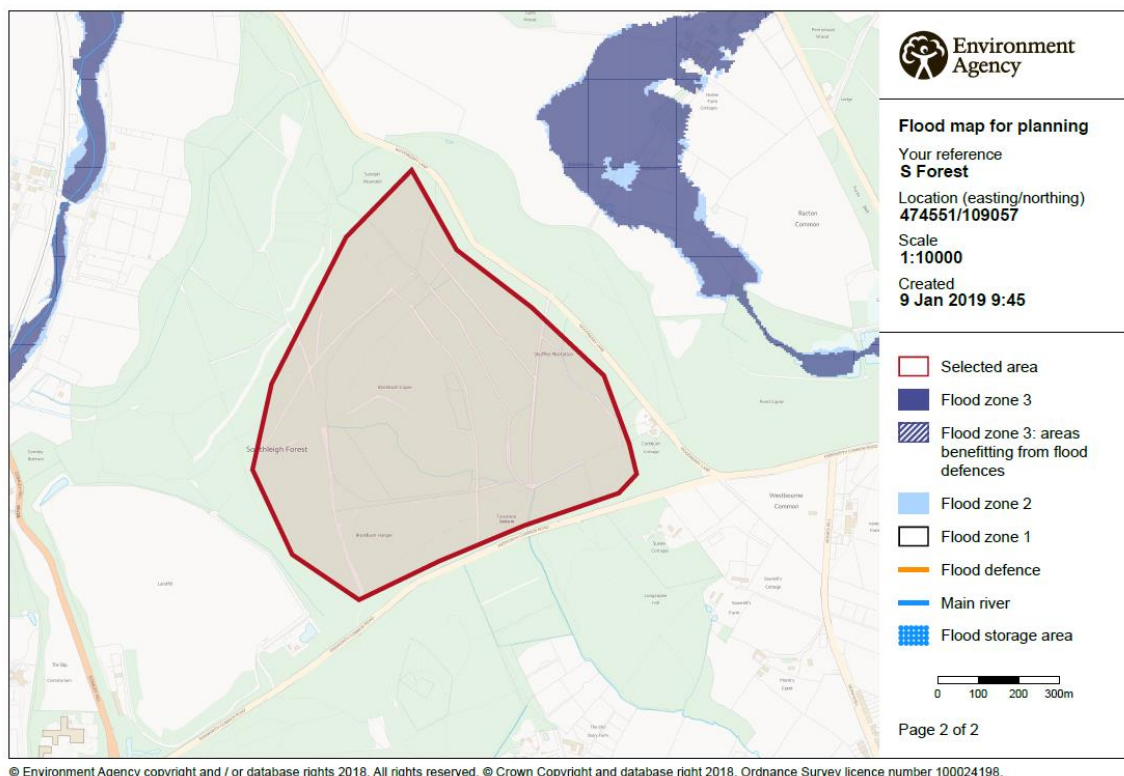


**Figure 3.12:** National Park boundaries (DEFRA Magic Map <https://magic.defra.gov.uk/MagicMap.aspx>, OS Copyright licence no. 2019 100018036, Natural England, contains public sector information licensed under the Open Government Licence v3.0.).

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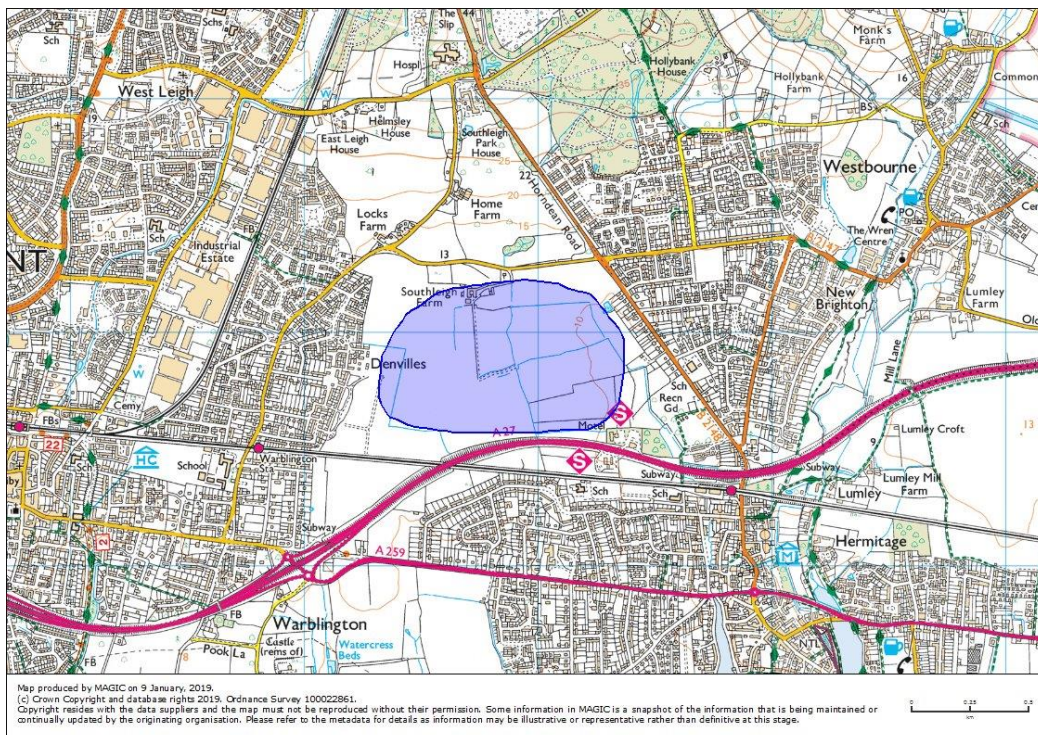


**Figure 3.13:** Ancient and Semi-Natural Woodland (green) and Ancient Replanted Woodland (brown) (DEFRA Magic Map <https://magic.defra.gov.uk/MagicMap.aspx>, OS Copyright licence no. 2019 100018036, Natural England, contains public sector information licensed under the Open Government Licence v3.0.).



**Figure 3.14:** Flood Plain Map of Southleigh Forest (Flood Map for Planning, Environment Agency, <https://flood-map-for-planning.service.gov.uk/>, contains public sector information licensed under the Open Government Licence v3.0., OS Copyright licence no. 2019 100018036).

| Site 60                             | Southleigh Farm                                                                                                                                                                                                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site Description</b>             | The site is located to the East of Havant and Northwest of Emsworth sitting adjacent to the A27 which was constructed on the South section of the original site resulting in a 31% reduction in the available site size. The site is a mixture of farmland and industrial buildings. |
| <b>Site Size</b>                    | 60 ha                                                                                                                                                                                                                                                                                |
| <b>Potential Reservoir Capacity</b> | 8,100 MI*                                                                                                                                                                                                                                                                            |



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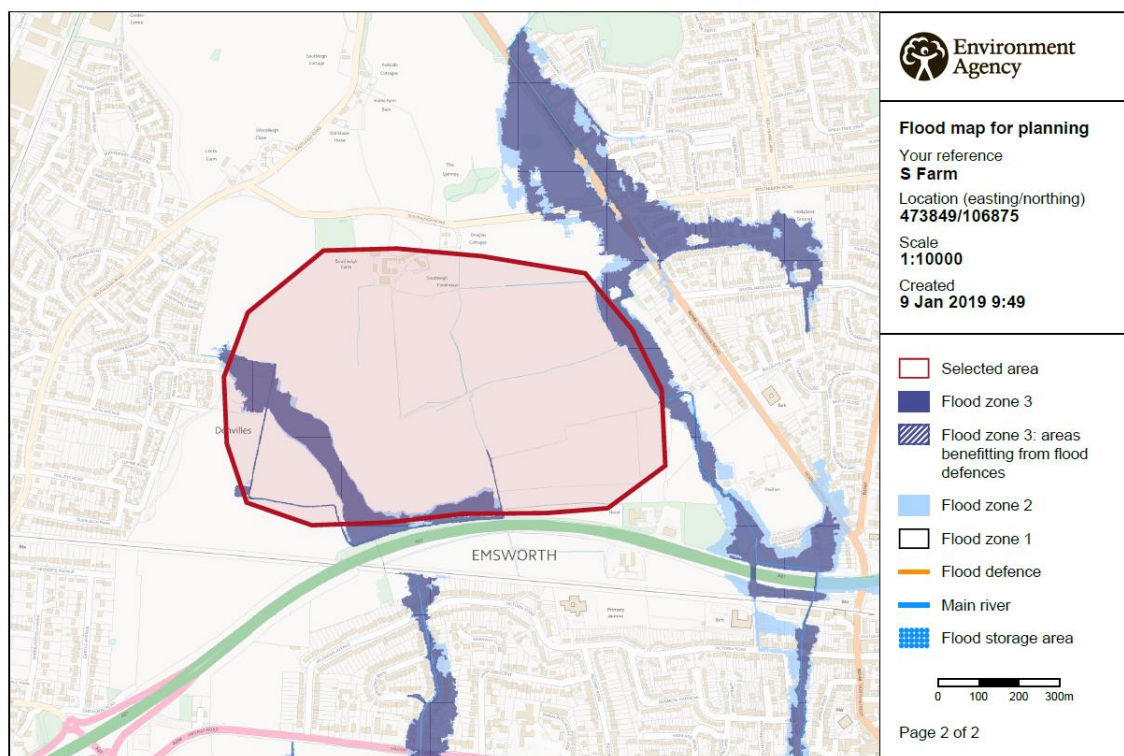
#### Green Criteria

- Site comprised of London Clay with sufficient general fill material available onsite for embankment construction.
- The volume of water available is able to support the need in the wider region.

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | <ul style="list-style-type: none"> <li>• There are no known heritage sites affected on the proposed site.</li> <li>• No Ancient Woodland at the site. Tree Preservation Orders (TPOs) are in place surrounding the site.</li> <li>• No known European Protected Species present at the site, may be some bat activity.</li> <li>• No public right of way footpaths pass through the site.</li> <li>• Site almost completely flat all material on site should be usable.</li> <li>• Good public transport links. The site is located close to Emsworth and Warblington railway stations with a local bus route passing along roads to the West and North of the site.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Amber Criteria</b> | <ul style="list-style-type: none"> <li>• Land designated as part of the South Coast Plain National Character Area (NCA).</li> <li>• Estimated 20,700 people live within 1.5 km and 68,600 people within 4.5 km. This is the second largest population within 1.5 km and 4.5 km of the five sites which could have maximised its potential recreational and educational use. However, the constrained size of the site, constricted by roads and a railway line, along with the need for steep embankments will significantly reduce the opportunity to provide recreational activities or biodiversity enhancements as the slopes would have to be armoured</li> <li>• Significant areas designated as Flood Zone 3 within site boundary (Figure 3.15).</li> <li>• Site construction would see the removal of the farmhouse and a handful of industrial units to the North of the site.</li> <li>• Site is located 3 km from pumping station at Bedhampton (6 m height difference). Water would need to be pumped to the reservoir. The proposed pipe route would be longer to allow an emergency discharge to the harbour and minimise disruption (~5 km), passing through 5 streams and once across the railway line. Route would be in relatively close proximity to Warblington Conservation Area (Warblington Cemetery, Castle (Grade II* listed building and historical monument) and St Thomas a Becket's Church (likely archaeological site)) as well as Chichester Harbour which is an EU protected SAC, SPA, RAMSAR and SSSI site.</li> <li>• Slip road to motel and petrol station on westbound side of A27 could be converted for construction access. However, this would currently only allow one-way access and construction of two-way access could be costly. This route is also adjacent to the SINC on site. Other access routes would have to pass through heavily built up areas.</li> </ul> |
| <b>Red Criteria</b>   | <ul style="list-style-type: none"> <li>• Privately owned arable land and adjacent farm buildings and industrial units. Site construction would completely eradicate the businesses in this area.</li> <li>• The site has been allocated for the development of 2100 dwellings as part of Havant Borough Council's 2036 Local Plan making it near impossible to acquire. <i>Note: The allocation for housing has been confirmed in the Local Plan. This would result in the site being screened out as no longer available.</i></li> <li>• Land almost entirely green field site, arable crops grown for agricultural purposes. Land provisionally characterised as Grade 1 or 2 under Agricultural Land Classification.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

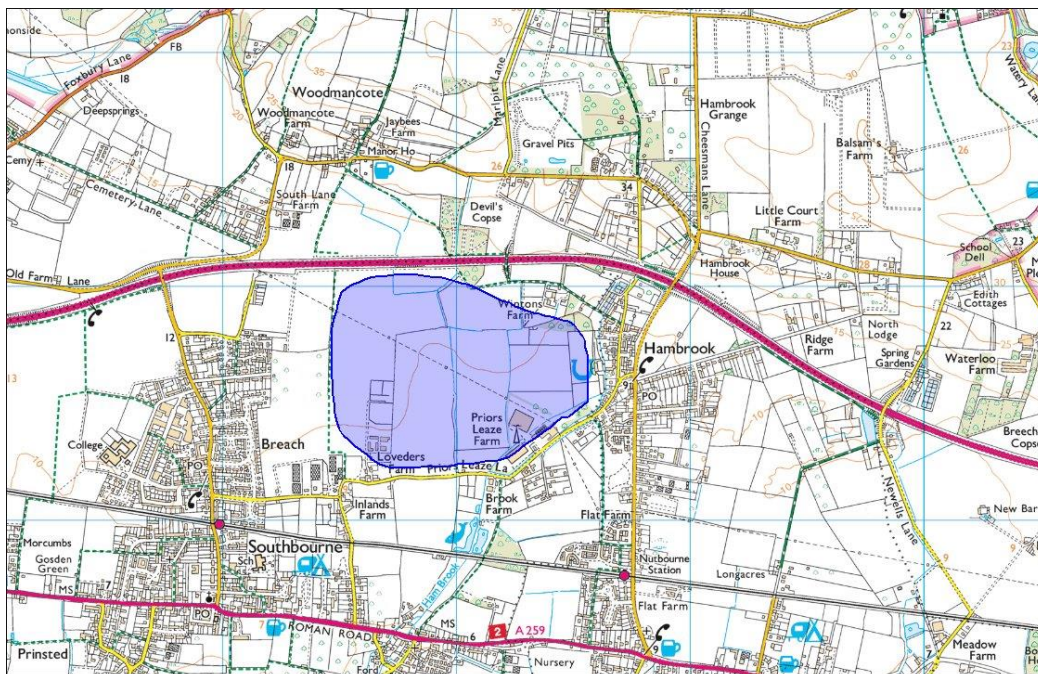
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|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | <ul style="list-style-type: none"> <li>Extremely high visibility from residential housing to the East and West of site. A27 and railway line form a boundary to the South of the site mostly shielded by a tree line along the course. Very little protection from the site to block views and noise associated with construction.</li> <li>A fully bunded reservoir is required and due to the relatively small size steep embankments are required to satisfy capacity requirements.</li> <li>There is a significant flood risk to housing and infrastructure from embankment failure. There is a high priority for flood risk management.</li> <li>Mill Pond which surrounding streams run into would be unable to cope with emergency discharge. This would require construction of an emergency drawdown pipe to discharge into Chichester Harbour which is an EU protected SAC, SPA, RAMSAR and SSSI site.</li> </ul> |
| <b>Summary</b>              | <p>The volume of water available is able to support the need in the wider region. Water would be able to return by gravity. However, the site forms part of the Havant Borough Council's Local Plan 2036, allocated for major housing development (plans for which are quite advanced). Therefore the site must now be screened out as it is no longer available. The smaller available area and flat topography would require a fully bunded reservoir with steep embankments which would result in undesirable views from the surrounding areas, and limits access and opportunities for recreation and biodiversity enhancement. There is significant floodplain encroachment and the flood risk to surrounding infrastructure in the event of embankment failure would be high. Finally, the requirement for a discharge pipe into the protected harbour would be a significant concern.</p>                            |
| <b>Pass to Stage Three?</b> | <b>NO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

\* Potential reservoir size is based on the capacity proposed in previous studies taking into account any reduction to the site size.



**Figure 3.15:** Flood Plain Map of Southleigh Farm (Flood Map for Planning, Environment Agency, <https://flood-map-for-planning.service.gov.uk/>, contains public sector information licensed under the Open Government Licence v3.0., OS Copyright licence no. 2019 100018036).

| Site 61                             | Loveders Farm                                                                                                                                                               |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site Description</b>             | 65 ha site located to the Northeast of Southbourne and East of Hambrook adjacent to the A27. The site is used as agricultural land with associated dwellings and buildings. |
| <b>Site Size</b>                    | 65 ha                                                                                                                                                                       |
| <b>Potential Reservoir Capacity</b> | 7,500 MI                                                                                                                                                                    |



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#### Green Criteria

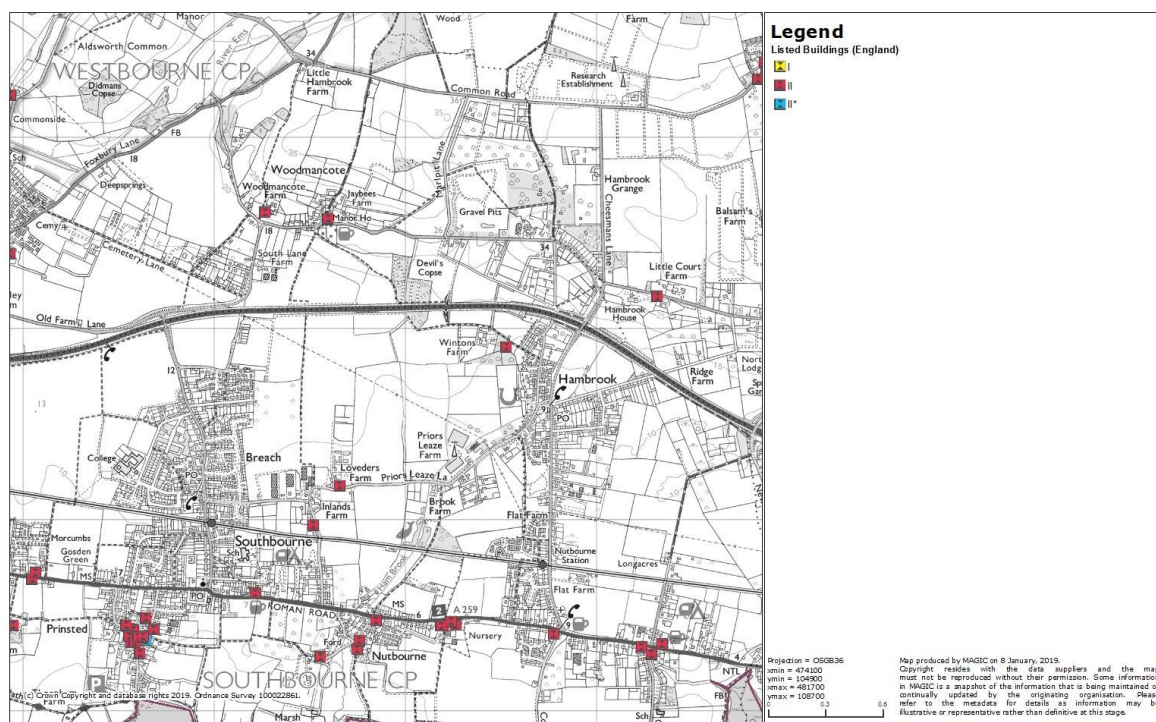
- Site comprised of London Clay with sufficient general fill material available on site for embankment construction.
- No floodplain encroachment on site (Figure 3.18).
- Site almost completely flat all material on site should be usable.

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                       | <ul style="list-style-type: none"> <li>No current plan for housing development on site. There is no change in use allocation in the Local Plan.</li> <li>There are no known European Protected Species at the site, some bats may use the site.</li> <li>There are no conservation designations at the site.</li> <li>There are good public transport links close by as it is located close to Southbourne and Nutbourne rail stations. Local bus service to the South would be within 1 km if site can be accessed from the South.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Amber Criteria</b> | <ul style="list-style-type: none"> <li>Volume of water available unlikely to be sufficient to support the need in the wider region.</li> <li>Privately owned arable land and adjacent farm buildings. Site construction would completely eradicate the business in this area.</li> <li>Land designated as part of the Southbourne Coastal Plain (SC5).</li> <li>Multiple public right of way footpaths pass through the site.</li> <li>Site construction would most likely see the removal of a handful of residential dwellings and farm buildings to the West and South-East of the site.</li> <li>Existing access for the A27 at the Northeast of the site <i>via</i> Priors Leaze Lane would allow one-way entry and exit from Chichester and to Havant respectively and minimises disruption in residential areas. Construction of two-way access would be costly.</li> <li>A small copse of Ancient Woodland (~2 ha) is located to the North of the site (Figure 3.17) and would be likely to be impacted by development.</li> <li>Loveders Farmhouse and Newell House are Grade II listed buildings located on the edges of proposed site and therefore would be impacted visually, or in the case of Loveders Farmhouse may need to be demolished (Figure 3.16).</li> </ul>                                                                                                                                                                                                                                                               |
| <b>Red Criteria</b>   | <ul style="list-style-type: none"> <li>Land almost entirely green field site, arable crops grown for agricultural purposes. Land provisionally characterised as Grade 1 or 2 under Agricultural Land Classification.</li> <li>Site is located ~7 km from pumping station at Bedhampton (3 m height difference). Water would need to be pumped to and from the reservoir. The proposed pipe route would be longer to facilitate ED and minimise disruption (~10 km), passing through 6 streams and once across the railway line. Route would be in relatively close proximity to Warblington Conservation Area (Warblington Cemetery, Castle (Grade II* listed building and historical monument) and St Thomas a Becket's Church (likely archaeological site)) as well as Chichester Harbour which is an EU protected SAC, SPA, RAMSAR and SSSI site. This is the longest pipeline of all options assessed.</li> <li>A fully bunded reservoir is required and due to the relatively small size steep embankments are required to satisfy capacity requirements.</li> <li>Estimated 5,500 people within 1.5 km and 24,800 people within 4.5 km. This is the smallest population within both 1.5 and 4.5 km of the five sites which will limit its recreational and educational use. The constrained size of the site, constricted by roads, along with the need for steep embankments will significantly reduce the opportunity to provide recreational activities or biodiversity enhancements as the slopes would have to be armoured.</li> </ul> |

|                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | <ul style="list-style-type: none"> <li>Water courses downstream not likely be able to cope with emergency discharge, hence construction of a discharge pipe into Chichester Harbour which is an EU protected SAC, SPA, RAMSAR and SSSI site would be required.</li> <li>Highly visible from residential housing located to the East and West, with the need for a fully bunded reservoir having a large negative visual impact.</li> <li>There is a significant flood risk to surrounding property and infrastructure in the event of embankment failure.</li> <li>Transmission lines run across the site.</li> </ul>                                                                                                                                                                                                                                                 |
| <b>Summary</b>              | <p>Volume of water available is unlikely to be sufficient to support the need in the wider region. Water would need to be pumped to and from the site increasing operating costs. The smaller available area for this site and flat topography means a fully bunded reservoir with steep embankments is required resulting in undesirable views from the surrounding areas, it also limits access and opportunities for recreation and biodiversity enhancement. It would be difficult to offset the loss of best and most valuable agricultural land. Public rights of way and listed buildings will be impacted. There would also be a significant flood risk to surrounding property and infrastructure in the event of embankment failure, plus the need for an emergency discharge pipe into the environmentally protected harbour is a significant concern.</p> |
| <b>Pass to Stage Three?</b> | <b>NO</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

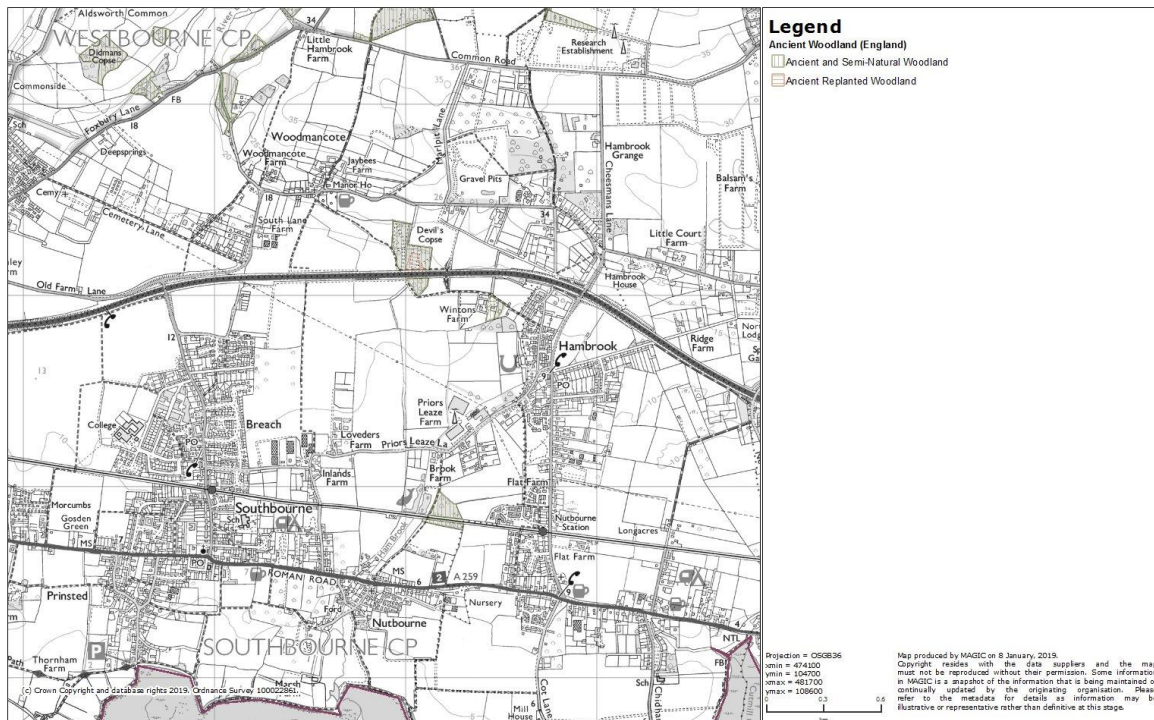
\* Potential reservoir size is based on the capacity proposed in previous studies taking into account any changes to the site size.

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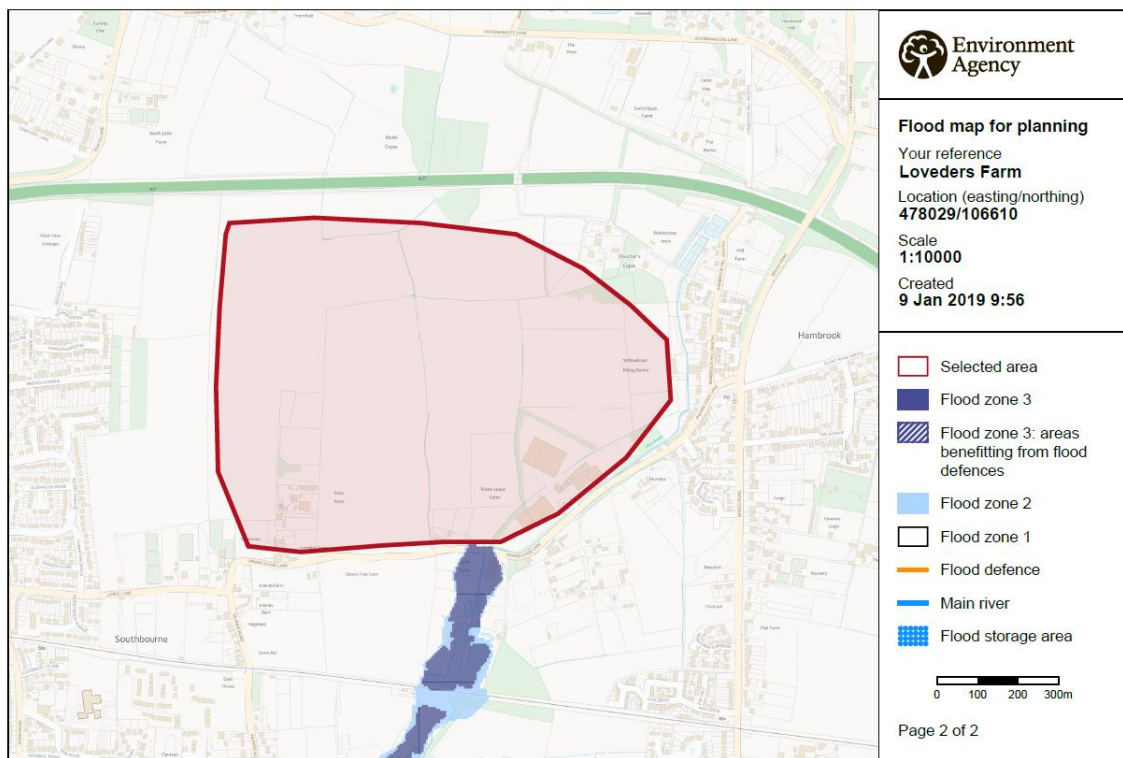


**Figure 3.16:** Location of listed buildings around Loveders Farm (DEFRA Magic Map <https://magic.defra.gov.uk/MagicMap.aspx>, OS Copyright licence no. 2019 100018036, © Historic England 2019. Contains Ordnance Survey data © Crown copyright and database right 2019 The Historic England GIS Data contained in this material was obtained on 09/01/2019. The most publicly available up to date Historic England GIS Data can be obtained from <http://www.HistoricEngland.org.uk>).

