

Havant Thicket Reservoir Project

Environmental Statement Volume 1 Non-Technical Summary

Portsmouth Water Ltd.

07/09/20

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Notice

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Foreword

by Bob Taylor, Chief Executive of Portsmouth Water

I feel extremely privileged to be the Chief Executive Officer at Portsmouth Water at this moment as we submit our planning application for the Havant Thicket Reservoir.

It has taken some years to reach this stage and as a Havant-based company we're delighted to be in a position to deliver this vital strategic water resource for the South East and create a unique leisure and wildlife environment for local communities.

Portsmouth Water has a long history since 1857 of supplying water to this area, and we've continually maintained a proud record of some of the highest service standards and the lowest water supply charges of all the water companies in England and Wales.

We believe in 'doing the right thing', a belief further embedded in our Community Pledge, launched earlier this year, and our Community Partnership, to be launched in the Spring which ensures society benefit is considered in all our decisions. Our aim is to make sure our objectives are in line with those of our communities.

Nowhere is this more important than in the development and delivery of a large infrastructure project like a reservoir, the first to be progressed in the South East since the 1970s.

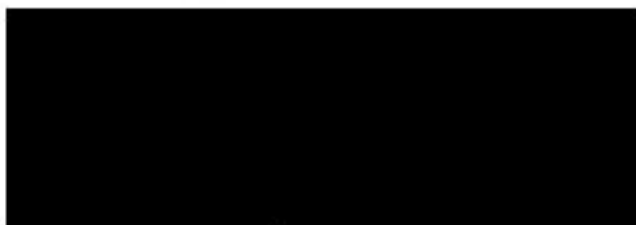
This project has always had the potential to provide many additional benefits, over and above its core purpose of securing vital water supplies for our customers and those of Southern Water – ensuring we're ready for housing growth, climate change and protecting two world-famous rare chalk streams in Hampshire.

We believe we've captured that potential in this scheme, not least through the creation of a wetland for threatened bird species, extensive tree, hedgerow and wildflower planting, drought resilience and the educational, training and employment opportunities these also bring. Our plans also create a green leisure space with paths and play areas – offering priceless benefits for health and wellbeing – with a visitor centre aimed at bringing communities together.

And with our eye on future challenges, we've also considered the role we'll play in meeting our unique commitment as an industry to become carbon net zero by 2030.

We've listened carefully to the ideas and thoughts of our customers, communities, partners and regulators – held discussion groups, drop-in sessions, delivered talks, chatted on Facebook, spent time with young people and engaged tirelessly with our regulators, environmental organisations and the planning authorities. We believe this is part of the reason we have such strong support.

We think this application embodies not only our hopes and aspirations for the reservoir, but also those of the communities who will benefit and be part of its delivery, and we look forward to continuing to work in partnership with our neighbours over the months and years to come.



Bob Taylor, Chief Executive Officer, Portsmouth Water

1. Background

- 1.1. This Non-Technical Summary of the Environmental Statement supports two outline planning applications, submitted by Portsmouth Water, for a new reservoir at Havant Thicket and a pipeline between the reservoir and Bedhampton pumping station ('The Scheme'). The new reservoir will secure reliable drinking water supplies for decades to come, while maximising the community and environmental benefits of a new raw water reservoir.
- 1.2. The application includes the reservoir for raw water storage, control house, visitor centre and car park, recreational facilities for public amenity and a wetland along the northern shore of the reservoir.
- 1.3. The reservoir, when constructed, would be filled with surplus water drawn from the springs at the Bedhampton works when flows are at their highest in winter via a new pipeline. The creation of a reservoir will make better use of the excess water by capturing it and storing it in the reservoir until it is needed. Portsmouth Water can then use this water to supply their customers and share the surplus with Southern Water's customers in west Hampshire.
- 1.4. The Scheme would provide a new wetland habitat and associated area for nature conservation. The proximity of the reservoir to the internationally important Chichester and Langstone Harbour means that it can be used as a safe retreat for roosting birds when there is disturbance in the Harbour Special Protection Area and Special Area of Conservation. The construction of the reservoir will result in substantial reductions in nutrients loads to the harbour.
- 1.5. The Scheme would also offer further opportunities to improve the wider footpath, cycleway and bridleway networks in the area.
- 1.6. The pipeline would transfer water from Bedhampton Springs to fill the reservoir in the winter and draw water off for treatment and supply when needed in the summer. It would also be used for emergency drawdown should the reservoir levels need to be reduced in emergency conditions, in accordance with the Environment Agency safety guidance.
- 1.7. As indicated on the Scheme Setting Plan, which is included in Appendix A of this Non-Technical Summary, the reservoir site lies within two local planning authorities, Havant Borough Council and East Hampshire District Council, within the county of Hampshire. The pipeline route is entirely within the Havant Borough Council.
- 1.8. The Scheme falls under the Environmental Impact Assessment Regulations 2017 and as such requires an Environmental Statement to support the planning application. The Environmental Statement comprises four volumes. This document, the Non-Technical Summary constitutes Volume 1 of the Environmental Statement . The main report is in Volume 2, with figures and appendices in Volumes 3 and 4 respectively.

Need for the reservoir

- 1.9. The increase in water supplies available to Portsmouth Water on completion of the Scheme will enable additional water to be supplied to Southern Water. Southern Water has a forecast deficit in water resources in the Hampshire area, which has been created by the reduction of its abstraction licences on the River Itchen imposed by the Environment Agency. Southern Water has an agreement under Section 20 of the Water Resources Act 1991 that requires them to use all best endeavours to remove this forecast deficit. Additional water made available by the Scheme will form at least 14% of the resources required to meet the forecast deficit.
- 1.10. The reservoir was included in Water Resources in the South East Group's regional strategy and Portsmouth Water and Southern Water's 25-year and 50-year Water Resources Management Plans, which gained approval from the Secretary of State for the Environment, and then Ofwat, in 2019. The Scheme will provide over 35% of water supply need over the next 25 years, and will help Portsmouth Water to free up existing supplies in the west of the catchment area to share with Southern Water's customers in order to meet the region's challenges in the future, in particular relating to abstraction licence changes, predicted population growth and climate change that will all place pressure on meeting future water supply demand.

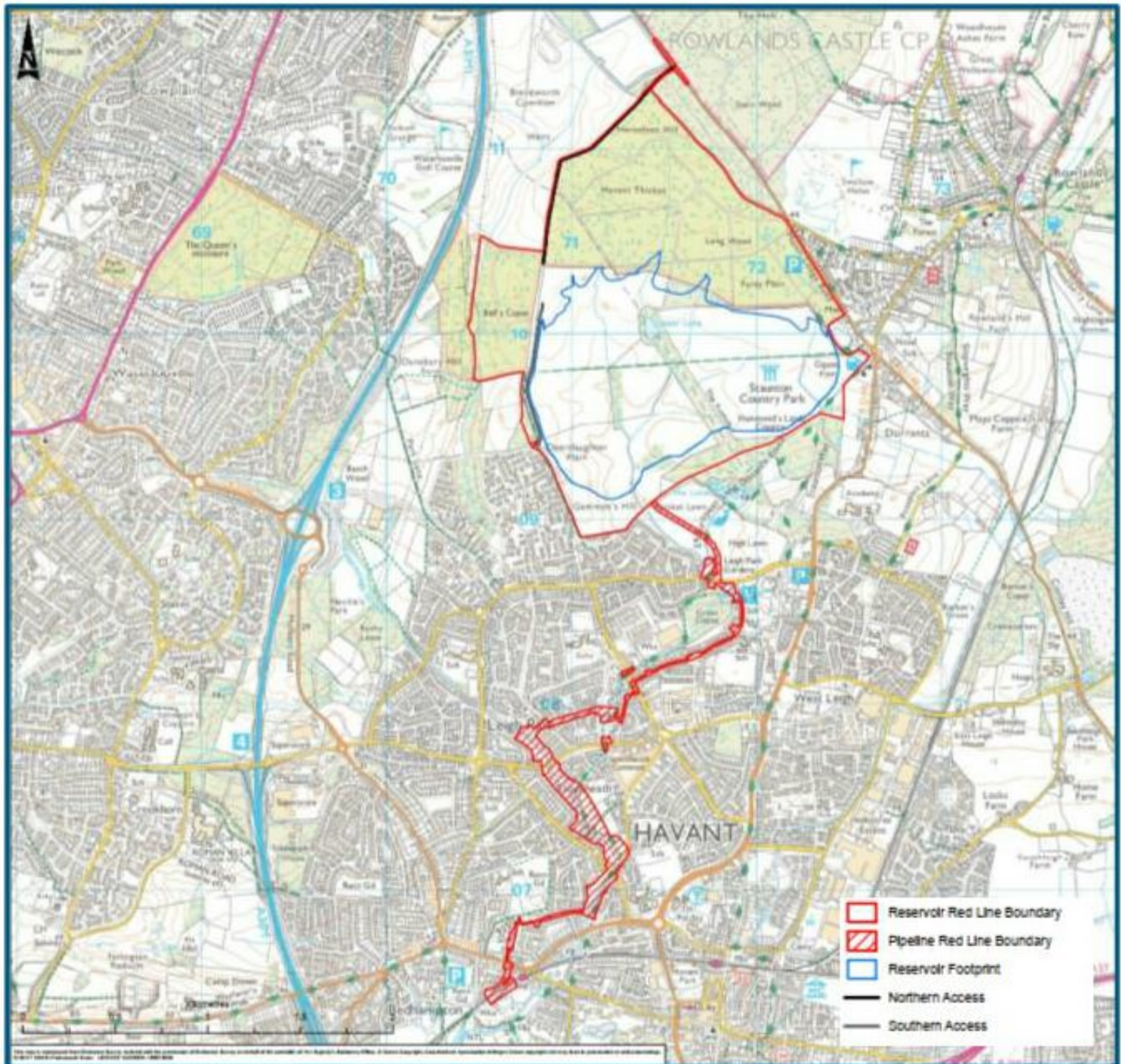


Figure 1-1 – Site Location Plan

Site and surrounding environment

Reservoir site

- 1.11. Portsmouth Water purchased approximately 160 hectares from the Forestry Commission (now Forestry England) in 1965 and Portsmouth City Council in 1966. This area of land that will accommodate the reservoir and visitor facilities, measures 1.6km in length from east to west and 0.8km from north to south. Since its purchase, the land has been improved for agricultural use through the removal of tree stumps, installation of drainage and soil improvement. The open grassland is managed by Hampshire County Council who use it for grazing. A large area of the reservoir site is also currently let to Staunton Country Park and area designated by Hampshire County Council for people to visit and enjoy recreation in a countryside environment. The Site is also used by the local community for walking, cycling, and horse riding.

