Hampshire Water Transfer and Water Recycling Project

Environmental Statement – Chapter 8 Terrestrial and freshwater biodiversity

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Contents

8 Terrestrial and freshwater biodiversity 1
8.1 Introduction 1
8.2 Legislation, policy and guidance 3
8.3 Consultation, scoping and engagement 25
8.4 Primary and tertiary mitigation 37
8.5 Assessment methodology 44
8.6 Assumptions and limitations 60
8.7 Baseline conditions 62
8.8 Assessment of likely significant effects 107
8.9 Mitigation, monitoring and enhancement 205
8.10 Summary of residual effects 228
References 258

Tables

Table 8-1 List of relevant legislation 3
Table 8-2 List of relevant national policy 6
Table 8-3 List of relevant local policy 12
Table 8-4 List of relevant guidance and standards 24
Table 8-5 Environmental Impact Assessment Scoping Opinion - Planning Inspectorate comments 26
Table 8-6 Summary of ecological mitigation and enhancement measures at the Environmental Mitigation and Enhancement Areas 39
Table 8-7 Summary of the scope for terrestrial and freshwater biodiversity assessment 45
Table 8-8 Terrestrial and freshwater biodiversity field survey and desk study areas 48
Table 8-9 Data sources used to inform the terrestrial and freshwater biodiversity assessment 52
Table 8-10 Transposition of feature importance descriptions 56
Table 8-11 Magnitude of impact on ecological features 58
Table 8-12 Significance of effect matrix 59
Table 8-13 Habitats of Principal Importance within the field survey area 65
Table 8-14 Ecological receptors and their geographical value 99
Table 8-15 Non-statutory sites subject to changes in air quality exceeding 1% of minimum Critical Load or Level 136
Table 8-16 Total predicted habitat loss across all components 143
Table 8-17 Ancient woodlands subject to changes in air quality exceeding 1% of minimum Critical Load or Level 145
Table 8-18 Summary of construction effects that require secondary mitigation 216
Table 8-19 Summary of residual effects 229

8 Terrestrial and freshwater biodiversity

8.1 Introduction

8.1.1 This chapter provides the assessment of the likely significant effects on terrestrial and freshwater biodiversity from the construction, operation and decommissioning of the Hampshire Water Transfer and Water Recycling Project (hereafter referred to as the 'Proposed Development'), which is being progressed by Southern Water Services Limited ('the Applicant').

8.1.2 This chapter details the legislation, policy and guidance that is relevant to terrestrial and freshwater biodiversity, summarises the engagement and consultation undertaken to date, sets out the scope and methodology of assessment, and describes the baseline environment. Following this, the likely significant effects of the Proposed Development on terrestrial and freshwaterr biodiversity are assessed taking account of embedded primary and tertiary mitigation within the design. The need for any secondary mitigation is then considered along with any proposals for monitoring and/or enhancement. The chapter concludes with a summary of residual effects.

8.1.3 Whilst this Environmental Statement (ES) presents an assessment of the effects that may occur from decommissioning activities of the Proposed Development, the Applicant is not seeking consent for decommissioning.

8.1.4 Terrestrial and freshwater ecological features considered within this chapter for the Proposed Development are:

1. Designated sites: all designated sites (including their associated designated interest features) within the Zone of Influence (ZoI) or that are hydrologically connected to the Proposed Development.
2. Habitats: all habitats within the ZoI, including priority habitats.
3. Protected and notable species: species considered to occur within the ZoI for the Proposed Development.
4. Invasive non-native species (INNS): INNS are considered in relation to the Proposed Development as a potential effect on terrestrial and freshwater biodiversity features.

8.1.5 This chapter should be read in conjunction with ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6) which describes the development parameters against which the effects considered in this chapter have been assessed.

8.1.6 In addition, this chapter should be read alongside relevant parts of other chapters in Volume I, namely:

1. ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) – contains predictions of the levels of pollutant concentrations and deposition rates which informed the assessment in this chapter of the likely significant effects of nitrogen on sites designated for nature conservation and the species that they support.

2. ES Chapter 7 Archaeology and cultural heritage, Volume I (Document reference 6.1, DCO Volume 6) – the assessment of likely significant effects on ancient woodland and priority habitats, which are outlined within this chapter, is informed by historic landscape feature information.
3. ES Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6) – marine designated sites and the species they support may be affected by impacts that originate within the terrestrial or freshwater environment. The assessment of likely significant effects on birds associated with the marine environment and marine designated sites is included in this chapter alongside the assessment for all other birds. All other marine aspects are assessed in ES Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6).
4. ES Chapter 11 Land quality and ground conditions, Volume I (Document reference 6.1, DCO Volume 6) - provides an assessment of the potential for pre-existing contamination to be mobilised, or for new sources of contamination to be introduced as part of the construction, operation and decommissioning of the Proposed Development. There is also the potential for construction works to create new preferential pathways between currently unconnected sources and receptors. Any migration and discharge of contamination into surface waters could lead to a reduction in surface water quality and impact on the ecological habitats they support. This is assessed in section 11.8 of ES Chapter 11 Land quality and ground conditions, Volume I (Document reference 6.1, DCO Volume 6).
5. ES Chapter 13 Landscape and visual, Volume I (Document reference 6.1, DCO Volume 6) – provides an assessment of the likely significant effects on the Special Qualities of the South Downs National Park, which includes Special Quality 2 relating to the rich variety of wildlife and habitats. ES Chapter 13 Landscape and visual, Volume I (Document reference 6.1, DCO Volume 6) and this chapter inform the Indicative Environmental Masterplan appended to the Design Approach Document (Document Reference 5.3, DCO volume 5) and the Outline Landscape and Ecology Management Plan (LEMP) (Document reference 7.5, DCO Volume 7). The Indicative Environmental Masterplan appended to the Design Approach Document (Document Reference 5.3, DCO volume 5) includes an indicative spatial representation of ecological mitigation and enhancement. The Outline LEMP (Document reference 7.5, DCO Volume 7). includes the reinstatement strategy and provides the securing mechanism for the ecological mitigation.
6. ES Chapter 14 Major accidents and disasters, Volume I (Document reference 6.1, DCO Volume 6) – provides an assessment of the potential introduction or release of INNS through operationally exceptional events such as emergency shut down of plants or pipeline failure.
7. ES Chapter 15 Noise and vibration, Volume I (Document reference 6.1, DCO Volume 6) – the predictions of the levels of noise and vibration set out in Chapter 15 (Document reference 6.1, DCO Volume 6) inform the assessment of likely significant effects on protected species in this chapter.
8. ES Chapter 19 Water environment, Volume I (Document reference 6.1, DCO Volume 6) – the predictions on changes in hydrology, hydrogeology,

geomorphology and water quality inform the assessment of likely significant effects on protected sites, habitats and species in this chapter.

9. ES Chapter 20, Cumulative and in-combination effects, Volume I (Document reference 6.1, DCO Volume 6) – an assessment of the cumulative effects i.e. effects from the interrelationship between the Proposed Development and other developments, and an assessment of the in-combination effects i.e. effects from the interaction between the individual effects of the Proposed Development.

8.1.7 This chapter is informed by the following appendices, all contained in ES, Volume II (Document reference 6.2, DCO Volume 6):

1. ES Appendix 8.1 Designated sites, Volume II (Document reference 6.2, DCO Volume 6).
2. ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6).
3. ES Appendix 8.3 Badger CONFIDENTIAL, Volume II (Document reference 6.2, DCO Volume 6).
4. ES Appendix 8.4 Bats, Volume II (Document reference 6.2, DCO Volume 6).
5. ES Appendix 8.5 Ornithology CONFIDENTIAL, Volume II (Document reference 6.2, DCO Volume 6).
6. ES Appendix 8.6 Hazel dormouse, Volume II (Document reference 6.2, DCO Volume 6).
7. ES Appendix 8.7 Riparian mammals, Volume II (Document reference 6.2, DCO Volume 6).
8. ES Appendix 8.8 Other notable fauna, Volume II (Document reference 6.2, DCO Volume 6).
9. ES Appendix 8.9 Freshwater ecology, Volume II (Document reference 6.2, DCO Volume 6).