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**Figure 3.17:** Ancient and Semi-Natural Woodland (green) and Ancient Replanted Woodland (brown) (DEFRA Magic Map <https://magic.defra.gov.uk/MagicMap.aspx>, OS Copyright licence no. 2019 100018036, Natural England, contains public sector information licensed under the Open Government Licence v3.0.).



**Figure 3.18:** Flood Plain Map of Loveders Farm (Flood Map for Planning, Environment Agency, <https://flood-map-for-planning.service.gov.uk/>, contains public sector information licensed under the Open Government Licence v3.0., OS Copyright licence no. 2019 100018036).

### 3.4.1 Results of Stage Two Assessment

**Table 3.3** Stage Two assessment summary.

| Criteria                             | Site 57<br>Lumley<br>Farm | Site 58<br>Havant<br>Thicket | Site 59<br>Southleigh<br>Forest | Site 60<br>Southleigh<br>Farm | Site 61<br>Loveders<br>Farm |
|--------------------------------------|---------------------------|------------------------------|---------------------------------|-------------------------------|-----------------------------|
| Land ownership and purchase cost     |                           |                              |                                 |                               |                             |
| Site area                            |                           |                              |                                 |                               |                             |
| Potential reservoir capacity         |                           |                              |                                 |                               |                             |
| Land use, quality & planning policy  |                           |                              |                                 |                               |                             |
| Flood plain encroachment             |                           |                              |                                 |                               |                             |
| Landscape                            |                           |                              |                                 |                               |                             |
| Views                                |                           |                              |                                 |                               |                             |
| Nature conservation and biodiversity |                           |                              |                                 |                               |                             |
| Ancient woodland                     |                           |                              |                                 |                               |                             |
| Archaeology and historic development |                           |                              |                                 |                               |                             |
| Impact on recreation                 |                           |                              |                                 |                               |                             |
| Recreational benefits                |                           |                              |                                 |                               |                             |
| Construction impact (excl. traffic)  |                           |                              |                                 |                               |                             |
| Impact of construction traffic       |                           |                              |                                 |                               |                             |
| Impact on residential dwellings      |                           |                              |                                 |                               |                             |
| Length of pipeline                   |                           |                              |                                 |                               |                             |
| Discharge measures                   |                           |                              |                                 |                               |                             |
| Topography & re-use of materials     |                           |                              |                                 |                               |                             |
| Visitor access                       |                           |                              |                                 |                               |                             |
| <b>Score<sup>a</sup></b>             | 41                        | 30                           | 43                              | 37                            | 41                          |
| <b>Preferred Site</b>                | No                        | Yes                          | No                              | No                            | No                          |

*Link to a summary of the reasoning behind the designation given to each criterion by clicking on the relevant box.*

By scoring the sites<sup>a</sup> based on a system of Green = 1, Amber = 2 and Red = 3 the analysis indicates that Havant Thicket has the lowest score and provides the best option from the stage 2 reservoir sites.

This is due to the fact that the size and natural topography of the available land allows for the development of areas for recreational activity that will benefit the local community, along with the potential for nature and biodiversity enhancement. This would be restricted at the other sites due to their constrained size and the requirement for fully bunded reservoirs with steeper embankments relative to those possible at the Havant Thicket site, which limits their potential use for recreation and opportunities to provide wetland habitats, as the embankments would be armoured. The volume of water available at Havant Thicket is able to support the need in the wider region.

However, it is recognised that development on the Havant Thicket site will involve the removal of 4 small areas (13.2 ha, 8.3% of the total site) of woodland designated as Ancient Woodland as well as construction within part of a listed heritage park and garden. Options to minimise these impacts and enhance benefits are considered in Stage Three.

The second lowest scoring site is Southleigh Farm, but this site is no longer available as it has been allocated in the Local Plan for housing.

On this basis Havant Thicket is the preferred option that has been passed for appraisal in Stage Three, where a variety of conceptual reservoir designs on the site will be analysed.

## 3.5 Stage Three – Havant Thicket Winter Storage Reservoir Options Appraisal

### 3.5.1 Description of Alternative Proposals for Havant Thicket Site

Due to the recognition that the development of a reservoir on the Havant Thicket site will have a significant impact upon the landscape, heritage and ecology of the area, it is necessary to assess the options that are available including the potential benefits to all stakeholders and the environment.

Stage Three sets out to assess eight potential options for a winter storage reservoir at Havant Thicket.<sup>5</sup> The following options are a shortlist of conceptual options considered in an option selection process for the final design of the reservoir. It should be noted that the data provided comparing cost and yield between options was estimated in 2006 and as such costs are expected to have risen significantly whilst yields for a 1 in 200 event are more conservative, this however would impact each option equally and thus the original data is deemed sufficient for comparisons between designs at this stage.

The options are:

- **Option 1:** Single HTWSR, based upon the original 1970s design;
- **Option 2:** Single HTWSR, as above, but including a peninsula extending southwards from the northern shore, and also with the main embankments having shallower slopes;
- **Option 3:** Single HTWSR, as above, but with the potential wetland areas maximised in the NW of the reservoir;
- **Option 4:** Single, smaller, HTWSR, which retains part of The Avenue;
- **Option 5:** Single HTWSR, but with lower embankments as a result of excavating material and 'sinking' the reservoir into the slope;
- **Option 6:** Single HTWSR with higher embankments to maximise capacity;
- **Option 7:** Series of three winter storage reservoirs at Havant Thicket stepped into the slope of the land and which retains The Avenue;
- **Option 8:** Two winter storage reservoirs either side of The Avenue which would be retained.

These options varied in size and scope from large designs maximising yield, wetland and recreational area to smaller and separated areas that attempted to preserve areas of woodland, in particular The Avenue.

These options were set out in a report sent to stakeholders in June 2006 (Entec June 2006) for discussion at a stakeholder workshop on 30 June 2006. The meeting was attended by councillors and officers from East Hants District Council and Havant Borough Council, Hampshire County Council (including the manager of Staunton Country Park), Forestry England, Environment Agency, Hants & IOW Wildlife Trust and Consumer Council for Water. Written feedback was requested by the 28 July 2006. The options report shared with stakeholders included information on key features and yield for each option as well as a section setting out the impacts the reservoir might have, with a layout plan

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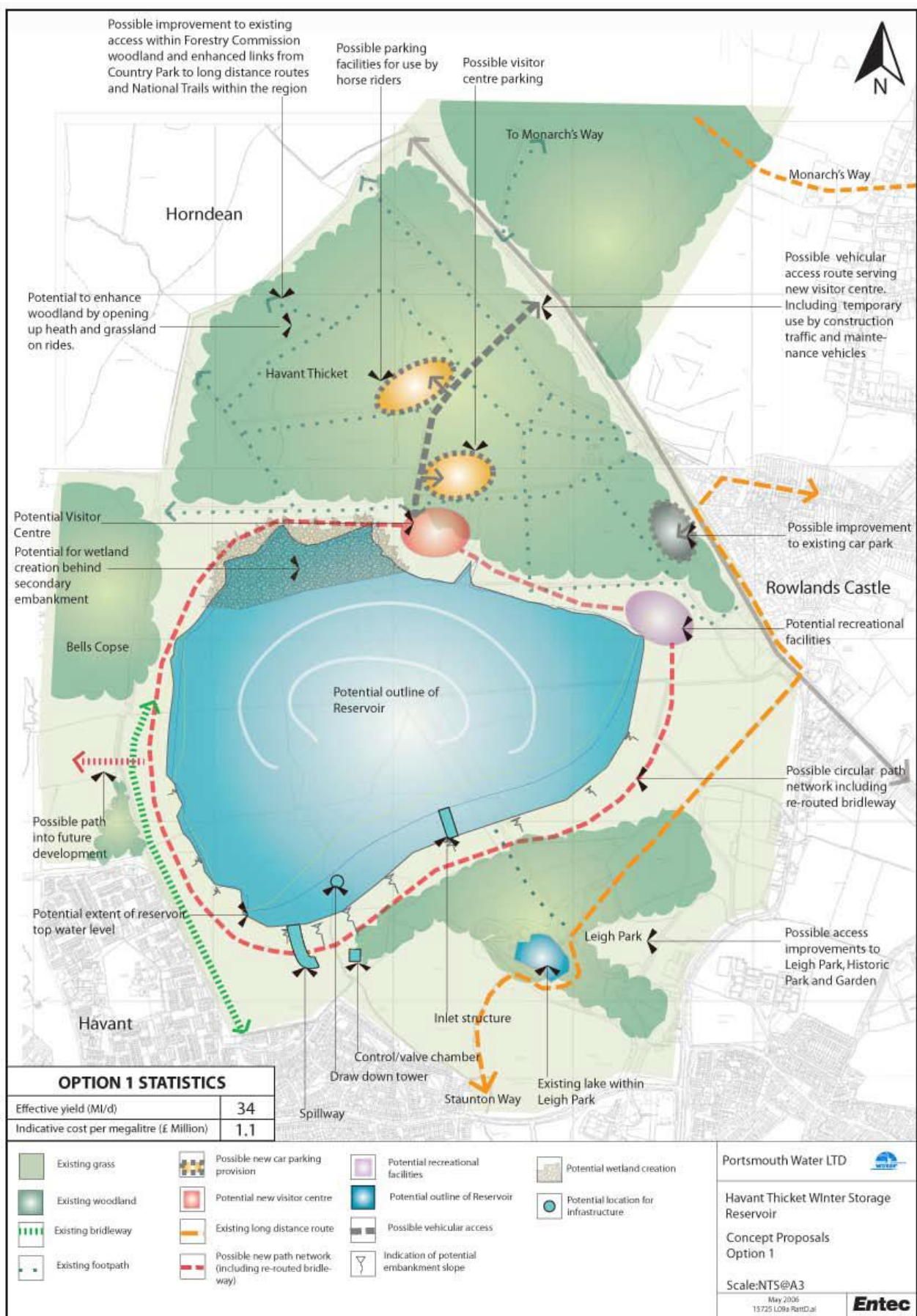
<sup>5</sup> Options 1-7 were derived from Entec 2006 report (There was also a design for a site at Southleigh Farm, however this has been screened out at Stage Two of this report). Option 8 is another potential design included in this [report as it has previously been discussed with Regulators and stakeholders](#), it is based on a combination of Options 4 and 7.

and summary table describing the potential advantages and disadvantages of each option. A summary table of the feedback is provided in Appendix G.

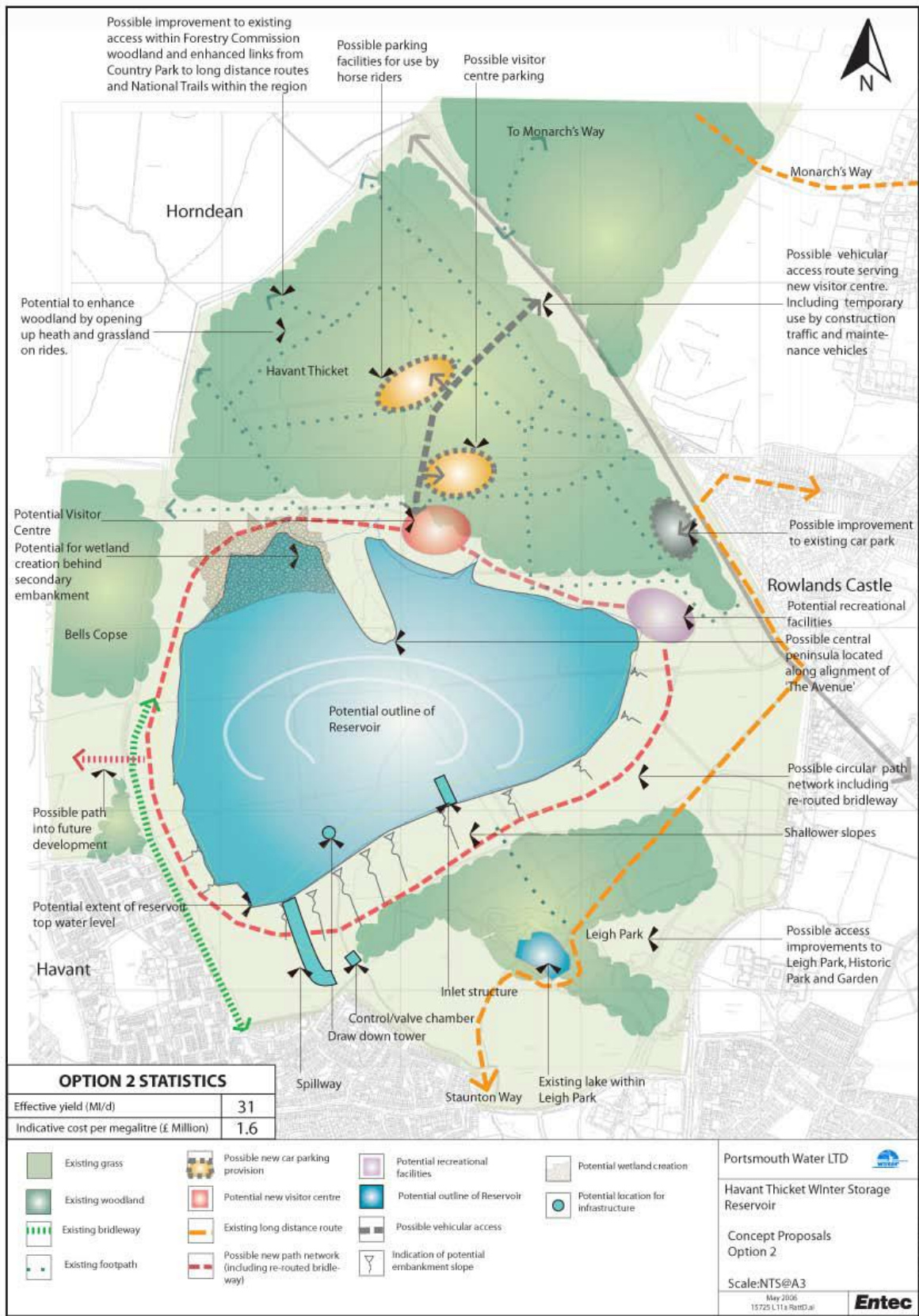
The stakeholder consultation in 2006 did not identify a preferred option. On balance the view of stakeholders was that the yield, recreation and biodiversity enhancements of the larger options outweighed the loss of The Avenue, as long as the main woodland areas to the north and south were preserved, and the woodland loss was addressed by tree planting. The visual aspect was considered important to ensure that the embankments blend in with the natural and historic landscape. This feedback was used to help develop a reduced set of options.

The options are as follows:

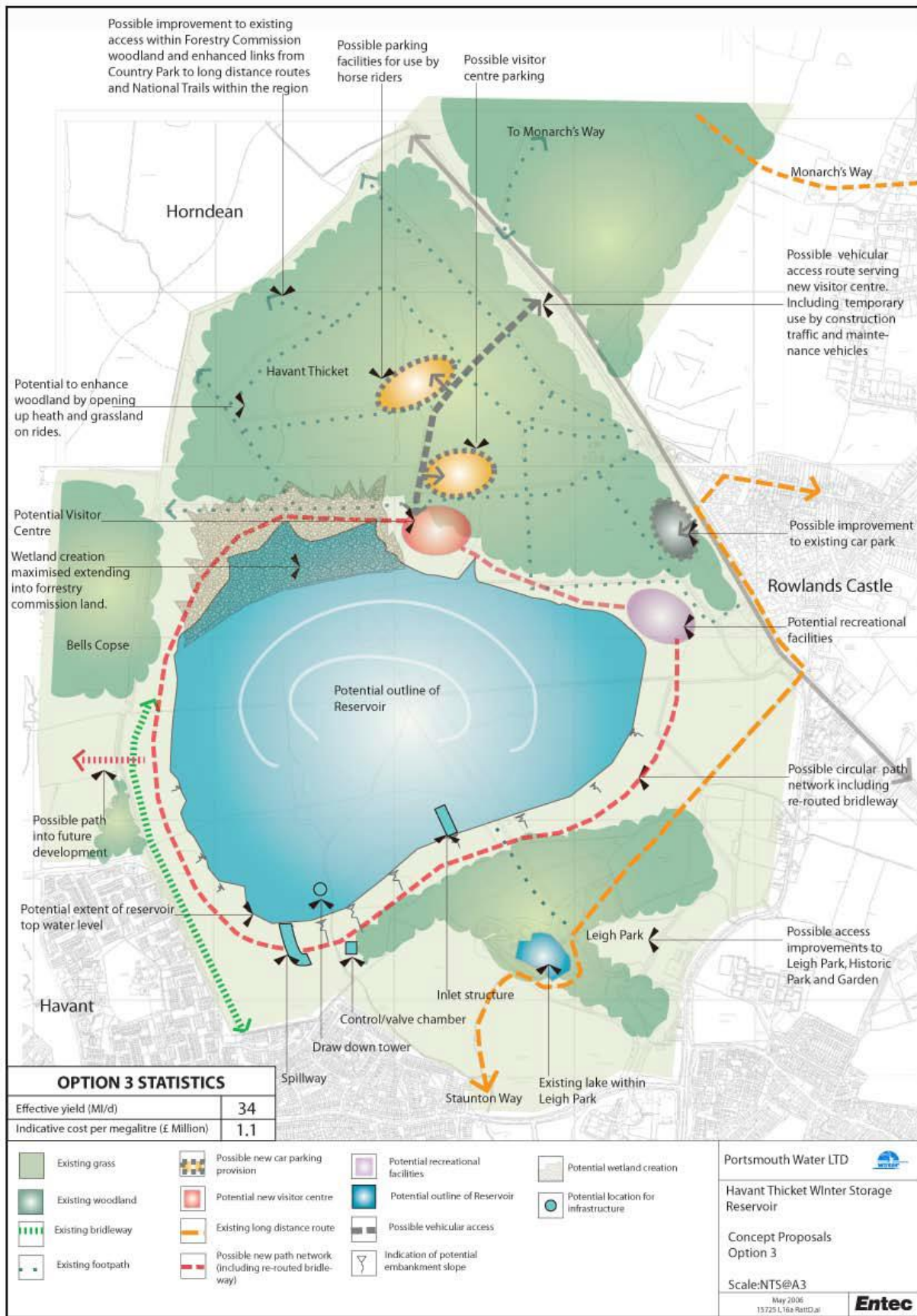
Option 1: Base Option (single reservoir optimising the use of the P.Water land)



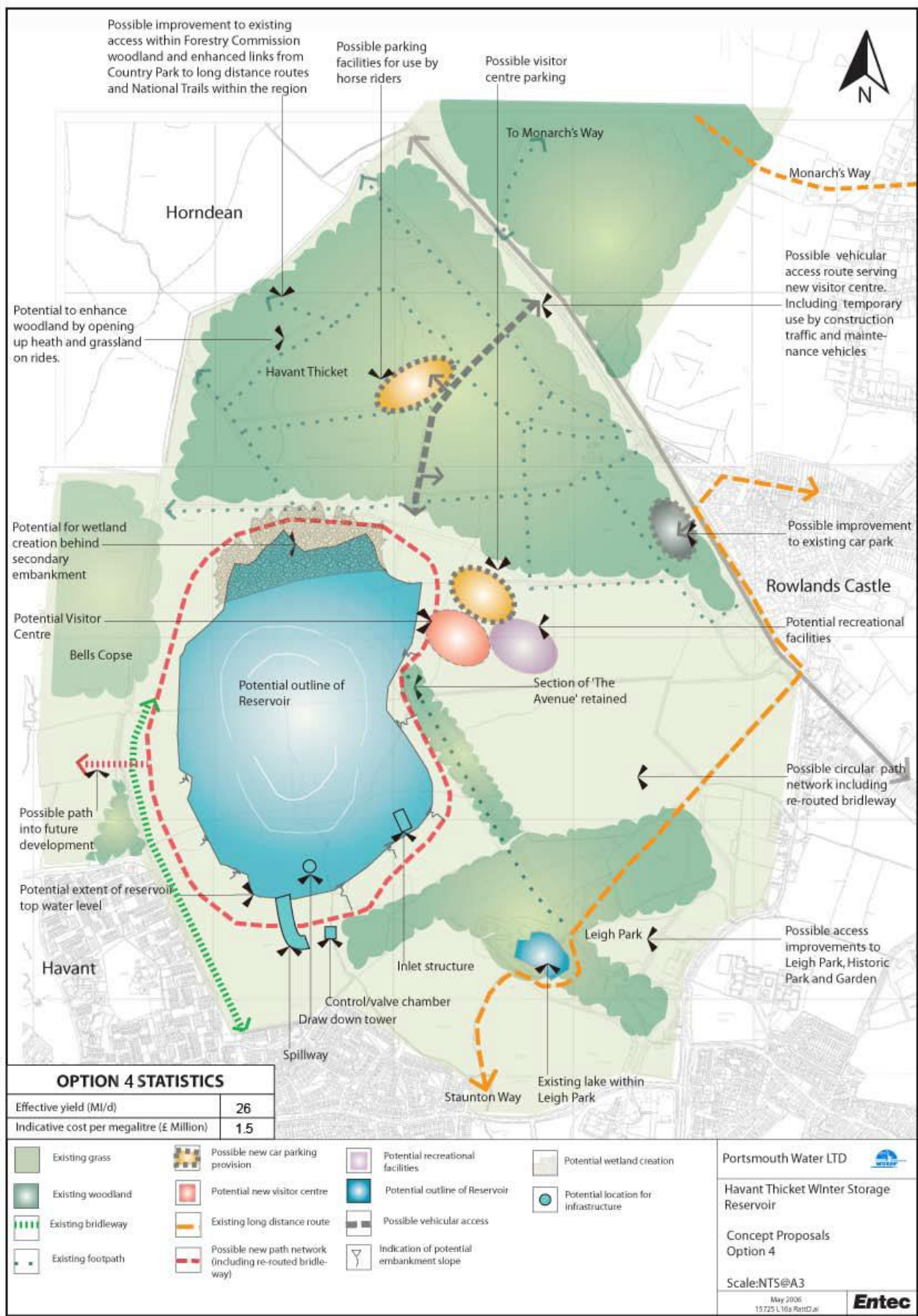
**Option 2: Single HTWSR, as above, but including a peninsula extending southwards from the northern shore, and also with the main embankments having shallower slopes**



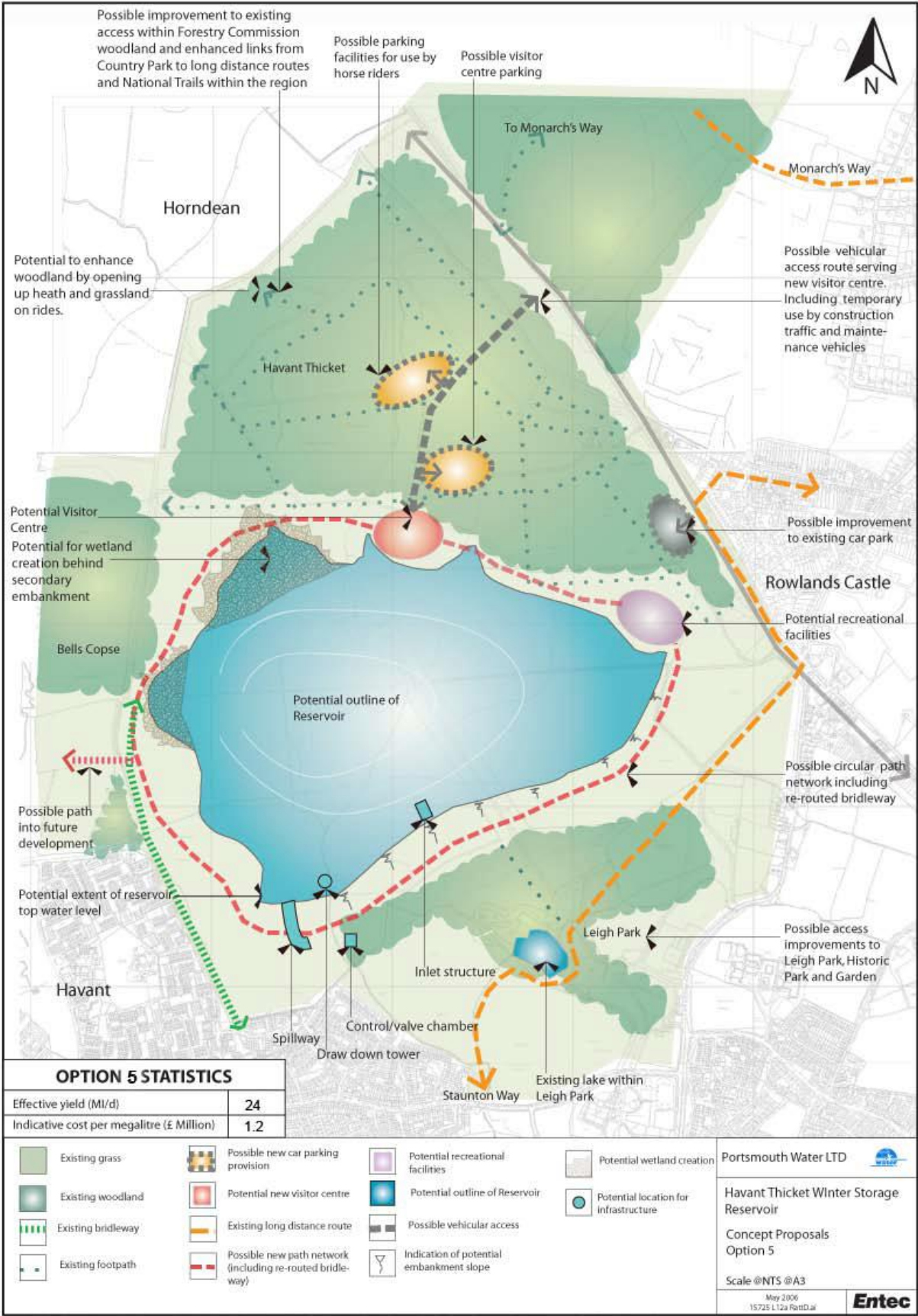
**Option 3: Single HTWSR, as above, but with the potential wetland areas maximised in the NW of the reservoir;**