- 1.12. The reservoir site lies within a shallow clay valley comprising predominantly open grassland with some woodland, hedgerows and ditches. At the centre of the reservoir site is an area classified as ancient woodland that runs from north to south that is known as The Avenue. Three other areas of ancient woodland, Middle Clearing, Round Wood and Corsican Pine Plantation, are located within the reservoir site. These woodland areas provide habitat for a range of bird, insect and bat species. A Public Right of Way (bridleway) extends across the reservoir site from east to west. Three unnamed small watercourses run from north to south across reservoir site, these converge into one stream to the west of The Avenue before flowing off site into Riders Lane Stream to the south-west.
- 1.13. The residential area of Warren Park is located adjacent to the western boundary of the reservoir site whilst Leigh Park is located approximately 480 m south-west of the reservoir. The settlement of Rowlands Castle is located 200 m east of the reservoir site with Redhill and Durrants located approximately 160 m from the reservoir on the eastern boundary.
- 1.14. The woodland of Havant Thicket directly north of the reservoir site is owned and managed by Forestry England for timber production. This woodland is also classified as ancient / ancient replanted woodland and is included within the red line boundary as it will accommodate proposed habitat mitigation measures. Directly to the west are open areas of grassland and woodland known as Bells Copse (ancient woodland) and Cabbagefield Row.
- 1.15. A large area of the reservoir site is part of Staunton Country Park a Grade II* Registered Park and Garden, and within the Sir George Staunton Conservation Area. The area of Staunton Country Park and the Conservation Area within the site is mainly open grasslands.

Pipeline corridor

- 1.16. The pipeline corridor extends from the Portsmouth Water pumping station at Bedhampton, northwards through the town of Havant, to the proposed control house within the reservoir site.
- 1.17. The southernmost point of the pipeline corridor is located approximately 1 km north of three European / internationally designated sites: Chichester and Langstone Harbours Special Protection Area and Ramsar site and Solent Maritime Special Area for Conservation.
- 1.18. Most of the corridor passes through the Leigh Park Estate and passes along and crosses local roads, areas of hardstanding and amenity grassland of low ecological value and typical of an urban setting.
- 1.19. The pipeline corridor runs north along the Hermitage Stream before turning north-east and broadly following the Riders Lane Stream towards the reservoir site. At the northern end of the corridor, before entering the reservoir site, the pipeline intersects the Sir George Staunton Conservation Area, and the Registered Park and Garden and species rich grassland within Staunton Country Park, designated Thicket Lawn and High Lawn Site of Importance for Nature Conservation.

2. Scheme description

2.1. The Scheme comprises the following:

- Reservoir site including vehicular and pedestrian access routes, an operational control house and visitor facilities including a visitor centre, bird hide, car park and recreational walking and cycling network.
- Pipeline corridor including the pipe, an emergency discharge structure on the Hermitage Stream and upgrades to existing culverts.

2.2. Further details are provided below and in the Environmental Statement Volume 2.

Reservoir application

2.3. Planning permission is being sought for:

Development of a reservoir for raw water storage, with control house, visitor centre and car park, recreational facilities for public amenity and a wetland along the northern shore of the reservoir.

2.4. The components of the reservoir application include:

- A pumped storage reservoir, with the minimum required total storage capacity of 8,700 million litres (ML), to support the planned bulk supply transfer of at least 21 ML/d in extreme (currently defined as 1:200 year) drought conditions.
- Construction of an earth embankment;
- Construction of a control house partially incorporated within landscaped earth mounding adjacent to the south west embankment;
- Construction of an overflow discharge/spillway at the south-western side of the reservoir and associated works;
- Construction of a new junction on the B2149 Manor Lodge Road and a new junction on Swanmore Road and access routes from both junctions to the visitor car park;
- Provision of 193 car parking spaces and between 70 and 75 overflow spaces plus spaces for staff, coach/minibus and disabled drivers sited to the north west of the reservoir;
- Construction of tracks and a network of bridleways, cycle paths and footpaths;
- Construction of a visitor centre / café, with storage areas and welfare facilities to the northwest of the reservoir to be used for recreational and education purposes;
- Provision of picnic area(s) and children's play area(s);
- Creation of a permanent wetland on the northern side of the reservoir and construction of bird watching hide/screen(s);
- Construction of a slipway on the western bank of the reservoir for operational use only;
- Provision of viewing areas on the southern embankment and western edge of the reservoir; and
- A small section of the proposed pipeline (210 m) is included in the reservoir application.

Pipeline application

- 2.5. Planning permission is being sought for:
Development of a new pipeline to transfer water from Bedhampton Springs to fill the reservoir in the winter and draw it off to treat and supply when needed in the summer.
- 2.6. The components of the pipeline application comprise:
 - Construction of an underground pipeline linking the reservoir with the existing pumping station at Bedhampton;
 - Emergency drawdown discharge structure at Hermitage Stream;
 - Upgrades to existing culverts; and
 - Washout and air valve chambers (typically below ground).
- 2.7. The environmental constraints plan and outline masterplan are included in Appendix A of this Non-Technical Summary.
- 2.8. An outline Biodiversity Mitigation and Compensation Strategy has been prepared to inform the environmental assessment and has been submitted with the planning applications.
- 2.9. Mitigation measures required as part of the Record of Environmental Actions and Commitment (REAC) in the Outline Environmental Management Plan (OEMP) in Appendix A2.1 of the Environmental Statement Volume 4 will be included by the appointed contractors in the Construction Environmental Management Plan (CEMP).

3. Construction

Reservoir site

- 3.1. The construction of the reservoir will be phased over approximately 10 years to take account of detailed design, environmental mitigation, preparatory operations, seasonal clay working limitations and time taken to fill the reservoir with water. The construction compound will be located within the reservoir site red line boundary in the area that will eventually accommodate the visitor centre and car park. Reservoir construction traffic will access the site via the northern access off the B2149.

Pipeline corridor

- 3.2. The reservoir and pipeline construction will be phased, to reduce the amount of traffic travelling to and from the reservoir site at any one time. It is likely that the pipeline will be broken down into sections to allow multiple teams to operate at the same time.
- 3.3. Construction traffic comprising heavy goods vehicles will be required to use the northern access as the main access point, with the southern access only being used for construction of the top third of the pipeline. Construction traffic for the lower two thirds of the pipeline will access the pipeline corridor directly from Junctions 2 and 3 of the A3(M). School term times will be avoided where the pipeline runs close to schools. The traffic impact is discussed in more detail in the Environmental Statement Volume 2 Chapter 13 Traffic and Transport.
- 3.4. The outline planning approval will be subject to detailed Traffic Management and Construction Environmental Management Plans that will include measures to reduce disruption from construction activities.

- 3.5. The key elements of the proposed construction sequence are indicated in Table 3.1:

Table 3.1: Indicative Construction Programme

Dates	Key activity / milestone
Spring 2021	Planning permission expected
Spring 2021 – November 2022	Commencement of works. Species relocation, tree felling, preparatory work on habitats avoiding breeding / nesting seasons, enabling works including access road construction.
March 2023 – September 2026	Construction of culvert structure, embankment and reservoir control house
Autumn 2026 – Spring 2029	Construction of visitor facilities. Filling of reservoir in stages with pumped water from Bedhampton Springs. Testing and commissioning.
2029	Scheme opening year (for the purposes of the environmental assessment)