8.2 Legislation, policy and guidance

8.2.1 This section identifies the legislation, policy and guidance and other documentation that has informed the assessment of likely significant effects on terrestrial and freshwater biodiversity.

Legislation

8.2.2 Table 8-1 lists the legislation relevant to the assessment of the likely significant effects on terrestrial and freshwater biodiversity.

Table 8-1 List of relevant legislation

Legislation	Relevance to assessment
Wildlife and Countryside Act 1981 (WCA) [1]	This legislation provides protections for a range of species of flora and fauna and Sites of Special Scientific Interest (SSSI). The Proposed Development would be located within the ZoI of SSSIs and a range of species of flora and fauna. Effects on SSSIs and European Protected Species (EPS) have been assessed, refer to sections 8.4, 8.5 and 8.8.

Legislation	Relevance to assessment
	This legislation also includes controls relating to INNS which has informed the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) and the Outline Construction Environmental Management Plan (CEMP) (Document reference 7.1, DCO Volume 7).
Protection of Badgers Act 1992 [2]	This Act includes protections for badger *Meles meles* and their setts in England, including a prohibition on the wilful injuring, killing or taking of (or attempts to kill, injure or take) a badger. It is also an offence to damage, destroy or block access to badger setts and to disturb badger in their setts. Badger are known to be in the ZoI of the Proposed Development. This legislation has informed the requirement for badger survey and assessment.
The Hedgerows Regulations, 1997 [3]	This legislation identifies and protects hedgerows that qualify as 'Important'. It has informed the hedgerow survey methodology and the classification of hedgerows within ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6).
Countryside and Rights of Way Act 2000 [4]	The Proposed Development would be located within the ZoI of SSSIs and this legislation details measures for the management and protection of SSSIs and strengthens wildlife enforcement legislation.
Natural Environment and Rural Communities Act 2006 (NERC) [5]	Places a duty to conserve and enhance biodiversity on public authorities in England. This requires a public authority (including the Secretary of State (SoS)) that has functions exercisable in relation to England to consider what action it can properly take to further the general biodiversity objective, namely the conservation and enhancement of biodiversity through the exercise of its functions (Section 40). The Act also places a duty on the SoS to maintain lists of species and habitats which are regarded as being of principal importance for both the conservation and enhancement of biodiversity in England (Section 41[1]). These species and habitats of principal importance have been considered with this assessment.
Conservation of Habitats and Species Regulations 2017 [6]	The Regulations provide for the designation and protection of the National Site Network (NSN). They provide the framework of the protection of EPS and conservation advice can include requirements for minimisation of INNS. They require a Habitats Regulations Assessment (HRA) to be carried out to assess whether the Proposed Development could have an adverse effect on the integrity of a NSN site. An HRA Stage 2: Appropriate Assessment (Document reference 5.2, DCO Volume 5) has been carried out and effects on EPS have been assessed in this chapter, refer to sections 8.4, 8.5 and 8.8.
The Invasive Alien Species (Enforcement and Permitting) Order 2019 [7]	The Invasive Alien Species (Enforcement and Permitting) Order 2019 gives effect to European Union (EU) regulations on the prevention and management of the spread of invasive alien species. This legislation has informed the INNS Biosecurity Plan

[1] Species and habitats of principal importance are referred to as Section 41 species and HPI in this document.

Legislation	Relevance to assessment
	(Document reference 7.10, DCO Volume 7) and the Outline CEMP (Document reference 7.1, DCO Volume 7).
Environment Act 2021 [8]	The Environment Act 2021 makes provision for targets, plans and policies aimed at improving the natural environment, including on biodiversity. The Act also sets out the requirement for all new planning permissions granted in England under the Town and Country Planning Act 1990 to include a pre-commencement condition for the developer to provide a minimum of 10% Biodiversity Net Gain (BNG). Whilst this legislation does not yet apply to Nationally Significant Infrastructure Projects (NSIPs), and hence does not apply to the Proposed Development, the Act has informed the approach taken in the Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7).
The Environmental Targets (Biodiversity) (England) Regulations 2023 [9]	The Regulations set the following long-term targets in relation to biodiversity: • Halt the decline in species abundance by 2030. • Reverse the decline of species abundance by ensuring that species abundance in 2042 is greater than in 2022, and at least 10% greater than 2030. (This is more ambitious than the consultation proposal to increase species abundance by at least 10% by 2042, compared to 2030 levels). • Improve the 2022 GB Red List Index (of species threatened with extinction) in England for species extinction risk by 2042, compared to 2022 levels. • Create or restore over 500,000ha of a range of wildlife-rich habitats outside protected sites by 2042, compared to 2022 levels. The assessment within this chapter takes into account these targets and the Proposed Development would not impact their achievability.
Management of Hedgerows (England) Regulations 2024 [10]	Building on the Hedgerows Regulations 1997; the 2024 regulations set out requirements in relation to hedgerow management and maintenance. This legislation has informed the Outline CEMP (Document reference 7.1, DCO Volume 7) and the Indicative Environmental Masterplan appended to the Design Approach Document (Document Reference 5.12, DCO volume 5).
The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 [11]	The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 transpose into English and Welsh law the Water Framework Directive (WFD) 2000/60/EC and contain provisions to protect rivers, lakes, estuaries, coastal waters and groundwater. These regulations provide for protection of all types of water bodies and include environmental objectives, compliance parameters to be assessed. They also provide for the protection of areas with specific requirements such as shellfish waters for example. The Proposed Development could impact the biological quality elements of water bodies, including macrophytes, macroinvertebrates, phytobenthos and fish. An assessment has

Legislation	Relevance to assessment
	been undertaken to establish whether the Proposed Development is likely to result in a failure to achieve WFD objectives in relation to a water body. This assessment is presented in ES Appendix 19.2 Water Environment Regulations Compliance Assessment, Volume II (Document reference 6.2, DCO Volume 6). The Water Framework Directive UK Technical Advisory Group (WFD-UKTAG) document Classification of aquatic alien species according to their level of impact [12] provides an impact classification to INNS based on the potential level of adverse impact they pose to the water environment. Species are allocated to one of the following four categories: High, Moderate, Low or Unknown impact. Waterbodies initially classified as 'High Status' (representing near-natural conditions) under the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 [11], will be reclassified to the lesser 'Good Status' if populations of High Impact INNS are introduced.

National policy

8.2.3 The primary policy for determining the application for the Development Consent Order (DCO) for the Proposed Development is the National Policy Statement for water resources infrastructure (NPSWRI) [13]. This sets out policies to guide how DCO applications for water resources infrastructure should be decided and how the effects of such infrastructure are considered.

8.2.4 Table 8-2 lists the paragraphs from the NPSWRI and other national policy that are relevant to the terrestrial and freshwater biodiversity assessment. It also sets out where these policy requirements are addressed.

Table 8-2 List of relevant national policy

Relevant paragraph reference	Summary of policy requirement	Where addressed in chapter
National Policy Statement for water resources infrastructure [2025] [13]		
General principles of assessment: 3.1.3 and 3.1.4	When considering any proposed development and weighing its adverse impacts against its benefits, the Examining Authority and the SoS should take into account its potential: • Benefits, including environmental improvement and any long-term wider benefits • Adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid,	Benefits of the Proposed Development include playing a major role in making up the shortfall in water supply across the Hampshire supply area, as detailed in the ES Chapter 1 Introduction, Volume I (Document reference 6.1, DCO Volume 6). An Environmental Net Gain (ENG) Statement (Document reference 7.12, DCO Volume 7) has been prepared and sets out a statement demonstrating how opportunities for delivering wider ENG have been considered, and where appropriate incorporated into the design of the Proposed Development. The Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7) sets out the approach to BNG.