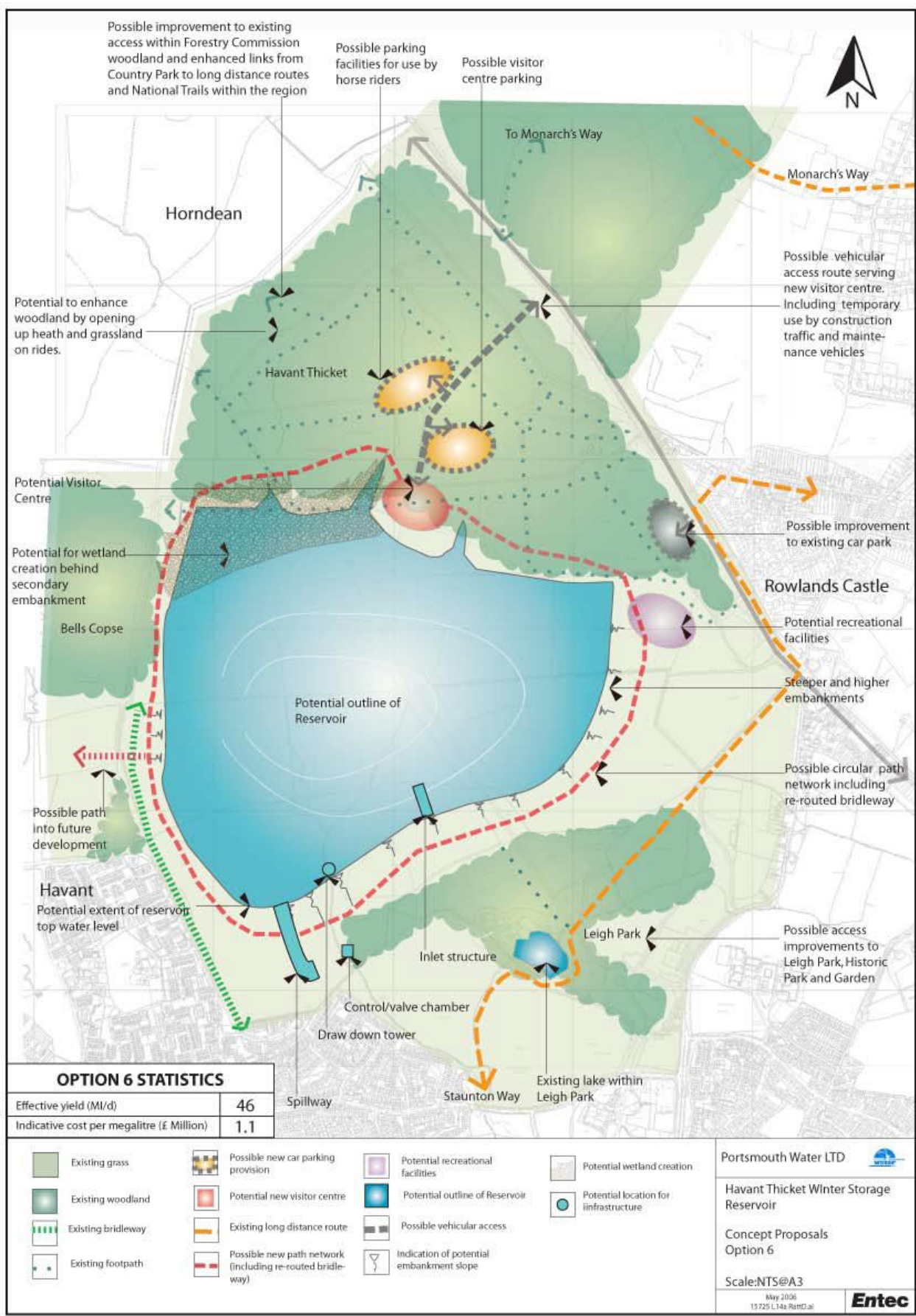
Option 4: Single, smaller, HTWSR, which retains ~62% of The Avenue;



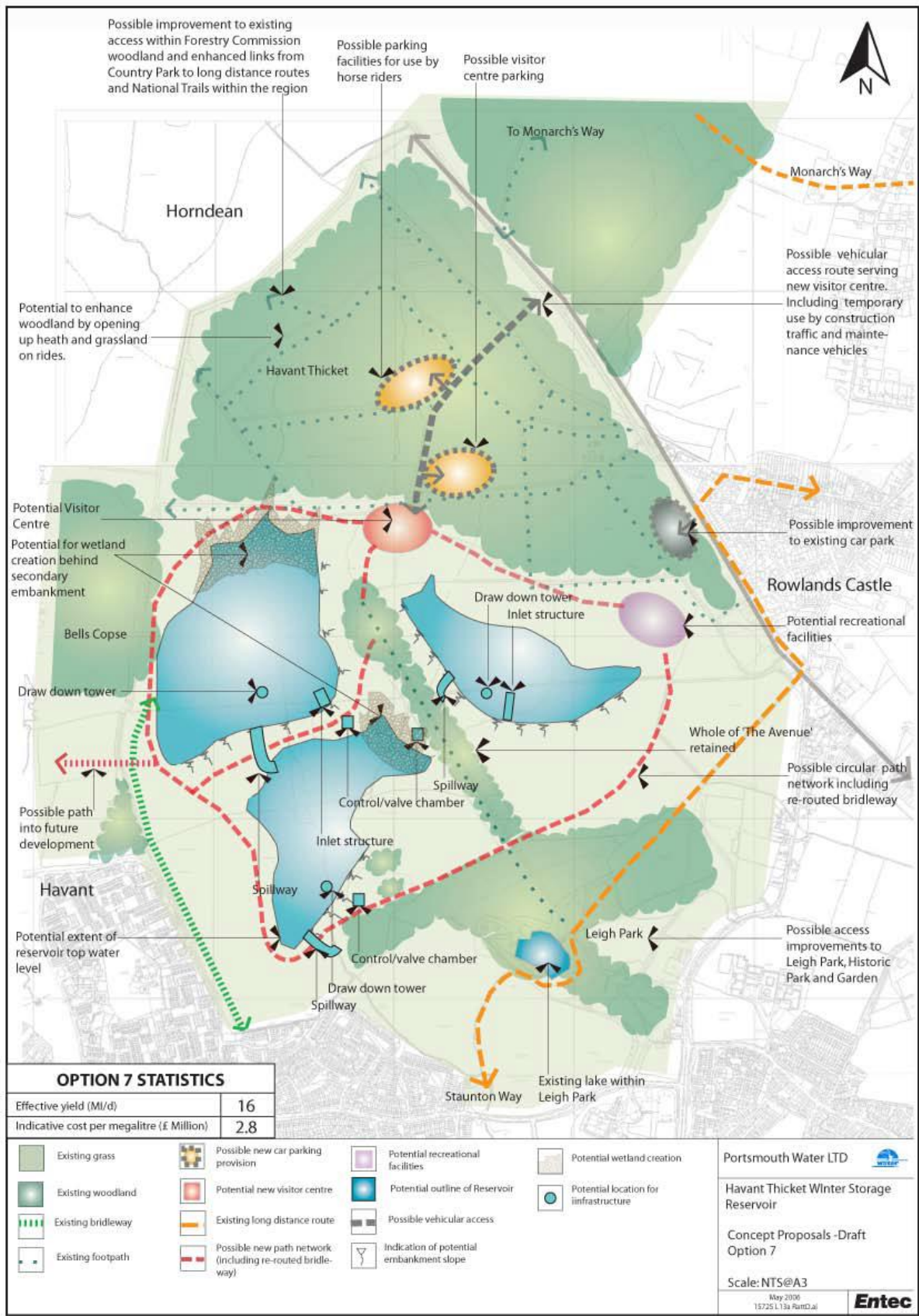
**Option 5: Single HTWSR, but with lower embankments as a result of excavating material and ‘sinking’ the reservoir into the slope;**



Option 6: Single HTWSR with higher embankments to maximise capacity;

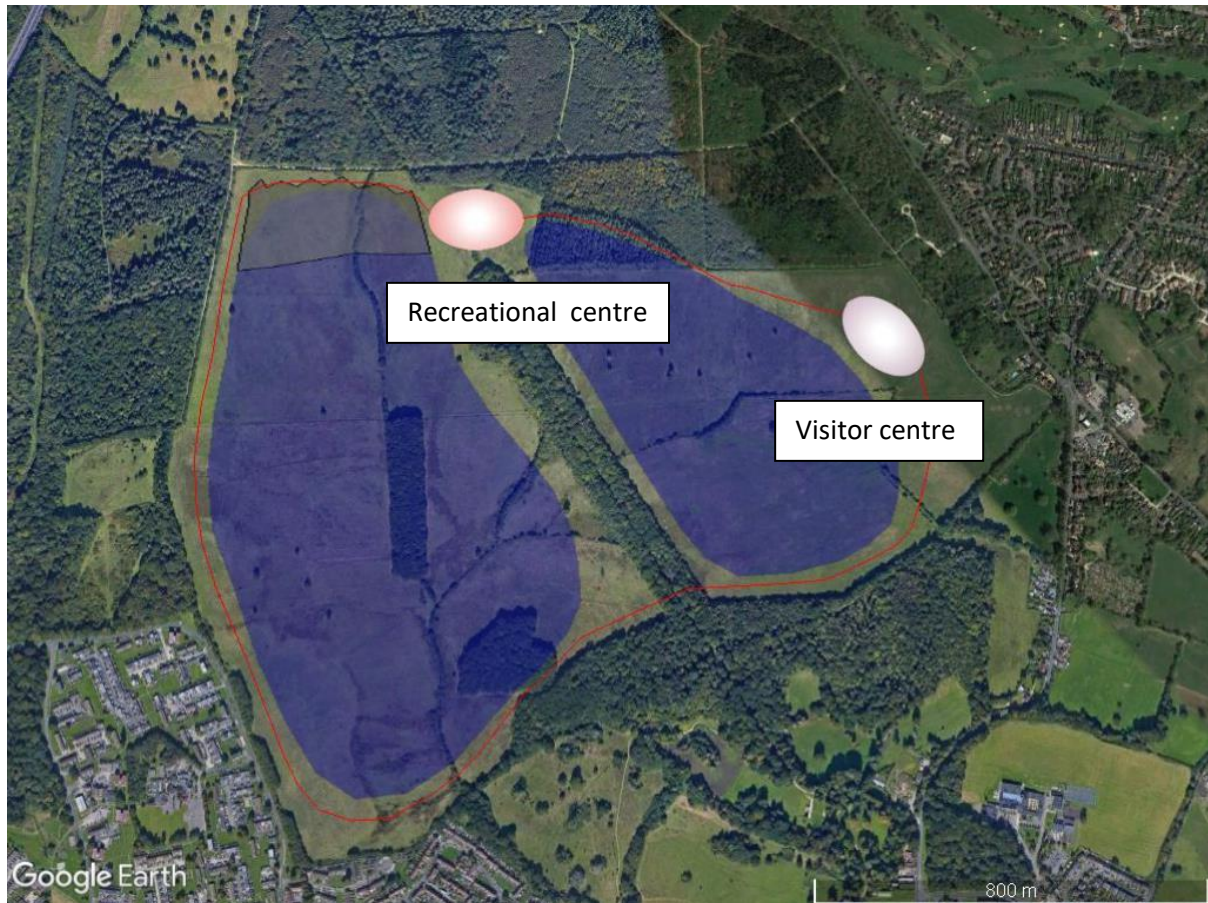


**Option 7: Series of three winter storage reservoirs at Havant Thicket stepped into the slope of the land and which retains The Avenue.**



**Option 8: Two winter storage reservoirs at Havant Thicket either side of The Avenue which is retained.**

*Note: Option 8 is another potential design included in this assessment report as it has previously been discussed with Regulators and stakeholders. It is based on a combination of Options 4 and 7, but does not have an Entec 2006 map as it was not included in the original options appraisal process.*



All of the options 1 to 8 illustrated on the maps have conceptual facilities such as car parking, access routes and recreational facilities, including a visitor centre. These are shown indicatively only and are generally all shown to be of a similar nature and location because further work is required to finalise these aspects of the scheme. Portsmouth Water also need to balance stakeholder aspirations as some activities may be mutually exclusive, or at least compete for the same resource on site. For example; recreational use of the water could conflict with the use of the water by waterfowl. This is important as the scheme layout must be compatible with delivering a net biodiversity gain. This will be considered as part of the Environmental Impact Assessment.

A summary of the key statistics for each option is given in Table 3.4. Each option has been assessed against key criteria (Table 3.5) and the results of the assessment are presented in Table 3.6. A more detailed assessment table for each option is provided in Appendix E.

A key reason why the Havant Thicket site was identified as a potential reservoir site in the 1960's was because it formed a natural bowl underlain by clay which could be used to construct the embankments reducing the costs and environmental impact of construction as material could be sourced on site. In 2006/07 Entec<sup>6</sup> completed an assessment of material availability, based on a review of the site investigation data available and engineering requirements of the options. This review concluded that there was insufficient material available on site for a number of the options. The fact that a number of the options were not viable was fed back to the Stakeholder Group on the 31 July 2007. The availability of material on site is a key assessment criteria and the findings of the Entec study are included in Table 3.6 and Appendix E.

It is worth noting from the information in Table 3.4 that only Options 1, 3 and 6 are able to provide a yield and effective storage volume of more than 8,000 MI that would be able to support the need in the wider region. Therefore selecting smaller reservoir options would adversely effect the options that Southern Water have to reduce abstraction from the River Itchen, which is designated as a SAC under the EC Habitats Directive.

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1. <sup>6</sup> Portsmouth Water Limited, 'Havant Thicket Winter Storage Reservoir Embankment Material Investigations', Entec, 2007.

**Table 3.4** Options Summary: Key Statistics.

|                                                         | <b>Option 1: Base option</b> | <b>Option 2: Shallower slopes</b> | <b>Option 3: Maximised wetland</b> | <b>Option 4: Retention of 62% of The Avenue</b> | <b>Option 5: Lower embankments</b> | <b>Option 6: Higher embankments</b> | <b>Option 7: Stepped ponds retaining The Avenue</b> | <b>Option 8: Two ponds retaining The Avenue</b> |
|---------------------------------------------------------|------------------------------|-----------------------------------|------------------------------------|-------------------------------------------------|------------------------------------|-------------------------------------|-----------------------------------------------------|-------------------------------------------------|
| <b>Effective Storage Capacity (MI)</b>                  | 8,160                        | 7,005                             | 8,160                              | 5,446                                           | 4,465                              | 12,164                              | 2,370                                               | ~6,000 <sup>a</sup>                             |
| <b>Effective Yield (MI/d)</b>                           | 34                           | 31                                | 34                                 | 26                                              | 24                                 | 46                                  | 16                                                  | ~27 <sup>a</sup>                                |
| <b>Outline Construction Costs (£Million)</b>            | 36                           | 50                                | 38                                 | 39                                              | 28                                 | 51                                  | 44                                                  | ~51 <sup>a</sup>                                |
| <b>Indicative Cost per Megalitre (£Million/MI)</b>      | 1.1                          | 1.6                               | 1.1                                | 1.5                                             | 1.2                                | 1.1                                 | 2.8                                                 | 1.7                                             |
| <b>Full Water Level (m AOD)</b>                         | 38.5                         | 38.5                              | 38.5                               | 38.5                                            | 34.5                               | 42.5                                | 26, 34.5, 38.5                                      | 38.5, 38.5 <sup>a</sup>                         |
| <b>Full Water Surface Area (ha)</b>                     | 110                          | 94                                | 98                                 | 71                                              | 85                                 | 121                                 | 63                                                  | 93                                              |
| <b>Typical End of Summer Storage (% Full)</b>           | 63                           | 60                                | 63                                 | 57                                              | 52                                 | 66                                  | 40                                                  | ~50 <sup>a</sup>                                |
| <b>Top of Embankment (m AOD)</b>                        | 40                           | 40                                | 40                                 | 40                                              | 36                                 | 44                                  | 27.5, 36, 40                                        | 40, 40 <sup>a</sup>                             |
| <b>Downstream Embankment Slope</b>                      | 1:3.5                        | 1:10                              | 1:3.5                              | 1:3.5                                           | 1:3.5                              | 1:3.5                               | 1:3.5                                               | 1:3.5 <sup>a</sup>                              |
| <b>Area of Designated Ancient Woodland Removed (ha)</b> | 15.2                         | 15.2                              | 15.2                               | 8.96                                            | 15.2                               | 15.2                                | 2.17                                                | 6.35                                            |

The statistics for the conceptual designs were estimated in 2006, as such the expected costs are predicted to have risen significantly and the yields for a 1 in 200 event would be more conservative than those detailed above. However, the impact is assumed equal amongst options and thus they are still deemed viable for comparison.

<sup>a</sup> Statistics for this option have been estimated based on those of similar options (Options 4 and 7) to give an approximate outline of this option compared to the others. Should it be deemed a viable option, a more detailed assessment would be required.

Note: Further site investigation in 2019/20 and slope stability analysis by Atkins indicates that with appropriate design and engineering a 1 in 5 slope can be constructed with an appropriate factor of safety. Steeper slopes would be a concern in relation to pore water pressure.

**Table 3.5 Assessment Criteria at Stage Three.**

| Criteria                                          | Description                                                                                            | Green                                                                                                                 | Amber                                                                                                                          | Red                                                                                                          |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|
| Views                                             | Will any visually sensitive viewpoints be affected?<br>(Things to consider when making the assessment) | Shallow downstream embankment slopes ( $\leq 1:10$ ) and/or low embankment height ( $< 40$ m AOD).                    | Average downstream embankment slopes ( $\leq 1:3.5$ ) and/or average embankment height ( $40$ m AOD).                          | Steep downstream embankment slopes ( $\geq 1:3.5$ ) and/or high embankment height ( $> 40$ m AOD).           |
| Nature conservation and biodiversity              | What is the impact on areas of nature conservation/biodiversity?                                       | Less than 50% of Ancient Woodland onsite removed.                                                                     | 50-75% of Ancient woodland onsite removed.                                                                                     | $> 75\%$ of Ancient Woodland on reservoir site removed.                                                      |
| Potential for nature and biodiversity enhancement | How much scope is there for biodiversity enhancement?                                                  | Creation of a wetland environment and compensatory flow into Riders Lane Stream.                                      | Creation of a wetland environment but no scope for compensatory flow into Riders Lane Stream.                                  | No wetland environment or scope for compensatory flow into Riders Lane Stream.                               |
| Recreational benefits                             | Will people benefit from recreational source?                                                          | Capacity $> 5,000$ ML and significant end of summer storage ( $\geq 60\%$ full) allowing year round recreational use. | Capacity of $3,000$ - $4,000$ ML and/or end of summer storage ( $50$ - $60\%$ full) may impact on year round recreational use. | Capacity $< 3000$ ML and/or end of summer storage ( $< 50\%$ full) year round recreational use not possible. |
| Material availability                             | Availability of clay on site for reservoir and embankment construction?                                | All materials available on site for design construction.                                                              | $< 50\%$ of materials for construction need to be imported.                                                                    | $> 50\%$ of materials for construction will need to be imported.                                             |
| Estimated Cost                                    | What are the estimated construction costs and costs per megalitre?                                     | Construction cost $< £40$ million and indicative cost per megalitre $\leq 1.2$ £million/ML                            | Construction cost between $£40$ - $50$ million and/or indicative cost per megalitre $1.2$ - $2$ £million/ML                    | Construction cost $> £50$ million and/or indicative cost per megalitre $> 2$ £million/ML                     |

| Criteria   | Description                          | Green                                                                                                                   | Amber                                                                                                                                                                                                              | Red                                                                                                                                                                                                                                          |
|------------|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Complexity | How complex is the reservoir design? | Construction complexity is low; it is not anticipated that the overall construction programme or cost will be impacted. | Construction complexity is medium. There is a moderate risk that the construction programme and cost will increase; although it is anticipated that these risks can be managed / mitigated throughout the project. | Construction complexity is high. There is a high risk that the construction programme and cost will increase due to increased risk of reservoir leakage. These risks are considered difficult to manage and mitigate throughout the project. |

### 3.5.2 Results of Stage Three Assessment

**Table 3.6** Overview of Stage Three Assessment Results

| Criteria                                          | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 | Option 6 | Option 7 | Option 8 |
|---------------------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Views                                             |          |          |          |          |          |          |          |          |
| Nature conservation and biodiversity              |          |          |          |          |          |          |          |          |
| Potential for nature and biodiversity enhancement |          |          |          |          |          |          |          |          |
| Recreational benefits                             |          |          |          |          |          |          |          |          |
| Material availability                             |          |          |          |          |          |          |          |          |
| Estimated Cost                                    |          |          |          |          |          |          |          |          |
| Complexity                                        |          |          |          |          |          |          |          |          |
| Score <sup>a</sup>                                | 10       | 14       | 10       | 14       | 12       | 13       | 15       | 14       |
| Ranking <sup>b</sup>                              | 1        | 6        | 1        | 6        | 3        | 4        | 8        | 4        |

*Link to a summary of the reasoning behind the designation given to each criteria by clicking on the relevant box.*

<sup>a</sup> Totals score of all criteria (Green = 1, Amber = 2, Red = 3). Lower scoring options are preferred.

<sup>b</sup> Options ranked in terms of preference from 1-8 with 1 the most preferable design option.

From the results of the appraisal it can be seen that Options 1 and 3 score equally the lowest with site 5 ranked third.<sup>a</sup> Whilst these three options involve the removal of areas designated as Ancient Woodland (an irreplaceable habitat), there will be biodiversity enhancement through the creation of a wetland environment, whilst also allowing for recreational activities. The attraction of Option 5 is that the shallower embankments lead to a lower visual impact for surrounding properties and visitors and less overall impact on the historic landscape.

A key consideration for all these options is the availability of suitable material onsite in order to construct the embankment, and lower construction complexity, which reduces risks and overall costs down and provides better value for money. Previous investigation has identified suitable clay in the area of the Borrow Pit shown in Appendix D. The area of suitable clay extends below The Avenue woodland. The pink line shows the indicative scale of the borrow pit needed.

Options 7 and 8 were included to assess whether it was possible to retain The Avenue. This was a key consideration as it is a feature of the Grade 2 listed historic park and garden, but also because it is more mature woodland designated as Ancient Woodland which is of higher ecological value than the other three plantation woodland blocks present. Appendix D shows that the borrow pit required where the good quality clay underlies the site extends under The Avenue woodland block. If the Avenue is not removed, this sterilises significant quantities of the clay needed for the construction of the embankments. This has a number of adverse impacts;

- There is not enough remaining clay available to construct the embankments
- Steep embankments would be needed either side of The Avenue as the natural topography is a deep hollow dipping down towards The Avenue. This requires even more clay to create the embankment than other options.
- The need to import large volumes of material to form the reservoir embankments will have significant adverse environmental impacts through the need for large numbers of traffic movements and would be expected to increase the carbon footprint, making the project far less sustainable.

- The high embankments on either side of The Avenue would also adversely impact the visual character of this feature which is part of the Grade 2 listed park and gardens, and the historic conservation area.
- The high embankments on either side of The Avenue would result in The Avenue being in shadow for long parts of the day. This would have adverse impacts upon the vegetation and ecology of the woodland due to greater humidity and a lack of sunlight.
- The volume and yield of any option which retains all or part of The Avenue is greatly reduced. As a result, it would have a significantly reduced benefit to alleviating the water resource deficit in the South East. This would adversely effect the options that Southern Water have to reduce abstraction from the River Itchen, which is designated as a SAC under the EC Habitats Directive.
- The impact of drawdown is likely to be greater with these options, potentially reducing the environmental and recreational benefits.
- Construction of these options would be more complex and the cost per megalitre of the water provided would be higher.

Stakeholder consultation showed a preference for larger reservoir volumes as they provided better value for money and allowed for the creation of larger areas of new habitat in order to improve the environmental benefits of the scheme. Larger volumes also allow for a higher effective yield providing the opportunity for compensatory discharges into the local stream. Stakeholders also favoured reducing environmental impacts and making the project more sustainable. The opportunity for recreation was also scored highly, especially as it was felt that the location near to deprived areas could have a significant beneficial social impact. Concerns were raised about the impact on the Grade II Listed Heritage Park and Gardens and an emphasis was put on minimising the visual impact of the reservoir. Further attempts to minimise the environmental impact by mitigating measures such as tree planting were also voiced and measures to ensure the wetland area was protected during and after drawdown of the reservoir were requested.

Following feedback from stakeholders, refinement of the alternatives took place, this aimed to maximise the storage volume of the reservoir, while minimising the environmental impact, visual impact on the historic landscape, as well as for residents and overall financial costs. Two further refined options, A and B, were developed which contained a combination of the best features of the favoured appraised options (1, 3 and 5) (Figure 3.19). Options A and B both have embankment slopes of 1:7, thus ensuring both engineering stability and relatively lower visual impact. The lower slopes mirror the existing natural slopes and will help the reservoir blend into the historic landscape. Both options also have relatively comparable construction costs.

The original early planning applications dating back to 1964 optimised the size of the reservoir across the Portsmouth Water landholding. This meant that the reservoir extended over the Thicket Bottom woodland to the south. To minimise the impact on the designated ancient woodland when preparing the conceptual designs, the reservoir footprint was moved North away from Thicket Bottom protecting 2.6 ha of mature Ancient Woodland.

Option A provides 8,920 million litres of reservoir storage whilst providing a 15 metre 'buffer zone' between the reservoir embankment and the woodland to the south. This zone would be used for construction access and occasional access by maintenance staff during normal operations.

Option B provides 8,649 million litres of reservoir storage with a wider 'buffer zone' of 40m to lessen the disturbance to wildlife in the margins of the woodland to the south. Again, 15m would be required for construction and maintenance operations, but a 25m strip would be reserved for conservation purposes alongside the existing woodland.

In 2008 Portsmouth Water undertook a comprehensive public consultation exercise, which asked for feedback on a number of aspects of the reservoir design, including whether the public preferred option A or B, various access and pipeline routes. Letters were sent out to 17,000 local residents around the site to make sure they were aware of the consultation. Public exhibitions took place in Leigh Park, Rowlands Castle, Horndean (college & Morrisons), Havant Asda as well as the Portsmouth Water Head Office. Workshop sessions were held in local schools to ensure feedback was obtained from younger people and at a community workshop involving local residents and community groups.

Results of the public consultation showed that people were only marginally in favour of Option B (58%), which lessens the impact on wildlife in the neighbouring woodland but has a reduced volume. As there wasn't a clear preference from the public consultation on the distance of the embankment toe from the existing woodland to the south, Portsmouth Water commissioned consultants to review the potential ecological benefits of a larger distance. Their assessment indicated that a 15 m 'buffer zone' was adequate to protect the woodland and associated tree roots from construction, and that a 25 m buffer would ensure that the southern embankment was not in the shadow zone of the existing woodland. This would maximise the potential wildlife value of the slope by creating a sunny, well drained environment which gave the best opportunity to create a wildflower meadow and maximise the habitat for use by reptiles.

On the basis of this evaluation it was agreed that the toe of the southern embankment would be located 25 m North of the existing woodland to optimise the biodiversity opportunities for creation of good quality grassland, reptile and invertebrate habitat.

The final post consultation May 2009 outline plan for the reservoir is shown in Figure 3.20.

In 2020 the outline masterplan is being reviewed and refined to reduce further the impact on Ancient Woodland, increase the area of retained wetland and explore opportunities for enhanced landscaping.



Figure 3.19: Conceptual design of Options A and B showing the projected embankment toes and crests.

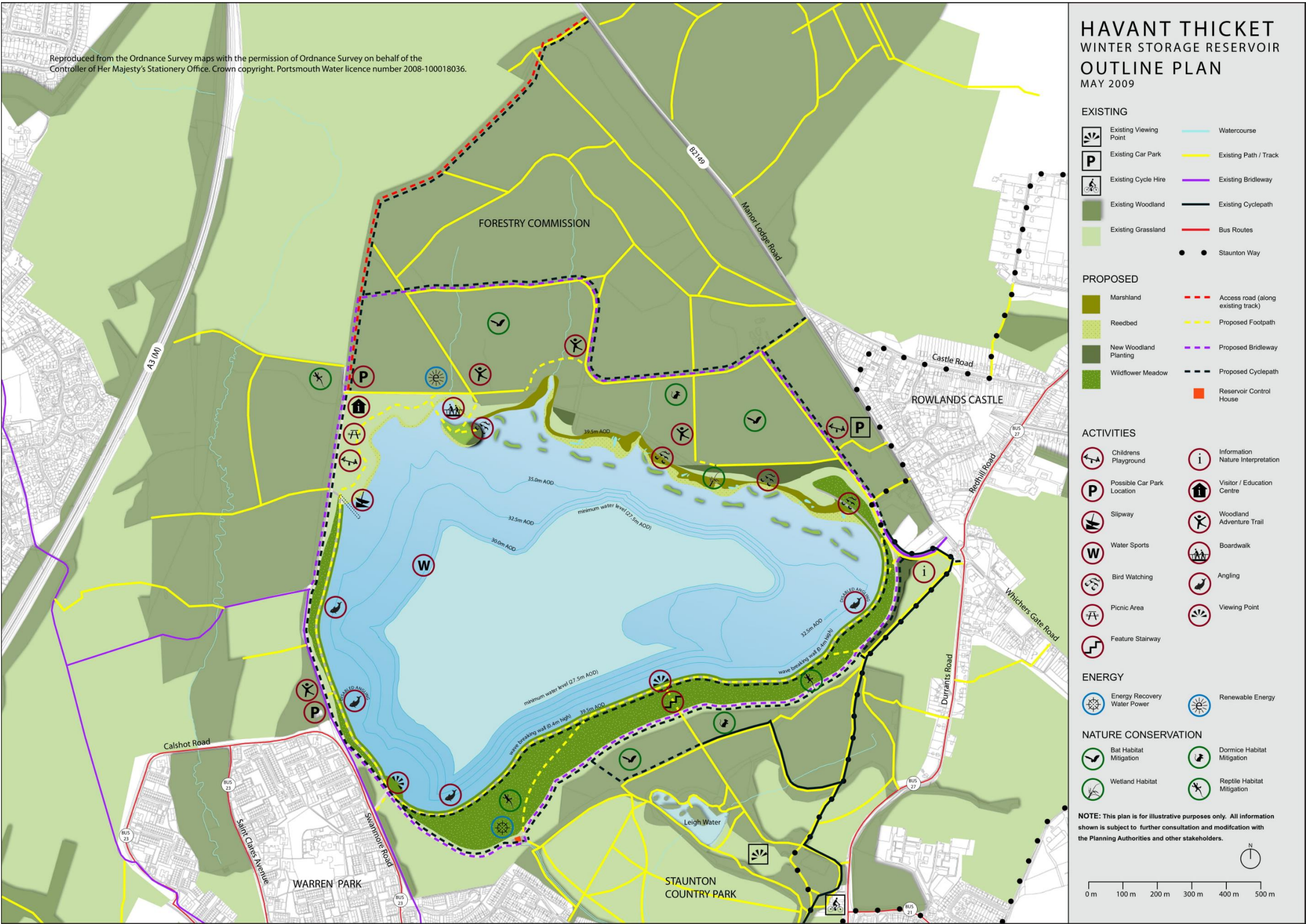


Figure 3.20: Preferred Havant Thicket Reservoir Outline Plan.