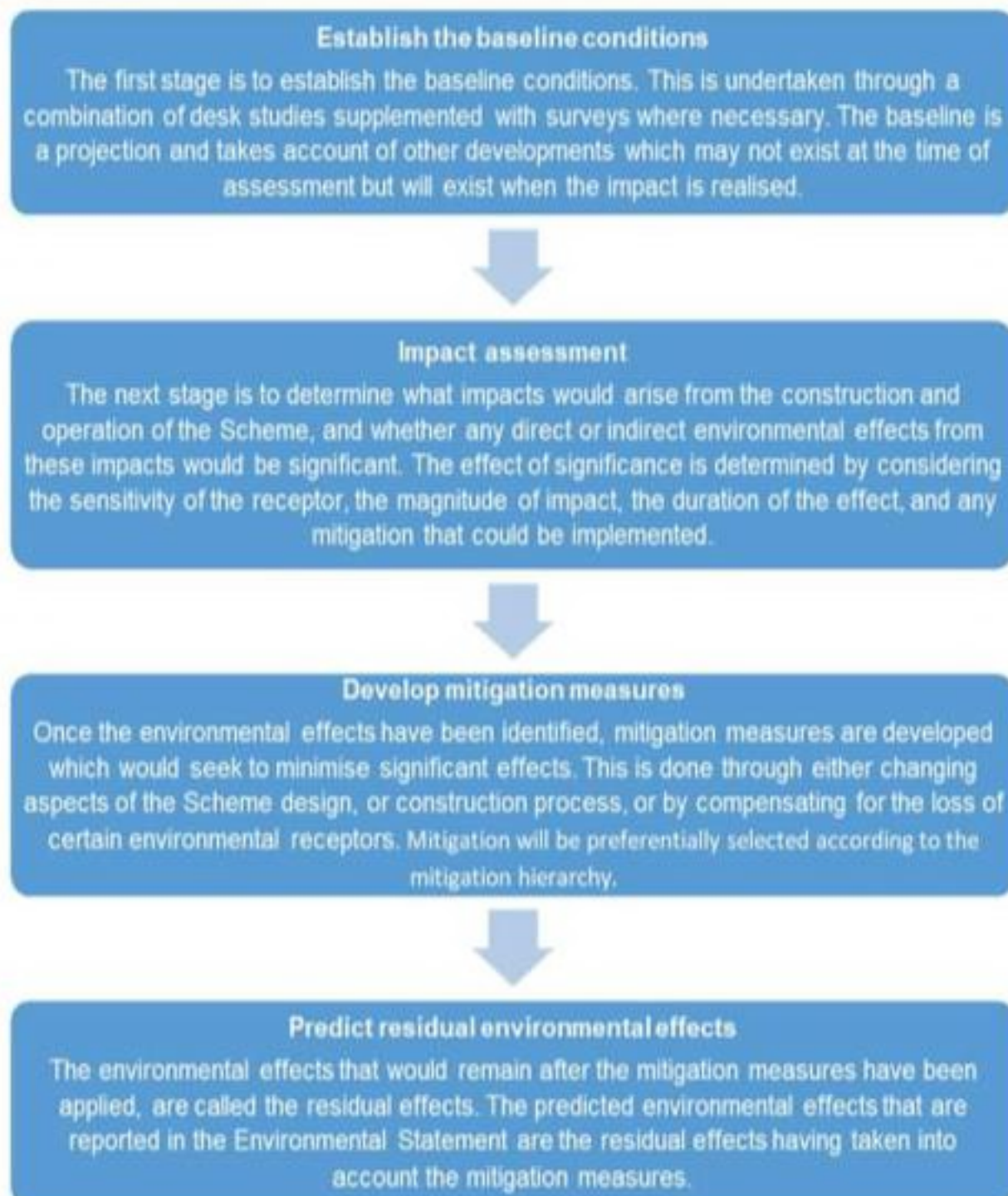
4. Alternatives considered

- 4.1. The Havant Thicket site has been identified as the preferred location for a reservoir following numerous studies undertaken over the past 53 years. Detailed ground investigations were commissioned by the Southern Water Authority in the 1960's and 1970's to identify potential reservoir sites with suitable geological conditions. The Site Alternatives Assessment (April 2020) in Appendix A4.1 Environmental Statement Volume 4 captures the site selection work that had been undertaken previously. The assessment methodology utilises a three-stage appraisal process in order to identify specifically the optimal location and design of a reservoir. Seventy two potential sites were assessed across the Portsmouth Water and south Hampshire area in stage one. Sixty seven of the 72 sites were rejected at this stage, primarily because the proposed source of abstraction was protected under an Abstraction Licensing Strategy (2013) and/or Habitat Directive. Only sites that could be supplied by the Havant and Bedhampton Springs were feasible. Five sites were taken forward to stage two and Havant Thicket was assessed as providing the best option as it has the largest capacity, allows for the development of areas for recreational activity that will benefit the local community, together with the potential for nature and biodiversity enhancement, the shortest pipeline and least impact on protected Chichester and Langstone Harbours.
- 4.2. At stage three, eight conceptual reservoir designs on the Havant Thicket site were developed and analysed and then discussed with stakeholders. This led to the development of two further refined options A and B, which contained a combination of the best features of the favoured appraised options. This was subject to public consultation in 2008 and refined further to form the 2009 Outline Masterplan. The Scheme, the subject of the current planning applications, is a refinement of the 2009 scheme: further reducing impacts on ancient woodland, Sir George Staunton Conservation Area and Leigh Park Registered Park and Garden; increasing the area of retained wetland; and enhancing landscaping and optimising opportunities for recreation and biodiversity.

5. Environmental assessment of significance and mitigation – approach

- 5.1. The Environmental Impact Assessment has been undertaken by competent experts in line with best practice and the Institute of Environmental Management and Assessment guidelines¹ and provides:
- A thorough assessment of the likely effects of the Scheme on the environment;
 - Consideration of mitigation and compensation measures based on the potential environmental effects of the Scheme; and
 - Assessment of the cumulative effects of the Scheme.
- 5.2. The EIA considers both the indirect and direct effects of the Scheme. Direct effects are those caused by activities that are an integral part of the proposals resulting in a change in environmental conditions, such as the removal of vegetation. Indirect effects are those due to activities that affect environmental conditions or the receptors, which in turn affects other aspects of the environment or receptors, such as increased noise from construction activities.

Figure 5.1 EIA Process



¹ Environmental Impact Assessment Guide to Delivering Quality Development - <https://www.iema.net/assets/newbuild/documents/Delivering%20Quality%20Development.pdf>, accessed July 2020

- 5.3. Best practice guidance including established criteria has been used to assess the significance of effects of the Scheme, which combines the magnitude of the impacts and the sensitivity of the receptors/resources. The significance criteria for environmental effects are defined in terms of the amount of change from the existing baseline environment i.e. the baseline. Effects can range from neutral to very large and it is noted that moderate, large or very large effects are considered significant. Environmental effects can be adverse or beneficial. Within this document the significance of effects is described as significant or not significant.
- 5.4. Where significant adverse effects were identified, the following principles of the mitigation hierarchy² have been adopted in the outline design and included within the assessment:
- Avoidance,
 - Mitigation, and
 - Compensation.
- 5.5. Opportunities for enhancement were also sought during the outline design.
- 5.6. The following environmental topics have been assessed as part of the EIA and are summarised below. The following chapters provide more information in the Environmental Statement Volume 2:
- Chapter 7 Air quality.
 - Chapter 8 Historic environment.
 - Chapter 9 Biodiversity.
 - Chapter 10 Ground conditions.
 - Chapter 11 Landscape and visual.
 - Chapter 12 Noise and vibration
 - Chapter 13 Traffic and transport.
 - Chapter 14 Material resources and waste.
 - Chapter 15 Water (including flows, quality and groundwater).
 - Chapter 16 Effect on climate.
 - Chapter 17 Vulnerability to climate change.
 - Chapter 18 Population and human health.
 - Chapter 19 Cumulative and in-combination effects.
 - Chapter 20 Vulnerability to major accidents and disasters.
- 5.7. Volume 3 includes the Figure drawings and Volume 4 the Appendices.

6. Assessment of likely significant effects

Air quality

What is the existing environment like?

- 6.1. Air quality in the area of the Scheme can be considered relatively good, with measured pollutant concentrations below relevant air quality criteria.
- 6.2. There are no Air Quality Management Areas³ within Hampshire Borough Council or East Hampshire District Council administrative boundaries.
- 6.3. The sensitive receptors included in the assessment comprise 20 locations representative existing human health receptors and ecological sites within 200 metres of the roads meeting the criteria for air quality assessment. These locations were chosen to represent the closest receptors to the

² Department of Communities and Local Development (2018). National Planning Policy Framework, Paragraph 118. <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

³ Air Quality Management Areas are declared by the local authority where national air quality objectives are not likely to be achieved. Then the local authority will put together a plan to improve the air quality - a Local Air Quality Action Plan <https://uk-air.defra.gov.uk/aqma/>

roads to ensure the highest pollutant concentrations and/or the largest changes in pollutant concentrations would be estimated with and without the construction traffic.

What are the effects during construction?

- 6.4. Construction works associated with the Scheme (at both reservoir site and along the pipeline corridor) have the potential to generate dust.
- 6.5. With appropriate mitigation measures in place, any adverse impacts resulting from the construction works would be minimised such that there would not be any residual significant effect on receptors. Mitigation measures to control dust are included in the Record of Environmental Actions and Commitment (REAC) in the Outline Environmental Management Plan (OEMP) in Appendix A2.1 of the Environmental Statement Volume 4. Any effect on air quality from construction traffic would be temporary, and would not be significant.

What are the effects during operation?

- 6.6. The effects on air quality once the Scheme is operational would not be significant.

Summary of assessment

- 6.7. There would be no adverse significant effects on receptors with the implementation of suitable mitigation measures during the construction of the reservoir and pipeline.

Historic environment

What is the existing environment like?

- 6.8. The reservoir site includes two designated heritage assets⁴ that mostly overlap. These comprise:
 - Leigh Park (Staunton Country Park), a Grade II* Registered Park and Garden (RPG), National Heritage List for England (NHLE) 1000112 of high value; and
 - The Sir George Staunton Conservation Area of medium value.
- 6.9. These designated areas include part of a 2km footpath called The Avenue created in the late 19th century by William Stone.
- 6.10. Two non-designated heritage assets are located within the reservoir site.
- 6.11. Outside of the Scheme the study area includes:
 - 42 designated heritage assets, six of which are high value, representing nationally significant heritage. The remaining 36 designated heritage assets are considered to be important in contributing to the character and understanding of local and regional heritage. Protected at a national level through their designations as listed buildings or conservation areas, their value primarily ranges from local to regional, and they are identified as medium value. These include three conservation areas:
 - Sir George Staunton Conservation Area (located within both East Hampshire and Havant Districts), and extending into the reservoir site;
 - Old Bedhampton Conservation Area; and
 - Rowlands Castle Conservation Area.
 - Three Scheduled Monuments: Motte Castle at Motley's Copse (1019111); Ringwork and Bailey at Motley's Copse (1019110); and, The Castle (1001923) - Rowlands Castle.
 - Two Grade II* Registered Park and Gardens: Stansted Park (NHLE 1000327); and, Leigh Park (Staunton Country Park) (NHLE 1000112), which also extends into the Reservoir Site.
 - One Grade II* Listed Building, the Staunton Memorial (NHLE 1303476).

⁴ An asset is a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest.

- 33 Grade II Listed Buildings with 13 of which are within the Grade II* Leigh Park (Staunton Country Park) Registered Park and Garden at Leigh Park and the Sir George Staunton Conservation Area.
- 68 non-designated heritage assets.

What are the effects during construction?

Construction of reservoir

- 6.12. Two of the 12 heritage assets identified within the study area would experience adverse effects that would be significant relating to the removal of part of The Avenue, a landscape element that contributes to the value of the Grade II* Leigh Park (Staunton Country Park) Registered Park and Garden (NHLE 1000112) and the Sir George Staunton Conservation Area. Whilst this effect would be adverse and significant it does not reach the level of substantial harm as the significance of the registered park and garden and conservation area would still be readily discernible and experienced.
- 6.13. There is the potential for as-yet unknown Mesolithic, Roman and post-medieval archaeology within the reservoir site. A programme of identification and recording of archaeological remains will be required as part of the Record of Environmental Actions and Commitment (REAC) in the Outline Environmental Management Plan (OEMP) in Appendix A2.1 of the Environmental Statement Volume 4.

Construction of pipeline

- 6.14. The construction of the pipeline would have adverse effects but would not be on four heritage assets: the Grade II* Leigh Park (Staunton Country Park) Registered Park and Garden (NHLE1000112), the Sir George Staunton Conservation Area, the Old Bedhampton Conservation Area, and St Chad's Well (HER⁵ 65094).

What are the effects during operation?

Operation of reservoir

- 6.15. The permanent removal of part of The Avenue would result in adverse effects that would be significant on the Grade II* Leigh Park (Staunton Country Park) (NHLE 1000112) and the Sir George Staunton Conservation Area. These adverse effects would be offset to some degree through interpretation measures that will be incorporated into the design of the public realm and amenities to enhance the understanding of the significance of the registered park and garden and conservation area, and the features lost during construction once the reservoir is in operation as required as part of the REAC in the OEMP in Appendix A2.1 of the of the Environmental Statement Volume 4.

Operation of pipeline

- 6.16. The operation of the pipeline would not have an adverse effect on any heritage assets.

Summary of assessment

Reservoir

- 6.17. The reservoir construction and operation would result in an adverse effect that would be significant on two designated heritage assets: the high value Grade II* Leigh Park (Staunton Country Park) Registered Park and Garden (NHLE 1000112) and the medium value Sir George Staunton Conservation Area. This effect would be offset to some degree through interpretation and enhancement measures reflecting the significance of these designated assets.

Pipeline

- 6.18. There would be no adverse effects that would be significant on heritage assets with the implementation of suitable mitigation measures during the construction of the pipeline.

⁵ Historic Environment Record

Biodiversity

What is the existing environment like?

- 6.19. Table 6.1 presents the biodiversity resources identified within the study area and their nature conservation value.