Relevant paragraph reference	Summary of policy requirement	Where addressed in chapter
	reduce or compensate for any adverse impacts The SoS should also have regard to the manner in which such benefits are secured, and the level of confidence in their delivery.	Consideration of effects on terrestrial and freshwater biodiversity has informed the iterative Proposed Development from the outset. This has informed the design principles, which are set out in the Design Principles Document (Document reference 5.11, DCO Volume 5) and the locations of the Environmental Mitigation and Enhancement Areas (EMEA), which are shown in the Works Plans (Document reference 2.3, DCO Volume 2). The assessment of likely significant effects on terrestrial and freshwater biodiversity associated with the Proposed Development is set out in section 8.8. Primary and tertiary mitigation measures are summarised in section 8.4. Additional mitigation, enhancement and monitoring measures are set out in section 8.9. Mitigation can also be found in the Outline LEMP (Document reference 7.5, DCO Volume 7) and the Outline CEMP (Document reference 7.1, DCO Volume 7). The Indicative Environmental Masterplan appended to the Design Approach Document (Document reference 5.12, DCO Volume 5) shows how the mitigation may be delivered.
Habitats Regulations Assessment (HRA): 3.3.1	Applicants are required to provide sufficient information within the HRA to enable the SoS to discharge their functions as the competent authority under the Conservation of Habitats and Species Regulations 2017.	A Habitats Regulations Assessment – Stage 2 Appropriate Assessment and Marine Conservation Zone – Stage 1 Assessment (Document reference 5.2, DCO Volume 5) has been undertaken. Engagement with key stakeholders on this document (including the provision of drafts for review) was undertaken during the drafting of this document for the DCO application.
Environmental Net Gain (ENG): 3.4.1	Projects should consider and seek to incorporate improvements in natural capital, ecosystem services and the benefits they deliver when planning how to deliver BNG.	Information can be found in the ENG Statement (Document reference 7.12, DCO Volume 7) and the Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7).

Relevant paragraph reference	Summary of policy requirement	Where addressed in chapter
Environmental Net Gain (ENG): 3.4.3	Applications for development consent should be accompanied by a statement demonstrating how opportunities for delivering wider ENG have been considered, and where appropriate incorporated into the design (including any relevant operational aspects) of the project. Applicants should make use of available guidance and tools for measuring natural capital assets and ecosystem services. Where ENG considerations have featured as part of the strategic options appraisal process in the water resources management plan to select a project, the statement should reference that information to supplement the site-specific detail.	An ENG Statement (Document reference 7.13, DCO Volume 7) has been prepared and sets out a statement demonstrating how opportunities for delivering wider ENG have been considered, and where appropriate incorporated into the design of the Proposed Development.
Biodiversity and nature conservation: 4.3.1, 4.3.2 and 4.3.4	Regard should be given to the aims and goals of the Environmental Improvement Plan [14] and any relevant measures and targets, including statutory targets set under the Environment Act 2021 [8]. The plan sets out the vision for enhancing biodiversity, by supporting healthy, well-functioning ecosystems and establishing more coherent ecological networks that are more resilient to current and future pressures.	The apex goal of the Environmental Improvement Plan (Goal 1 - Thriving plants and wildlife) includes key policies such as promoting biodiversity net gain. The approach to BNG is set out in the Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7).
Biodiversity and nature conservation: 4.3.5, 4.3.6, 4.3.7 and 4.3.21	The ES should clearly set out any likely significant effects on designated sites of ecological or geological conservation importance, on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity.	The assessment of likely significant effects on terrestrial and freshwater biodiversity associated with the Proposed Development is set out in section 8.8. Primary and tertiary mitigation is set out in section 8.4 and secondary mitigation and enhancement is set out in section 8.9.

Relevant paragraph reference	Summary of policy requirement	Where addressed in chapter
	The assessment should consider the full range of potential impacts on ecosystems including habitats, protected species or species identified as being of principal importance to biodiversity and nature conservation. It should include appropriate mitigation measures as an integral part of their proposed development, including identifying where and how these will be secured and it should contribute to and enhance the natural environment by providing net gains for biodiversity.	Consideration of effects on terrestrial and freshwater biodiversity has informed the iterative Proposed Development from the outset. This has informed the design principles, which are set out in the Design Principles Document (Document reference 5.11, DCO Volume 5) and the locations of the Environmental Mitigation and EMEAs, which are shown in the Works Plans (Document reference 2.3, DCO Volume 2). Additional mitigation, enhancement and monitoring measures are set out in section 8.9. An HRA Stage 2: Appropriate Assessment (Document reference 5.2, DCO Volume 5) has also been undertaken.
National Planning Policy Framework [2025] [15]		
Section 15: paragraphs 187-201	These paragraphs set out the requirement for projects to enhance the natural and local environment and protect and enhance biodiversity by: • protecting and enhancing sites of biodiversity value • recognising the intrinsic character and beauty of the countryside – including benefits of the best and most versatile agricultural land, trees and woodland • minimising impacts on and providing net gain for biodiversity, including by establishing coherent ecological networks and incorporating features which support priority or threatened species such as swifts, bats and hedgehogs • identifying, mapping and safeguarding	The assessment of likely significant effects on terrestrial and freshwater biodiversity associated with the Proposed Development is set out in section 8.8. Primary and tertiary mitigation measures are summarised in section 8.4 and include details of the EMEAs, which are shown in the Works Plans (Document reference 2.3, DCO Volume 2). Section 8.9 addresses secondary mitigation, monitoring and enhancement measures. Mitigation can also be found in the Outline LEMP (Document reference 7.5, DCO Volume 7) and the Outline CEMP (Document reference 7.1, DCO Volume 7). The Indicative Environmental Masterplan appended to the Design Approach Document (Document reference 5.12, DCO Volume 5) shows how the mitigation may be delivered. The Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7) sets out the approach to BNG.

Relevant paragraph reference	Summary of policy requirement	Where addressed in chapter
	components of local wildlife-rich habitats and wider ecological networks • promoting the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for measurable net gains The policy also outlines the following principles: • if significant harm to biodiversity cannot be avoided, mitigated or compensated for then planning permission should be refused • development within or outside a SSSI, and which is likely to have an adverse effect on it should not be permitted, unless the benefits of the development outweighs the impacts on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest • development resulting in the loss or deterioration of irreplaceable habitats should be refused unless there are wholly exceptional reasons and a suitable compensation strategy exists The following sites should be given the same protection as habitat sites:	

Relevant paragraph reference	Summary of policy requirement	Where addressed in chapter
	• potential SPAs and proposed SACs • listed or proposed Ramsar sites • compensatory habitats	
Environmental Improvement Plan [14]		
Goal 1 – Restored Nature: pages 28 - 37	Focuses of Goal 1 include: • Progressing 30by30 on land in England • Conserving and recovering plants, animals and fungi • Achieving clean, healthy, safe, productive and biologically diverse seas	Commitment 2 includes the preparation and delivery of Local Nature Recovery Strategies (LNRS). The Hampshire LNRS [16] have been considered in planning the delivery of BNG and the LNRS was reviewed during the design of the EMEAs, which are detailed in the Design Principles Document (Document reference 5.11, DCO Volume 5). Commitment 8 includes the commitment for SSSI features to have actions on track to achieve favourable condition. Primary mitigation outlined in section 8.4 includes avoiding all direct impacts to statutory designated sites, therefore, supporting Commitment 8. Commitment 10 includes restoration or creation of a range of wildlife-rich habitats outside of protected sites and Commitment 11 includes increase England's tree canopy and woodland cover. The EMEAs have been designed to include enhanced woodland connectivity and biodiversity. Commitment 14 requires targeted action to conserve and recover threatened species and Commitment 15 includes halting the decline in species abundance (an Environment Act statutory target). These include details of the Species Recovery Programme. These commitments aim to support recovery of threatened and declining species and protect species at risk and improve their conservation status. This ES assesses likely significant effects on protected and notable terrestrial and freshwater species during the construction and operation of the Proposed Development. Primary and tertiary mitigation measures are summarised in section 8.4. Section 8.9 addresses secondary mitigation, monitoring and enhancement measures.

Relevant paragraph reference	Summary of policy requirement	Where addressed in chapter
		These measures are secured through the Outline CEMP (Document reference 7.1, DCO Volume 7), the Outline LEMP (Document reference 7.5, DCO Volume 7) and the Design Principles Document (Document reference 5.11, DCO Volume 5).