# Appendices

## Appendix A Alternative Reservoir Sites Identified in Previous Studies

The following information on potential sites have been sourced from previous site assessment reports from the 1960s and 70s which covered the wider Portsmouth Area (Section 3.1 and Figure 3.1), identifying areas with suitable underlying geology and proximity to an abstraction source. The data contained in the table is based on what was deemed feasible at the time. As there has been a significant time period since this study, the final column identifies any changes to the land use that has occurred and highlights where the potential size may have been impacted due to development as well as any new environmental designations that have been given.

| Site No. | Site Name         | Grid Reference | Size (km <sup>2</sup> ) | Maximum Potential Storage Capacity (MI) | Water Source                  | Proposed Reservoir Type | Ground Surface Material                                                   | Land Development or Designation Since Report |
|----------|-------------------|----------------|-------------------------|-----------------------------------------|-------------------------------|-------------------------|---------------------------------------------------------------------------|----------------------------------------------|
| 1        | West Dean         | SU245285       | 0.54                    | 3910                                    | Old Canal                     | Pumped Storage          | London Clay                                                               | -                                            |
| 2        | Landford          | SU247209       | 0.19                    | 691                                     | River Blackwater              | Pumped Storage          | London Clay                                                               | -                                            |
| 3        | Stoney Cross 1    | SU266133       | 0.18                    | 680                                     | Cadnam Brook (Test Tributary) | Pumped Storage          | Bracklesham Beds Containing Clay                                          | -                                            |
| 4        | Stoney Cross 2    | SU275133       | 0.23                    | 910                                     | Cadnam Brook (Test Tributary) | Pumped Storage          | Bracklesham Beds Containing Clay                                          | -                                            |
| 5        | Plaitford         | SU277208       | 0.25                    | 1523                                    | River Blackwater              | Pumped Storage          | London Clay                                                               | -                                            |
| 6        | Wellow            | SU325178       | -                       | -                                       | River Blackwater              | Impounding              | Bagshot beds (permeable)                                                  | -                                            |
| 7        | Compton Parnholt  | SU355290       | -                       | -                                       | River Test                    | Pumped Storage          | Clay Patches on Chalk                                                     | -                                            |
| 8        | North of Romsey 1 | SU345235       | 0.26                    | 3978                                    | River Test                    | Pumped Storage          | Valley Gravel on London Clay                                              | -                                            |
| 9        | North of Romsey 2 | SU350230       | 0.14                    | 2146                                    | River Test                    | Pumped Storage          | Valley Gravel on London Clay                                              | -                                            |
| 10       | North of Romsey 3 | SU355230       | 0.80                    | 12047                                   | River Test                    | Pumped Storage          | Alluvium overlying the Tertiaries. London Clay may not be at great depth. | -                                            |
| 11       | North of Romsey 4 | SU356216       | 0.14                    | 4000                                    | River Test                    | Pumped Storage          | Poor Soil, Surplus Gravel                                                 | Developed into Housing.                      |
| 12       | Fairbourne Copse  | SU355240       | 0.28                    | 1191                                    | River Test                    | Pumped Storage          | London Clay Overlying Reading Beds                                        | -                                            |

| Site No. | Site Name                        | Grid Reference      | Size (km <sup>2</sup> ) | Maximum Potential Storage Capacity (ML) | Water Source                     | Proposed Reservoir Type | Ground Surface Material                        | Land Development or Designation Since Report                                       |
|----------|----------------------------------|---------------------|-------------------------|-----------------------------------------|----------------------------------|-------------------------|------------------------------------------------|------------------------------------------------------------------------------------|
| 13       | Sherfield English                | SU300205            | 1.42                    | 5910                                    | Blackwater Tributary and Springs | Impounding              | London Clay with some Overlying Bagshot Sand   | -                                                                                  |
| 14       | Lee House                        | SU360187            | 0.61                    | 9206                                    | River Test                       | Pumped Storage          | Valley Gravel on London Clay                   | -                                                                                  |
| 15       | Upper Ashfield                   | SU265185            | 0.55                    | 8410                                    | River Test                       | Pumped Storage          | Valley Gravel and Brickearth on London Clay    | -                                                                                  |
| 16       | Nursling 1                       | SU360160            | 0.49                    | 7390                                    | River Test                       | Pumped Storage          | Valley Gravel, Poor Soil                       | Close to M27 and Industrial Estate and National Grid Station Built Onsite.         |
| 17       | Nursling 2                       | SU360170            | 0.81                    | 12274                                   | River Test                       | Pumped Storage          | Valley Gravel, Poor Soil                       | -                                                                                  |
| 18       | Rownhams                         | SU395170            | 2.5                     | 50000                                   | River Test                       | Pumped Storage          | London Clay                                    | M27 Dissects the Site.                                                             |
| 19       | Sleepy Hollow                    | SU395237            | 0.24                    | 882                                     | River Test                       | Pumped Storage          | London Clay                                    | -                                                                                  |
| 20       | B/C (W Bank of R Test, S of M27) | SU350158            | 1.92                    | 4400                                    | River Test                       | Pumped Storage          | London Clay and Excess Gravel                  | Testwood Lakes Reservoir Development.                                              |
| 21       | B/C (W Bank of R Test, S of M27) | SU350158 & SU348156 | 1.92                    | 5000                                    | River Test                       | Pumped Storage          | London Clay and Excess Gravel                  | Testwood Lakes Reservoir Development.                                              |
| 22       | Sowley Pond                      | SZ375965            | 0.53                    | 909                                     | Crockford Stream                 | Impounding              | Pond Watertight, Plateau Gravel on Headon Beds | Designated a Site of Special Scientific Interest (SSSI) in 1984.                   |
| 23       | Keyhaven                         | SZ305925            | 0.40                    | 2455                                    | Avon Water and Lymington River   | Pumped Storage          | Plateau Gravel on Headon Beds                  | -                                                                                  |
| 24       | Pylewell                         | SZ345960            | 0.40                    | 2455                                    | Avon Water and Lymington River   | Pumped Storage          | Plateau Gravel on Headon Beds                  | -                                                                                  |
| 25       | Stoneham Park Golf Course        | SU430170            | -                       | -                                       | River Itchen                     | Pumped Storage          | London Clay                                    | Golf Course Deemed 'Impossible to Acquire'. M27 Development to the South and West. |
| 26       | South Stoneham                   | SU440150            | -                       | -                                       | River Itchen                     | Pumped Storage          | London Clay                                    | Developed into a Housing Estate and Recreation Ground.                             |
| 27       | Knapp Hill                       | SU415240            | 0.11                    | 516                                     | River Itchen                     | Pumped Storage          | London Clay                                    | -                                                                                  |

| Site No. | Site Name                                 | Grid Reference | Size (km <sup>2</sup> ) | Maximum Potential Storage Capacity (ML) | Water Source | Proposed Reservoir Type | Ground Surface Material                   | Land Development or Designation Since Report                                                                                                                       |
|----------|-------------------------------------------|----------------|-------------------------|-----------------------------------------|--------------|-------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 28       | Hoccombe                                  | SU435233       | 0.27                    | 1214                                    | River Itchen | Pumped Storage          | London Clay                               | -                                                                                                                                                                  |
| 29       | Bugle Farm                                | SU467217       | 0.38                    | 5705                                    | River Itchen | Pumped Storage          | Valley Gravel and Alluvium on London Clay | -                                                                                                                                                                  |
| 30       | Highbridge Farm                           | SU467210       | 0.41                    | 6251                                    | River Itchen | Pumped Storage          | Valley Gravel and Alluvium on London Clay | -                                                                                                                                                                  |
| 31       | Fisher's Pond 1                           | SU475205       | 0.16                    | 864                                     | River Itchen | Pumped Storage          | London Clay                               | -                                                                                                                                                                  |
| 32       | Fisher's Pond 2 (Colden Common Reservoir) | SU495205       | 1.21                    | 6819                                    | River Itchen | Pumped Storage          | London Clay                               | Disturbance of Property and Raising of A333 was Required. Road is now the B335 (Less Important Since M3 Development but Still Important Linking Road in the Area). |
| 33       | East of Eastleigh Airport 1               | SU472180       | 0.11                    | 4300                                    | River Itchen | Pumped Storage          | Alluvium on Gravel and/or London Clay     | -                                                                                                                                                                  |
| 34       | East of Eastleigh Airport 2               | SU467170       | 0.43                    | 6546                                    | River Itchen | Pumped Storage          | Alluvium on Gravel and/or London Clay     | -                                                                                                                                                                  |
| 35       | East of Eastleigh Airport 3               | SU458166       | 0.51                    | 7728                                    | River Itchen | Pumped Storage          | Alluvium on Gravel and/or London Clay     | -                                                                                                                                                                  |
| 36       | Southeast of Eastleigh Airport            | SU455160       | 0.35                    | -                                       | River Itchen | Pumped Storage          | Alluvium on Gravel and/or London Clay     | Close to M27 Development to South and Eastleigh Airport to West.                                                                                                   |
| 37       | Lower Upham 1                             | SU515190       | 0.22                    | 1277                                    | River Itchen | Pumped Storage          | London Clay                               | East Horton Golf Club.                                                                                                                                             |
| 38       | Lower Upham 2                             | SU515195       | 0.14                    | 859                                     | River Itchen | Pumped Storage          | London Clay                               | -                                                                                                                                                                  |
| 39       | Curbridge 1                               | SU512115       | 0.13                    | 809                                     | River Hamble | Pumped Storage          | London Clay                               | -                                                                                                                                                                  |
| 40       | Curbridge 2                               | SU523115       | 0.10                    | 614                                     | River Hamble | Pumped Storage          | London Clay                               | -                                                                                                                                                                  |
| 41       | Curbridge 3                               | SU505107       | 0.15                    | 882                                     | River Hamble | Pumped Storage          | London Clay                               | -                                                                                                                                                                  |
| 42       | Kitnocks Gully                            | SU530128       | 0.42                    | 5455                                    | River Hamble | Pumped Storage          | Bracklesham Beds                          | -                                                                                                                                                                  |
| 43       | Wickham 1                                 | SU578130       | 0.40                    | 4910                                    | River Meon   | Pumped Storage          | London Clay                               | -                                                                                                                                                                  |
| 44       | Wickham 2                                 | SU582108       | 0.25                    | 3728                                    | River Meon   | Pumped Storage          | London Clay                               | -                                                                                                                                                                  |
| 45       | Rookesbury Park, West Walk                | SU590135       | 0.60                    | 5910                                    | River Meon   | Impounding              | London Clay                               | -                                                                                                                                                                  |

| Site No. | Site Name                        | Grid Reference | Size (km <sup>2</sup> ) | Maximum Potential Storage Capacity (ML) | Water Source                     | Proposed Reservoir Type | Ground Surface Material      | Land Development or Designation Since Report                                                                                                                                                                                                            |
|----------|----------------------------------|----------------|-------------------------|-----------------------------------------|----------------------------------|-------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 46       | Titchfield Park Farm             | SU540085       | 0.13                    | 809                                     | River Meon                       | Pumped Storage          | London Clay                  | Skylark Golf and Country Club. M27 development to the South.                                                                                                                                                                                            |
| 47       | Titchfield Haven                 | SU535030       | -                       | 7274                                    | River Meon                       | Pumped Storage          | Alluvium on Bracklesham Beds | National Nature Reserve (NNR) SSSI and part of the Solent and Southampton Water Ramsar and Solent and Southampton Water SPA.                                                                                                                            |
| 48       | West End Fareham 1               | SU560055       | 0.49                    | 7365                                    | Rivers Meon and Wallington       | Pumped Storage          | London Clay                  | Housing Development on the Northern Border of the Site.                                                                                                                                                                                                 |
| 49       | West End Fareham 2               | SU552055       | 0.33                    | 5023                                    | Rivers Meon and Wallington       | Pumped Storage          | London Clay                  | Housing Development on the Northern Part of the Site and on the Southern Border.                                                                                                                                                                        |
| 50       | Southeast of Fareham             | SU595040       | -                       | -                                       | Wallington River                 | Pumped Storage          | London Clay                  | -                                                                                                                                                                                                                                                       |
| 51       | Forest of Bere, North of Wickham | SU595132       | 0.52                    | 3400                                    | River Meon                       | Pumped Storage          | London Clay                  | Forest of Bere Recreational Development.                                                                                                                                                                                                                |
| 52       | Boarhunt                         | SU602090       | 0.27                    | 4000                                    | Wallington River                 | Impounding              | London Clay                  | -                                                                                                                                                                                                                                                       |
| 53       | Southwick Park                   | SU628083       | 0.18                    | 680                                     | Wallington River                 | Pumped Storage          | London Clay                  | Southwick Park Golf Club and MOD Site.                                                                                                                                                                                                                  |
| 54       | Boarhunt-Denmead 1               | SU610115       | 0.15                    | 1860                                    | Wallington River                 | Pumped Storage          | London Clay                  | -                                                                                                                                                                                                                                                       |
| 55       | Boarhunt-Denmead 2               | SU628013       | 0.23                    | 2290                                    | Wallington River                 | Pumped Storage          | London Clay                  | -                                                                                                                                                                                                                                                       |
| 56       | Boarhunt-Denmead 3               | SU665103       | 0.20                    | 2400                                    | Wallington River                 | Pumped Storage          | London Clay                  | -                                                                                                                                                                                                                                                       |
| 57       | Lumley Farm                      | SU762066       | 0.88                    | 10640                                   | River Ems and Bedhampton Springs | Pumped Storage          | London Clay and Reading Beds | The Development of the A27 Trunk Road means it intersects the Original Site Leading to a 27% Reduction in Total Area (0.64 km <sup>2</sup> Remaining). To the East, the School which made up part of the Original Site is now Bourne Community College. |
| 58       | Havant Thicket                   | SU715095       | 1.18                    | 9000                                    | Bedhampton Springs               | Pumped Storage          | London Clay                  | -                                                                                                                                                                                                                                                       |

| Site No. | Site Name          | Grid Reference | Size (km <sup>2</sup> ) | Maximum Potential Storage Capacity (ML) | Water Source                             | Proposed Reservoir Type | Ground Surface Material                                     | Land Development or Designation Since Report                                                                                                                                                                                                                                                                                                                                                                                              |
|----------|--------------------|----------------|-------------------------|-----------------------------------------|------------------------------------------|-------------------------|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 59       | Southleigh Forest  | SU745090       | 0.55                    | 2800                                    | Bedhampton Springs                       | Pumped Storage          | London Clay                                                 | Operational Landfill Site Adjacent to the Southwest Corner. An Increased Area has been Designated as Ancient Woodland. 65% of the Site is Designated as a Site of Importance for Nature Conservation (SINC).                                                                                                                                                                                                                              |
| 60       | Southleigh Farm    | SU737067       | 0.87                    | 11800                                   | Bedhampton Springs                       | Pumped Storage          | London Clay                                                 | A27 Development and Service Area Dissects the Southern Section of the Original Site Leading to a 31% Reduction in the Available Site Size (0.60 km <sup>2</sup> Remaining). In the Southeast Corner of the Original Site 3.8 ha of Land has been Designated a Site of Importance for Nature Conservation (SINC). The Site is also Part of Havant Borough Councils 2036 Local Plan and is earmarked as Part of a 2100 Housing Development. |
| 61       | Loveders Farm      | SU779067       | 0.62                    | 7500                                    | River Ems and Bedhampton Springs         | Pumped Storage          | London Clay                                                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 62       | Hayling Island     | SU732005       | 0.40                    | 2460                                    | Bedhampton Springs                       | Pumped Storage          | London Clay                                                 | Mill Rythe Holiday Village Golf Course                                                                                                                                                                                                                                                                                                                                                                                                    |
| 63       | West Wittering     | SU786005       | 0.40                    | 2460                                    | River Ems                                | Pumped Storage          | London Clay                                                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 64       | West of Chichester | 825055         | 0.62                    | 7550                                    | Funtington Stream and Fishbourne Springs | Pumped Storage          | Brickearth and Valley Gravel on London Clay or Reading Beds | A27 Development to the North of the Site.                                                                                                                                                                                                                                                                                                                                                                                                 |
| 65       | Lavant Gravel Pits | SU885055       | 0.59                    | 7170                                    | Lavant Stream                            | Pumped Storage          | Valley Gravel on London Clay                                | Close to A27 and Chichester Bypass                                                                                                                                                                                                                                                                                                                                                                                                        |
| 66       | Birdham Mill       | SU830015       | 0.40                    | 610                                     | Fishbourne Channel                       | Pumped Storage          | London Clay                                                 | Chichester Marina has been developed on this site.                                                                                                                                                                                                                                                                                                                                                                                        |
| 67       | East of Birdham    | SU840005       | 0.40                    | 3680                                    | Fishbourne Stream and Rifes              | Pumped Storage          | London Clay                                                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 68       | South of Runcton   | SU890006       | 0.40                    | 2460                                    | Rifes                                    | Pumped Storage          | London Clay                                                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 69       | Lagness            | SU905000       | 0.32                    | 1920                                    | Rifes                                    | Pumped Storage          | London Clay                                                 | Some Housing Developed Close to Proposed Site                                                                                                                                                                                                                                                                                                                                                                                             |
| 70       | Walberton          | SU980052       | 0.27                    | 4090                                    | River Arun                               | Pumped Storage          | London Clay                                                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Site No. | Site Name                | Grid Reference | Size (km <sup>2</sup> ) | Maximum Potential Storage Capacity (Ml) | Water Source                | Proposed Reservoir Type | Ground Surface Material | Land Development or Designation Since Report |
|----------|--------------------------|----------------|-------------------------|-----------------------------------------|-----------------------------|-------------------------|-------------------------|----------------------------------------------|
| 71       | Arundel 1                | TQ008057       | 0.19                    | 2820                                    | River Arun and River Rother | Pumped Storage          | London Clay             | -                                            |
| 72       | Arundel 2                | TQ004057       | 0.16                    | 2490                                    | River Arun and River Rother | Pumped Storage          | London Clay             | -                                            |
| 73       | Chichester Tidal barrage | SU686000       |                         | 9000*                                   | Bedhampton Springs          | Tidal Barrage           | N/A                     | -                                            |

## Appendix B Stage One: Assessment Summary of Potential Reservoir Sites

The 72 sites listed in Appendix A were appraised using a three-stage process where they were evaluated against key criteria (Section 3.2 & 3.4.1). If a site was failed at any stage it was not assessed in any further stages. The results for how each option performed under this assessment are given below along with a description of the reasons for rejection or acceptance. Any additional potential reasons for rejection that were provided for a specific site in previous reports have also been included in the relevant comments section in italics for completeness.

| Proposed Site           | Stage |   |   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------|-------|---|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | 1     | 2 | 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Site 1 - West Dean      | x     | x | x | This site was rejected as the proposed abstraction source is the Old Canal which runs into the River Dun which itself is a tributary of the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and its tributaries are encompassed in the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>This site was rejected as sufficient supply from this source could be an issue.</i>                                                                                               |
| Site 2 - Landford       | x     | x | x | This site was rejected as the proposed abstraction source is the River Blackwater which is a tributary of the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and its tributaries are encompassed in the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>This site was rejected due to the fact the Blackwater River was identified in 1993 Planning and Transport Committee Report as a poor quality river with low flows in the catchment due to over abstraction.</i> |
| Site 3 - Stoney Cross 1 | x     | x | x | This site was rejected as the proposed abstraction source is Cadnam Brook which is a tributary of the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and its tributaries are encompassed in the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                                               |
| Site 4 - Stoney Cross 2 | x     | x | x | This site was rejected as the proposed abstraction source is Cadnam Brook which is a tributary of the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and its tributaries are encompassed in the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                                               |
| Site 5 - Plaitford      | x     | x | x | This site was rejected as the proposed abstraction source is the River Blackwater which is a tributary of the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and its tributaries are encompassed in the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>This site was rejected due to the fact the Blackwater River was identified in 1993 Planning and Transport Committee Report as a poor quality river with low flows in the catchment due to over abstraction.</i> |

| Proposed Site              | Stage |   |   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------|-------|---|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                            | 1     | 2 | 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Site 6 - Wellow            | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Blackwater which is a tributary of the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and its tributaries are encompassed in the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. An impounding reservoir was also proposed for this site and initial ground study suggested a lack of impermeable strata.</p> <p><i>This site was rejected due to the fact the Blackwater River was identified in 1993 Planning and Transport Committee Report as a poor quality river with low flows in the catchment due to over abstraction.</i></p> |
| Site 7 - Compton Parnholt  | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Site 8 - N of Romsey 1     | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>The dam for this site requires full bunding; upstream of Testwood Lakes Reservoir Development which may reduce flow available for existing abstraction.</i></p>                                                                                                                                                                                                                                                   |
| Site 9 - N of Romsey 2     | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>This site is upstream of Testwood Lakes Reservoir Development which may reduce flow available for existing abstraction.</i></p>                                                                                                                                                                                                                                                                                   |
| Site 10 - N of Romsey 3    | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>This site is upstream of Testwood Lakes Reservoir Development which may reduce flow available for existing abstraction.</i></p>                                                                                                                                                                                                                                                                                   |
| Site 11 - N of Romsey 4    | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. The proposed site has also been developed into a housing estate.</p> <p><i>This site is upstream of Testwood Lakes Reservoir Development which may reduce flow available for existing abstraction. This site would be comparatively costly to develop and is found on poor soils.</i></p>                                                                                                                                   |
| Site 12 - Fairbourne Copse | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>This site is upstream of Testwood Lakes Reservoir Development which may reduce flow available for existing abstraction.</i></p>                                                                                                                                                                                                                                                                                   |

| Proposed Site               | Stage |   |   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------|-------|---|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | 1     | 2 | 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Site 13 - Sherfield English | x     | x | x | This site was rejected as the proposed abstraction source is the River Blackwater which is a tributary of the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and its tributaries are encompassed in the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. An impounding reservoir was also proposed for this site. <i>This site is upstream of Woodington Nature Reserve</i>                                                                                                |
| Site 14 - Lee House         | x     | x | x | This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. <i>This site is comprised of fine (Class II) agricultural land and may potentially have poor sub-soil conditions. A high voltage powerline runs across the northern part of the site.</i>                                                                                              |
| Site 15 - Upper Ashfield    | x     | x | x | This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. <i>This site would be relatively expensive to develop, containing no marketable quantities of gravel and is based on good agricultural ground.</i>                                                                                                                                     |
| Site 16 - Nursling 1        | x     | x | x | This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. This site has since been developed by national grid into Nursling Substation and the northern section of the original site dissected by the M27 development.                                                                                                                           |
| Site 17 - Nursling 2        | x     | x | x | This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. <i>This site was previously worked for gravel and part of it used as a tip for municipal rubbish. It has poor soils and there are doubts about water losses due to seepage.</i>                                                                                                        |
| Site 18 - Rownhams          | x     | x | x | This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. <i>Dissection of this site by the M27 motorway makes it less economically viable due to the need for significant embankments to protect the motorway.</i>                                                                                                                              |
| Site 19 - Sleepy Hollow     | x     | x | x | This site was rejected as the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. <i>This site is located 3 miles from the river and is a comparatively expensive option.</i>                                                                                                                                                                                            |
| Site 20 - B/C               | x     | x | x | This site was a preferred site from the 1960s review and the land has since been purchased by Southern Water and developed into the Testwood Lakes Reservoir (1990s) as part their SRN plan and is included in their Water Resources Management Plan (WRMP). This site would now be rejected on the grounds that the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. |

| Proposed Site                       | Stage |   |   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------|-------|---|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | 1     | 2 | 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Site 21 - B+C                       | x     | x | x | This site was a preferred site from the 1960s review and the land has since been purchased by Southern Water and developed into the Testwood Lakes Reservoir (1990s) as part their SRN plan and is included in their Water Resources Management Plan (WRMP). This site would now be rejected on the grounds that the proposed abstraction source is the River Test. The River Test is protected as a Site of Special Scientific Interest (SSSI) throughout its course and is part of the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. |
| Site 22 - Sowley Pond               | x     | x | x | This site was rejected as the proposed abstraction source is the Crockford Stream and the area is designated as a Site of Special Scientific Interest (SSSI). The Crockford Stream is covered by the New Forest Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. An impounding reservoir was also proposed for this site.                                                                                                                                                                                                                                 |
| Site 23 - Keyhaven                  | x     | x | x | This site was rejected as the proposed abstraction sources are the Avon Water and Lymington River, which are covered by the New Forest Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                                                                                                                                                                                   |
| Site 24 - Pylewell                  | x     | x | x | This site was rejected as the proposed abstraction sources are the Avon Water and Lymington River, which are covered by the New Forest Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                                                                                                                                                                                   |
| Site 25 - Stoneham Park Golf Course | x     | x | x | This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>Stoneham Park Golf Course was deemed 'impossible to acquire'. The site is located close to the large Junction 4 of the M27.</i>                                                                                                            |
| Site 26 - South Stoneham            | x     | x | x | This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. The site has also been developed into a housing estate and recreation ground.                                                                                                                                                                    |
| Site 27 - Knapp Hill                | x     | x | x | This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>This site is located 3.5 miles from the proposed abstraction source.</i>                                                                                                                                                                   |
| Site 28 - Hocombe                   | x     | x | x | This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>This site is located 2 miles away from the proposed abstraction source.</i>                                                                                                                                                                |
| Site 29 - Bugle Farm                | x     | x | x | This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>The site is located within a meandering river path which in times of flood could affect the extent of the floodplain or itself be flooded causing failure.</i>                                                                             |

| Proposed Site                                       | Stage |   |   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------------------|-------|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                     | 1     | 2 | 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Site 30 - Highbridge Farm                           | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>The site is located within a meandering river path which in times of flood could affect the extent of the floodplain or itself be flooded causing failure. There is also a variable thickness of gravel. This site was deemed 'the least attractive site on the River Itchen.'</i></p> |
| Site 31 - Fisher's Pond 1                           | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>There is a fish farm located very close to the site.</i></p> <p><i>This site has a significant risk of causing a bird strike hazard due to its close proximity to the airport</i></p>                                                                                                  |
| Site 32 – Fisher's Pond 2 - Colden Common Reservoir | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>This site has a significant risk of causing a bird strike hazard due to its close proximity to the airport</i></p>                                                                                                                                                                     |
| Site 33 - E of Eastleigh Airport 1                  | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>This site has a significant risk of causing a bird strike hazard due to its close proximity to the airport. There are also potential problems with seepage through sandy/silty materials.</i></p>                                                                                      |
| Site 34 - E of Eastleigh Airport 2                  | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>This site has a significant risk of causing a bird strike hazard due to its close proximity to the airport.</i></p>                                                                                                                                                                    |
| Site 35 - E of Eastleigh Airport 3                  | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>This site has a significant risk of causing a bird strike hazard due to its close proximity to the airport.</i></p>                                                                                                                                                                    |
| Site 36 - SE of Eastleigh Airport                   | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>This site has a significant risk of causing a bird strike hazard due to its close proximity to the airport.</i></p>                                                                                                                                                                    |