Table 6.1 Biodiversity resources and nature conservation value

Resource	Value
Internationally designated sites (Singleton and Cocking Tunnels Special Area of Conservation (SAC), Briddlesford Copses SAC, Ebernoe Common SAC, Chichester and Langstone Harbours Ramsar site, The Solent Maritime SAC, The Solent and Isle of Wight Lagoon SAC and Solent and Dorset Coast Special Protection Area (SPA))	International
Nationally designated sites (Langstone Harbour and Chichester Harbour Site of Special Scientific Interest)	National
Ancient woodlands and veteran trees that includes: The Avenue - semi-natural ancient woodland including a number of veteran trees; The Corsican Pine Plantation – planted ancient woodland (PAWS); Round Wood and Middle Clearing – young oak plantations on ancient woodland soils; Havant Thicket woodland – subject to commercial forestry; Bells Copse – both semi-natural ancient woodland and PAWS; These ancient woodlands include lowland mixed deciduous woodland priority habitat; wet woodland priority habitat; other broadleaved woodland; and, coniferous woodland. Eight veteran trees were recorded outside ancient woodland areas, within or adjacent to the pipeline corridor.	Regional (and an irreplaceable habitat)
Sites of Importance for Nature Conservation (SINCs)/Local Wildlife Sites (61 within 2 km of the reservoir site and 65 within 2 km of the pipeline corridor of which eleven are at least partially within the Site). The SINCs within the Reservoir Footprint are also ancient woodland. Havant Thicket SINC has been designated as it retains significant remnants of heathland vegetation.	County
Local Nature Reserves (Hazelton Common, Dell Piece West and Farlington Marshes).	Local
Priority Habitats listed in Section 41 of the Natural Environment and Rural Communities Act 2006: Lowland mixed deciduous woodland; Wet woodland; Purple moor-grass and rush pastures; Lowland dry acid grassland.	County
Other neutral grassland	County
Upper Lake (a pond)	County
Intermittent headwaters of Riders Lane Stream	County
Unnamed tributary of Riders Lane Stream (The Lake Stream)	County
Riders Lane Stream	Local

Resource	Value
Hermitage Stream	Local
Bats	National
Hazel dormice	County
Otters	Site
Water voles	Negligible
Badgers	Negligible
Breeding Birds	County
Wintering birds	Local
Reptiles	County
Great crested newt	Local
Invertebrates	Local

What are the effects during construction?

Construction of reservoir

- 6.20. Residual adverse effects of the Scheme that would be significant relate to the reservoir site, including the reservoir itself and the access roads, and other related development.
- 6.21. The Scheme would result in the loss of 12.45 ha of irreplaceable ancient woodland, including the loss of 17 veteran trees, resulting in an adverse effect that would be significant at the regional level. Compensation for this residual adverse effect would include a total of 110 ha of woodland / wood pasture habitat creation and enhancement, onsite and offsite. While suitable compensation would be undertaken, this would still constitute loss of irreplaceable habitat.
- 6.22. The Scheme would result in the loss of 13.55 ha within Sites of Importance for Nature Conservation (of which 12.45 ha is the ancient woodland), 7.18 ha priority lowland mixed deciduous woodland habitat, and 1.21 ha of purple moor-grass and rush pastures priority habitat. The Scheme will include suitable compensation for these losses.
- 6.23. The Scheme would result in the loss of 3.7 km of watercourses that are intermittent headwaters to Riders Lane Stream and a residual adverse effect that would be significant due to this loss of unique habitat and associated species with limited practical options for mitigation.
- 6.24. The reservoir would result in the creation of new habitats of ecological value, particularly the wetland along the northern edge of the reservoir. It is considered likely that habitats of at least County value would establish. A number of reservoirs have been recognised for their national or even international ornithological interest so a future greater value is possible.
- 6.25. The residual adverse effects that would be significant include a loss of grassland, which would only be partially compensated for through habitat creation onsite. Grassland creation and enhancement would therefore be one of the targets of the Capital Grants scheme, as described in the outline Biodiversity Mitigation and Compensation Strategy that is included with the planning application.
- 6.26. For bats and dormouse, mitigation and compensation will be undertaken in accordance with an European Protected Species mitigation licence, which will ensure there are no residual adverse effects that would be significant. Habitat loss, including known and potential roosts for bats) will be minimised and retained habitats protected. New suitable habitats will be created and existing habitats enhanced to compensate for the loss of habitat.
- 6.27. For other European Protected Species, badgers, birds, invertebrates and other priority animals, habitat loss will also be minimised and retained habitats will be protected and enhance ensuring that there would be potential benefits and no residual adverse effects that would be significant once new habitats established on the Site.
- 6.28. Reptile translocation will be undertaken to suitable enhanced habitat in land adjacent to and bordering the reservoir site, and site clearance undertaken in accordance with a precautionary method of work as required as part of the Record of Environmental Actions and Commitment

(REAC) in the Outline Environmental Management Plan (OEMP) in Appendix A2.1 of the Environmental Statement Volume 4.

- 6.29. Potential indirect effects on internationally and nationally designated sites through pollution and changes in water flows and water levels will be avoided through mitigation.

Construction of pipeline

- 6.30. Impacts on biodiversity would not result in adverse effects that would be significant from the pipeline and culvert construction. Impacts would be largely temporary in nature, significant trees will be avoided and habitats will be re-instated in accordance with details in an Ecological Mitigation and Management Plan prepared by the appointed contractor as required as part of the REAC in the OEMP in Appendix 2.1 in Volume 4 of the Environmental Statement.

What are the effects during operation?

Operation of reservoir

- 6.31. There would be potentially some beneficial effects on internationally and nationally designated sites resulting from reduced nutrient inputs, and the creation of alternative recreational facility for visitors that may otherwise have visited the internationally designated sites. As well as the creation of a wetland and open water habitat providing additional habitat for qualifying bird species.
- 6.32. The Scheme would potentially provide long term benefits as a result of:
- Habitat creation of wetland and reservoir margins and enhancement or retained habits on site;
 - Enhancement of retained ancient woodland;
 - Enhancement of existing and establishment of new lowland woodland; and
 - Enhanced habitats for European Protected Species, badgers, birds, invertebrates and other priority animals.

Operation of pipeline

- 6.33. No adverse effects that would be significant during the operation phase are anticipated.

Summary of assessment

Reservoir

- 6.34. There would be residual adverse effects as a result of the Scheme that would be significant at a regional and county level as a result of the direct loss of ancient woodland, habitat within Sites of Importance for Nature Conservation, priority habitat and watercourse. While suitable compensation will be undertaken, this would still constitute loss of irreplaceable habitat for ancient woodland and veteran trees.

Pipeline

- 6.35. There would be no adverse effects that would be significant on receptors with the implementation of suitable mitigation measures during the construction and operation of pipeline.

Ground conditions

What is the existing environment like?

- 6.36. The assessment considers the existing geology, and effects associated with ground conditions, mineral resources and waste soils.
- 6.37. The majority of the reservoir site is underlain by superficial Head deposits (silty clay, clayey silt and flint gravel). The bedrock underlying the Site is the London Clay Formation (clay, sand and silt) that gives way to the Harwich Formation (sand) and small areas of the Lambeth Group (Reading Formation) (clay, sand and silt) and the Bognor Member (sand). Superficial River Terrace Deposits (sand and gravel) and Head deposits (sand, gravel and clay) are present underlying the south of the pipeline corridor. The bedrock underlying the pipeline corridor is mainly the London Clay Formation (clay, sand and silt), with Chalk and the Lambeth Group (Reading Formation) (clay, sand and silt) present in the south of the Site. There is no evidence of sinkholes on the Site.

- 6.38. For the reservoir site, the British Geological Society has recorded eight mineral sites in the study area including two located on the reservoir site: Horsefoot Clay Pit and Long Wood Brick Works. The British Geological Society have recorded two sites within the study area of the pipeline corridor.
- 6.39. Two Minerals and Waste Consultation Areas are located within the central and eastern areas of the reservoir site, both for clay resources. These areas are also located adjacent to the north of the reservoir site and approximately 250 m east, again for clay resources. A Mineral Safeguarding Area for oil and gas is located adjacent to the north of the reservoir site. A Minerals and Waste Consultation Area for sharp sand and gravel resources is located approximately 120 m south of the pipeline corridor. A Mineral Safeguarding Area (Harts Farm Way) is located approximately 380 m south of the Site.
- 6.40. Principal, Secondary A and Secondary Undifferentiated aquifers ranging from medium to high vulnerability underlay the study areas for the reservoir site and pipeline corridor. Source Protection Zones are associated with the aquifers. The north and north east of the reservoir site and the south of the pipeline corridor are located within groundwater drinking safeguard zones.
- 6.41. The groundwater system is dominated at depth by the Upper Chalk Formation that flows in a southerly direction to the sea.
- 6.42. Portsmouth Water has three existing groundwater abstraction licences at Bedhampton Pumping Station and Havant Pumping Station within the pipeline corridor. There is one surface water abstraction point for agricultural use 200 m north of the reservoir site. There are two discharge consents to watercourses located on the reservoir site and 11 within the pipeline corridor into Hermitage stream, other watercourses and the estuary.
- 6.43. A small number of streams and ditches drain the Site into shallow valleys to the south feeding into Riders Lane Stream and Hermitage Stream.
- 6.44. The majority of the reservoir site is located in a low probably flood risk area, Flood Zone 1, with the central watercourse flowing south from Deerslaughter Plain to Gammon's Hill and Thicket Lawn and the unnamed watercourse within Bells Copse designated as having a medium and high probability flood risk, Flood Zones 2 and 4. Within the pipeline corridor, areas close to Hermitage Stream and that cross Riders Lane Stream are high probability flood risk, Flood Zone 3.
- 6.45. The reservoir site and pipeline corridor are located within a Nitrate Vulnerable Zone.
- 6.46. From ground investigations undertaken to date and a review of historic land uses there is no evidence of Made Ground or contamination on the reservoir site. No ground investigation information is available for the pipeline corridor. Potential sources of contamination associated with historical land use have been identified within the study area for the Pipeline.
- 6.47. Historic landfills relevant to the reservoir site include two inert waste landfills located at Dunsbury Hill Farm on the northwest boundary of the Site and Padnell Farm, 180 m to the west. There are no historic landfill areas within the study area for the pipeline corridor. Within the pipeline corridor there are two licenced waste management facilities located on Site associated with the Bedhampton Pumping Station and a further three sites located within the study area located up to 496 m from the Site.
- 6.48. A petrol station is located 84 m east of the reservoir site and includes a pollution control. There are five petrol stations located within the study area for the pipeline corridor between 68 m and 474 m from the Site. The pipeline corridor includes four pollution controls with several associated with the petrol stations.
- 6.49. There is a low to moderate risk of encountering unexploded ordnance on the reservoir site and within the pipeline corridor.
- 6.50. Sensitive receptors identified for the reservoir site and pipeline corridor include human health receptors (site users and occupants of surrounding residential and commercial properties); Controlled Waters receptors (groundwater in Principal, Secondary A and Secondary Undifferentiated aquifers and surface watercourses); property receptors (on-site and off-site services and structures); ecological receptors (National Park and Ancient Woodland); geological receptors (underlying soils and geology) and mineral resources (Minerals and Waste Consultation and Mineral Safeguarding Areas).