Local policy

8.2.5 The local policies listed in Table 8-3 are considered relevant to the terrestrial and freshwater biodiversity assessment of the Proposed Development. While the SoS is required to determine an application for development consent in accordance with the NPSWRI, it may be that the SoS considers aspects of local policy to be matters that are important and relevant to the determination. In accordance with the NPSWRI, in the event that there is any conflict between the local policy and the NPSWRI, the NPSWRI would prevail for the purposes of decision making given the national significance of the infrastructure.

8.2.6 Adopted and emerging development plan policies have been considered. Adopted and emerging planning policy that are relevant are included in Table 8-3.

Table 8-3 List of relevant local policy

Local planning authority	Relevant local policy	Relevance to assessment
East Hampshire District Council (EHDC)	East Hampshire District Local Plan: Joint Core Strategy – (Adopted June 2014) [17] • CP21 - Biodiversity • CP28 - Green Infrastructure	Details requirements for development proposals within the district to: • Maintain, enhance and protect the district's biodiversity and its surrounding environment, in particular the nature conservation designations (CP21). • Protection and enhancement of important trees, rivers, river corridors and hedgerows (CP21). • Incorporate wildlife enhancements into design to achieve a net gain in biodiversity (CP21). • Maintain and enhance networks of new and existing Green Infrastructure (CP28). These policies have informed the protected species and habitat mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7) and the Outline CEMP (Document reference 7.1, DCO Volume 7).

Local planning authority	Relevant local policy	Relevance to assessment
	Emerging local plan - Our Local Plan 2021 – 2040 (Regulation 18 - January 2024) [18] • NBE2 - Biodiversity, Geodiversity and Nature Conservation • NBE3 - Biodiversity Net Gain • NBE6 - Solent Special Protection Area (SPA) • NBE12 - Green and Blue Infrastructure	Details requirements for development proposals within the district to: • Maintain, enhance and protect the district's biodiversity and its surrounding environment (NBE2). • Maintain and enhance networks of new and existing Green Infrastructure (NBE3). • Undertake an Appropriate Assessment that ensures no adverse effects on the integrity of the Solent SPA (NBE6). • Maintain and enhance networks of new and existing Green Infrastructure (NBE12). These policies have informed the protected species and habitat mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and the Habitats Regulations Assessment – Stage 2 Appropriate Assessment and Marine Conservation Zone – Stage 1 Assessment (Document reference 5.2, DCO Volume 5).
Eastleigh Borough Council (EBC)	Eastleigh Borough Local Plan (2016 – 2036) (Adopted April 2022) [19] • S5 – New development in the countryside • S9 - Green Infrastructure • DM1 - General criteria for new development • DM4 – Zero or low carbon energy • DM11 - Nature conservation	Details requirements for development proposals within the borough to: • Avoid adverse impacts on the rural, woodland, riparian or coastal character…and on the biodiversity of the area (S5). • Protect and create Green Infrastructure (S9). • Connect habitats linking the network of designated sites and existing priority habitats, taking account of the Hampshire ecological network map (see policy DM11, Chapter 5) (S9). • Have no significant adverse impact on and where practicable enhance biodiversity (DM1 and DM4). • Protect, conserve and enhance designated sites, networks of natural habitats and features. Assist achieving national, county and local biodiversity targets set out in Biodiversity Action Plans (BAP) (DM11).

Local planning authority	Relevant local policy	Relevance to assessment
		• Seek a net gain of biodiversity on all development sites (including sites for redevelopment) through the protection, enhancement and connection of existing and provision of new habitats and features of nature conservation interest compatible with the native biodiversity characteristics of the Borough, having regard to local geodiversity and soils (DM11). • Contribute to major elements of the PfSH Green Infrastructure Strategy and other strategies for the provision and enhancement of multifunctional Green Infrastructure including green routes, ecological networks and biodiversity enhancements (see strategic policy S9) (DM11). These policies have informed the protected species and habitat mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7).
	Securing our Natural Environment: Biodiversity Strategy 2024-2034 (Adopted March 2025) [20]	Sets out the approach for the protection and enhancement of biodiversity and the natural environment in the borough from 2024-2034. It reflects the aims and obligations in legislation and policy and provides the framework for delivery of a diverse natural environment. This policy has informed the protected species and habitat mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). It has also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7).
Fareham Borough Council (FBC)	Fareham Local Plan 2037 (Adopted April 2023) [21] • NE1 – Protection of Nature Conservation, Biodiversity and the Local Ecological Network	Details requirements for development proposals within the borough to: • Protect and enhance biodiversity and do not prejudice the Ecological Network or result in fragmentation (NE1). • Maintain the integrity of internationally designated sites (NE4).

Local planning authority	Relevant local policy	Relevance to assessment
	• NE4 - Water Quality Effects of the SPA, Special Area of Conservation (SAC) and Ramsar Sites of the Solent. • NE5 - Solent Wader and Brent Goose Strategy (SWBGS) sites • NE6 - Trees, Woodland and Hedgerows • NE8 – Air Quality • NE9 - Green Infrastructure • CC1 – Climate Change • CC2 – Managing Flood Risk and Sustainable Drainage Systems (SuDS) • D1 – High Quality Design and Place Making	• Protect SWBGS sites from adverse impacts commensurate to their status in the hierarchy of the SWBGS (NE5). • Retain or provide suitable justification and compensation for the removal of protected trees, woodland and hedges (NE6). • Contribute to the improvement of local air quality through the delivery and/or enhancement of Green Infrastructure (NE8). • Provide appropriate mitigation for impacts to Green Infrastructure (NE9). • Integrate Green Infrastructure into the design (CC1). • Consider flood protection, prevention and resilience measures are appropriate to biodiversity in the area (CC2). • Positively integrate existing and new habitats and biodiversity within a coherent and well managed, connected structure (D1). These policies have informed the protected species and habitat mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7).
	Green Infrastructure Strategy for Fareham Borough (2014) [22]	Outlines the importance of biodiversity within the borough and recognises that the successful development of Green Infrastructure is dependent on a co-ordinated approach to planning and delivery of green spaces. This strategy has informed the protected habitat mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). It has also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and has fed into the Indicative Environmental Masterplan appended to the Design Approach Document (Document Reference 5.12, DCO volume 5).

Local planning authority	Relevant local policy	Relevance to assessment
	Local Biodiversity Action Plan (LBAP) (2008) [23]	Sets out conservation actions for protecting threatened species and habitats within the borough. This Action Plan has informed the protected habitat and species mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). It has also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and has fed into the Indicative Environmental Masterplan appended to the Design Approach Document (Document Reference 5.12, DCO Volume 5).
	Local Plan Part 3: The Welborne Plan (Adopted June 2015) [24] • WEL2 – High Level Development Principles • WEL30 – Avoiding and Mitigating the Impact on Internationally Protected Sites and Off-site Green Infrastructure • WEL31 – Conserving and Enhancing Biodiversity	Details requirements for development layout proposals within the borough to: • Avoid or mitigate potential ecological impacts of the development (WEL2) • Provide a net gain in biodiversity in the area (particularly with regards to priority habitats and species) (WEL2). • Conserve and enhance the existing ecological features on the site and adjacent areas, whilst linking new and existing green spaces (WEL2). • Fully assess the potential impacts on habitats and biodiversity of all sites of national and international importance that may be adversely impacted (WEL30). • Carry out a full ecological assessment to identify and address potential impacts on designated sites, priority habitats and protected species, within and immediately adjacent to the site boundary (WEL31). • Contribute towards enhancing biodiversity (WEL31). These policies have informed the protected habitat and species mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and have fed into the Indicative Environmental Masterplan appended to the Design Approach Document (Document reference 5.12, DCO Volume 5).