| Proposed Site                               | Stage |   |   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------|-------|---|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                             | 1     | 2 | 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Site 37 - Lower Upham 1</b>              | x     | x | x | This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>This site is located several miles from an abstraction source.</i> |
| <b>Site 38 - Lower Upham 2</b>              | x     | x | x | This site was rejected as the proposed abstraction source is the River Itchen, which is designated as a Site of Special Scientific Interest (SSSI) and a Special Area of Conservation (SAC) along its course. It is also covered by the Test and Itchen Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>This site is located several miles from an abstraction source.</i> |
| <b>Site 39 - Curbridge 1</b>                | x     | x | x | This site was rejected as the proposed abstraction source is the River Hamble, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>This site is located close to a Sewage Works which discharges into the River Hamble.</i>                                                                                                             |
| <b>Site 40 - Curbridge 2</b>                | x     | x | x | This site was rejected as the proposed abstraction source is the River Hamble, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                            |
| <b>Site 41 - Curbridge 3</b>                | x     | x | x | This site was rejected as the proposed abstraction source is the River Hamble, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                            |
| <b>Site 42 - Kitnocks Gully</b>             | x     | x | x | This site was rejected as the proposed abstraction source is the River Hamble, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>The site is located close to the railway embankment which could cause further obstruction of flood flows.</i>                                                                                        |
| <b>Site 43 - Wickham 1</b>                  | x     | x | x | This site was rejected as the proposed abstraction source is the River Meon, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                              |
| <b>Site 44 - Wickham 2</b>                  | x     | x | x | This site was rejected as the proposed abstraction source is the River Meon, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>There are transmission lines close to the proposed location.</i>                                                                                                                                       |
| <b>Site 45 - Rookesbury Park, West Walk</b> | x     | x | x | This site was rejected as the proposed abstraction source is the River Meon, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. An impounding reservoir was also proposed for this site.                                                                                                                                                     |
| <b>Site 46 - Titchfield Park Farm</b>       | x     | x | x | This site was rejected as the proposed abstraction source is the River Meon, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                              |

| Proposed Site                          | Stage |   |   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------|-------|---|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        | 1     | 2 | 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Site 47 - Titchfield Haven             | x     | x | x | This site was rejected as the proposed abstraction source is the River Meon, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. This site is designated as a National Nature Reserve (NNR) and is also designated as a Site of Special Scientific Interest (SSSI) forming part of the Southampton and Solent RAMSAR and Special Protection Area (SPA). Proximity of this site to the coastline may have future consequences due to rising sea levels and extreme events |
| Site 48 - West End Fareham 1           | x     | x | x | This site was rejected as the proposed abstraction sources are the River Meon and River Wallington, which are covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. There has also been a housing development built on the site.                                                                                                                                                                                                                                                    |
| Site 49 - West End Fareham 2           | x     | x | x | This site was rejected as the proposed abstraction sources are the River Meon and River Wallington, which are covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. There has also been a housing development built on the site.                                                                                                                                                                                                                                                    |
| Site 50 - SE of Fareham                | x     | x | x | This site was rejected as the proposed abstraction source is the River Wallington, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>The site is close to unprotected coast.</i>                                                                                                                                                                                                                                                                                 |
| Site 51 - Forest of Bere, N of Wickham | x     | x | x | This site was rejected as the proposed abstraction source is the River Meon, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. The site also forms part of the Forest of Bere Recreational Development.<br><i>This site has potential problems with seepage and uplift pressures associated with London Clay Basal Beds. It is less attractive than Eastern sites.</i>                                                                                                 |
| Site 52 - Boarhunt                     | x     | x | x | This site was rejected as the proposed abstraction source is the River Wallington, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. An impounding reservoir was also proposed for this site.<br><i>This site has a low storage potential and is comparatively expensive. Southern Water completed £0.5m worth of works downstream in 2005.</i>                                                                                                                        |
| Site 53 - Southwick Park               | x     | x | x | This site was rejected as the proposed abstraction source is the River Wallington, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>This site may block a floodplain.</i>                                                                                                                                                                                                                                                                                       |
| Site 54 - Boarhunt-Denmead 1           | x     | x | x | This site was rejected as the proposed abstraction source is the River Wallington, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>Cut-offs required through gravels.</i>                                                                                                                                                                                                                                                                                      |
| Site 55 - Boarhunt-Denmead 2           | x     | x | x | This site was rejected as the proposed abstraction source is the River Wallington, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>Cut-offs required through gravels.</i>                                                                                                                                                                                                                                                                                      |
| Site 56 - Boarhunt-Denmead 3           | x     | x | x | This site was rejected as the proposed abstraction source is the River Wallington, which is covered by the East Hampshire Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.<br><i>Cut-offs required through gravels.</i>                                                                                                                                                                                                                                                                                      |

| Proposed Site            | Stage    |   |   | Comments |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------|----------|---|---|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                          | 1        | 2 | 3 |          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Site 57 - Lumley Farm    |          | ✓ | ✗ | ✗        | This site was rejected as a fully bunded reservoir with steep embankments is required, resulting in undesirable views from the surrounding areas and limiting access and opportunities for recreation and biodiversity enhancement. This makes it difficult to offset the loss of best and most valuable agricultural land which is an important area for Brent Geese as well as public rights of way. There is a significant flood risk to surrounding infrastructure in the event of embankment failure and the requirement for a discharge pipe into the environmentally protected (SPA, SAC, Ramsar & SSSI) harbour was also a major concern.                                                                                                                                                                       |
|                          | Option 1 | ✓ | ✓ | ✓        | This option is favoured due to its large capacity and value for money. Whilst it requires the removal of small blocks of ancient woodland, creation of a significant wetland habitat and provision for recreational activities can be achieved. There is also sufficient material onsite for construction of this option.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                          | Option 2 | ✓ | ✓ | ✗        | This option was rejected on the basis that it doesn't provide value for money due to the high cost and complexity of landscaping to achieve significantly shallower embankments and creating the peninsula. The value of the latter was also questioned by stakeholders especially given the decreased capacity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                          | Option 3 | ✓ | ✓ | ✓        | This option is favoured due to is large capacity and value for money. Whilst it requires the removal of small blocks of ancient woodland, creation of the largest wetland habitat of all options and provision for recreational activities can be provided. There is also sufficient material onsite for construction of this option.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                          | Option 4 | ✓ | ✓ | ✗        | This option was rejected on the basis that it doesn't provide value for money due to having a similar cost to Options 1-3 whilst delivering a much smaller yield. This is due to the requirement to import construction materials, as in order to protect what remains of The Avenue the clay below is sterilised and steep embankments would be required which would also adversely affect the views of the landscape and would also minimise the benefit of retaining part of The Avenue                                                                                                                                                                                                                                                                                                                              |
|                          | Option 5 | ✓ | ✓ | ✓        | This option is favoured due to is low construction cost and reduced embankment heights which mitigate some of the negative visual impact of other options whilst still representing value for money. Whilst it requires the removal of small blocks of ancient woodland, creation of a wetland habitat and provision for recreational activities can be achieved. However, it should be noted there are slight concerns regarding the impermeability of underlying material at the depths required and the low end of summer storage volume, which could affect recreation and nature conservation areas.                                                                                                                                                                                                               |
|                          | Option 6 | ✓ | ✓ | ✗        | This option was rejected due to its high construction cost due to increased embankment heights which also have a large negative visual impact and increase the complexity of the design. In fact, it was unclear if this option could be delivered within the site boundary utilising only materials available onsite. Most likely a reduction in the reservoir footprint would be required which would remove the benefit of increased capacity over other options.                                                                                                                                                                                                                                                                                                                                                    |
|                          | Option 7 | ✓ | ✓ | ✗        | This option was rejected on the basis that it doesn't provide value for money with the second highest cost and by far the costliest per megalitre delivered due to its complexity. In fact, the low capacity and yield for this option mean it does not meet future demand. It is estimated that at least one of the reservoirs would be emptied each year reducing the environmental/recreational benefits. Whilst retention of the ancient woodland is a clear positive over other options, the smaller footprint also means there is insufficient material available onsite for construction.                                                                                                                                                                                                                        |
| Site 58 - Havant Thicket | Option 8 | ✓ | ✓ | ✗        | This option was rejected on the basis that the retention of The Avenue results in an estimated 25% reduction in the availability of good quality clay from the borrow pit required for construction of embankments either side of the woodland for protection. This would require import of significant amounts of material which would have significant environmental and traffic impacts. This also makes this option costlier and with a lower potential yield than other options scores lower in terms of value for money. Whilst retention of The Avenue, which is designated ancient woodland, is a clear positive over other options. The steep embankments required to protect The Avenue would result in it being in shadow for the majority of the time effecting the vegetation and ecology of the woodland. |

| Proposed Site                | Stage |   |   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------|-------|---|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | 1     | 2 | 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Site 59 - Southleigh Forest  | ✓     | x | x | <p>This site was rejected as a fully bunded reservoir with steep embankments is required resulting in undesirable views from national trails within the South Downs National Park which would have to be rerouted. This also limits access and opportunities for recreation and biodiversity enhancement. A large section of the site is a SINC and almost all is comprised of ancient woodland known to house protected Bechstein's Bats, the loss of which would be extremely difficult to mitigate. Finally, the requirement for a discharge pipe into the environmentally protected harbour was also a major concern.</p> <p><i>Much of the embankments for this site would be created over London Clay Basal Beds requiring extensive use of grouting or impermeable fill blankets. The removal of Plateau Gravel locally would be required for effective cut-off into London Clay. The difficult engineering makes this an expensive option.</i></p> |
| Site 60 - Southleigh Farm    | ✓     | x | x | <p>This site was rejected as the site forms part of the Local Plan 2036, a major housing development plan for Havant Borough Council (plans for which are quite advanced). Therefore, the site was deemed near impossible to acquire. The size of the available area and flat topography would require a fully bunded reservoir with steep embankments resulting in undesirable views from the surrounding areas and limits access and opportunities for recreation and biodiversity enhancement. There is also significant floodplain encroachment and the flood risk to surrounding infrastructure in the event of embankment failure would be high. Finally, the requirement for a discharge pipe into the environmentally protected (SPA, SAC, Ramsar &amp; SSSI) harbour would be a major concern.</p>                                                                                                                                                |
| Site 61 - Loveders Farm      | ✓     | x | x | <p>This site was rejected as a fully bunded reservoir with steep embankments would be required resulting in undesirable views from the surrounding areas and limiting access and opportunities for recreation and biodiversity enhancement. It would be difficult to offset the loss of best and most valuable agricultural land and public rights of way as well as impact on listed buildings. There would be a significant flood risk to surrounding infrastructure in the event of embankment failure. Finally, the requirement for a discharge pipe into the environmentally protected (SPA, SAC, Ramsar &amp; SSSI) harbour was a major concern.</p>                                                                                                                                                                                                                                                                                                 |
| Site 62 - Hayling Island     | x     | x | x | <p>This site was rejected despite the fact that the originally proposed source was Bedhampton Springs, as this was deemed no longer feasible due to the requirement for construction of a long pipeline that would pass across Chichester and Langstone Harbours which are EU, Special Area of Conservation (SAC), Special Protection Areas (SPA) and RAMSAR sites as well as a protected Site of Special Scientific Interest (SSSI). For the same reason, abstraction from alternative sources in this area are unfeasible.</p> <p><i>Uneconomical to develop, freshwater likely to be scarce thus desalination may be required to abstract locally.</i></p>                                                                                                                                                                                                                                                                                              |
| Site 63 – West Wittering     | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Ems, which is covered by the Arun and Western Streams Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.</p> <p><i>Uneconomical to develop, freshwater likely to be scarce thus desalination may be required to abstract locally.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Site 64 – W of Chichester    | x     | x | x | <p>This site was rejected as the proposed abstraction source is the Funtington Stream and Fishbourne Springs which are covered by the Arun and Western Streams Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. The Stream and Springs also flow into Chichester Harbour which is an EU protected Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site as well as a Site of Special Scientific Interest (SSSI).</p> <p><i>Uneconomical to develop, freshwater likely to be scarce thus desalination may be required to abstract locally.</i></p>                                                                                                                                                                                                                                     |
| Site 65 - Lavant Gravel Pits | x     | x | x | <p>This site was rejected as the proposed abstraction source is the River Lavant, which is covered by the Arun and Western Streams Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

additional abstraction is unlikely to be supported by Natural England or the Environment Agency.

| Proposed Site                             | Stage |   |   | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------|-------|---|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           | 1     | 2 | 3 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Site 66 - Birdham Mill</b>             | x     | x | x | This site was rejected as the proposed abstraction source is the Fishbourne Channel which is covered by the Arun and Western Streams Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. The Channel also flows into Chichester Harbour which is an EU protected Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site as well as a Site of Special Scientific Interest (SSSI). Chichester Marina has also been developed on this site. |
| <b>Site 67 - E of Birdham</b>             | x     | x | x | This site was rejected as the proposed abstraction source is the Fishbourne Stream and Rifes which are covered by the Arun and Western Streams Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. The Stream and Rifes flow into Chichester Harbour which is an EU protected Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site as well as a Site of Special Scientific Interest (SSSI).                                            |
| <b>Site 68 - South of Runcton</b>         | x     | x | x | This site was rejected as the proposed abstraction source is the Rifes which are covered by the Arun and Western Streams Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. The Rifes flow into Chichester Harbour which is an EU protected Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site as well as a Site of Special Scientific Interest (SSSI).                                                                             |
| <b>Site 69 - Lagness</b>                  | x     | x | x | This site was rejected as the proposed abstraction source is the Rifes which are covered by the Arun and Western Streams Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency. The Rifes flow into Chichester Harbour which is an EU protected Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site as well as a Site of Special Scientific Interest (SSSI).                                                                             |
| <b>Site 70 - Walberton</b>                | x     | x | x | This site was rejected as the proposed abstraction source is the River Arun, which is covered by the Arun and Western Streams Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                                                                                                   |
| <b>Site 71 - Arundel 1</b>                | x     | x | x | This site was rejected as the proposed abstraction sources are the River Arun and River Rother, which are covered by the Arun and Western Streams Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                                                                               |
| <b>Site 72 - Arundel 2</b>                | x     | x | x | This site was rejected as the proposed abstraction sources are the River Arun and River Rother, which are covered by the Arun and Western Stream Abstraction Licensing Strategy (2013) under the Water Framework Directive (WFD) and thus additional abstraction is unlikely to be supported by Natural England or the Environment Agency.                                                                                                                                                                                                                                                                |
| <b>Site 73 – Chichester Tidal Barrage</b> | x     | x | x | This site was rejected as the proposed method of storage would have an unacceptable direct and extensive impact upon a site, Chichester Harbour, which is an EU protected Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site as well as a Site of Special Scientific Interest (SSSI). This is unlikely to be supported by the Environment Agency or Natural England.                                                                                                                                                                                                       |

## Appendix C Stage Two: Site Appraisal Tables

Table C.1. Stage Two Assessment of Lumley Farm against key constraints.

| Criteria                             | Description                                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------|----------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land ownership and purchase cost     | Who and how many people own the land?                                                              |                | Privately owned arable land and adjacent farm buildings. Site construction would completely eradicate the business in this area.                                                                                                                                                                                                                                                                                                                                                                                 |
| Site area                            | How large is the potential reservoir site?                                                         |                | 64 ha site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Reservoir capacity                   | What is the potential capacity of the reservoir?                                                   |                | Third largest proposed capacity at 7,800 ML.<br>The volume of water available unlikely to be sufficient to support the need in the wider region                                                                                                                                                                                                                                                                                                                                                                  |
| Land use, quality & planning policy  | Will best and most versatile agricultural land be affected?<br>Proposed land use?                  |                | Land lost almost entirely greenfield site, arable crops grown for agricultural purposes. Land provisionally characterised as Grade 1 or 2 under Agricultural Land Classification.<br>There is no proposal in the local plan for a change of use.                                                                                                                                                                                                                                                                 |
| Flood plain encroachment             | What percentage of the site is covered by a floodplain?                                            |                | No floodplain encroachment on site. There is a level 3 flood zone to the west of the site along River Ems channel. <i>See notes under Discharge Measures re – risk of flooding.</i>                                                                                                                                                                                                                                                                                                                              |
| Landscape                            | Are there any landscape designations that will be affected?                                        |                | Land designated as part of the Southbourne Coastal Plain (SC5).                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Views                                | Will any visually sensitive viewpoints be affected?                                                |                | Site not visible from the A27 to the North, however the railway line and residential housing to the South, as well as Bourne Community College to the East have clear line of site. Due to the flat topography and size of the site which has been reduced by 27% due to the A27 construction (64 ha remaining), steep embankments would be required to achieve a comparative volume to other sites which would be visually unappealing.<br>Views from the SDNP would be distant and unlikely to be significant. |
| Nature conservation and biodiversity | Are any designated areas of nature conservation/ biodiversity importance affected, or EPS species? |                | Designated as a Secondary Support Area under the Brent Goose Strategy.<br><br>No known European Protected Species present, may be some bat use of the site.                                                                                                                                                                                                                                                                                                                                                      |

| Criteria                             | Description                                                              | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------|--------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Impact on Ancient Woodland           | Are any areas of Ancient Woodland impacted by the reservoir development? |                | No areas of Ancient Woodland are located on the proposed site.                                                                                                                                                                                                                                                                                                                                                                                                                |
| Archaeology and historic development | Are any heritage sites affected?                                         |                | Lumley Mill is a Grade II* listed building and the surrounding cottages are Grade II listed and would be in very close proximity to the reservoir development.                                                                                                                                                                                                                                                                                                                |
| Impact on recreation                 | Are any recreational sites or public rights of way affected?             |                | Multiple public rights of way footpaths pass through the site which would need to be re-routed.                                                                                                                                                                                                                                                                                                                                                                               |
| Recreational benefits                | Will people benefit from recreational source?                            |                | Estimated more than 14,500 people live within 1.5 km, 45,000 people within 4.5 km. This is the third lowest within 1.5 km of the five sites and may limit its recreational and educational use, opportunities will be limited by constrained site (bounded by A27 road and railway line) and need for steep embankments on all sides.                                                                                                                                         |
| Non-traffic construction impact      | Will on site construction impact local residents?                        |                | Housing to South and East within 350 m of the site boundary. Bourne college in close proximity to the East of the site. Housing and college overlook site and would be impacted.                                                                                                                                                                                                                                                                                              |
| Impact of construction traffic       | Will the traffic impact local residents?                                 |                | Currently no access to the site directly from the A27, two way access would be difficult and costly to construct. Currently most viable access from the A27 would be <i>Via</i> A259 Main Road then Stein Road. Whilst this avoids small country and residential lanes, it still involves passing through residential built up areas.                                                                                                                                         |
| Impact on residential dwellings      | Will construction result in the loss of residential dwellings?           |                | Site construction would most likely see the removal of a handful of residential dwellings and farm buildings to the West of the site.                                                                                                                                                                                                                                                                                                                                         |
| Length of pipeline for conveyance    | Distance of proposed intake/outfall point from site?                     |                | The site is located ~5 km from Bedhampton pumping station (3 m height difference). Water would need to be pumped to and from the reservoir. A ~7 km pipe route is proposed which would pass in close proximity to Warblington Conservation Area (Warblington Cemetery, Castle (Grade II* listed building and historical monument) and St Thomas a Becket's Church (likely archaeological site)). This option requires the second longest pipeline of the five sites assessed. |

| Criteria                                   | Description                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------------|------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discharge measures                         | How and where will water be discharged in an emergency?<br><br>Risk to property?   |                | Surrounding streams would be unable to cope with emergency discharge. This would require construction of an emergency drawdown pipe which would discharge into Chichester Harbour which is an EU protected SPA, SAC and RAMSAR and also a SSSI site. There would be a high risk of flooding and damage to property / infrastructure in the event of embankment failure. |
| Topography and reuse of excavated material | What is the variation in topography across the site? Can material be re-used?      |                | Site almost completely flat, embankments required on all sides, all material excavated on site should be usable.                                                                                                                                                                                                                                                        |
| Visitor access                             | What is the proximity to sustainable transport networks (railways and bus routes)? |                | Located close (~0.8km) to Emsworth and Southbourne rail stations. Regular local bus route to the West of the site, however stops are on the wrong side of either the A27 or railway line making access to the site difficult by public transport most likely at a distance greater than 1 km.                                                                           |

Table C.2. Stage Two Assessment of Havant Thicket Against Key Constraints.

| Criteria                             | Description                                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                     |
|--------------------------------------|----------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land ownership and purchase cost     | Who and how many people own the land?                                                              |                | Land already owned by Portsmouth Water.                                                                                                                                                                                                                                                                                                                                     |
| Site area                            | How large is the potential reservoir site?                                                         |                | 160 ha site.                                                                                                                                                                                                                                                                                                                                                                |
| Reservoir capacity                   | What is the potential capacity of the reservoir?                                                   |                | The largest proposed capacity at 8,900 Ml.<br><br>The volume of water available is able to support the need in the wider region.                                                                                                                                                                                                                                            |
| Land use, quality & planning policy  | Will best and most versatile agricultural land be affected?<br><br>Proposed land use?              |                | Land entirely greenfield site, low quality farmland used for grazing.<br><br>Site allocated in the Local Plan for the construction of a reservoir (HBC Policy CS18, HBC emerging policy KP9, EHDC S31)                                                                                                                                                                      |
| Flood plain encroachment             | What percentage of the site is covered by a floodplain?                                            |                | Very small level 3 floodplain encroachment in South West corner where stream is present (~2% of site).                                                                                                                                                                                                                                                                      |
| Landscape                            | Are there any landscape designations that will be affected?                                        |                | The land is part of the South Hampshire Lowlands National Character Area (NCA). To the North East of the site is the boundary of the South Downs National Park. Only the site entrance will be visible from the park boundary due to the presence of dense woodland. There will be no significant impact on the views from the South Downs.                                 |
| Views                                | Will any visually sensitive viewpoints be affected?                                                |                | Residential housing adjacent to the site to the Southwest and East. Due to southward sloping nature of the land, embankments to the South will be visible from the housing to the South. Due to having the space to reduce the embankment slope the view should remain similar as a grassy slope. To the East and West existing treeline greatly restricts site visibility. |
| Nature conservation and biodiversity | Are any designated areas of nature conservation/ biodiversity importance affected, or EPS species? |                | The site has no national or international designations. The four small woodland areas are designated as SINCs. ( <i>See note under discharge measure re benefit to Langstone Harbour</i> ) European protected species are known to be present (Bechstein's Bats, Dormice). Great Crested newt have been recorded on the FE land within 500m of the site.                    |

| Criteria                             | Description                                                              | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------|--------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Impact on Ancient Woodland           | Are any areas of Ancient Woodland impacted by the reservoir development? |                | Four small blocks of Ancient Woodland (irreplaceable habitat) at the site will be lost totalling 13.22 ha (8.3% of the total site area) including; The Avenue (ASNW) (6.87 ha), the oak plantations know as Middle Clearing (ASNW) (2.17 ha) and Round Wood (ASNW) (1.99 ha) and the Corsican Pine Planted Ancient Woodland Site (PAWS) (2.19 ha)                                                                                                 |
| Archaeology and historic development | Are any heritage sites affected?                                         |                | Part of the site (7 ha, c. 4.4%) is included in the boundary of Leigh Park (Staunton Country Park), which is Grade II listed in the Register of Parks and Gardens of Special Historic Interest in England by English Heritage. An area of grassland to the south west of The Avenue is designated as a historic Conservation Area.                                                                                                                |
| Impact on recreation                 | Are any recreational sites or public rights of way affected?             |                | A public bridleway crosses the site. The Staunton Way and E9 European Long Distance footpaths pass around the Southeast and East of the site providing opportunity for links.                                                                                                                                                                                                                                                                     |
| Recreational benefits                | Will people benefit from recreational source?                            |                | Estimated 29,500 people live within 1.5 km and 119,000 people within 4.5 km. This is the largest population within both 1.5 and 4.5 km of the five sites maximising the potential recreational and educational use. Plan to reroute bridleway and footpaths around periphery of the reservoir and link site to other local and regional trails. Opportunity to create additional recreational activities such as sailing and cycling.             |
| Non-traffic construction impact      | Will on site construction impact local residents?                        |                | Onsite construction may impact housing to Southwest and East which are within 350 m of the site boundary. Housing to the South also directly overlooks site. The majority of housing to the East is protected by a relatively dense treeline or new tree planting scheme and as a result is further away from the construction area. Housing to the west protected by a belt of woodland. The treeline to the Southwest is significantly thinner. |
| Impact of construction traffic       | Will the traffic impact local residents?                                 |                | The proposed access route is from the B2149 to the North of the site, skirting around the western edge of Havant Thicket utilising an existing track. The B2149 can already be accessed from the A3(M) at Junction 2 from both directions. This route avoids passing through residential areas with a minimal impact on local traffic flows*.                                                                                                     |
| Impact on residential dwellings      | Will construction result in the loss of residential dwellings?           |                | There are no residential dwellings located on the proposed site.                                                                                                                                                                                                                                                                                                                                                                                  |

| Criteria                                   | Description                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------------|------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Length of pipeline for conveyance          | Distance of proposed intake/outfall point from site?                               |                | The site is located ~3 km from Bedhampton pumping station (16 m incline). Water would be pumped to the site and gravity fed on return for public water supply. The pipeline route would be under 5 km in total length. This is the shortest distance of all options assessed. The route will follow the course of the Hermitage Stream where possible to minimise disruption to residents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Discharge measures                         | How and where will water be discharged in an emergency?<br>Risk to property?       |                | Emergency discharge water can be directed into the Riders Lane and Hermitage stream, which then flows naturally into Langstone Harbour area, replicating a storm event without the risk of flooding dwellings. The harbour is designated a SAC, SPA, RAMSAR and SSSI. In the event of an embankment breach the natural drainage would be towards the existing streams reducing the risk.<br><i>Note: Water quality modelling has indicated that there will be some benefit in reducing nitrate concentrations entering Langstone Harbour (SAC, SPA, RAMSAR &amp; SSSI). Overall there will be a benefit to stream water quality, including moderating peaks in iron and manganese that are currently experienced.</i><br><i>Downstream of the reservoir the Riders Lane Stream is ephemeral. There is the opportunity to provide a regular compensation discharge from the reservoir (if supported by the EA) which could improve flows and water quality in the Riders Lane Stream and the Hermitage Stream.</i> |
| Topography and reuse of excavated material | What is the variation in topography across the site? Can material be re-used?      |                | An existing bowl-shaped topography removes the need for embankments on all sides, all excavated material should be usable on site. The lack of an embankment in the north provides opportunities for recreational activities and the creation of wetland habitats.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Visitor access                             | What is the proximity to sustainable transport networks (railways and bus routes)? |                | Located close to Rowlands Castle railway station (~1.2 km) with regular local bus routes on the roads immediately bordering the site to the East, South and West.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

\*An alternative southern access route is being considered. If this were selected then the assessment would change to red for traffic, as the construction traffic would then need to pass through a residential area.