What are the effects during construction?

- 6.51. Potential contamination impacts may occur during the construction of the Scheme. Construction activities could potentially introduce new sources of contamination, and disturb and mobilise existing sources of contamination, which may pose a risk to human health and controlled water receptors. The construction of the Scheme may also result in physical effects to soils and geological receptors, arising from changes in soil erosion, soil compaction and ground stability associated with the earthworks, stockpiling of material and movement of heavy plant. Waste soils may also be generated during construction through excavation works. The construction of the Scheme may result in the loss, damage or sterilisation of important mineral resources.
- 6.52. With the mitigation measures implemented during the reservoir and pipeline construction, including the adoption of working methods to appropriately manage soil erosion and compaction, waste soils, surface water runoff, dust generation, pollution incidents and re-use of mineral resources, the risks identified to human health, controlled waters, ecological, geological and property receptors and mineral resources would range from low to very low and would be classed as not significant.

What are the effects during operation?

- 6.53. The operation of the Scheme may potentially introduce new sources of contamination and below ground services could create additional potential pathways for the migration of potential contamination. Physical effects and effects on mineral resources and waste soils are considered to be mainly related to the construction phase.
- 6.54. The Scheme would be operated in accordance with the relevant regulations and best practice pollution prevention guidance, therefore risks identified to human health, controlled waters, ecological and property receptors during operation of the reservoir and pipeline are assessed as low to very low and would be classed as not significant.

Summary of assessment

- 6.55. There would be no adverse effects that would be significant on receptors with the implementation of suitable mitigation measures during the construction and operation of the reservoir and pipeline.

Landscape and Visual

What is the existing environment like?

- 6.56. The landscape of the reservoir site is characterised by woodland, forestry plantation and historic parkland associated with former country house estates. Fields and other open areas used for grazing and agriculture are present within the wooded landscape that have most likely been created through historic woodland clearance or forestry felling. The landform is low lying and undulating. Shallow valleys exist being formed by the streams that flow from the north to the south. The land rises higher and steeper in the south west where views over the area looking north are possible from Bells Copse, Warren Park Estate, High Lawn Way and from some locations within the Historic Parkland of Staunton Country Park. The land also rises up beyond Havant Thicket Woodland in the north and north east, forming the South Downs. Views looking south from this high ground within the South Downs National Park are screened by the large areas of woodland present.
- 6.57. The area is influenced by the presence of the urban edge of Havant, with both Leigh Park and Warren Park housing estates visible to the south and south west. Overhead electric power lines and pylons are visible along the skyline when looking west from within the area. The A3(M) is located fairly closely to the west, although not visible it makes its presence known through constant noise.
- 6.58. The area is characterised by many areas of woodland that lie within or surrounding the reservoir site, many of these are and ancient woodland remnant of the Forest of Bere. Some areas such as Havant Thicket and Stein Wood to the north are managed by Forestry England.
- 6.59. Smaller wooded areas, tree clumps, individual trees, scrub and hedgerows are all present, scattered over the area, following the course of streams or along the boundaries of Staunton Country Park. The Avenue forms a prominent landscape feature through the area, this is a wide footpath running in a north south alignment, and wooded on both sides. The Avenue divides the open grazing land in the north of the Country Park, forming two open grassland areas, one in the east and one to the west.

- 6.60. The historic parkland occupies the southern half of Staunton Country Park, and is part of the Sir George Staunton Conservation Area and a Grade II* Leigh Park Registered Park and Garden that includes Leigh Park House. It contains a number of listed buildings and follies that make up the historic parkland. The southern boundary of the South Downs National Park lies to the north of Havant Thicket Woodland on the north side of the B2149 Manor Lodge Road. The Staunton Country Park provides an important recreational feature in the area along with woodlands such as Havant Thicket, much of these are open access land for the public to enjoy. Further recreational features are provided in the area by public rights of way such as footpaths and bridleways that run through and around the reservoir site.
- 6.61. The pipeline corridor runs through an area of low lying and relatively flat landscape. Both Hermitage Stream and Riders Lane Stream make prominent features as they meander within this landscape. The area surrounding the pipeline route is mostly large-scale housing estates, built post second world war. These have associated schools, recreational grounds and small pockets of retail such as convenience stores. Many of these residential areas feature roads with wide tree lined grass verges and many other small pockets of green open space.
- 6.62. Large areas of public open space adjacent to Hermitage Stream and Riders Lane Stream form important green corridors cutting through the built-up areas, and include public footpaths with seating, play and informal sports areas. The open spaces include open grassland and extensive areas of mature tree and scrub that align the stream sides and edges to the residential areas. The residential areas include some areas of woodland, the most notable being The Great Copse, an ancient woodland, located at the northern end of the pipeline corridor.

What are the effects during construction?

Construction of reservoir

- 6.63. There would be adverse effects that would be significant and permanent on the landscape character of the reservoir site. This is due to the scale of works required and the loss of existing landscape features such as the open grassland and woodland.
- 6.64. The construction and use of the two new access roads and road junctions on Swanmore Road and the B2149 Manor Lodge Road would result in very localised effects from construction traffic and would not be significant. Existing woodland and hedgerows provide a good level of containment and will screen the South Downs National Park from the reservoir site.
- 6.65. There would be adverse effects that would be significant on views from Sir George Staunton Conservation Area, Leigh Park Registered Park and Garden and associated listed buildings, from the public rights of way, and from residential areas adjacent to the Site, including Warren Park, Leigh Park and Durrants. This is also due to the scale of works required within a large construction site, including the removal of woodland and other vegetation as well as major earthworks, and existing landscape features in existing views being altered or lost.

Construction of pipeline

- 6.66. The excavation of a trench will be required along the pipeline route in order to install the pipe below ground. This will require the disturbance of the existing ground covering such as the road surface or grass within areas of public open space.
- 6.67. There would be adverse effects that would be significant on areas of public open space during the works. These areas would be minimised and the route of the pipeline would be designed and constructed to avoid any very large mature trees or any other prominent landscape features as required in the Record of Environmental Actions and Commitment (REAC) in the Outline Environmental Management Plan (OEMP) in Appendix A2.1 of the Environmental Statement Volume 4.
- 6.68. There would also be short term adverse effects that would be significant on views from residential properties, and users of local roads, public rights of way, and public open spaces along the pipeline route.



Figure 6-1 – Visualisation of The Avenue once reservoir construction is complete

What are the effects during operation?

Operation of reservoir

- 6.69. On completion, the reservoir site will be restored to the relatively tranquil rural character of the existing landscape. The extensive areas of woodland surrounding the reservoir site will remain resulting in the same background and skyline views to the reservoir. With The Avenue removed, longer distance views will be possible between the east and west. Physical connections will be maintained and improved as a result of new pedestrian and cycling routes implements as part of the access and recreation strategy as described in the Design and Access Statement included with the planning application. Two new road junctions will be operational on Swanmore Road and the B2149 Manor Lodge Road.
- 6.70. Views of the reservoir, reservoir earthworks and new access routes created through the construction works would remain for a time until proposed mitigation planting has matured, screening and filtering views into and over the Site from residential properties, local roads, public rights of way, and from Leigh Park Registered Park and Garden. Bare earth may also be visible on the embankment for a while until grassland has established.

Operation of pipeline corridor

- 6.71. Where the pipeline route is within an existing highway or other hard surface, the surface would have been replaced and, therefore, there would no longer be any effects.
- 6.72. Where the pipeline corridor runs through public open space or a grass verge, the landscape will take a while to recover, signs of excavation would still be visible. All vegetation removed to allow excavation will be replaced, it will take a time for this mitigation replacement planting to establish and mature, and hide the traces of the construction works.

Summary of assessment

Reservoir

- 6.73. During construction there would be significant adverse effects on landscape and visual amenity on views from Sir George Staunton Conservation Area and Leigh Park Registered Park and Garden, from adjacent Public Rights of Way and from residential areas adjacent to the Site, including Warren Park, Leigh Park and Durrants. This is due to the removal of landscape features such as the open grassland and wooded features such as The Avenue and the large construction site and scale of earthworks required, and the loss or alteration of existing landscape features in existing views.

- 6.74. Following construction, likely adverse effects that would be significant on the landscape and visual amenity would reduce to 'not significant' once the open grassland areas, wetland and new planting have established.

Pipeline

- 6.75. During construction there would be some effects on landscape character and views from residential properties, from roads, from public rights of way and public open space close to the pipeline corridor. These effects are considered 'not significant', affecting only a very localised area and being temporary in nature.
- 6.76. During operation there would be very little trace of construction works and any effects remaining would not be significant once the Site is restored and planting established.

Noise and Vibration

What is the existing environment like?

- 6.77. Existing noise levels in the area around the Scheme are within the range expected of a suburban environment.
- 6.78. The study area for noise and vibration included existing human health receptors within 300 m of the reservoir site and the pipeline corridor.

What are the effects during construction?

Construction of reservoir

- 6.79. Noise and vibration from construction works associated with the reservoir would not result in adverse effects that would be significant during daytime hours.
- 6.80. In exceptional circumstances, night time works may be required on the reservoir site, and such works would require mitigation as set out in the Record of Environmental Actions and Commitment (REAC) in the Outline Environmental Management Plan (OEMP) in Appendix A2.1 of the Environmental Statement Volume 4. Where impacts from noise and vibration cannot be effectively mitigated, night time works will not be carried out on the reservoir site. On this basis there would be no significant effects from any night time works on the reservoir site, should these be required.

Construction of pipeline

- 6.81. There would be adverse noise and vibration effects from construction works associated with the pipeline corridor. With appropriate mitigation measures in place, any adverse impacts from construction works will be minimised such that there would not be any residual significant effect on receptors. Mitigation measures to control noise and vibration are included in the REAC in the OEMP in Appendix A2.1 of the Environmental Statement Volume 4.

What are the effects during operation?

Operation of reservoir

- 6.82. There are no adverse effects that would be significant from the operation of the reservoir. Additional traffic on the existing road network would not cause adverse effects that would be significant.
- 6.83. Traffic using the site access routes would impact nearby receptors, however when existing road noise sources in the area are considered, such as the A3(M), impacts from the access roads would not cause adverse effects that would be significant.

Operation of pipeline

- 6.84. There are no adverse effects from the operation of the pipeline.

Summary of assessment

- 6.85. During construction there would be no adverse effects that would be significant on receptors with the implementation of suitable mitigation measures.
- 6.86. During operation there would be no adverse effects that would be significant on receptors.

Traffic and Transport

What is the existing environment like?