Local planning authority	Relevant local policy	Relevance to assessment
		The Biodiversity Gain Plan is also consistent with these requirements (Document reference 7.11, DCO Volume 7).
Hampshire County Council (HCC)	The Local Nature Recovery Strategy for Hampshire (Adopted December 2025) [16]	The LNRS maps the most valuable areas for wildlife and identifies opportunities to improve the natural environment. The Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7) has considered the LNRS in planning the delivery of BNG and the LNRS was reviewed during the design of the EMEAs, which are detailed in the Design Principles Document (Document reference 5.11, DCO Volume 5).
Havant Borough Council (HBC)	Havant Borough Core Strategy (Adopted March 2011) [25] • Policy DM8 - Conservation, Protection and Enhancement of Existing Natural Features • Policy CS11 - Protecting and Enhancing the Special Environment and Heritage of Havant Borough • CS13 – Green Infrastructure • CS16 – High Quality Design • DM9 – Development in the Coastal Zone	Details requirements for development proposals within the borough to: • Protect and enhance local habitats and landscape distinctiveness (DM8). • Protect and enhance the Special Environment and Heritage of Havant Borough (CS11). • Maintain, manage and where appropriate improve existing Green Infrastructure or create new Green Infrastructure (CS13). • Promote wildlife and biodiversity of the local area into the design (CS16). • Have no harmful effects on nature conservation within the Chichester and Langstone Harbour SSSI and SPA, Solent Maritime SAC and Ramsar site, or any Sites of Importance for Nature Conservation (SINCs) and Local Nature Reserves (LNR) (DM9). These policies have informed the protected habitat and species mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and have fed into the Indicative Environmental Masterplan appended to the Design Approach Document (Document Reference 5.12, DCO volume 5).
	Havant Borough Biodiversity Strategy (2019) [26]	Sets out how the biodiversity network of Havant Borough can be conserved and enhanced through the planning system. It provides a vision and a strategy to both conserve and produce a net gain in

Local planning authority	Relevant local policy	Relevance to assessment
		biodiversity throughout the Borough. The protected habitat and species mitigation embedded in the design is consistent with this strategy, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). The Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7) is also consistent with this strategy.
	Havant Borough Site Allocations (Adopted 2014) [27] • AL7 – Hermitage Stream • DM23 – Sites for Brent Geese and Waders • BD11 – Brockhampton West	Details requirements for development proposals within the borough to: • Positively contribute to the improvement of the Hermitage Stream (AL7). • Avoid important sites for brent geese and/or waders outside of the statutory designated areas. Where this cannot be avoided, developments need to undertake a site specific HRA. Replacement feeding/roosting habitat, on a no net loss basis, will need to be sought if impacts cannot be avoided (DM23). • Undertake a site specific HRA to ensure that there is no net loss of important habitat for brent geese (BD11). These policies have informed the protected habitat and species mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and fed into Indicative Environmental Masterplan appended to the Design Approach Document (Document Reference 5.12, DCO Volume 5). A Habitats Regulations Assessment – Stage 2 Appropriate Assessment and Marine Conservation Zone – Stage 1 Assessment (Document reference 5.2, DCO Volume 5) has been undertaken.
	Emerging Local Plan - Building a Better Future Plan (2025 consultation) [28] • Policy 20 – International and	Details requirements for development proposals within the borough to: • Protect, conserve, and enhance the Borough's internationally and nationally designated sites, both individually and as a network. Developments likely to have

Local planning authority	Relevant local policy	Relevance to assessment
	National Nature Conservation Sites • Policy 21: The Local Ecological Network • Policy 24: Protected and Notable Species • Policy 25: Solent Wader and Brent Goose Strategy Sites	an impact on internationally designated sites will be subject to a HRA (Policy 20). • Protect and enhance the Borough's Local Ecological Network of local designated sites, Irreplaceable Habitats, Priority Habitats, and other areas of local biodiversity value (Policy 21). • Protect and conserve populations of protected and notable species. Incorporate enhancement features for protected and notable species. Where Bechstein's Bat is likely to be found on site or within the ZoI, or where the development will impact habitat within 3km of known Beckstein's Bat roosts, surveys appropriate to Bechstein's Bat must be undertaken. (Policy 24). • Use existing SWBGS records and bespoke field surveys to inform the impact assessment. To avoid an adverse effect, provide an avoidance and mitigation package, in accordance with the SWBGS, secured in perpetuity by legal agreement (Policy 25). Habitats Regulations Assessment – Stage 2 Appropriate Assessment and Marine Conservation Zone – Stage 1 Assessment (Document reference 5.2, DCO Volume 5) has been undertaken. These policies have informed the protected habitat and species mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and fed into Indicative Environmental Masterplan appended to the Design Approach Document (Document Reference 5.12, DCO Volume 5). Full details on Bechstein's bat are within ES Appendix 8.4 Bats, Volume II (Document reference 6.2, DCO Volume 6).
Partnership for Urban South Hampshire - EHBC, EBC, FBC, HBC, HCC and	South Hampshire Green Infrastructure Strategy (2017-2034) (Adopted March 2017) [29]	Identifies key Green Infrastructure features and future requirements for South Hampshire to enable growth and development to take place, informing the location of new development, and providing

Local planning authority	Relevant local policy	Relevance to assessment
Winchester City Council (WCC)		a high-quality Green Infrastructure network for South Hampshire's communities. The Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7), Outline LEMP (Document reference 7.5, DCO Volume 7) and the mitigation and enhancement outlined in section 8.9 are in line with this strategy's objectives.
Portsmouth City Council (PCC)	Portsmouth Plan (The Portsmouth Core Strategy) (Adopted January 2012) [30] • PCS13 - A Greener Portsmouth	Details requirements for development proposals within the city council to: • Carry out a HRA if likely to have an adverse effect on a European site either alone or in-combination with other plans or projects. • Protect biodiversity and produce a net gain wherever practicable. • Recognise the importance of currently important brent goose *Branta bernicla* feeding sites and high tide wader roosts outside of the site boundaries to the ecological integrity of the European sites. Habitats Regulations Assessment – Stage 2 Appropriate Assessment and Marine Conservation Zone – Stage 1 Assessment (Document reference 5.2, DCO Volume 5) has been undertaken. This policy has fed into the Indicative Environmental Masterplan appended to the Design Approach Document (Document reference 5.12, DCO Volume 5). Its requirements are also consistent with the Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7).
	Pre-submission Local Plan (2024) [31] • PLP1 - Design • PLP2 - Climate Emergency • PLP32 - SuDS • PLP38 – Green Infrastructure • PLP39 – Biodiversity • PLP41 – Trees and Hedgerows	Details requirements for development proposals within the city council to: • Understand and relate positively to the site and its local and wider context, including the existing natural environment and open space (PLP1). • Deliver Green Infrastructure and enhance biodiversity (PLP2). • SuDS are incorporated and they maximise multi-functional benefits including net gains in biodiversity (PLP32).

Local planning authority	Relevant local policy	Relevance to assessment
	• PLP42 – Solent Waders and Brent Geese Sites	• Maintain, protect and enhance the function, integrity, quality, connectivity and multi-functionality of the existing green and blue infrastructure network and individual sites (PLP38). • Conserve and enhance the Green Grid (PLP38). • Conserve and enhance biodiversity, giving particular regard to ecological networks and areas with high potential for priority habitat restoration or creation (PLP39). • Demonstrate that the need for and benefits of the development outweighs any loss or deterioration of woodlands, hedgerows or trees of high amenity value and their immediate surroundings (PLP41). • Avoid all loss or deterioration of aged or veteran trees and impact on their immediate surroundings (PLP41). • Functionally linked sites which are used by Solent Waders and/or Brent Geese are to be protected from adverse impacts. Proposals that impact the functionally linked sites need to provide mitigation as set out in the SWBGS document [32] (PLP42). These policies have informed the protected habitat and species mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and fed into the Indicative Environmental Masterplan appended to the Design Approach Document (Document Reference 5.12, DCO Volume 5). Its requirements are also consistent with the Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7).
South Downs National Park Authority (SDNPA)	South Downs Local Plan (2014-2033) (Adopted July 2019) [33] • SD1 – Sustainable Development	Details requirements for development proposals within the SDNP to: • Conserve and enhance the wildlife of the area (SD1). • Have an overall positive impact on ecosystem services (SD2).