Table C.3. Stage Two Assessment of Southleigh Forest Against Key Constraints.

| Criteria                             | Description                                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                           |
|--------------------------------------|----------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land ownership and purchase cost     | Who and how many people own the land?                                                              |                | Land already owned by Portsmouth Water.                                                                                                                                                                                                                                                                                                                           |
| Site area                            | How large is the potential reservoir site?                                                         |                | 60 ha site.                                                                                                                                                                                                                                                                                                                                                       |
| Reservoir capacity                   | What is the potential capacity of the reservoir?                                                   |                | The smallest proposed capacity at 2,800 ML.<br>The volume of water available will not be sufficient to support the need in the wider region.                                                                                                                                                                                                                      |
| Land use, quality & planning policy  | Will best and most versatile agricultural land be affected?<br>Proposed land use?                  |                | The site is mainly a greenfield site, however there are two landfill sites located in the Southwest corner. Assessment and planning to ensure the reservoir was protected from any leachate would be needed. The rest of the site is woodland and is not utilised for any agricultural purposes. There is no proposal in the Local Plan for a change in land use. |
| Flood plain encroachment             | What percentage of the site is covered by a floodplain?                                            |                | No floodplain encroachment on site.<br>See notes under Discharge Measures re – risk of flooding.                                                                                                                                                                                                                                                                  |
| Landscape                            | Are there any landscape designations that will be affected?                                        |                | The site is located within the South Hampshire Lowlands National Character Area (NCA).<br>Approximately 30% of the proposed site is within the South Downs National Park.                                                                                                                                                                                         |
| Views                                | Will any visually sensitive viewpoints be affected?                                                |                | Very little residential or commercial property surrounding the site that would be affected by the view. Part of South Downs National Park and on the route of a National Trail this would have an adverse impact on the views from these locations, but within a woodland setting.                                                                                |
| Nature conservation and biodiversity | Are any designated areas of nature conservation/ biodiversity importance affected, or EPS species? |                | Bechstein's Bats are known to be present within the woodland and are a European Protected Species. The presence of dormice and badgers which are also protected species is anticipated. Around 65% of the proposed site is designated as a Site of Importance for Nature Conservation (SINC).                                                                     |
| Impact on Ancient Woodland           | Are any areas of Ancient Woodland impacted by the reservoir development?                           |                | All of the site is woodland. The majority of the site (87%, 52 ha) is Ancient Woodland an irreplaceable habitat, either Ancient Semi-Natural Woodland (ASNW) or Planted Ancient Woodland (PAWS) (Figure 3.13).                                                                                                                                                    |

| Criteria                             | Description                                                    | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------|----------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Archaeology and historic development | Are any heritage sites affected?                               |                | No known heritage sites affected on the proposed site.                                                                                                                                                                                                                                                                                                                                                                                                           |
| Impact on recreation                 | Are any recreational sites or public rights of way affected?   |                | The Sussex Border Path National Trail and a public bridleway pass through the site. These would have to be re-routed, but they provide linkage to the wider path network. Only an estimated 7,300 people within 1.5 km and more than 64,000 people within 4.5 km. This is the second smallest population within 1.5 km of the five sites which may limit its recreational and educational use.                                                                   |
| Recreational benefits                | Will people benefit from recreational source?                  |                | Site size will impede creation of areas for recreational activities, as well as limit biodiversity opportunities, as steep embankments are needed on all sides and the site is enclosed by roads to the South and East, as well as the landfill site in the Southwest.                                                                                                                                                                                           |
| Non-traffic construction impact      | Will on site construction impact local residents?              |                | Major housing estate located to the South but is a good distance from the site (~1 km) and is separated by a dense area of woodland. Two cottages are located adjacent to the southeast site boundary and would be affected by the construction.                                                                                                                                                                                                                 |
| Impact of construction traffic       | Will the traffic impact local residents?                       |                | Excavated material may need to be removed from site ( <i>see topography below</i> )<br>The site is located 3km from the Havant to Horndean main road and to gain access to this route construction traffic would have to pass through built up residential areas.                                                                                                                                                                                                |
| Impact on residential dwellings      | Will construction result in the loss of residential dwellings? |                | No residential dwellings located on the proposed site.                                                                                                                                                                                                                                                                                                                                                                                                           |
| Length of pipeline for conveyance    | Distance of proposed intake/outfall point from site?           |                | The site is located 4 km from the pumping station at Bedhampton (16 m height difference). Proposed pipeline route would be ~5 km crossing two streams and the railway line twice. Water would need to be pumped to the site but could be gravity fed back down when required.                                                                                                                                                                                    |
| Discharge measures                   | How and where will water be discharged in an emergency?        |                | Surrounding streams would be unable to cope with emergency discharge. This would require construction of an emergency drawdown pipe which would discharge into Chichester Harbour which is an EU protected Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site as well as a Site of Special Scientific Interest (SSSI) In the event of embankment failure properties downhill to the south are likely to be at risk from flooding. |

| Criteria                                   | Description                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------|------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Topography and reuse of excavated material | What is the variation in topography across the site? Can material be re-used?      |                | Large variation in topographical levels with part of the site residing on a hill. May require the removal of excess material as well as Plateau Gravel. Engineering constraints make this a comparatively expensive option. Careful engineering will be required to protect the reservoir from landfill leachate / gas migration. Extensive use of grouting or impermeable fill blankets would be required due to the geology |
| Visitor access                             | What is the proximity to sustainable transport networks (railways and bus routes)? |                | There are poor public transport links to the site, it is located ~2 km from Rowlands Castle railway station with no regular local bus services in close proximity to the site.                                                                                                                                                                                                                                                |

Table C.4. Stage Two Assessment of Southleigh Farm Against Key Constraints.

| Criteria                             | Description                                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------|----------------------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land ownership and purchase cost     | Who and how many people own the land?                                                              |                | Privately owned arable land and adjacent farm buildings and industrial units. Site construction would completely eradicate the businesses in this area.                                                                                                                                                                                                                                                                                                                                        |
| Site area                            | How large is the potential reservoir site?                                                         |                | 60 ha site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Reservoir capacity                   | What is the potential capacity of the reservoir?                                                   |                | The second largest proposed capacity at 8,100 ML.<br>The volume of water available is able to support the need in the wider region.                                                                                                                                                                                                                                                                                                                                                            |
| Land use, quality & planning policy  | Will best and most versatile agricultural land be affected?<br>Proposed land use?                  |                | Land almost entirely greenfield site, arable crops grown for agricultural purposes. Land provisionally characterised as Grade 1 or 2 under Agricultural Land Classification.<br>The site has been allocated for the development of 2100 dwellings as part of Havant Borough Council's 2036 Local Plan making it near impossible to acquire.<br>Note: The allocation for housing has been confirmed in the Local Plan. This would result in the site being screened out as no longer available. |
| Flood plain encroachment             | What percentage of the site is covered by a floodplain?                                            |                | Significant areas (~25%) designated as Flood Zone 3 within site boundary.<br><i>See notes under Discharge Measures re – risk of flooding.</i>                                                                                                                                                                                                                                                                                                                                                  |
| Landscape                            | Are there any landscape designations that will be affected?                                        |                | Land designated as part of the South Coast Plain NCA.                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Views                                | Will any visually sensitive viewpoints be affected?                                                |                | Extremely high visibility from residential housing to the East and West of site. A27 and railway line form boundary to the south of the site mostly shielded by a tree line along the course. Very little protection from the site to block views and noise associated with construction. Views from the SDNP would be distant and unlikely to be significant.                                                                                                                                 |
| Nature conservation and biodiversity | Are any designated areas of nature conservation/ biodiversity importance affected, or EPS species? |                | No local or national environmental designations on site. Tree Preservation Orders (TPOs) are in place surrounding site, which upon assessment may be put in place onsite as well.<br>A Small area of land to the West of the Emsworth recreation ground adjacent to the development is designated as a Site of Importance for Nature Conservation (SINC).<br>There are no known European protected Species at the site, there may be some bat activity.                                        |

| Criteria                             | Description                                                              | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------|--------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Impact on Ancient Woodland           | Are any areas of Ancient Woodland impacted by the reservoir development? |                | No areas designated as Ancient Woodland on site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Archaeology and historic development | Are any heritage sites affected?                                         |                | No known heritage sites affected on proposed site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Impact on recreation                 | Are any recreational sites or public rights of way affected?             |                | No public rights of way footpaths pass through the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Recreational benefits                | Will people benefit from recreational source?                            |                | Estimated 20,700 people live within 1.5 km and 68,600 people within 4.5 km. This is the second largest population within 1.5 km and 4.5 km of the five sites which could have maximised its potential recreational and educational use. However, the constrained size of the site, constricted by roads and a railway line, along with the need for steep embankments will significantly reduce the opportunity to provide recreational activities or biodiversity enhancements as the slopes would have to be armoured. There are no opportunities for direct links to long distance footpaths. |
| Non-traffic construction impact      | Will on site construction impact local residents?                        |                | Significant number of houses to the East and West of the site with very little protection from the site to block views and noise associated with construction.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Impact of construction traffic       | Will the traffic impact local residents?                                 |                | Motel and petrol station on westbound side of A27, where the slip road could be converted for access. However, this would currently only allow one-way access and construction of two-way access could be costly. This route is also adjacent to the SINC on site. Other access routes would have to pass through heavily built up areas.<br><i>Note: The assessment as orange assumes that an access could be achieved off the A27 for construction.</i>                                                                                                                                        |

| Criteria                                   | Description                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------|------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Impact on residential dwellings            | Will construction result in the loss of residential dwellings?                     |                | Site construction would see the removal of the farmhouse and a handful of industrial units to the North of the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Length of pipeline for conveyance          | Distance of proposed intake/outfall point from site?                               |                | Site is located 3 km from pumping station at Bedhampton (6 m height difference). Water would be pumped to the site and gravity fed on return for public water supply. The proposed pipe route would be longer to provide an emergency discharge to the harbour and to minimise disruption (~5 km), passing through 5 streams and once across the railway line. Route would be in relatively close proximity to Warblington Conservation Area (Warblington Cemetery, Castle (Grade II* listed building and historical monument) and St Thomas a Becket's Church (likely archaeological site)) as well as Chichester Harbour which is an EU protected Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site as well as a Site of Special Scientific Interest (SSSI). |
| Discharge measures                         | How and where will water be discharged in an emergency drawdown?                   |                | Mill Pond which surrounding streams run into would be unable to cope with emergency discharge. This would require construction of an emergency drawdown pipe which would discharge into Chichester Harbour which is an EU protected Special Area of Conservation (SAC), Special Protection Area (SPA) and RAMSAR site as well as a Site of Special Scientific Interest (SSSI)<br>There is a significant flood risk to housing and infrastructure from embankment failure.                                                                                                                                                                                                                                                                                                                      |
| Topography and reuse of excavated material | What is the variation in topography across the site? Can material be re-used?      |                | Site almost completely flat, steep embankments required on all sides, all material excavated on site should be usable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Visitor access                             | What is the proximity to sustainable transport networks (railways and bus routes)? |                | Good public transport links. The site is located close to Emsworth (~1.4km) and Warblington (~1.2km) railway stations with a local bus route passing along roads to the West and North of the site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table C.5. Stage Two assessment of Loveders Farm Against Key Constraints.

| Criteria                             | Description                                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                             |
|--------------------------------------|----------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Land ownership and purchase cost     | Who and how many people own the land?                                                              |                | Privately owned arable land and adjacent farm buildings. Site construction would completely eradicate the business in this area.                                                                                                                                                                    |
| Site area                            | How large is the potential reservoir site?                                                         |                | 65 ha site.                                                                                                                                                                                                                                                                                         |
| Reservoir capacity                   | What is the potential capacity of the reservoir?                                                   |                | The second smallest proposed capacity at 7,500 ML.<br>The volume of water available unlikely to be sufficient to support the need in the wider region.                                                                                                                                              |
| Land use, quality & planning policy  | Will best and most versatile agricultural land be affected?<br>Proposed land use?                  |                | Land almost entirely greenfield site, arable crops grown for agricultural purposes. Land provisionally characterised as Grade 1 or 2 under Agricultural Land Classification.<br>There is no proposal in the Local Plan for a change in land use.                                                    |
| Flood plain encroachment             | What percentage of the site is covered by a floodplain?                                            |                | No flood plain encroachment onsite.<br><i>See notes under Discharge Measures re – risk of flooding.</i>                                                                                                                                                                                             |
| Landscape                            | Are there any landscape designations that will be affected?                                        |                | Land designated as part of the Southbourne Coastal Plain (SC5).                                                                                                                                                                                                                                     |
| Views                                | Will any visually sensitive viewpoints be affected?                                                |                | Extremely high visibility from residential housing to the East and West of site. A27 and railway line form boundary to the North and South of the site respectively and are mostly shielded by tree lines along the routes.<br>Views from the SDNP would be distant and unlikely to be significant. |
| Nature conservation and biodiversity | Are any designated areas of nature conservation/ biodiversity importance affected, or EPS species? |                | No Local or National environmental designations onsite.<br>No known European Protected Species present, but some bats may use the site.                                                                                                                                                             |
| Impact on Ancient Woodland           | Are any areas of Ancient Woodland impacted by the reservoir development?                           |                | Small copse of Ancient Woodland (~2 ha) is located to the North of the site and would be likely to be indirectly impacted by the construction.                                                                                                                                                      |

| Criteria                             | Description                                                    | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------|----------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Archaeology and historic development | Are any heritage sites affected?                               |                | Loveders Farmhouse and Newell House are Grade II listed buildings located on the edges of proposed site and therefore would be impacted visually, or in the case of Loveders Farmhouse may need to be demolished.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Impact on recreation                 | Are any recreational sites or public rights of way affected?   |                | Two public rights of way footpaths pass through the site and would be impacted.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Recreational benefits                | Will people benefit from recreational source?                  |                | Estimated 5,500 people within 1.5 km and 24,800 people within 4.5 km. This is the smallest population within both 1.5 and 4.5 km of the five sites which will limit its recreational and educational use. The constrained size of the site, constricted by roads, along with the need for steep embankments will significantly reduce the opportunity to provide recreational activities or biodiversity enhancements as the slopes would have to be armoured.                                                                                                                                                                                                                                       |
| Non-traffic construction impact      | Will on site construction impact local residents?              |                | Significant number of houses to the East and West of the site with very little protection from the site to block views and noise associated with construction. Loveders Nursery located at the Southwest corner of the proposed site would be significantly impacted visually by development.                                                                                                                                                                                                                                                                                                                                                                                                        |
| Impact of construction traffic       | Will the traffic impact local residents?                       |                | Existing access for the A27 at the Northeast of the site <i>via</i> Priors Leaze Lane would allow one-way enter and exit from Chichester and to Havant respectively and minimises disruption in residential areas. Construction of two-way access would be costly.                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Impact on residential dwellings      | Will construction result in the loss of residential dwellings? |                | Site construction would most likely see the removal of a handful of farm buildings to the South East of the site.<br>Transmission lines run across the site and would need to be re-routed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Length of pipeline for conveyance    | Distance of proposed intake/outfall point from site?           |                | Site is located ~7 km from pumping station at Bedhampton (3 m height difference). Water would need to be pumped to and from the reservoir. The proposed pipe route would be longer to facilitate an emergency discharge and minimise disruption (~10 km), passing through 6 streams and once across the railway line. Route would be in relatively close proximity to Warblington Conservation Area (Warblington Cemetery, Castle (Grade II* listed building and historical monument) and St Thomas a Becket's Church (likely archaeological site)) as well as Chichester Harbour which is an EU protected SAC, SPA, RAMSAR and SSSI site. This is the longest pipeline of all the options assessed. |

| Criteria                                   | Description                                                                        | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------------|------------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Discharge measures                         | How and where will water be discharged in an emergency drawdown?                   |                | Surrounding streams would be unable to cope with emergency discharge. This would require construction of an emergency drawdown pipe which would discharge into Chichester Harbour which is an EU protected SAC, SPA, RAMSAR and SSSI site. There is a significant flood risk to surrounding property and infrastructure in the event of embankment failure.               |
| Topography and reuse of excavated material | What is the variation in topography across the site? Can material be re-used?      |                | Site almost completely flat, steep embankments required on all sides, all excavated material on site should be usable.                                                                                                                                                                                                                                                    |
| Visitor access                             | What is the proximity to sustainable transport networks (railways and bus routes)? |                | Good public transport links; Located close (~750m) to Southbourne and Nutbourne rail stations. Local bus service to the South would be within 1 km if site can be accessed from the South. However, as the main proposed access is from the Northeast this would result in a distance greater than 1 km to the nearest bus stop to the likely position of any facilities. |

Appendix D Borrow Pit Required at Havant Thicket to Excavate Good Quality Clay

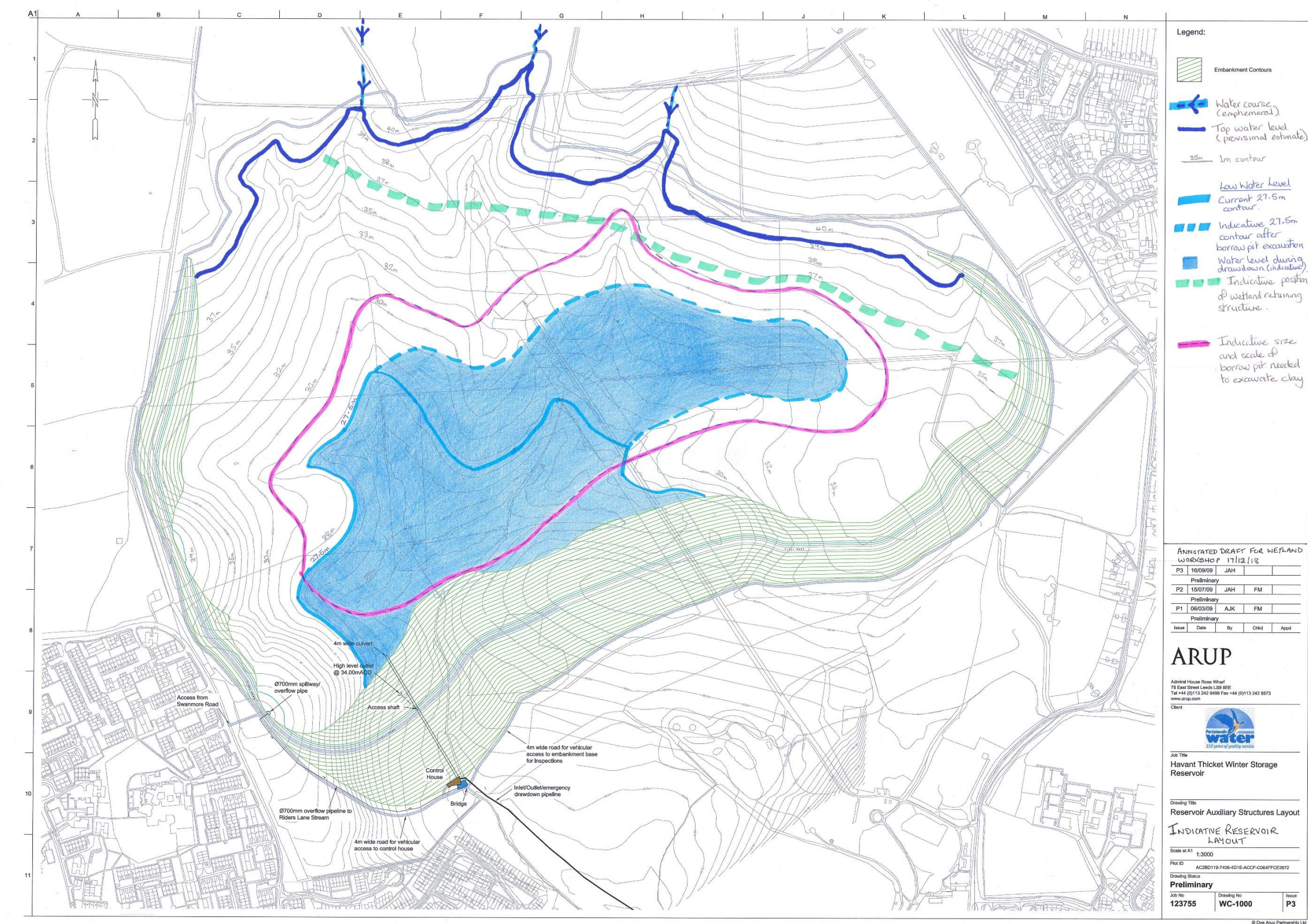


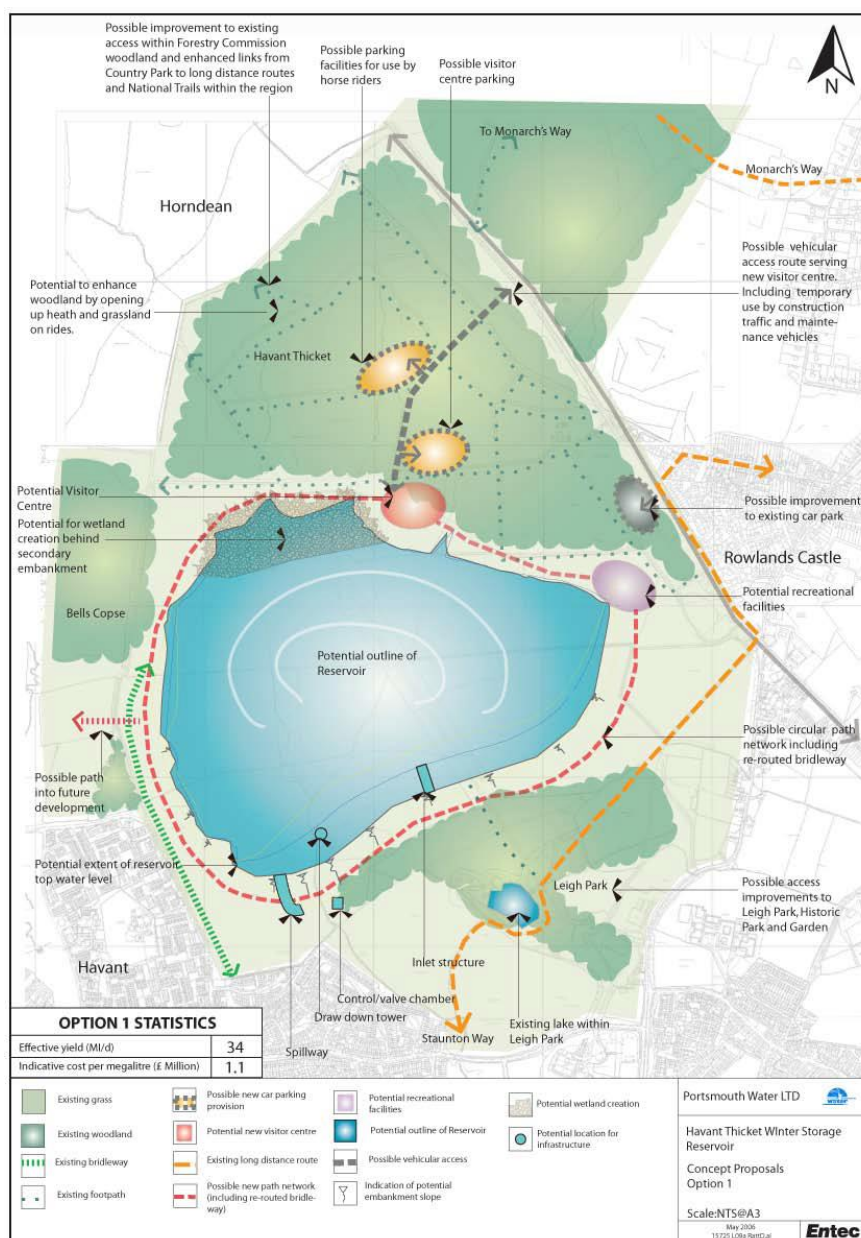
Figure D.1: Map showing the position and scale of the borrow pit required at Havant Thicket to excavate underlying Clay (Based on the 2009 Arup outline design).

## Appendix E Stage Three: Detailed Assessment of Conceptual Designs plus Cost Assessment

It should be taken into consideration that the statistics for the following conceptual designs were estimated in 2006, as such the expected costs are predicted to have risen significantly and the yields for a 1 in 200 event would be more conservative than those detailed below. This however would impact each option equally and thus the original data is deemed sufficient for comparison between the layout options at this stage.

| Option 1 Base Option – single reservoir optimising the use of the P.Water land |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Effective storage capacity                                                     | 8,160 MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Effective yield                                                                | 34 MI/d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Indicative cost                                                                | £36 million                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Indicative cost per megalitre                                                  | 1.1 £million/MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Full water level                                                               | 38.5 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Full water surface area                                                        | 110 ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Typical end of summer storage levels                                           | 63% full                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Top of embankment                                                              | 40 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Downstream embankment slope                                                    | 1:3.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Green criteria                                                                 | <ul style="list-style-type: none"> <li>This reservoir option provides a relatively high yield of water joint second largest option in terms of capacity.</li> <li>Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of a large wetland area.</li> <li>The large reservoir storage in this option means it may be possible to provide some releases to the Riders Lane Stream for environmental purposes.</li> <li>Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park. Capacity means balance can be struck between areas for nature conservation and recreation.</li> <li>Viable construction materials on site without the need to import impermeable materials.</li> <li>Joint lowest indicative cost per megalitre of all the options.</li> <li>Relatively simple design for single reservoir and embankments.</li> </ul> |
| Amber criteria                                                                 | <ul style="list-style-type: none"> <li>Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South (part of the Grade II listed park and gardens), three adjacent small plantations and grazing farmland.</li> <li>Embankment height, combined with steep gradients on downstream slopes, could have a negative visual effect on residential properties to Southwest and South. Space remains for landscape screening.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Red criteria</b> | <ul style="list-style-type: none"> <li>Complete removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha).</li> <li>EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.</li> </ul> |
| <b>Summary</b>      | This option is favoured due to its large capacity and value for money. It requires the removal of 15.2 ha of ancient woodland. This option provides the opportunity for creation of significant wetland habitat and provision for recreational activities. There is also sufficient material on site for construction of this option.                                                                                                                                |

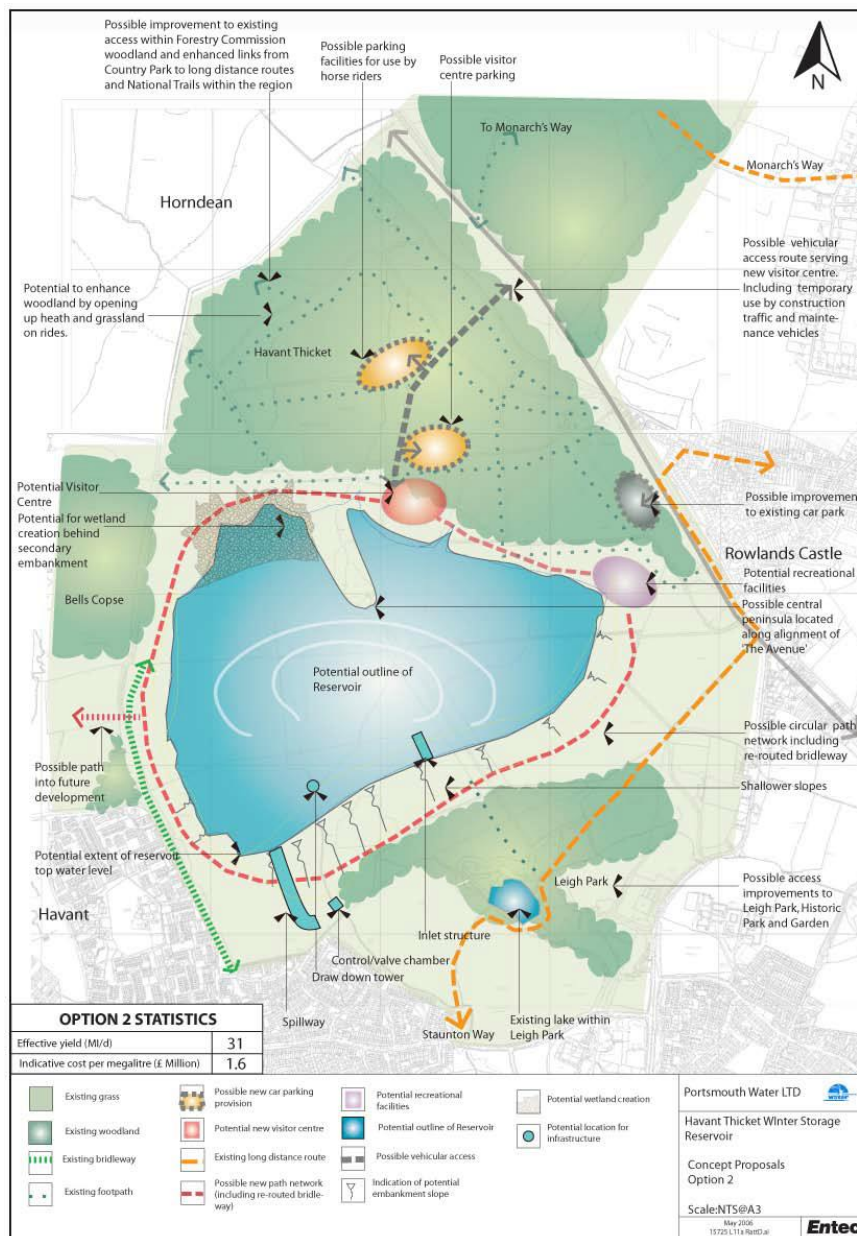


Note: On all options the access road and car park are shown in the centre of the Havant Thicket woodland. The Forestry Commission did not support the access road dissecting the wood and as a result, the access road and car park were moved to the periphery on the post-consultation May 2009 Outline Plan.

| <b>Option 2</b>                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Single HTWSR, as above, but including a peninsula extending southwards from the northern shore, and also with the main embankments having shallower slopes</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Effective storage capacity</b>                                                                                                                                 | 7,005 MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Effective yield</b>                                                                                                                                            | 31 MI/d*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Indicative cost</b>                                                                                                                                            | £50 million                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Indicative cost per megalitre</b>                                                                                                                              | 1.6 £million/MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Full water level</b>                                                                                                                                           | 38.5 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Full water surface area</b>                                                                                                                                    | 94 ha*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Typical end of summer storage levels</b>                                                                                                                       | 60% full*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Top of embankment</b>                                                                                                                                          | 40 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Downstream embankment slope</b>                                                                                                                                | 1:10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Green criteria</b>                                                                                                                                             | <ul style="list-style-type: none"> <li>• Gentler gradients than for Option 1 on downstream slopes to reduce the negative visual effects associated with raising ground levels for residential properties and for visitors.</li> <li>• The central peninsula maintains a visual focus in, and acknowledges the location of The Avenue, and with appropriate features may partially balance the loss of The Avenue from a landscape perspective, although the value of this was questioned by stakeholders.</li> <li>• Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of a wetland area although this would be smaller than Option 1.</li> <li>• The relatively large reservoir storage in this option means it may be possible to provide some releases to the Riders Lane Stream for environmental purposes.</li> <li>• Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park. Capacity means balance can be struck between areas for nature conservation and recreation and peninsula may create a natural barrier between the two.</li> </ul> |
| <b>Amber criteria</b>                                                                                                                                             | <ul style="list-style-type: none"> <li>• Fourth largest option in terms of capacity.</li> <li>• Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South, three adjacent small plantations and grazing farmland.</li> <li>• The gentler slopes and requirement for a peninsula means significantly more material is required to form these structures than Option 1. Extension of the peninsula over the area of good quality clay required for the borrow pit makes the availability of material on site less certain (Appendix D).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Red criteria</b>                                                                                                                                               | <ul style="list-style-type: none"> <li>• Removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | <ul style="list-style-type: none"> <li>• EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.</li> <li>• Second highest construction cost and indicative cost per megalitre of all the options.</li> </ul>                                                                                                                                                     |
| <b>Summary</b> | <p>This option was rejected on the basis that it doesn't provide value for money due to the high cost and complexity of landscaping to achieve significantly shallower embankments and creating the peninsula. The value of the latter was also questioned by stakeholders especially given The Avenue would still be lost and the decreased capacity. This option also still requires the removal of further woodland to the South in Leigh Park Gardens whilst delivering a smaller wetland habitat.</p> |

\* These figures vary from those for Option 1 due mainly to the increased embankment slopes. It has been assumed that the peninsula will have no net impact on storage (due to excavations required to create the feature), but this requires confirmation following the geotechnical investigations. The extent of the Borrow Pit may effect the viability of the peninsula.