- 6.87. The study area has been established during consultation with the Local Highway Authority and includes roads and junctions that form the key highway links surrounding the Site, as indicated in the Transport Assessment, included in Appendix A13 of the Environmental Statement Volume 4.
- 6.88. The network of existing public rights of way within the study area includes the Havant 120 Bridleway which extends across the length of the Site, Staunton Way, and Staunton Country Park. There are also footpaths in both north eastern and south western corners of the site. The Havant 123 Bridleway also follows Park Lane under the A3(M) and links to the Havant 120 Bridleway at a point approximately 700 m west of the reservoir. There is an existing access and pedestrian crossing to the east of the Site on the B2149 north of its junction with Mallard Road. There is also a network of footways bordering the residential access and distributor roads within the vicinity of the Site.
- 6.89. Two National Cycle Network routes are near to the Site as well as shared use paths on Fitzwygram Way and Middle Park Way. On road cycle lanes are provided on both sides of Swanmore Road between Middle Park Way and its junction with Sandleford Road.
- 6.90. The closest existing bus stops to the Site include Pennerly Court bus stop on Swanmore Road and the Durrants Gardens bus stop on Durrants Road.
- 6.91. Havant Railway Station provides the closest rail connection to the Site, situated approximately 2.5km to the south of the southern access.
- 6.92. Collision data has been reviewed as part of the Traffic Assessment, included in Appendix A13 in the Environmental Statement Volume 4. No material concern relating road safety has been identified as part of the review.
- 6.93. The study area contains a mix of A class distributor roads, local distributor roads and local access roads, with varying speed limits across the network. In terms of the potential key routes to and from the site, it is considered that there are a number of routes which would likely be used for either the northern or southern access.
- 6.94. The baseline traffic data for all assessed links, including Existing (2020), Construction (2023) and Operational (2029), is summarised in Chapter 13 Traffic and Transport in the Environmental Statement Volume 2.

What are the effects during construction?

Construction of reservoir

- 6.95. There are not expected to be any significant effects from traffic and transport, in relation to the construction of the reservoir and embankment when considering the magnitude of change in traffic.
- 6.96. However, some of the local roads do not typically accommodate Heavy Goods Vehicles (HGVs) and therefore the magnitude of change assessment cannot record a percentage change. Therefore, a qualitative review has been undertaken. Although it is acknowledged that any increase in HGVs may be perceptible to local residents in the setting where none are currently observed, the number of HGVs across the day, 15 HGVs in each direction, equates to one HGV every 30 minutes. This number is not considered significant.
- 6.97. As part of the construction of the reservoir, there will be a permanent severing of the Havant 120 Bridleway running east to west. The Bridleway will be temporarily diverted to the north of the location of the reservoir, before reconnecting back with the existing Havant 120 Bridleway. Whilst a potential increase in route length of 1.2 km could increase journey time to a level that leads to a significant effect for users seeking to use the full east to west route, due to the leisure nature of the route and the relatively low usage, it is considered that any adverse effect would not be significant.
- 6.98. In addition, there will be a permanent severing of part of the informal footpath running north – south along The Avenue to Upper Lake. Due to the low number of users of this informal footpath (less than 200) it is considered that any adverse effect as a result of this would not be significant.

Construction of pipeline

- 6.99. In addition to the cumulative change in traffic from both the pipeline and the reservoir site assessed above, consideration has been given to the potential temporary impacts associated with

construction of the pipeline in relation to traffic management and / or temporary road closures. Full construction methodology will be the subject of on-going discussion with the relevant authorities and will be agreed through the Construction Environmental Management Plan prepared by the appointed contractor.

- 6.100. As part of the construction of the pipeline and culvert improvement works, there will likely be night-time only partial closures of some roads.
- 6.101. The road closures, to allow the pipeline to cross the road, will be undertaken during night-time only for two consecutive nights, and would therefore not result in any adverse effects that would be significant relating to traffic and transport.
- 6.102. For the construction of the pipeline, there will be a temporary diversion of a bridleway, however the diversion will not add a material distance onto the footpath and would not result in an adverse effect that would be significant.

What are the effects during operation?

Operation of reservoir

- 6.103. The assessment of visitor traffic indicates that there would be no adverse effects that would be significant in relation to traffic and transport, resulting from the operation of the reservoir.
- 6.104. As part of the construction of the reservoir, there will be a permanent severing of the Bridleway Havant 120 running east to west. During operation, the diversion will be retained as a permissive route, with a new permanent bridleway provided to the south of the reservoir, connecting to the permissive route to create a new circular path. It is considered that this will enhance the active travel route through and around the site, providing a beneficial effect for active travel and equestrian users.
- 6.105. In addition, the informal footpath running north – south along The Avenue to the Upper Lake, which will be partially severed during construction, will connect to the new avenue staircase leading to a viewing area on the crest of the reservoir. It is considered that this will enhance the active travel route through and around the site from the south, whilst providing a beneficial effect for active travel.

Operation of pipeline

- 6.106. There will be no traffic generated by the pipeline during operation

Summary of assessment

- 6.107. The review of potential effects indicates that during construction of the reservoir site and access roads, and pipeline in combination, there would be adverse effects that would be significant on some road links, due to either the increase in Heavy Goods Vehicles traffic (in the case of the reservoir site and access roads) or temporary closures of highway or public right of way (in the case of the reservoir site and access roads, and pipeline). However, these effects would be minor in nature, and for a temporary period only. The requirements in the Record of Environmental Actions and Commitment (REAC) in the Outline Environmental Management Plan (OEMP) in Appendix A2.1 of the Environmental Statement Volume 4 will seek to minimise the effects of construction traffic as far as is reasonably practical.
- 6.108. During operation, the review of impacts indicates that there would be no adverse effects that would be significant relation to traffic and transport.

Material Resources and Waste

What is the existing environment like?

- 6.109. The material resources and waste assessment considered the following existing conditions:
 - Sales of construction materials in the South East of England each year;
 - Proximity of the development to mineral resources that have been identified for future use, referred to as Mineral Safeguarding Areas; and,

- Construction, Demolition and Excavation (CDE) waste produced in Hampshire each year and the capacity of the existing waste management facilities to store, treat and dispose of CDE waste.

- 6.110. The material resources considered include aggregate, asphalt, concrete, iron and steel. These materials would be required for construction of the reservoir and pipeline corridor. The regional sales of these materials were used to assess the construction of the reservoir and pipeline corridor.
- 6.111. In addition, a Mineral Safeguarding Areas identified for brick clay is present in the northern area of the reservoir site between the A3(M) and Rowlands Castle. Outside of the site's boundary to the north and northeast is Horndean Wellsite, consisting of multiple areas identified for potential oil or gas extraction.
- 6.112. In terms of waste, the estimated CDE waste produced in Hampshire and CDE waste received at waste management facilities in Hampshire was used to assess waste produced during construction of the reservoir and pipeline corridor.

What are the effects during construction?

Construction of reservoir

- 6.113. The construction of the reservoir would require materials to construct the embankments, reservoir infrastructure and access road(s). The majority of the material required would be sourced from the site itself by excavating areas of clay and other natural materials that can be used in construction. This mitigates several environmental impacts associated with importing materials to the site. A Materials Management Strategy included in Appendix A14.1 in The Environmental Statement Volume 4 has been developed to identify the preferred approach for managing and reusing excavated materials. Other construction materials such as aggregate, asphalt, cement and iron/steel would be imported to the site. The effect would be to reduce the regional availability of construction materials on the market.
- 6.114. Construction, Demolition and Excavation (CDE) wastes would also be generated during construction of the reservoir. These would consist of surplus or used construction materials or equipment, materials from demolition of any existing structures and excavated material that is contaminated or not suitable to use on the site. A Site Waste Management Plan will be produced by the appointed contractor as required in the Record of Environmental Actions and Commitment (REAC) in the Outline Environmental Management Plan (OEMP) in Appendix A2.1 of the Environmental Statement Volume 4 to identify opportunities to prevent waste and prepare for unavoidable wastes by ensuring they are managed appropriately to mitigate environmental impacts. The effect of waste produced during construction would be to increase the quantity of waste produced in Hampshire and reduce existing waste management facilities' capacity to store, treat and dispose of CDE wastes in Hampshire.

Construction of pipeline

- 6.115. Construction of the pipeline would require materials for the pipe itself, to fill in the pipeline trench and reinstate road infrastructure following installation of the pipeline. Where possible, the material excavated from the pipeline trench would be used to fill in the trench once the pipeline has been installed. A Materials Management Strategy included in Appendix A14.1 in The Environmental Statement Volume 4 has been developed to identify the preferred approach for managing and reusing excavated materials. Other construction materials would need to be imported to the site. The effect would be to reduce the regional availability of construction materials on the market.
- 6.116. CDE wastes would also be generated during construction of the pipeline corridor. These would consist of surplus or used construction materials or equipment, materials from demolition of any existing structures and excavated material that is contaminated or not suitable to use on the site. A Site Waste Management Plan would be produced by the appointed contractor as required in the REAC in the OEMP in Appendix A2.1 of the Environmental Statement Volume 4 to identify opportunities to prevent waste and prepare for unavoidable wastes by ensuring they are managed appropriately to mitigate environmental impacts. The effect of waste produced during construction would be to increase the quantity of waste produced in Hampshire and reduce existing waste management facilities' capacity to store, treat and dispose of CDE wastes in Hampshire.

What are the effects during operation?

- 6.117. The quantity of materials required for routine and ad-hoc maintenance of the reservoir and pipeline corridor during operation are not expected to be significant and were not included within the assessment.

Summary of assessment

- 6.118. The assessment compared estimates of construction materials that would be required during construction of the reservoir and pipeline corridor to existing sales of construction materials in the region. The assessment found that there would not be an adverse effect that would be significant on the availability of construction materials in the region.
- 6.119. In addition, construction of the reservoir would use the brick clay resource within the reservoir site to construct embankments and therefore construction would not have an adverse effect that would be significant on an Mineral Safeguarding Area.
- 6.120. The assessment also compared estimates of CDE waste that would be produced during construction of the reservoir and pipeline corridor to CDE waste produced in Hampshire and CDE waste received at waste management facilities in Hampshire. The assessment found that there would not be an adverse effect that would be significant from CDE waste produced during construction.

Water (including flows, quality and groundwater)

What is the existing environment like?