Local planning authority	Relevant local policy	Relevance to assessment
	• SD2 – Ecosystem Services • SD9 – Biodiversity and Geodiversity • SD10 – International Sites • SD11 – Trees, Woodland and Hedgerows • SD42 – Infrastructure • SD45 – Green Infrastructure	• Conserve and enhance biodiversity, giving particular regard for priority habitat restoration or creation (SD9). • Consider impacts to specific internationally designated sites (SD10). • Represent the least environmentally harmful option reasonably available and for design to reduce the impact on natural beauty, wildlife and cultural heritage of the National Park and the general amenity of local communities (SD42). • Consider Green Infrastructure (SD45). • Includes the Development Management Policy for trees, woodland and hedgerows (SD11). Although the Proposed Development is not within the SDNP, these policies have informed the protected habitat and species mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and have fed into the Indicative Environmental Masterplan appended to the Design Approach Document (Document reference 5.12, DCO Volume 5). Its requirements are also consistent with the Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7).
	South Downs National Park Partnership Management Plan (2026-31) [34]. Pre-Consultation Draft (November 2025) • Aim 1: Nature Recovery • Aim 3: Clean Water	Objective 1.1: To improve, expand, connect and increase the resilience of wildlife-rich habitats and land managed for nature to ensure we are on track to reach 60% managed for nature by 2060. Objective 3.1: To support catchment-based partnership approaches to water management so that nature and communities can thrive, and flood risk is reduced. Objective 3.2: To improve the condition of the water environment to ensure enough clean water for nature and people, and water habitats are restored.

Local planning authority	Relevant local policy	Relevance to assessment
		Although the Partnership Management Plan Pre-Consultation Draft has been published following the finalisation of the protected habitat and species mitigation for the Proposed Development, the broad aims of the Proposed Development are aligned with the objectives for nature recovery and clean water.
WCC	Winchester District Local Plan Part 2 Development Management and Site Allocations (Adopted April 2017) [35] • DM5 – Protecting Open Areas • DM15 – Local Distinctiveness • DM24 - Special Trees, Important Hedgerows and Ancient Woodlands	Details requirements for development proposals within the city council to: • Protect open areas with the exception of where the benefit clearly outweighs the harm (DM5). • Conserve or enhance trees, hedgerows, water features and corridors which contribute to local distinctiveness (DM15). • Avoid loss of ancient woodlands, important hedgerows, special trees and distinctive ground flora (DM24). These policies have informed the protected habitat and species mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7).
	'Your Place Your Plan. Winchester District Local Plan' 2020 – 2040 (Adopted March 2026) [36] • NE4 – Green and Blue Infrastructure • NE5 – Biodiversity • NE15 – Special Trees, Important Hedgerows and Ancient Woodlands • NE16 – Nutrient Neutrality Water Quality Effects on the SPAs, SACs and Ramsar Sites of the Solent and the River Itchen	Sets out the requirements for development proposals within the city council to: • Maintain, protect and enhance the function or the integrity of the existing Green Infrastructure identified at district and sub district level (NE4). • Protect designated sites and avoid or mitigate adverse impacts on functionally linked land (NE5). • The Local Planning Authority will require, in accordance with the Environment Act 2021, development to deliver a minimum of 10% measurable net gain in biodiversity to be maintained for a period of 30 years in accordance with the Environment Act and to the latest Statutory Biodiversity Metric (NE5). Full details are provided in the Biodiversity Gain Plan (Document reference 7.11, DCO Volume 7).

Local planning authority	Relevant local policy	Relevance to assessment
		• Avoid loss or deterioration of ancient woodland, important hedgerows, veteran trees, distinctive ground flora and the space required to support them (NE15). • Permission will be granted only where effects can either be excluded or, if that is not possible, mitigation by nutrient neutrality is achieved following the guidance provided by Natural England (NE16). These policies have informed the protected habitat and species mitigation embedded in the design, refer to section 8.4 and the Design Principles Document (Document reference 5.11, DCO Volume 5). They have also informed the practices set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) and have fed into the Indicative Environmental Masterplan appended to the Design Approach Document (Document reference 5.12, DCO Volume 5).

Guidance, standards and advice

8.2.7 In addition, the terrestrial and freshwater assessment has been undertaken in accordance with relevant guidance and has been compiled in accordance with professional standards. The overarching guidance and standards which relate to this assessment are detailed in Table 8-4. Species specific guidance and standards are presented in the Technical Appendices (Document reference 6.2, DCO Volume 6).

Table 8-4 List of relevant guidance and standards

Guidance	Description	Relevance to assessment
The British Standards Institute (2013) British Standards (BS) 42020:2013 Biodiversity. Code of practice for planning and development [37]	This code of practice gives recommendations and provides guidance primarily for ensuring that actions and decisions taken at each stage of the planning process are informed by sufficient and appropriate ecological information.	This provides recommendations and guidance on the appropriate ecological information required to support planning and development. The code of practice has been followed during scheme development for the Proposed Development.

Guidance	Description	Relevance to assessment
Chartered Institute for Ecology and Environmental Management (CIEEM) (2017) Guidelines for Preliminary Ecological Appraisal – 2nd edition [38]	This guidance provides good practice guidance for those undertaking preliminary ecological surveys and appraisals.	This guidance informed the survey scope and methodology.
CIEEM (2018) Guidelines for Ecological Impact Assessment (EcIA) in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine - Version 1.2 (updated April 2022) [39]	This guidance provides practical advice for all professionals involved with ecological evaluation and assessment for proposed developments in terrestrial, freshwater, marine and coastal environments.	These guidelines have been followed. They explain the key elements of the process of EcIA and provide the criteria to be considered when undertaking an ecological assessment as set out in sections 8.5 and 8.8 of the chapter.
Natural England (NE) (2023) Protected species and development: advice for local planning authorities from NE [40]	Guidance on how to assess a planning application when there are protected species on or near a proposed development site.	This guidance is relevant because protected species are scoped into the assessment as they are present within and near the Proposed Development. The guidance provides information on what details are required to support development applications and has been applied when preparing this chapter.
The Environment Agency's position statement on Managing the risk of spread of Invasive Non-Native Species through raw water transfers [41]	Guidance outlines the EA's position on how it will manage the risks of raw water as a pathway for the spread of INNS.	The guidance is relevant as it indicates that the focus should be on any new pathways that a transfer creates, and not on the current distribution of INNS. The position statement states that new schemes that create a hydrological connection between isolated catchments are required to have mitigation measures in place.
Natural England's advice on INNS risks for the Regulator's Alliance for Progressing Infrastructure Development [42]	The advice note provides supplementary guidance on the risk of spreading INNS through water transfers.	The guidance is relevant as it provides guidance on developing risk assessment for INNS and has been referenced in the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7).

8.3 Consultation, scoping and engagement

Consultation

8.3.1 Feedback received from stakeholders relevant to terrestrial and freshwater biodiversity is summarised within the Consultation Report (Document reference 5.1, DCO Volume 5), including how the Proposed Development has had regard to the feedback. These cover the consultation responses received for the following consultations:

1. Summer 2022 Consultation
2. Summer 2024 Consultation
3. Spring 2025 Consultation
4. Autumn 2025 Consultation
5. Spring 2026 Consultation

Environmental Impact Assessment scoping

8.3.2 An Environmental Impact Assessment (EIA) Scoping Opinion was adopted by the Planning Inspectorate on behalf of the SoS on 31 August 2023. A full list of the EIA Scoping Opinion comments made by the Planning Inspectorate and their respective responses are provided in ES Appendix 5.3 Response to EIA Scoping Opinion, Volume II (Document reference 6.2, DCO Volume 6).