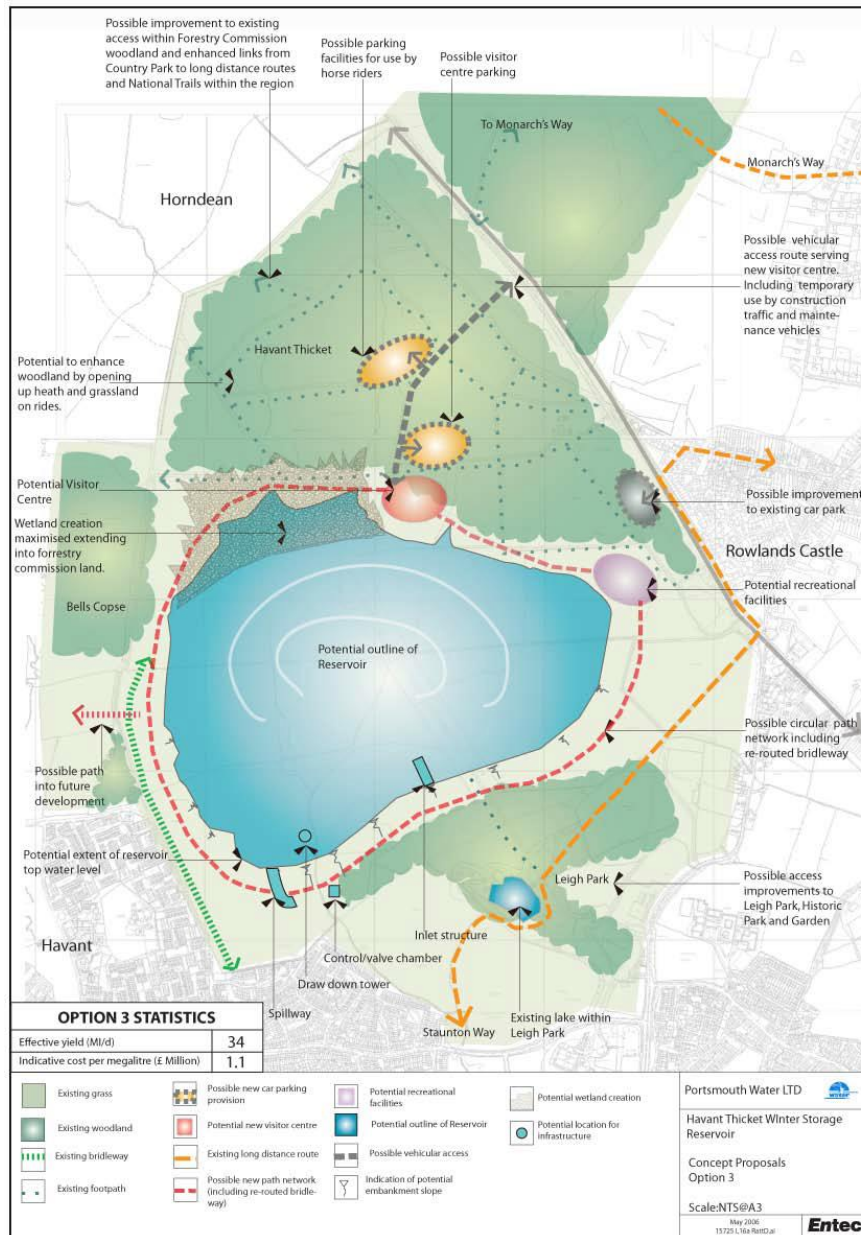


| <b>Option 3</b>                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Single HTWSR, as above, but with the potential wetland areas maximised in the NW of the reservoir</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Effective storage capacity</b>                                                                        | 8,160 MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Effective yield</b>                                                                                   | 34 MI/d*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Indicative cost</b>                                                                                   | £38 million                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Indicative cost per megalitre</b>                                                                     | 1.1 £million/MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Full water level</b>                                                                                  | 38.5 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Full water surface area</b>                                                                           | 98 ha*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Typical end of summer storage levels</b>                                                              | 63% full                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Top of embankment</b>                                                                                 | 40 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Downstream embankment slope</b>                                                                       | 1:3.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Green criteria</b>                                                                                    | <ul style="list-style-type: none"> <li>• Joint second largest option in terms of capacity.</li> <li>• Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of the largest proposed wetland area of all options.</li> <li>• The construction of embankments will allow water levels to be maintained in the wetland area.</li> <li>• The relatively large reservoir storage in this option means it may be possible to provide some releases to the Riders Lane Stream for environmental purposes.</li> <li>• Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park. Capacity means balance can be struck between areas for nature conservation and recreation.</li> <li>• Viable construction materials on site without the need to import impermeable materials. Slightly less construction material available than Option 1 due to larger wetland area.</li> <li>• Joint lowest indicative cost per megalitre of all the options.</li> <li>• Only slightly more complex design than Option 1 due to the extended wetland habitat.</li> </ul> |
| <b>Amber criteria</b>                                                                                    | <ul style="list-style-type: none"> <li>• Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South (part of the Grade II listed park and gardens), three adjacent small plantations and grazing farmland.</li> <li>• Embankment height, combined with steep gradients on downstream slopes, could have a negative visual effect on residential properties to Southwest and South.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Red criteria</b>                                                                                      | <ul style="list-style-type: none"> <li>• Complete removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha).</li> <li>• EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Summary**

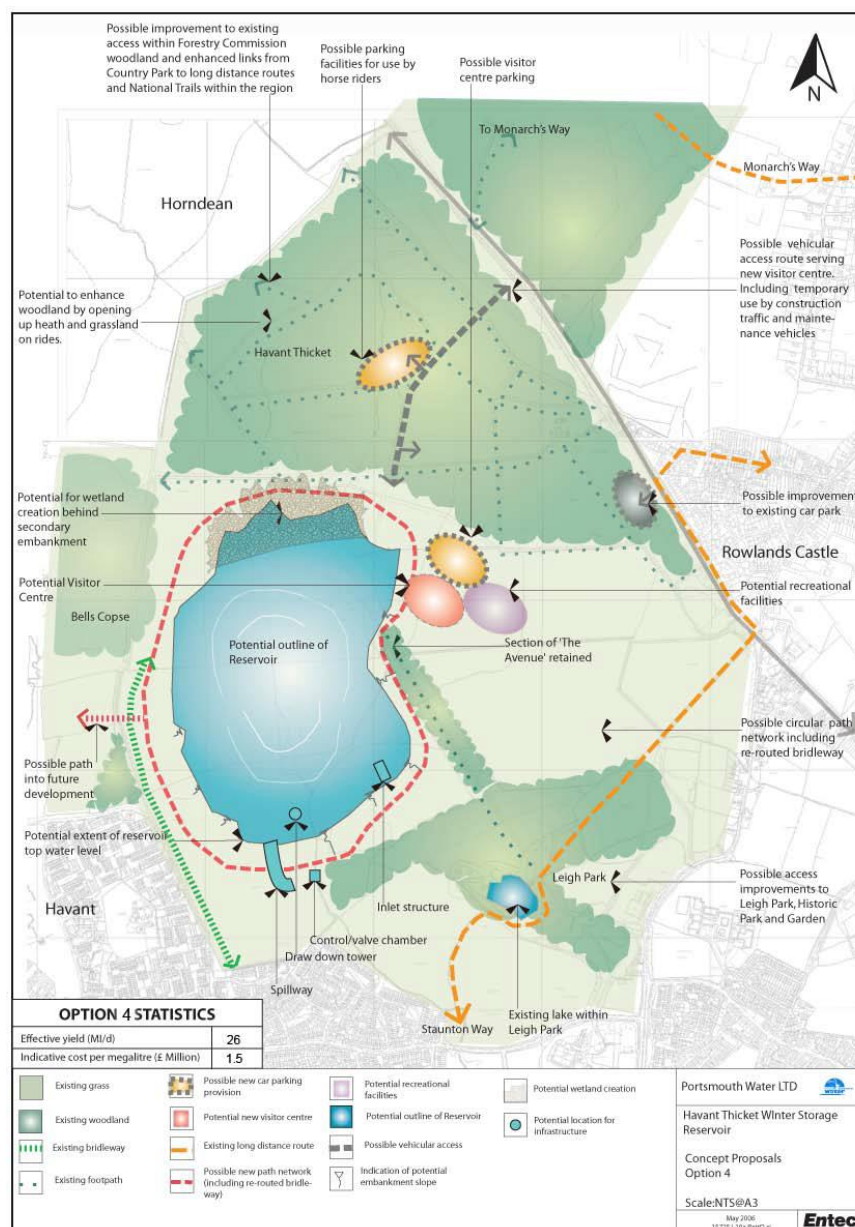
This option is favoured due to its large capacity and value for money. Whilst it requires the removal of ancient woodland, this option provides the opportunity for creation of the largest wetland habitat of all options and provision for recreational activities. There is also sufficient material on site for construction of this option.

*\* It has been assumed that the larger embankments for habitat protection around the north-western shore will have no net impact on storage (due to excavations required to create the features), but this requires confirmation following the geotechnical investigations.*



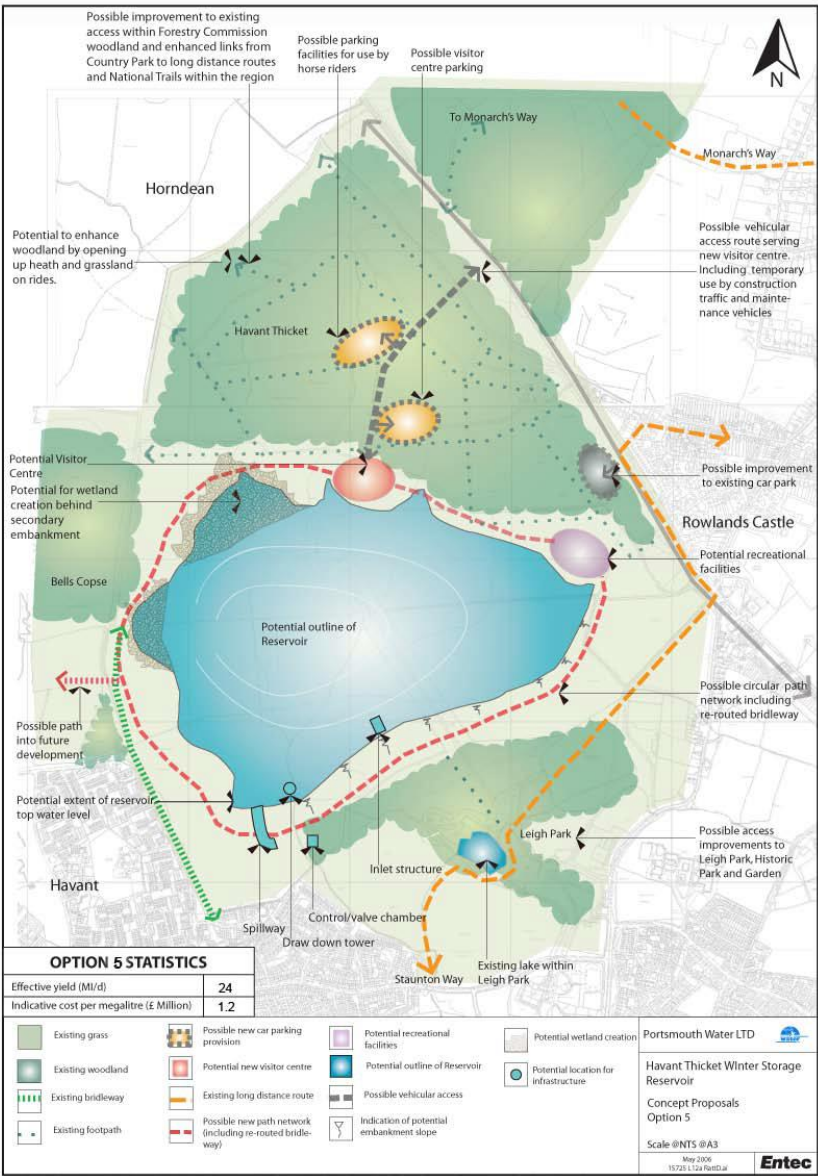
| <b>Option 4</b>                             |  | <b>Single, smaller, HTWSR, which retains ~62% of The Avenue</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
|---------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Effective storage capacity</b>           |  | 5,446 MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Effective yield</b>                      |  | 26 MI/d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |  |
| <b>Indicative cost</b>                      |  | £39 million                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <b>Indicative cost per megalitre</b>        |  | 1.5 £million/MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>Full water level</b>                     |  | 38.5 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |
| <b>Full water surface area</b>              |  | 71 ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Typical end of summer storage levels</b> |  | 57% full                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Top of embankment</b>                    |  | 40 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |  |
| <b>Downstream embankment slope</b>          |  | 1:3.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Green criteria</b>                       |  | <ul style="list-style-type: none"> <li>• Potential for significant ecological enhancement to the north into the Forestry England land with the creation of a wetland area similar to that of Option 1.</li> <li>• Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park.</li> <li>• Reduced Ancient Woodland loss, including partial retention of The Avenue.</li> <li>• Impact on EPS and other species will be less.</li> <li>• Similar complexity to Option 1 as a smaller site excavation is required but steeper bank construction is needed.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |  |
| <b>Amber criteria</b>                       |  | <ul style="list-style-type: none"> <li>• Third lowest capacity and yield of all options.</li> <li>• Steep gradients on downstream slopes to protect the Avenue have negative visual effects for visitors to sensitive landscapes. Steep slopes on the embankments also significantly change the landscape setting on the west side of The Avenue, which is part of the Grade II listed park and gardens. Steep embankments will still be needed in the south and this will have a negative visual effect on residential properties to the south.</li> <li>• Loss of only 38% of The Avenue (ASNW) and part of the Grade II park and gardens. Complete removal of Middle Clearing (ASNW) (2.17 ha), Round Wood (ASNW) (1.99 ha) and Corsican pine plantation (PAWS) (2.19 ha). Total Ancient Woodland loss 8.69 ha.</li> <li>• Dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified, along with reptile and breeding bird populations will be affected. Impact on EPS and other species will be less as part of The Avenue retained. Embankment on west side of The Avenue will to some extent shade the woodland in the late afternoon and evening, which will have some ecological impact.</li> <li>• The lower reservoir storage in this option means it may not be possible to provide some releases to the Riders Lane Stream.</li> <li>• The smaller surface area means that finding a balance between areas for nature conservation and recreation is more difficult. This would most likely result in a smaller amount of recreational opportunities related to this reservoir option.</li> </ul> |  |

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | <ul style="list-style-type: none"> <li>Third highest indicative cost per megalitre of all the options.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Red criteria</b> | <ul style="list-style-type: none"> <li>60% reduction in available material for construction but 25% increase in total material required than Option 1 due to steeper sloped embankments to protect The Avenue and achieve a reasonable capacity. This would require the import of large volumes of material for construction.</li> </ul>                                                                                                                                                                                                                                                 |
| <b>Summary</b>      | <p>This option was rejected on the basis that it does not provide value for money due to having a similar cost to Options 1-3 whilst delivering a much smaller yield. This is due to the requirement to import construction materials, as in order to protect what remains of The Avenue (grade II listed park and gardens) steep embankments would be required which would also adversely affect the character of the area and views across the site. The low capacity and yield for this option mean it would have a reduced benefit to alleviating the deficit in the South East.</p> |



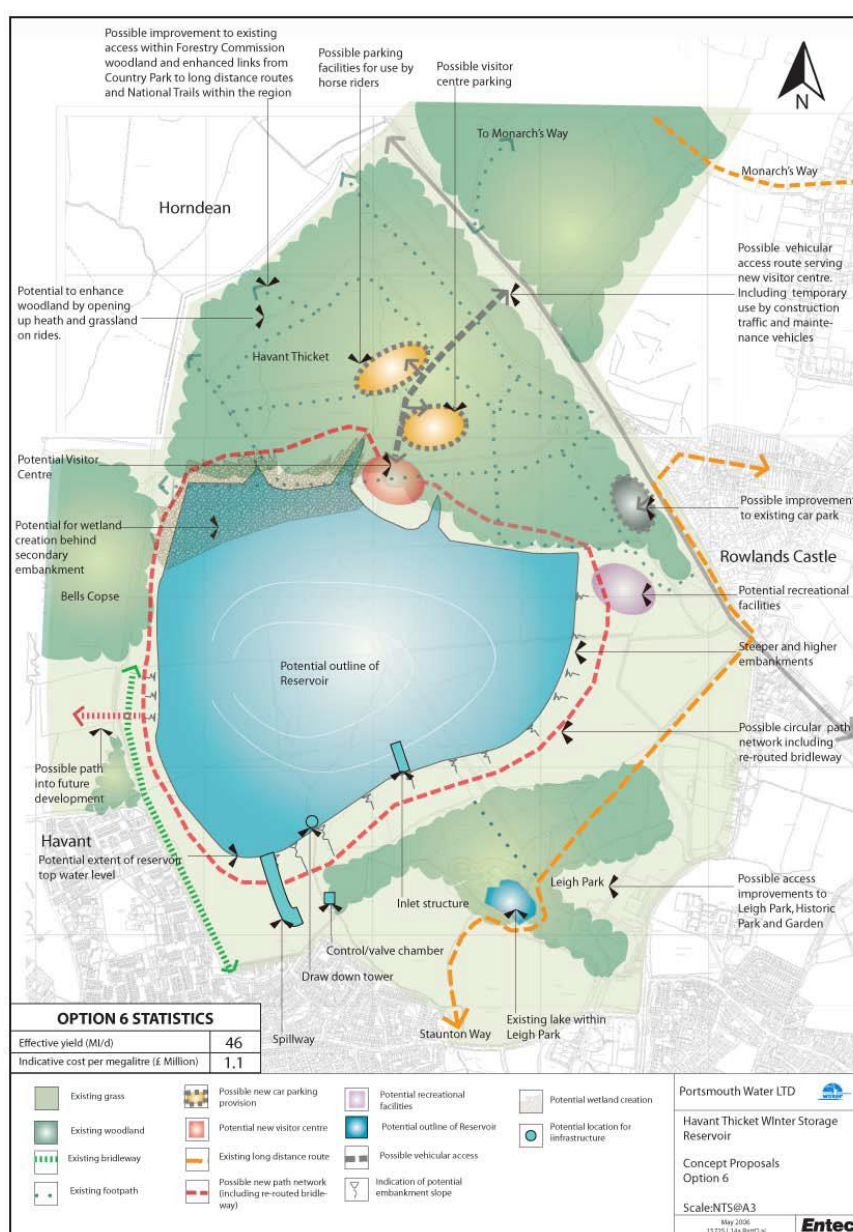
| <b>Option 5</b>                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Single HTWSR, but with lower embankments as a result of excavating material and 'sinking' the reservoir into the slope</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Effective storage capacity</b>                                                                                             | 4,465 MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Effective yield</b>                                                                                                        | 24 MI/d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Indicative cost</b>                                                                                                        | £28 million                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Indicative cost per megalitre</b>                                                                                          | 1.2 £million/MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Full water level</b>                                                                                                       | 34.5 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Full water surface area</b>                                                                                                | 85 ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Typical end of summer storage levels</b>                                                                                   | 52% full                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Top of embankment</b>                                                                                                      | 36 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Downstream embankment slope</b>                                                                                            | 1:3.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Green criteria</b>                                                                                                         | <ul style="list-style-type: none"> <li>• Lower embankment height reduces the negative visual effects on residential properties to the south and south west, and to visitors.</li> <li>• Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of a wetland area although this appears smaller than Option 1 and is split into two areas.</li> <li>• Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park.</li> <li>• Viable construction materials most likely present onsite without the need to import impermeable materials. However, further investigation would be needed as required deeper excavations within the reservoir may increase risk of leakage into Chalk.</li> <li>• Lowest estimated construction cost of all options and only marginally higher indicative cost per megalitre than lowest options for this metric.</li> <li>• Construction complexity is similar to Option 1 but with deeper excavation and shallower banks with a higher risk of leakage.</li> </ul> |
| <b>Amber criteria</b>                                                                                                         | <ul style="list-style-type: none"> <li>• Second lowest yield of all options.</li> <li>• Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South (part of the Grade II listed park and gardens), three adjacent small plantations and grazing farmland.</li> <li>• The lower reservoir storage in this option means it may not be possible to provide some releases to the Riders Lane Stream for environmental purposes.</li> <li>• Smaller surface area may make balance between areas for nature conservation and recreation difficult especially in the summer where estimated storage levels for this option are much lower than others.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Red criteria</b>                                                                                                           | <ul style="list-style-type: none"> <li>• Complete removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha).</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | <ul style="list-style-type: none"><li>• EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                    |
| Summary | <p>This option is favoured due to its low construction cost and reduced embankment heights which mitigate some of the negative visual impact of other options whilst still representing value for money. It requires the removal of some ancient woodland, this option provides the opportunity for creation of wetland habitats and provision for recreational activities. However, it should be noted there are slight concerns regarding the impermeability of underlying material at the depths required and the low end of summer storage volume, which could significantly affect recreation and nature conservation areas.</p> |



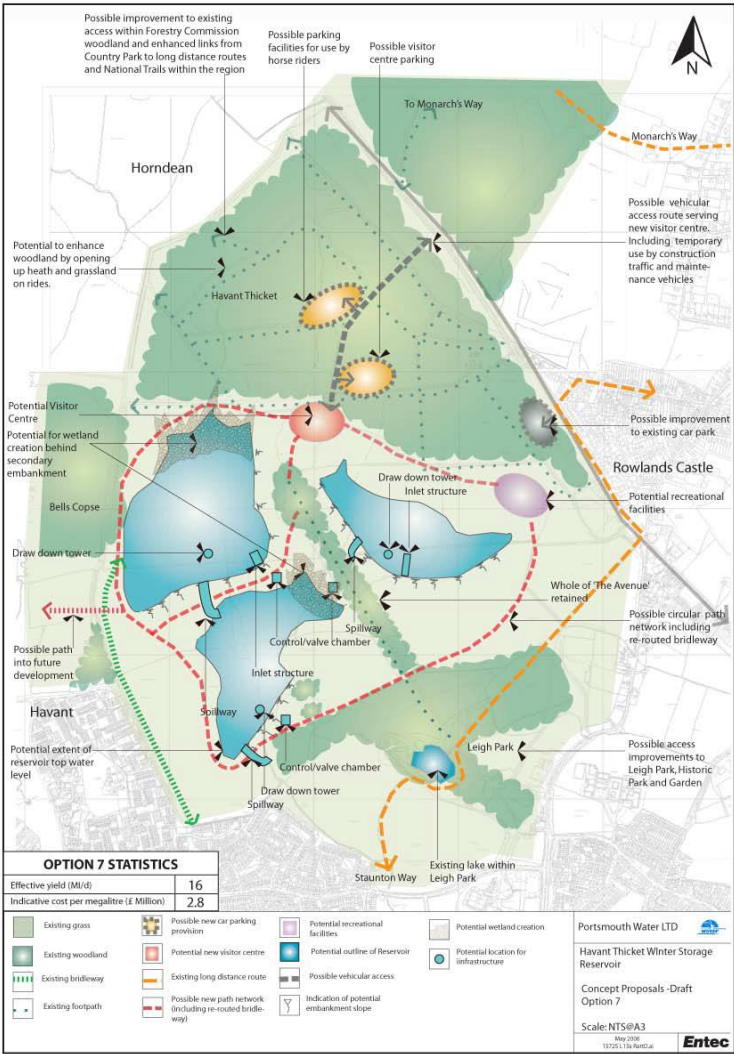
| <b>Option 6</b>                             |  | <b>Single HTWSR with higher embankments to maximise capacity</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |  |
|---------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| <b>Effective storage capacity</b>           |  | 12,164 MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>Effective yield</b>                      |  | 46 MI/d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |  |
| <b>Indicative cost</b>                      |  | £51 million                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |
| <b>Indicative cost per megalitre</b>        |  | 1.1 £million/MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |
| <b>Full water level</b>                     |  | 42.5 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |
| <b>Full water surface area</b>              |  | 121 ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
| <b>Typical end of summer storage levels</b> |  | 66% full                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <b>Top of embankment</b>                    |  | 44 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |
| <b>Downstream embankment slope</b>          |  | 1:3.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |
| <b>Green criteria</b>                       |  | <ul style="list-style-type: none"> <li>• Greater storage capacity increases volume available for water supply, providing a much greater yield than any other option.</li> <li>• Indicative cost per megalitre is the joint lowest of all options.</li> <li>• Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of a wetland area which is larger than Option 1.</li> <li>• The greater reservoir storage in this option means it may be possible to provide some releases to the Riders Lane Stream for environmental purposes.</li> <li>• Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park.</li> <li>• Largest surface area makes balance between areas for nature conservation and recreation possible. Estimated summer storage levels are highest for this option which will help to support both conservation and recreational activities.</li> <li>• Unlikely to require import of material for embankment construction for a crest level up to 1.5 m above 40mOD.</li> <li>• Highest yield of all options</li> </ul> |  |
| <b>Amber criteria</b>                       |  | <ul style="list-style-type: none"> <li>• Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South (part of the Grade II listed park and gardens), three adjacent small plantations and grazing farmland.</li> <li>• Realignment of the banks may be required due to reservoir footprint which would offset gains in volume and yield achieved by crest height.</li> <li>• More complex than Option 1 due to increased embankment heights and reservoir footprint.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |
| <b>Red criteria</b>                         |  | <ul style="list-style-type: none"> <li>• Highest construction cost of all options.</li> <li>• Steep gradients on downstream slopes have negative visual effects on residential properties and visitors to sensitive landscapes. Increased embankment height increases negative visual effects and impact on historic landscape.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |  |