- 6.121. Water quality classifications under the Water Framework Directive (WFD) for both Ecological and Chemical status of the Hermitage Stream, River Lavant and Langstone Harbour were Good or High. This status is supported by existing flow conditions informed by Environment Agency (EA) flow data and Portsmouth Water flow monitoring. There are localised areas of poorer water quality with a general trend of a reduction/deterioration in water quality, from upstream to downstream of the study area.
- 6.122. In the Hermitage Catchment, there is one surface water abstraction point at more than 820 m and 5 surface discharges more than 650 m from the reservoir's central point. In 2019 the EA considered the catchment to have 'water available for licencing'.
- 6.123. Flood risk information has been informed by EA data and Portsmouth Water modelling. The Hermitage Stream and Riders lane Stream flood in different storm types due to geology and landform. The large capacity of the watercourse as a result of the Hermitage Flood Alleviation Scheme, also contributes to the reduced frequency of flooding in the catchment since the early 1970's. There is limited property flooding despite the fact the watercourse flows through a highly urbanised area. There is a high risk in some areas of surface water flooding along local roads and ponding caused by local variations in landform.
- 6.124. Based on the geology there are three WFD status 'Good' groundwater bodies: East Hants Chalk groundwater body, a Principal Aquifer, and the two associated Lambeth Group groundwater bodies, Secondary A Aquifers and are of high sensitivity. In terms of groundwater quality, in 2020 EA classified both South Hants Lambeth and East Hants Lambeth Group as 'Good' but was East Hants Chalk was given a 'Poor' classification, due to poor nutrient management from agricultural land use.
- 6.125. At the southern end of the pipeline corridor - the Chalk groundwater comes to the surface at many locations as part of the Havant and Bedhampton springs.
- 6.126. The London Clay on the reservoir site is not considered to be productive strata, being predominantly clay and having generally low permeability and negligible significance for water supply or river baseflow. However, the London Clay Formation does contain sand beds within it, such as the Bognor Sand Member which is classed as a Secondary A Aquifer.
- 6.127. There are no groundwater discharge points abstraction points within 1 km of the reservoir central point. With the exception of the Portsmouth Water Havant and Bedhampton springs licence, the only other known groundwater abstraction is a spray irrigation licence located 1.2 km from the reservoir.
- 6.128. The study area lies within one large source protection zone (SPZ), designated to show the risk of contamination from activities that may cause pollution. The pipeline corridor and the reservoir site

are within a high risk area SPZ1. SPZ1 is defined as the area where groundwater in the aquifer has a 50-day or less travel time to the source/abstraction.

- 6.129. There are international and nationally designated ecological areas considered in the Water assessment (see Table 6.1 in the Biodiversity Section of this document for details).

What are the effects during construction?

Construction of reservoir

- 6.130. Adverse residual effects of the Scheme that would be significant relate to the construction of the reservoir site itself. The Scheme would result in the loss of 3.7 km of headwater stream habitats and a permanent adverse effect that would be significant on aquatic habitat connectivity and geomorphology in the river system, which would affect the downstream Riders Lane Stream. There would also be a permanent change to the outline of superficial aquifers as a result of the presence of the reservoir resulting in adverse effects that would be significant.
- 6.131. Whilst compensation and mitigation will be undertaken, there remains the potential for deterioration for invertebrates, hydromorphology, macrophytes and phytobenthos for the Hermitage Stream WFD waterbody (GB107042016370). An Article 4.7 deterioration assessment is required to seek a derogation for the Scheme as necessary under the WFD legislation where a potential deterioration is deemed a possibility. There are no deterioration risk for other surface water, transitional or groundwater WFD waterbodies.

Construction of pipeline

- 6.132. The pipeline impacts are largely temporary during the construction phase and, upon successful implementation of mitigation measures identified in the Record of Environmental Actions and Commitment (REAC) in the Outline Environmental Management Plan (OEMP) in Appendix A2.1 of the Environmental Statement Volume 4, would not result in adverse effects that would be significant on the water environment.

What are the effects during operation?

Operation of reservoir

- 6.133. The reservoir will result in the creation of new habitats of ecological value, particularly the wetland along the northern edge of the reservoir and a new Water Framework Directive (WFD) 'lake' waterbody as well as approximately 100 m additional stream length to the east of the reservoir.
- 6.134. The reservoir will have a compensation flow, which still needs to be established, but can offer additional benefits if this is improved over the current intermittent flow regime especially if other operational discharges are also timed appropriately. The reservoir will also have benefits to downstream flood risk by reducing the volume and frequency of peak flows.
- 6.135. Overall, water discharged from the reservoir into the Riders Lane Stream will be of a more consistent quality with improvements identified in nutrient levels notably a significant benefit in terms of nitrogen load to the downstream Langstone Harbour designated: a Special Area for Conservation; Special Protection Area; Site of Special Scientific Interest; and, Ramsar. Water quality changes predicted for the Riders Lane Stream and Hermitage Stream are likely to result in an improvement in primary and secondary productivity (which is considered positive), with no negative effects on ecological functioning of watercourse or WFD status anticipated.

Operation of pipeline

- 6.136. There is a potential for impacts associated with operational discharges from the pipeline, which can result in higher 'flushing' catchment flows but can be mitigated through appropriate timing of the discharges; and the provision of backwater habitats. There are no other adverse effects that would be significant on the water environment.

Summary of assessment

- 6.137. Overall, there would be the potential for a deterioration of the Hermitage Stream WFD waterbody. There would be no deterioration risks for other surface water, transitional or groundwater WFD waterbodies.

Reservoir

- 6.138. During construction upon successful implementation of mitigation measures identified in the REAC as part of the OEMP in Appendix 2.1 of the Environmental Statement Volume 2, there would be residual adverse effects that would be significant on aquatic habitats, habitat connectivity and geomorphology. These are associated with the loss of 3.7 km of headwater stream habitats being lost and permanent change to the outline of superficial aquifers.
- 6.139. There are benefits associated with the presence of a reservoir, including the provision of new wetland habitat and new open water habitat. Upon successful implementation of the detailed Outline Biodiversity Mitigation and Compensation Strategy, there will be further benefits to the flow regime and productivity in the downstream Riders Lane Stream and Hermitage Stream as a result of a more consistent flow regime and more consistent water quality inputs. There is also a major benefit to the downstream Langstone Harbour designated: a Special Area for Conservation; Special Protection Area; Site of Special Scientific Interest; and, Ramsar in terms of nitrogen load.
- 6.140. There is a potential for deterioration for Hermitage Stream WFD waterbody. There are no deterioration risks for other surface water, transitional or groundwater WFD waterbodies.

Pipeline

- 6.141. During construction there would be no residual adverse effects that would be significant upon successful implementation of mitigation measures identified in the REAC as part of the OEMP in Appendix 2.1 in the Environmental Statement Volume 4.

Effects on Climate

What is the existing environment like?

- 6.142. Global greenhouse gas emissions amount to approximately 33 billion tonnes of greenhouse gases, presented as their carbon dioxide equivalent (CO₂e). There is a global consensus that these emissions must be reduced dramatically to avoid dangerous effects on the global climate.
- 6.143. The UK is one of the world's largest emitters of greenhouse gases, although national emissions are reducing. The UK has in place carbon 'budgets' for five-year periods up to 2032. The UK is currently in the third carbon budgetary period (2018-2022), the budget for which is 2,544 MtCO₂e (million tonnes of greenhouse gases, presented as their carbon dioxide equivalent of CO₂e). The UK cannot legally emit more greenhouse gases than this within the budgetary period. The carbon budget for the 2023–2027 budgetary period is 1,950 MtCO₂e, and the budget for 2028-2032 is 1,725 MtCO₂e. There are no UK carbon budgets set beyond 2032, however there is a legal requirement for the UK to reach 0 MtCO₂e by 2050, an ambition which is echoed by both Hampshire County Council and East Hampshire District Council.
- 6.144. Greenhouse gas emissions from the site itself are currently likely to be negligible. The only activity currently undertaken at the site is management of Havant Thicket and Bells Copse by Forestry England. This would likely continue through construction and operation with no impact from the Scheme.

What are the effects during construction?

Construction of reservoir

- 6.145. The construction of the reservoir would generate approximately 170,000 tCO₂e (tonnes of greenhouse gases, presented as their carbon dioxide equivalent of CO₂e). Greenhouse gas emissions would be generated by raw material extraction and product manufacturing, transport of materials and workforce to site, energy and water use during construction, and waste management. Assuming construction emissions are spread evenly across the construction period, the construction of the Scheme would contribute 0.0015% of the third, 0.0049% of the fourth and 0.0022% of the fifth carbon budget.

Construction of pipeline

- 6.146. The construction of the pipeline corridor would generate approximately 4,000 tCO₂e (tonnes of greenhouse gases, presented as their carbon dioxide equivalent of CO₂e). Greenhouse gas emissions would be generated by raw material extraction and product manufacturing, transport of

materials and workforce to site, energy and water use during construction, and waste management. Assuming construction emissions are spread evenly across the construction period, the construction of the Scheme would contribute 0.000026% of the third, 0.000088% of the fourth and 0.00004% of the fifth carbon budget.

What are the effects during operation?

Operation of reservoir

- 6.1. Operation of the reservoir would generate approximately 40,000 tCO_{2e} (tonnes of greenhouse gases, presented as their carbon dioxide equivalent of CO_{2e}) across its life. Greenhouse gas emissions would be generated by energy and water used to operate pumps and visitor facilities and other operational buildings. Emissions would also be generated by the management of operational wastes, and during maintenance activities. The Scheme will be operational for four years during the fifth carbon budgetary period. Operation during this five-year period would contribute 0.0002% of the UK budget.
- 6.2. Given the scale of operational emissions and growing opportunities to reduce these as technologies develop, it is considered that reductions in line with the UK's net zero carbon target would be achievable by Portsmouth Water.

Operation of pipeline

- 6.3. Emissions associated with the operation of the pipeline corridor are likely to be negligible.

Summary of assessment

Reservoir

- 6.4. Whilst the emission of greenhouses gases from the Scheme would lead to a long-term negative effect (global warming) on a highly sensitive international receptor (the atmosphere), the magnitude of emissions is considered to be minor. The Scheme is deemed to be unlikely to cause significant effects on climate, or significantly affect the UK's ability to meet its emissions reduction targets.

Pipeline

- 6.5. The Scheme is deemed to be unlikely to cause significant effects on climate, or significantly affect the UK's ability to meet its emissions reduction targets.

Climate vulnerability

What is the existing environment like?

- 6.6. For climate vulnerability the existing environment includes both the current climatological conditions as well as future projected changes to climate in the study area.
- 6.7. The current climate is one of relatively mild winters and warm summers. The long-term average monthly rainfall is lower than the UK average.
- 6.8. Going forward it is projected that, on average, the study area is likely to experience hotter and drier summers and warmer and wetter winters. Alongside these changes in the average conditions, climate change may increase the frequency and severity of extreme weather events, such as heavy rainfall, storms and heatwaves

What are the effects during construction?

- 6.9. This section summarises the potential construction related climate vulnerability impacts that have been assessed.

Construction of reservoir

- 6.10. Extreme weather events or climatic events that compromise the viability of the construction site, including access to it. For example, heavy rain resulting in closure of local roads and power cuts due to flooding or flood inundation of the construction site itself.

Construction of pipeline

- 6.11. Extreme weather events or climatic events that compromise the viability of the construction site, including access to it. For example, heavy rain resulting in closure of local roads and power cuts due to flooding or flood inundation of the construction site itself.

What are the effects during operation?

- 6.12. This section summarises the potential climate vulnerability impacts that have been assessed.