8.3.3 Comments received in relation to terrestrial and freshwater biodiversity are set out in Table 8-5 describing how and where these are addressed in the ES:

Table 8-5 Environmental Impact Assessment Scoping Opinion - Planning Inspectorate comments

Scoping Opinion ID	Summary of Scoping Opinion comment	How the ES addresses the Scoping Opinion comment	Where addressed in the ES
ID 3.3.1	The EIA Scoping Opinion requested further clarity on potential ecological features and impact pathways for designated sites. Specifically, clearly defining the scoping area for designated sites and identify any best practice measures relied upon to avoid significant effects and explain how these are secured through the DCO.	All statutory and non-statutory designated sites within 2km of the Order Limits and any sites hydrologically connected to the Proposed Development are scoped into the assessment. Section 8.5 presents further clarity on the study areas for ecological features, including the ZoI and potential impact pathways. Survey methodologies (which also define the scoping area) have been shared and agreed with NE and the EA. Section 8.4 details good practice measures relied upon to avoid significant effects to ecological features and how they are secured through management plans.	Section 8.5 and Table 8-5.
ID 3.3.2	The EIA Scoping Opinion states that Eurasian beaver *Castor fiber* can be scoped out of the assessment owing to the absence of this species within the Order Limits and connected catchments.	This is scoped out of the assessment because no records were identified within the desk study and there is no connectivity to catchments where there have been official releases of this species.	No additional information is provided in the ES.

Scoping Opinion ID	Summary of Scoping Opinion comment	How the ES addresses the Scoping Opinion comment	Where addressed in the ES
ID 3.3.3	The EIA Scoping Opinion states that where District Licensing (DL) cannot be used for great crested newt (GCN) *Triturus cristatus*, the ES should include an assessment of effects on GCN.	Where the local planning authority is signed up to a GCN DL scheme an assessment of effects on GCN has not been carried out, since any potential adverse effects will be mitigated through the DL. This is consistent with the Scoping Opinion. Two planning authorities located within the GCN desk study area are not signed up to a GCN DL scheme, these are PCC and HBC. A review of the GCN baseline within PCC and HBC was undertaken and is provided in paragraph 8.7.106. This concluded that GCN are considered absent from the GCN ZoI located within PCC and HBC due to a lack of suitable habitat, as confirmed by the desk study and field surveys. Therefore, there is no pathway to impact and GCN within PCC and HBC are not considered further. A District Licence Report has been produced by NatureSpace detailing the outcome of the assessment, the second-stage compensation requirement (which will be finalised post-consent), mitigation requirements and the commitment to using DL is set out in the Outline CEMP (Document reference 7.1, DCO Volume 7). This report demonstrates that the DL route can be used for the DCO application. A post-consent reassessment will be carried out to appropriately quantify the actual planned impacts and the resulting DL conditions and an impact plan will be embedded in the detailed CEMP and submitted for	Section 8.7, 8.8 and ES Appendix 8.8 Other notable fauna, Volume II (Document reference 6.2, DCO Volume 6).

Scoping Opinion ID	Summary of Scoping Opinion comment	How the ES addresses the Scoping Opinion comment	Where addressed in the ES
		approval to the relevant planning authority. On approval, a certificate from NatureSpace will be commissioned and submitted to HCC confirming compliance with the DL.	
ID 3.3.4	EIA Scoping Opinion indicated that in the absence of further baseline information relating to notable invertebrate assemblages, and potential impact pathways, it could not scope these matters out of the assessment. It stated that the ES should provide an assessment of these matters, where there is potential for likely significant effects or should demonstrate that no likely significant effects would occur with agreement from relevant consultation bodies.	Terrestrial invertebrates are included in the assessment and baseline information is provided in section 8.7, with subsequent impact assessment in section 8.8.	Sections 8.7 and 8.8.
ID 3.3.5	The EIA Scoping Opinion acknowledged and agreed that reptile surveys, National Vegetation Classification (NVC) surveys and hedgerow surveys would be undertaken where preliminary surveys identified the potential for effects. Where further surveys are scoped out, the ES must present a clear justification for this approach. Effort should be made to agree the survey scope and methodology with relevant consultation bodies.	Hedgerow and NVC survey scope and methodologies were agreed with NE in 2024. The results of these surveys are presented within ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6). Due to the abundance of suitable habitat to support reptiles within the Order Limits and the largely temporary nature of the impacts from the Proposed Development, it was considered proportionate to assume a level of presence of common reptile species at all components of the Proposed Development and mitigate accordingly. However, if the potential for likely significant effects became apparent in specific locations, for example if passive displacement for reptiles was considered	Section 8.7, 8.8, ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6) and ES Appendix 8.8 Other notable fauna, Volume II (Document reference 6.2, DCO Volume 6).

Scoping Opinion ID	Summary of Scoping Opinion comment	How the ES addresses the Scoping Opinion comment	Where addressed in the ES
		inappropriate due to a lack of suitable habitat to displace into, targeted surveys would be undertaken. Further detail is provided within ES Appendix 8.8 Other notable fauna, Volume II (Document reference 6.2, DCO Volume 6) and summarised in section 8.7 with subsequent impact assessment in section 8.8.	
ID 3.3.6	The EIA Scoping Opinion stated that the ES should assess effects on European hedgehog *Erinaceus europaeus*, brown hare *Lepus europaeus*, and harvest mouse *Micromys minutus*, based on robust survey data, or provide justification for scoping them out including evidence of agreement with relevant consultation bodies.	Due to the abundance of suitable habitat within the Order Limits and the largely temporary nature of the impacts from the Proposed Development, it was considered proportionate to assume a level of presence of these species and mitigate accordingly as summarised in paragraph 8.5.28. These species have been scoped in and baseline information is presented in ES Appendix 8.8 Other notable fauna, Volume II (Document reference 6.2, DCO Volume 6), which is also summarised in section 8.7. The impact assessment for these species is detailed within section 8.8.	Section 8.7, section 8.8 and ES Appendix 8.8 Other notable fauna, Volume II (Document reference 6.2, DCO Volume 6).
ID 3.3.7	The EIA Scoping Opinion stated that the ES should assess any likely significant effects on ancient woodland and veteran trees from the construction and operation of the Proposed Development.	Baseline information detailing the presence of ancient woodland and veteran trees is given within ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6) and summarised in section 8.7. An assessment of likely significant effects on ancient woodland and veteran trees is presented in section 8.8.	Section 8.7, section 8.8, ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6).
ID 3.3.8	The EIA Scoping Opinion stated that the ES should include assessment of impact pathways during the operational phase of the	An assessment of run-off, damage to or loss of habitat, killing or injury of protected or notable species and disturbance or displacement of	ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1,

Scoping Opinion ID	Summary of Scoping Opinion comment	How the ES addresses the Scoping Opinion comment	Where addressed in the ES
	Proposed Development from airborne pollution, run-off, damage to or loss of habitat, killing or injury of protected or notable species and disturbance or displacement of protected or notable species through habitat loss or fragmentation, or otherwise demonstrate why likely significant effects would not occur and have agreement from relevant consultation bodies.	protected or notable species through habitat loss or fragmentation during operation is presented in section 8.8. Impacts on ecological features from dust, particulate matter (ID 3.1.2) and road traffic emissions during operation (ID 3.1.3) were scoped out within the EIA Scoping Opinion, as detailed within ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6).	DCO Volume 6) and section 8.8.
ID 3.3.9	The EIA Scoping Opinion stated that the extent of survey area should be clearly explained and justified in the ES for each ecological feature assessed. Effort should be made to agree the location of field surveys with relevant consultation bodies. It states that the survey effort should include areas of land proposed for mitigation of significant adverse effects. Additionally, it was stated that given the study area for terrestrial habitat is 200m, the survey area buffer for terrestrial habitats should also be 200m.	The terrestrial habitat survey area is the Order Limits plus 50m rising to up to 200m for habitats likely to be sensitive to hydrology impact and includes areas of land proposed for mitigation. Survey methodologies were shared with NE and EA for review and agreed in 2024. Further clarity is provided in section 8.5 regarding survey areas for ecological features. The assessment presented in section 8.8 is based on robust baseline data including field surveys.	Section 8.5 and 8.8.
ID 3.3.10	The EIA Scoping Opinion states that the ES should confirm and justify the spatial extent of bird surveys undertaken and should consider whether any areas of functionally linked land would be affected by the Proposed Development. It also drew the Applicant's attention to NE's comments regarding the potential for the Proposed Development to	The field survey methodology is presented in ES Appendix 8.5 Ornithology, Volume II (Document reference 6.2, DCO Volume 6) and is summarised in section 8.5 where the spatial extent of bird surveys is outlined and justified. The assessment in section 8.8 considers potential effects on functionally linked land relating to NSNs.	Section 8.5, 8.8 and ES Appendix 8.5 Ornithology, Volume II (Document reference 6.2, DCO Volume 6).