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                | <ul style="list-style-type: none"> <li>Complete removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha).</li> <li>EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.</li> </ul>        |
| <b>Summary</b> | <p>This option was rejected due to its high construction cost due to increased embankment heights which also have a large negative visual impact and increase the complexity of the design. In fact, it was unclear if this option could be delivered within the site boundary utilising only materials available onsite. Most likely a reduction in the reservoir footprint would be required which would remove the benefit of increased capacity over other options.</p> |



| <b>Option 7</b>                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Series of three winter storage reservoirs at Havant Thicket stepped into the slope of the land and which retains The Avenue</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Effective storage capacity</b>                                                                                                  | 2,370 MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Effective yield</b>                                                                                                             | 16 MI/d                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Indicative cost</b>                                                                                                             | £44 million                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Indicative cost per megalitre</b>                                                                                               | 2.8 £million/MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Full water level</b>                                                                                                            | 26 m AOD, 34.5 m AOD, and 38.5m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Full water surface area</b>                                                                                                     | 63 ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Typical end of summer storage levels</b>                                                                                        | 40% full                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Top of embankment</b>                                                                                                           | 27.5 m AOD, 36 m AOD, and 40 m AOD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Downstream embankment slope</b>                                                                                                 | 1:3.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Green criteria</b>                                                                                                              | <ul style="list-style-type: none"> <li>• Smallest footprint of all options.</li> <li>• Retention of The Avenue and Round Wood. Loss of only the Middle Clearing (ASNW) (1.99 ha) and part of the Corsican pine plantation (PAWS). Total Ancient Woodland loss only 2.17 ha.</li> <li>• Impact on EPS and other species will be less.</li> <li>• Lower embankment heights reduce negative visual effects on residential properties to the south and south west, and to visitors to sensitive landscapes, although embankments are still needed on both sides of The Avenue.</li> <li>• Potential for significant ecological enhancement with the creation of wetland areas.</li> <li>• Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park may be possible to include The Avenue in this.</li> <li>• Possible to completely separate areas for nature conservation and recreation although each area will most likely be smaller than larger options.</li> </ul> |
| <b>Amber criteria</b>                                                                                                              | <ul style="list-style-type: none"> <li>• The lower reservoir storage in this option means it may not be possible to provide some releases to the Riders Lane Stream.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Red criteria</b>                                                                                                                | <ul style="list-style-type: none"> <li>• Lowest storage volume and yield of all options which would reduce the ability of Portsmouth Water to deal with long-term requirements and Southern Water's options for reducing their deficit.</li> <li>• Very high cost in proportion to the volume of water that would be available for use.</li> <li>• It is likely that at least one of the reservoirs would be emptied in the summer each year which may impact its use for recreation or as a wetland habitat.</li> <li>• A large part of the borrow pit would not be available, resulting in a 70% reduction in available material for construction (Appendix D). This is exacerbated by the need for similar amounts of material as for Option 1. This would require the import of large volumes of material (&gt;60%) for construction.</li> <li>• Although The Avenue would be retained, the creation of tall embankments on either side of part of its length would result in The</li> </ul>                                                       |

|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | <p>Avenue being in shadow for the majority of the time. This would negatively impact the visual appearance of The Avenue and would result in adverse impacts upon the vegetation and ecology of the woodland due to greater humidity and a lack of sunlight.</p> <ul style="list-style-type: none"><li>• The high embankments either side of part of The Avenue will adversely impact the visual character of The Avenue, which is part of the Grade II listed park and gardens</li><li>• Complex construction process.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                           |
| Summary | <p>This option was rejected on the basis that it doesn't provide value for money with the second highest estimated construction cost and the highest cost per megalitre delivered. This is largely due to the complex design, lack of availability of suitable clay and reduced volume. The required importation of ~60% of construction material would have significant environmental and traffic impacts. The low capacity and yield for this option mean it would have a reduced benefit to alleviating the deficit in the South East. It is estimated that at least one of the reservoirs would be emptied each year reducing the environmental/recreational benefits. Whilst retention of the majority of the designated ancient woodland onsite, except for the Middle Clearing (2.17 ha), is a clear positive over other options, the reduced volume and lack of availability of suitable clay onsite make this option unviable.</p> |



| Option 8 Two ponds with retention of The Avenue |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Effective storage capacity                      | ~6,000 MI <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Effective yield                                 | ~27 MI/d <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Indicative cost                                 | ~51 million <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Indicative cost per megalitre                   | £1.7 million/MI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Full water level                                | 38.5 m AOD and 38.5 m AOD <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Full water surface area                         | 93 ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Typical end of summer storage levels            | ~50% full <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Top of embankment                               | 40 m AOD and 40 m AOD <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Downstream embankment slope                     | 1:3.5 <sup>a</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Green criteria                                  | <ul style="list-style-type: none"> <li>Retention of The Avenue woodland. Loss of 6.35 ha of Ancient Woodland including; Middle Clearing (ASNW) (2.17 ha), Round Wood (ASNW) (1.99 ha) and Corsican pine plantation (PAWs) (2.19 ha).</li> <li>Impact on EPS and other species will be less.</li> <li>Potential for significant ecological enhancement with the creation of a wetland area. This could also be completely separated from areas of recreation.</li> <li>Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park may be possible to include The Avenue in this.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Amber criteria                                  | <ul style="list-style-type: none"> <li>The lower reservoir storage in this option means it may not be possible to provide some releases to the Riders Lane Stream.</li> <li>Area available for wetland creation is reduced compared to the one pond options.</li> <li>Steep gradients on downstream slopes to protect the Avenue on either side have negative visual effects on visitors to sensitive landscapes. The high embankments either side of The Avenue will adversely impact the visual character of The Avenue, which is part of the Grade II listed park and gardens. Steep embankments still needed in SW with visual effects on residential properties to the south.</li> <li>Possible to completely separate areas for nature conservation and recreation although each area most likely smaller than larger options. Recreation may be impacted upon drawdown due to lower storage levels than larger options.</li> <li>Costs are estimated to be lower than Option 7, however due to the need to construct embankments either side of The Avenue it will be higher than for single pond options such as Option 1. This coupled with the lower capacity of this two pond option compared to the single pond options means the cost per megalitre is also expected to be higher, although again not as high as the more complex and significantly lower yielding Option 7.</li> <li>More complex than Option 1 due to the requirement to excavate two ponds and protect either side of The Avenue with steep embankments.</li> </ul> |
| Red criteria                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | <ul style="list-style-type: none"> <li>Although The Avenue would be retained, the creation of tall embankments on either side would result in The Avenue being in shadow for the majority of the time. This would negatively impact the visual appearance of The Avenue and would result in adverse impacts upon the vegetation and ecology of the woodland due to greater humidity and a lack of sunlight. The high embankments on either side of The Avenue would also adversely impact the visual character of this feature which is part of the Grade II listed park and gardens.</li> <li>Approximately 25% of the borrow pit would not be available resulting in a reduction in available good quality clay material for construction (Appendix D). This is exacerbated by the need for increased amounts of material than Option 1, in order to construct steep embankments that protect The Avenue. This would require the import of large volumes of material for construction (&gt;50%), with knock-on adverse impacts.</li> </ul>                                                                                                                                                  |
| Summary | <p>This option was rejected on the basis that the retention of The Avenue results in a 25% reduction in the availability of good quality clay from the borrow pit required for construction of embankments either side of the woodland for protection. The creation of more embankments would also be required which means that a greater volume of material would be required. This would require import of large amounts of material which would have significant environmental and traffic impacts. This also makes this option more costly and with a lower potential yield than other options it scores lower in terms of value for money. Whilst retention of a significant amount of the designated ancient woodland onsite (59% compared to other options) and a feature which is part of the Grade II listed park and gardens is a clear positive over other options, the steep embankments required to protect The Avenue would result in it being in shadow for the majority of the time effecting the vegetation and ecology of the woodland. The lower capacity and yield for this option mean it would have a reduced benefit to alleviating the deficit in the South East.</p> |

<sup>a</sup> Some statistics for this option have been estimated based on those of similar options (Options 4 and 7) to give an approximate outline of this option compared to the others.



## Appendix F Stage Three: Design Appraisal Tables

**Table 3.7** Stage Three Assessment of Havant Thicket Reservoir Option 1.

| Criteria                                          | Description                                                             | RAG<br>(Red/Amber/Green)<br>Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------|-------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Views                                             | Will any visually sensitive viewpoints be affected?                     |                                        | Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South (part of the Grade II listed park and gardens), three adjacent small plantations and grazing farmland. Embankment height, combined with steep gradients on downstream slopes, could have a negative visual effect on residential properties to Southwest and South but could be mitigated. |
| Nature conservation and biodiversity              | What is the impact on areas of nature conservation/biodiversity?        |                                        | Complete removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha). EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.                                                                        |
| Potential for nature and biodiversity enhancement | How much scope is there for biodiversity enhancement?                   |                                        | Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of a wetland area. The large reservoir storage in this option means it may be possible to provide some releases to the Riders Lane Stream for environmental purposes.                                                                                                                                                        |
| Recreational benefits                             | Will people benefit from recreational source?                           |                                        | Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park. Capacity means balance can be struck between areas for nature conservation and recreation.                                                                                                                                                                                                                                           |
| Material availability                             | Availability of clay on site for reservoir and embankment construction? |                                        | Viable construction materials onsite without the need to import impermeable materials.                                                                                                                                                                                                                                                                                                                                                                                           |
| Cost                                              | What are the estimated construction costs and costs per megalitre?      |                                        | £36 million construction cost equating to £1.1 million/MI which is joint lowest for all the options.                                                                                                                                                                                                                                                                                                                                                                             |
| Complexity                                        | How complex is the reservoir design?                                    |                                        | Relatively simple design for single reservoir and embankments.                                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 3.8 Stage Three Assessment of Havant Thicket Reservoir Option 2.**

| Criteria                                          | Description                                                             | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------|-------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Views                                             | Will any visually sensitive viewpoints be affected?                     |                | Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South (part of the Grade II listed park and gardens), three adjacent small plantations and grazing farmland. The central peninsula maintains a visual focus in, and acknowledges the location of The Avenue, and with appropriate features may partially balance the loss of The Avenue from a landscape perspective. Gentler gradients than for Option 1 on downstream slopes to reduce the negative visual effects associated with raising ground levels for residential properties and for visitors. |
| Nature conservation and biodiversity              | What is the impact on areas of nature conservation/biodiversity?        |                | Removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha). EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.                                                                                                                                                                                                                                                                                        |
| Potential for nature and biodiversity enhancement | How much scope is there for biodiversity enhancement?                   |                | Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of a wetland area although this would be smaller than Option 1. The large reservoir storage in this option means it may be possible to provide some releases to the Riders Lane Stream for environmental purposes.                                                                                                                                                                                                                                                                                                                  |
| Recreational benefits                             | Will people benefit from recreational source?                           |                | Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park. Capacity means balance can be struck between areas for nature conservation and recreation and peninsula may create a natural barrier between the two.                                                                                                                                                                                                                                                                                                                                                                                       |
| Material availability                             | Availability of clay on site for reservoir and embankment construction? |                | The gentler slopes and requirement for a peninsula means significantly more material is required to form these structures than Option 1. Extension of the peninsula over the area of good quality clay required for the borrow pit makes the availability of material onsite less certain (Appendix D).                                                                                                                                                                                                                                                                                                                                                                                 |
| Estimated Cost                                    | What are the estimated construction costs and costs per megalitre?      |                | Second highest construction cost at £50 million equating to £1.6 million/Ml which is also second highest of all the options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Complexity                                        | How complex is the reservoir design?                                    |                | More complex than Option 1 due to greater landscaping and peninsula creation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Table 3.9 Stage Three Assessment of Havant Thicket Reservoir Option 3.**

| Criteria                                          | Description                                                             | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------|-------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Views                                             | Will any visually sensitive viewpoints be affected?                     |                | Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South (part of the Grade II listed park and gardens), three adjacent small plantations and grazing farmland. Embankment height, combined with steep gradients on downstream slopes, could have a negative visual effect on residential properties to Southwest and South. |
| Nature conservation and biodiversity              | What is the impact on areas of nature conservation/biodiversity?        |                | Complete removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha). EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.                                                 |
| Potential for nature and biodiversity enhancement | How much scope is there for biodiversity enhancement?                   |                | Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of the largest proposed wetland area of all options. The large reservoir storage in this option means it may be possible to provide some releases to the Riders Lane Stream for environmental purposes.                                                                                               |
| Recreational benefits                             | Will people benefit from recreational source?                           |                | Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park. Capacity means balance can be struck between areas for nature conservation and recreation.                                                                                                                                                                                                                    |
| Material availability                             | Availability of clay on site for reservoir and embankment construction? |                | Viable construction materials onsite without the need to import impermeable materials. Slightly less construction material available than Option 1 due to larger wetland area.                                                                                                                                                                                                                                                                            |
| Estimated Cost                                    | What are the estimated construction costs and costs per megalitre?      |                | £38 million construction cost equating to £1.1 million/MI which is joint lowest of all the options.                                                                                                                                                                                                                                                                                                                                                       |
| Complexity                                        | How complex is the reservoir design?                                    |                | Only slightly more complex design than Option 1 with the extended wetland habitat.                                                                                                                                                                                                                                                                                                                                                                        |

**Table 3.10 Stage Three Assessment of Havant Thicket Reservoir Option 4.**

| Criteria                                          | Description                                                             | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------|-------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Views                                             | Will any visually sensitive viewpoints be affected?                     |                | Steep gradients on downstream slopes to protect the Avenue have negative visual effects for visitors to sensitive landscapes. Steep slopes on the embankments also significantly change the landscape setting on the west side of The Avenue, which is part of the Grade II listed park and gardens. Steep embankments still needed in the south will have a negative visual effects on residential properties to the south.                                                                                                                                                                                                           |
| Nature conservation and biodiversity              | What is the impact on areas of nature conservation/biodiversity?        |                | Loss of only 38% of The Avenue (ASNW). Removal of Middle Clearing (ASNW) (2.17 ha), Round Wood (ASNW) (1.99 ha) and Corsican pine plantation (PAWS) (2.19 ha). Total Ancient Woodland loss 8.69 ha. Dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified, along with reptile and breeding bird populations will be affected. Impact on EPS and other species will be less as part of The Avenue retained. Embankment on west side of The Avenue will to some extent shade the woodland in the late afternoon and evening, which will have some ecological impact. |
| Potential for nature and biodiversity enhancement | How much scope is there for biodiversity enhancement?                   |                | Potential for significant ecological enhancement to the north into the Forestry England land with the creation of a wetland area similar to that of Option 1. The lower reservoir storage volume means it may not be possible to provide some releases to the Riders Lane Stream.                                                                                                                                                                                                                                                                                                                                                      |
| Recreational benefits                             | Will people benefit from recreational source?                           |                | Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park may be possible to include the Avenue in this. Capacity means finding a balance between areas for nature conservation and recreation is more difficult. Most likely smaller amount of recreational opportunities related to the reservoir.                                                                                                                                                                                                                                                  |
| Material availability                             | Availability of clay on site for reservoir and embankment construction? |                | 60% reduction in available material for construction but 25% increase in total material required than Option 1 due to steeper sloped embankments to protect The Avenue and achieve a reasonable capacity. This would require the import of large volumes (>50%) of material for construction or an extension of the borrow area beyond the reservoir footprint.                                                                                                                                                                                                                                                                        |
| Estimated Cost                                    | What are the estimated construction costs and costs per megalitre?      |                | £39 million construction cost equating to £1.5 million/MI which is third highest of all the options.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Complexity                                        | How complex is the reservoir design?                                    |                | Most likely similar to Option 1 as smaller site excavation required but steeper bank construction is needed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Table 3.11 Stage Three Assessment of Havant Thicket Reservoir Option 5.**

| Criteria                                          | Description                                                             | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------|-------------------------------------------------------------------------|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Views                                             | Will any visually sensitive viewpoints be affected?                     |                | Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South (part of the Grade II listed park and gardens), three adjacent small plantations and grazing farmland. Lower embankment height reduces the negative visual effects on residential properties to the south and south west, and to visitors. |
| Nature conservation and biodiversity              | What is the impact on areas of nature conservation/biodiversity?        |                | Complete removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha). EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.                        |
| Potential for nature and biodiversity enhancement | How much scope is there for biodiversity enhancement?                   |                | Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of a wetland area although this appears smaller than Option 1. The lower reservoir storage in this option means it may not be possible to provide some releases to the Riders Lane Stream for environmental purposes.                                                        |
| Recreational benefits                             | Will people benefit from recreational source?                           |                | Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park. Smaller capacity may make balance between areas for nature conservation and recreation difficult especially in the summer where estimated storage levels for this option are much lower than others.                                                                                 |
| Material availability                             | Availability of clay on site for reservoir and embankment construction? |                | Viable construction materials most likely present onsite without the need to import impermeable materials. However further investigation would be needed as required deeper excavations within the reservoir may increase risk of leakage into Chalk.                                                                                                                                                                            |
| Estimated Cost                                    | What are the estimated construction costs and costs per megalitre?      |                | £28 million construction cost equating to £1.2 million/MI which is only marginally more than the lowest options.                                                                                                                                                                                                                                                                                                                 |
| Complexity                                        | How complex is the reservoir design?                                    |                | Similar to Option 1 but with deeper excavation and shallower banks. Wetland split into two areas.                                                                                                                                                                                                                                                                                                                                |

**Table 3.12 Stage Three Assessment of Havant Thicket Reservoir Option 6.**

| Criteria                                          | Description                                                             | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------|-------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Views                                             | Will any visually sensitive viewpoints be affected?                     |                | Change to character and setting of sensitive landscapes and the direct loss of sensitive landscape features through the removal of 'The Avenue' and part of the woodland to the South (part of the Grade II listed park and gardens), three adjacent small plantations and grazing farmland. Steep gradients on downstream slopes have negative visual effects on residential properties and visitors to sensitive landscapes. Increased embankment height increases negative visual effects. |
| Nature conservation and biodiversity              | What is the impact on areas of nature conservation/biodiversity?        |                | Complete removal of four blocks of woodland designated as Semi Natural or Planted Ancient Woodland totalling 15.2 ha, including the loss of the edge of Leigh Park Gardens woodland to the South (2 ha). EPS including dormouse and a range of bat species foraging in the open areas and roosting/foraging in the woodland have been identified. Reptile and breeding bird populations will be affected.                                                                                     |
| Potential for nature and biodiversity enhancement | How much scope is there for biodiversity enhancement?                   |                | Potential for significant ecological enhancement on selected margins of reservoir and to the north into the Forestry England land with the creation of a wetland area which appears to be larger than Option 1. The greater reservoir storage in this option means it may be possible to provide some releases to the Riders Lane Stream for environmental purposes.                                                                                                                          |
| Recreational benefits                             | Will people benefit from recreational source?                           |                | Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park. Largest capacity make balance between areas for nature conservation and recreation possible especially as estimated summer storage levels for are highest for this option.                                                                                                                                                                        |
| Material availability                             | Availability of clay on site for reservoir and embankment construction? |                | Unlikely to require import of material for embankment construction for a crest level up to 1.5 m above 40mOD. Realignment of banks may be required due to footprint which would offset gains in volume and yield achieved by crest height.                                                                                                                                                                                                                                                    |
| Estimated Cost                                    | What are the estimated construction costs and costs per megalitre?      |                | Highest construction cost at £51 million equating to £1.1 million/ML which is the joint lowest of all options.                                                                                                                                                                                                                                                                                                                                                                                |
| Complexity                                        | How complex is the reservoir design?                                    |                | More complex than Option 1 due to increased embankment heights and footprint.                                                                                                                                                                                                                                                                                                                                                                                                                 |

**Table 3.13 Stage Three Assessment of Havant Thicket Reservoir Option 7.**

| Criteria                                          | Description                                                             | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------|-------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Views                                             | Will any visually sensitive viewpoints be affected?                     |                | Retention of the entire wooded 'Avenue' and one woodland plantation, and some of the grassland habitats. Lower embankment heights reduce negative visual effects on residential properties to the south and south west, and to visitors to sensitive landscapes, although embankments are still needed on both sides of The Avenue. The high embankments either side of The Avenue in places will adversely impact the visual character of The Avenue, which is part of the Grade II listed park and gardens. |
| Nature conservation and biodiversity              | What is the impact on areas of nature conservation/biodiversity?        |                | Retention of The Avenue and Round Wood. Loss of only Middle Clearing (ASNW) (1.99 ha) and part of the Corsican pine plantation (PAWS). Total Ancient Woodland loss only 2.17 ha. Embankments on both sides of The Avenue where present will shade the woodland resulting in some adverse impacts upon the vegetation and ecology of the woodland due to greater humidity and a lack of sunlight. Impact on EPS and other species will be less.                                                                |
| Potential for nature and biodiversity enhancement | How much scope is there for biodiversity enhancement?                   |                | Potential for significant ecological enhancement with the creation of a wetland area similar to that of Option 1. This could also be completely separated from areas of recreation. The lower reservoir storage in this option means it may not be possible to provide some releases to the Riders Lane Stream.                                                                                                                                                                                               |
| Recreational benefits                             | Will people benefit from recreational source?                           |                | Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park may be possible to include the Avenue in this. Possible to completely separate areas for nature conservation and recreation although each area most likely smaller than larger options. It is likely that at least one of the reservoirs would be emptied in the summer each year which may impact its use.                                                        |
| Material availability                             | Availability of clay on site for reservoir and embankment construction? |                | A large part of the borrow pit would not be available resulting in a 70% reduction in available material for construction (Appendix D). This is exacerbated by the need for similar amounts of material as for Option 1. This would require the import of large volumes of material (>60%) for construction.                                                                                                                                                                                                  |
| Estimated Cost                                    | What are the estimated construction costs and costs per megalitre?      |                | £44 million construction cost equating to £2.8 million/MI which is highest of all the options.                                                                                                                                                                                                                                                                                                                                                                                                                |
| Complexity                                        | How complex is the reservoir design?                                    |                | By far the most complex construction of all options.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

**Table 3.14 Stage Three Assessment of Havant Thicket Reservoir Option 8.**

| Criteria                                          | Description                                                             | RAG Assessment | Summary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------|-------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Views                                             | Will any visually sensitive viewpoints be affected?                     |                | Steep gradients on downstream slopes to protect the Avenue on either side have negative visual effects on visitors to sensitive landscapes. The high embankments either side of The Avenue will adversely impact the visual character of The Avenue, which is part of the Grade II listed park and gardens. Steep embankments still needed in SW with visual effects on residential properties to the south                                                                                                                                                                                                                                                                                                                                                                                             |
| Nature conservation and biodiversity              | What is the impact on areas of nature conservation/biodiversity?        |                | Retention of The Avenue woodland. Loss of 6.35 ha of Ancient Woodland including; Middle Clearing (ASNW) (2.17 ha), Round Wood (ASNW) (1.99 ha) and Corsican pine plantation (PAWs) (2.19 ha). A range of bat species foraging in the open areas and roosting in the woodland have been identified and reptile and breeding bird populations will be affected although to a lesser extent than options where The Avenue is removed. Although The Avenue would be retained, the creation of tall embankments on either side would result in The Avenue being in shadow for the majority of the time. This would negatively impact the visual appearance of The Avenue and would result in adverse impacts upon the vegetation and ecology of the woodland due to greater humidity and a lack of sunlight. |
| Potential for nature and biodiversity enhancement | How much scope is there for biodiversity enhancement?                   |                | Potential for significant ecological enhancement with the creation of a wetland area. This could also be completely separated from areas of recreation. The lower reservoir storage in this option means it may not be possible to provide releases to the Riders Lane Stream. However the wetland area will be smaller relative to options that do not retain The Avenue.                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Recreational benefits                             | Will people benefit from recreational source?                           |                | Opportunities for enhanced access and recreational/educational facilities including additional attractions linked to Staunton Country Park may be possible to include The Avenue in this. Possible to completely separate areas for nature conservation and recreation although each area most likely smaller than larger options. Recreation may be impacted upon drawdown due to lower storage levels than larger options.                                                                                                                                                                                                                                                                                                                                                                            |
| Material availability                             | Availability of clay on site for reservoir and embankment construction? |                | Approximately 25% of the borrow pit would not be available resulting in a reduction in available good quality clay material for construction (Appendix D). This is exacerbated by the need for increased amounts of material than Option 1, in order to construct steep embankments that protect The Avenue. This would require the import of large volumes of material for construction (>50%) with knock on adverse environmental impacts.                                                                                                                                                                                                                                                                                                                                                            |

|                |                                                                    |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------|--------------------------------------------------------------------|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Estimated Cost | What are the estimated construction costs and costs per megalitre? |  | Cost are estimated to be lower than Option 7, however due to the need to construct embankments either side of The Avenue it will be higher than for single pond options such as Option 1. This coupled with the lower capacity of this two pond option compared to the single pond options means the cost per megalitre is also expected to be higher, although again not as high as the more complex and significantly lower yielding Option 7. |
| Complexity     | How complex is the reservoir design?                               |  | More complex than Option 1 due to the requirement to excavate two ponds and protect either side of The Avenue with steep embankments.                                                                                                                                                                                                                                                                                                            |

## Appendix G Stakeholder Consultation Summary

Havant Thicket Reservoir (HTWSR) Stakeholder Group:

- Environment Agency
- WaterVoice Southern
- Hampshire County Council
- Havant Borough Council
- East Hampshire District Council
- Rowlands Castle Parish Council
- Sir George Staunton Country Park
- Forestry Commission
- Hampshire & Isle of Wight Wildlife Trust
- Hampshire Ornithological Society

The table below summarises the responses received from members of the stakeholder group on the conceptual designs for the reservoir (Options 1-7).

| Stakeholder                                                                                                              | Comments on conceptual design options for the reservoir                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Stephan d'Este Hoare – Principal Landscape Officer - East Hampshire District Council – July 2006                         | Staunton Park Landscape Group showed a preference for Option 7 which relates well to character and topography and maintains The Avenue.<br>Option 4 was second best which also retains the Avenue and lower embankments have less visual impact.<br>Option 2 third, although the value of peninsula was questioned.<br>Preference for footpaths to be above embankments not below.<br>Separate footpaths and wetland to benefit wildlife.<br>The Avenue could link the reservoir with Staunton Park. |
| David Williamson – Forest District Manager SE England – Forestry Commission England – July 2006                          | Loss of woodland needs to be balanced against need for water storage and wider benefits of mitigation package.<br>Larger schemes offer value for money and greater recreational/conservation opportunities. Proximity to deprived area means social improvements should be ranked highly.<br>Large options could be mitigated by tree planting.                                                                                                                                                      |
| Dennis Garratt – Head of Conservation – Central/South East – The Wildlife Trusts Hampshire and Isle of Wight – July 2006 | Bigger the wildlife area the better.<br>Carefully sited hides overlooking the wetland for public viewing.<br>Floating rafts for terns and wildfowl.<br>Wildflowers, grasslands along embankments with a possibility for grazing.                                                                                                                                                                                                                                                                     |
| John Goodspeed - Hampshire Ornithological Society – July 2006                                                            | Release into Hermitage Stream beneficial as recently used by grey wagtails, egrets and sandpipers.<br>Option 3 is attractive due to increased wetland.<br>Option 4 – loss of water area and release into stream disadvantage for birds.<br>Option 7 – smaller water areas will detract some birds.                                                                                                                                                                                                   |

|                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cllr. Eunice M. Byrom – Member for Catherington – Hampshire County Council – July 2006                                                                                         | Key statistic is yield as it is a major factor for the future. Option 6 is the preferred option as it has the highest storage capacity, loss of The Avenue is a disadvantage but could be overcome by woodland planting. Option 3 is the second preference as next in both yield and storage capacity with a large wetland area. Option 1 is third preference, similar to Option 3 with links to Staunton Country Park recreation facilities, however smaller wetland.                                                                                                                                                                                                   |
| Sally Beard – Clark – Rowlands Castle Parish Council – July 2006                                                                                                               | Recreation and biodiversity enhancement outweigh loss of The Avenue as long as main wooded area of Havant Thicket is preserved. Visual aspect crucial, minimise embankment height, look to excavate to increase capacity rather than embankment height. Option 5 most favourable on this basis as long as water requirement is met. Could incorporate flood control schemes for adjoining areas.                                                                                                                                                                                                                                                                         |
| Nick Price – Senior Water Resources Planner – Supra-Regional Water Resources Planning team and Water Resources, Fisheries and Recreation Team - Environment Agency – July 2006 | Priority should be split equally between recreation and wildlife. Size and yield the key issue, so as to maximise recreation and wildlife spaces. Option 3 & 5 preferred for fisheries. Option 3 maximises wetland. Option 5 has complex bank outline. Key issue is to have a variety of depths and complex bank profiles.                                                                                                                                                                                                                                                                                                                                               |
| Lewis Paterson – Park Manager – Landscape Advisory Group - Sir George Staunton Country Park – July 2006                                                                        | Option 7 preferred option. Minimal impact on heritage and preserves The Avenue. Advantages: Lower embankments. Zoned recreation. Grazing land may remain to the East of The Avenue. Possible landscaping to make a more natural aesthetic. Disadvantages: Reservoir may be empty in summer. Option 4 is second preference. Minimised impact on heritage and preserves most of The Avenue. Embankments screened by woodland. Terrestrial habitat for grazing preserved. Size would support recreation with visitor centre and facilities. Option 2 third preference. Gentle slopes reduce visual impact from the South. Reservoir significant size to support recreation. |
| Peter Watts – WaterVoice Southern – July 2006                                                                                                                                  | Sufficient water at the lowest cost, then visual impact followed by ecological impact. Options 1, 3 and 6 the best. Option 6 has highest visual impact. Option 3 has more ecological benefits than Option 1. Option 3 preferred. Steep embankment slopes a disadvantage should be softened at low cost.                                                                                                                                                                                                                                                                                                                                                                  |



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