Operation of reservoir

- Impacts on the resilience of the regions water supply.
- Impacts on the source of the reservoirs water.
- Impacts on the quality of water in the reservoir and the associated impacts this could have on the treatment of that water.
- Impacts affecting structures (including the reservoir embankments).
- Impacts affecting drainage infrastructure and flood risk.
- Impacts affecting recreation, landscape and fire risk.
- Impacts on assets and equipment (mechanical and technological).
- Potential benefits such as reduced cold weather impacts like slips and freeze thaw damage to underground assets.

Operation of pipeline

- Impacts affecting structures associated with the pipeline and flood risk.

Summary of assessment

- 6.13. Without mitigation the reservoir and pipeline could be vulnerable to potential impacts linked to projected changes in the climate. Mitigation measures built into the design (i.e. embedded mitigation) that either avoids these impacts, minimises them or reduces their consequences to acceptable levels has been identified. After consideration of embedded mitigation none of the potential climate vulnerability impacts would have adverse effects that would be significant.

Population and Human Health

What is the existing environment like?

- 6.1. There are a number of open spaces close to or within the Site including Staunton Country Park and informal green spaces. The reservoir site is generally used for informal recreation, primarily walking, jogging, horse riding and cycling. The Site is accessible by a number of different forms of transport including car, public transport, walking, cycling and horse-riding. Woodland to the north of the reservoir site (Havant Thicket) has a recreational and commercial forestry use.
- 6.2. A bridleway runs through the Site from east to west. Staunton Way is a long-distance path which runs along and just inside the south eastern boundary of the Site. Further footpaths provide linkages between the reservoir site and the adjacent country park and woodland. Within the Havant Thicket woodland there are further tracks which the public can access. More than 29,500 people live within a reasonable walking distance of the Site and 120,000 people live within a reasonable cycling distance of the Site.
- 6.3. Along the pipeline corridor or crossing it there are a number of non-vehicular routes including public rights of way and footpaths and cycleways on the eastern and western sides of Hermitage Stream.
- 6.4. There are several recreation and leisure facilities within 500 m of the Site and a range of local businesses and community facilities such as schools and places of worship.
- 6.5. Three out of the five wards that the Scheme falls within generally suffer from poorer health compared to the national average. Some of the wards in which the Scheme is located suffer from relatively high levels of deprivation.

What are the effects during construction?

Construction of reservoir

- 6.6. Whilst the reservoir is under construction, the local population would be expected to experience adverse effects that would be significant on physical activity and stress and wellbeing due to the temporary reduction in access to open space. This will be mitigated by maintaining safe access for the public where possible, clearly communicating proposals to close amenity spaces and access routes and managing construction traffic flows. A clear and concise traffic management plan will be designed to facilitate access to local facilities during construction of the Scheme.
- 6.7. Temporary restrictions on access to opportunities for recreation and leisure would have an adverse effect that would be significant on the local population. This will be mitigated by maintaining safe access for the public whenever possible and clearly communicating proposals to close amenity spaces and to close and divert access routes. Construction staff will be encouraged to travel to and from the site by public transport.
- 6.8. Significant beneficial effects on the local population during construction of the Scheme would be derived from support to the local supply chain and the creation of employment opportunities. This could provide financial security and contribute to self-esteem, particularly for low-income groups in the area. Construction traffic would negatively affect local businesses by changing amenity and accessibility which could influence trading conditions. This will be mitigated by various measures to be included in a traffic management plan including the clear communication of proposals to close roads and encouraging construction staff to travel to and from the site by public transport.

Construction of pipeline

- 6.9. Construction of the pipeline, including construction traffic and road closures, would adversely affect access to open space which could have an adverse effect that could be significant on physical activity and wellbeing. Different construction traffic routes are proposed for different sections of the pipeline to mitigate the impact of construction traffic. This will be mitigated by maintaining safe access for the public where possible, clearly communicating proposals to close amenity spaces and access routes and managing construction traffic flows. A clear and concise traffic management plan will be designed to facilitate access to local facilities during construction of the Scheme.
- 6.10. Construction traffic and temporary road closures would also have a temporary adverse effect that would be significant on access to community facilities such as health centres and schools, on recreation and leisure facilities and on local businesses. To minimise the effects, school term times will be avoided where the pipeline runs close to schools. Different construction traffic routes are proposed for the different sections of the pipeline to mitigate the impact of construction traffic. A detailed traffic management plan which will include further measures to minimise disruption.

What are the effects during operation?

Operation of reservoir

- 6.11. The improvement in open space provision in an area accessible to local users will support health and outdoor recreation, help instill a sense of place and enhance nature. All facilities proposed have been designed to engage families, schools and community groups in education. This is expected to result in significant beneficial effects for the local population and visitors from further afield. New recreational facilities for all ages, abilities and groups would be provided adjacent to a relatively deprived area. This will bring significant physical and mental health benefits by encouraging activity and connecting people to nature.
- 6.12. The Scheme comprises of a variety of terrain, landscapes and route lengths for walkers, cyclists and horse riders which will be well connected to existing routes beyond the site and will provide safe access into the site. This improved provision is expected to have significant beneficial effect physical activity and social connectivity.
- 6.13. The increase in visitors to the Site would benefit local businesses and potentially create jobs. This could positively affect mental and physical health, particularly for low-income groups in one of the more deprived areas of South East Hampshire.
- 6.14. The reservoir would be signposted from the north to discourage use of the southern access route and thereby limit the impact of visitor traffic on access to recreation and leisure, community facilities

and residential areas to the south of the reservoir, particularly along Swanmore Road and Calshot Road.

- 6.15. A number of local businesses would benefit due to the increase of visitors to the reservoir. The Scheme would lead to the creation of new direct and indirect jobs, through supply chain benefits and new expenditure introduced to the local economy. Opportunities to provide work and training to local communities will be identified.
- 6.16. It is proposed to implement a travel plan for the Scheme. This will involve the implementation of various measures to encourage the use of sustainable travel modes and reduce traffic-related air pollution when travelling to the reservoir, including the management of coach operations.

Operation of pipeline

- 6.17. No adverse effects that would be significant on population and human health during operation of the pipeline corridor have been identified.

Summary of assessment

Reservoir

- 6.18. With the implementation of suitable mitigation measures, there would be no adverse effects that would be significant on receptors during the construction and operation of the reservoir.

Pipeline

- 6.19. With the implementation of suitable mitigation measures, there would be no adverse effects that would be significant on receptors during the construction of the pipeline. No adverse effects that would be significant on population and human health during operation of the pipeline corridor have been identified.

Cumulative and In-combination Effects

What is the existing environment like?

- 6.20. A list of 34 committed developments have been identified in proximity to the Scheme comprising of proposals for residential, commercial or mixed-use development which either have planning permission or are identified in development plans. These developments, in-combination with the Scheme have the potential to cause significant cumulative effects.

What are the effects during construction?

Cumulative effects

- 6.21. There is a potential for the Scheme, in combination with other committed development, to have a significant adverse effect on the conservation status of the Bechstein's bat population. To avoid and mitigate this effect Portsmouth Water has already begun to engage with Forestry England and promoters of other development to establish a strategic mitigation and compensation approach to maintain the conservation status of the Bechstein's bat population. In addition, Portsmouth Water has called for, and is supporting, the local authorities in developing the technical content of a Bechsteins Bat conservation policy for the area.
- 6.22. There could also be potentially significant cumulative impacts on designated sites and protected species through loss of habitat and the severing of important habitat links. Opportunities will be identified to maximise the benefits of off-site compensation measures and minimise the risks of adverse cumulative effects from habitat loss and fragmentation.
- 6.23. Significant cumulative effects on landscape character are likely during construction of the reservoir and the pipeline corridor in combination with other development proposals. Following the completion of construction and once mitigation planting has established, no adverse effects that would be significant are likely.
- 6.24. Significant cumulative visual effects are expected during construction. Following the completion of construction and once mitigation planting has established, no adverse effects that would be significant are likely.

- 6.25. The concurrent construction of the Scheme and nearby developments would result in cumulative effects through consumption of primary, recycled or secondary resources and generation of construction, demolition and excavation wastes.
- 6.26. Noise from construction plant and from construction traffic generated by other development in combination with the Scheme could have significant effects on human health receptors. However subject to mitigation no adverse effects that would be significant are likely.
- 6.27. Other development will generate construction employment opportunities and potentially generate income for local businesses. The cumulative health effects arising from the Scheme in combination with these committed developments would be significant in terms of improving financial security and self-esteem particularly among low-income groups.

In-combination effects

- 6.28. There is the potential for in-combination effects to arise during construction as a result of effects of the Scheme on residential receptors resulting from dust, visual intrusion, noise and vibration, temporary road closures and potentially night time working. The appointed contractor will work closely with local communities potentially affected to ensure works are phased to reduce adverse effects as far as reasonably practicable, and to ensure residents are kept informed on timing and duration of works.
- 6.29. The effects of the permanent loss of areas of Leigh Park Registered Park and Garden and the Sir George Staunton Conservation Area on the setting of and views to, and from the assets when considered in combination with the effects of temporary construction compounds have been assessed as not significant.

What are the effects during operation?

Cumulative effects

- 6.30. Proposals to build over 1000 dwellings within 2 km of the reservoir site could increase the recreational pressure on retained areas of public open space such as the parts of the application site surrounding the proposed reservoir which could damage habitats and disturb animals. An access and recreation strategy to manage circulation on the reservoir site and connect to the wider network is in the Design and Access Statement that is included in the planning application.
- 6.31. Other developments alongside the Scheme are likely to have significant cumulative physical and mental health benefits by improving access to opportunities for recreation and leisure. The developments would encourage activity and connect people to nature, particularly benefitting children and adolescents.
- 6.32. Restoration of a length of Hermitage Stream and improvements to the headwater water bodies north of the reservoir could result in improvements to the appearance of Hermitage Stream and the public space through Warren Park. This is expected to have a significant positive cumulative benefit on the landscape and the water environment.
- 6.33. The operation of committed developments alongside the Scheme could have significant beneficial effects by increasing trade for local businesses and potentially creating jobs. This would positively influence mental and physical health particularly for low-income groups.

In-combination effects

- 6.34. To avoid and mitigate in-combination effects on bats, Portsmouth Water will engage with Forestry England and promoters of other developments to develop a strategic mitigation and compensation approach that ensures public areas within the reservoir site are appropriately managed to minimise disturbance and damage from recreational users.

Summary of assessment

Cumulative effects

- 6.35. There is a potential for the Scheme, in-combination with other committed development, to have an adverse effect that would be significant during construction or operation. However, with mitigation, these effects can be reduced to non-significant.

In-combination effects

- 6.36. There is a potential for the Scheme to give rise to significant in-combination effects during construction or operation. However, with mitigation, these effects can be reduced to non-significant.

Appendix A. Plans

Figure 1.1 Scheme Setting

Figure 2.2 Environmental Constraints

Figure 2.3 Outline Masterplan



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