Scoping Opinion ID	Summary of Scoping Opinion comment	How the ES addresses the Scoping Opinion comment	Where addressed in the ES
	affect FLL of Special Protection Areas (SPA) scoped into the assessment.		
ID 3.3.11	The EIA Scoping Opinion stated that the ES should identify the locations where fish could be affected by impacts from noise and vibration effects associated with construction activities and drilling along with a baseline description based on robust data, i.e. including the EA Ecology and Fish Data Explorer. It states that where there is potential for likely significant effects to occur to fish from noise and vibration during construction drilling, these should be assessed in the ES. Effort should be made to agree the scope and method of baseline data gathering and assessment with relevant consultation bodies.	Freshwater survey methodologies were shared with NE and the EA for review and agreement in 2024. No concerns have been raised. Those locations where fish could be affected by impacts from noise and vibration (including from construction drilling) are included in this assessment. The field survey methodology is given in ES Appendix 8.9 Freshwater ecology, Volume II (Document reference 6.2, DCO Volume 6) and is summarised in section 8.5. An assessment of effects is presented in section 8.8.	Section 8.5, 8.8 and ES Appendix 8.9 Freshwater ecology, Volume II (Document reference 6.2, DCO Volume 6).
ID 3.3.12	The EIA Scoping Opinion stated that the ES should consider the potential for INNS and disease to be spread via the transfer of water, particularly between catchments, and should provide an assessment of where this is potential for likely significant effects to occur.	The baseline information for INNS is provided in section 8.7, with subsequent impact assessment in section 8.8. The INNS baseline and assessment also considers the potential for pathogens to be spread. In addition, the potential for spread of disease spread is also scoped in and is considered for badgers and amphibians in section 8.8.	Sections 8.7 and 8.8.
ID 3.3.13	The EIA Scoping Opinion stated that confidential survey and assessment data should be provided as a confidential annex in the ES.	Confidential bird survey and assessment data, including Schedule 1 breeding birds, is provided in ES Appendix 8.5 Ornithology CONFIDENTIAL, Volume II (Document reference 6.2, DCO Volume 6).	ES Appendix 8.5 Ornithology CONFIDENTIAL, Volume II (Document reference 6.2, DCO Volume 6) and ES Appendix 8.3 Badger

Scoping Opinion ID	Summary of Scoping Opinion comment	How the ES addresses the Scoping Opinion comment	Where addressed in the ES
		Confidential badger survey and assessment data is provided in ES Appendix 8.3 Badger CONFIDENTIAL, Volume II (Document reference 6.2, DCO Volume 6).	CONFIDENTIAL, Volume II (Document reference 6.2, DCO Volume 6).

Engagement

8.3.4 This section provides details of the ongoing technical engagement that has been undertaken with stakeholders in relation to terrestrial and freshwater biodiversity.

Environmental Impact Assessment Working Groups

8.3.5 Five EIA Working Groups have been established as forums for ongoing engagement with statutory bodies regarding the Proposed Development. These Working Groups when combined cover all of the assessment topics considered by the EIA. A full description of each of the EIA Working Groups, the key stakeholders, and an overview of the topics presented can be found in ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6). This section presents a summary of the topics covered in the EIA Working Groups which are of relevance for the terrestrial and freshwater biodiversity assessment.

8.3.6 The Biodiversity and Water Environment EIA Working Group which includes land quality, hydrogeology, water, marine ecology and terrestrial and freshwater ecology has been the main forum for engagement for terrestrial and freshwater biodiversity. There have been 12 Biodiversity and Water Environment EIA Working Group meetings between Summer 2022 and DCO application. Technical officers from NE, EA, EBC, FBC, HBC, HCC, PCC, SDNPA, WCC and the Marine Management Organisation (MMO) attended the EIA Working Group meetings.

8.3.7 The following overarching themes were covered across the EIA Working Group meetings:

1. Introduction and background to the Proposed Development.
2. Overview of the baseline environment.
3. EIA scoping which included setting out the proposed approach to EIA scoping, providing an overview of the EIA Scoping Report (Document reference 6.2, DCO Volume 6) and seeking feedback on the EIA Scoping Opinion (Document reference 6.2, DCO Volume 6).
4. An overview of the PEI (Preliminary Environmental Information) Report, including setting out the baseline and approach to mitigation, as well as providing an overview of the PEI Report findings.
5. Updates on the approach to development of the design of the Proposed Development.
6. Briefings on the materials to be consulted on, including design and environmental assessment related matters, ahead of the Summer 2022, Summer 2024 and Spring 2025 Consultations.

7. Approach to mitigation, Commitments Register (ES Appendix 5.5 Commitments Register, Volume II (Document reference 6.2, DCO Volume 6)) and associated management plans.
8. Consultation feedback and update on scheme development and design principles following the Summer 2024 Consultation and PEI Report.
9. Updates on EIA progress and development of mitigation, including management plans and the Commitments Register.
10. An overview of the ES, including setting out the baseline and any updates from the PEI Report, as well as providing an overview of the findings of the EIA.

8.3.8 Comments received as part of the EIA Working Groups and matters resolved in relation to terrestrial and freshwater biodiversity include:

1. The approach to field survey methodology was discussed and the methodologies shared with the relevant regulators; no concerns were raised by stakeholders.
2. Natural England and HCC queried if southern damselfly *Coenagrion mercuriale* surveys would be carried out on the Itchen and the Meon. NE also queried whether southern damselfly surveys were to be undertaken at Otterbourne Stream. It was confirmed that surveys were programmed for southern damselfly and habitat suitability assessment surveys were undertaken at relevant watercourses in the Itchen and Meon catchments in 2024. Access was attempted to the Otterbourne Stream in 2024 but was not possible, therefore presence has been assumed as part of this assessment.
3. The EA queried if surveys for otter *Lutra lutra* included the coastal strip and advised that surveys for otter should include the coastal strip in the vicinity of where construction would take place. The Applicant did not consider this necessary due to the distance of the above-ground works from the coastal strip. Survey coverage was shared with the EA during a Technical Working Group (TWG) meeting in March 2025. The survey coverage was agreed including assumptions, such as if construction works are undertaken within 30m of the coastal strip, a pre-construction survey for otter will be required.
4. Hampshire County Council commented that not all Hampshire local planning authorities are signed up to a GCN DL scheme. It was confirmed that DL accessed from NatureSpace on behalf of NE will be used in those local planning authority areas where they have signed up to DL and an assessment carried out where they are not (HBC). This is detailed in Table 8-7.
5. Natural England queried whether Havant Thicket Reservoir mitigation would be included in the baseline for scoping impacts. It was confirmed that this is an important part of the assessment approach. It was also confirmed that the terrestrial and freshwater biodiversity team are working closely with Portsmouth Water to ensure mitigation measures are complementary.
6. Natural England noted that BNG would likely be a requirement for NSIPs by the time the Proposed Development is delivered. Therefore, 10% increase in biodiversity value should be considered a minimum. While the statutory regime in relation to BNG does not yet apply to NSIPs the Applicant has committed to the delivery of at least 10% biodiversity net gain.
7. The EA and NE raised that the River Meon supports Brook lamprey *Lampetra planeri* and Atlantic salmon *Salmo salar* which is why the River Meon has been

designated as a compensatory SAC. The Applicant has confirmed that these species are present within historic data and potential effects on these ecological features have been included in this assessment.

8. Eastleigh Borough Council raised that Stoke Park Farm and Bow Lake may have ecological opportunities for biodiversity enhancements. These locations were discussed and are being considered as part of BNG and enhancement delivery.
9. Natural England raised the importance of retaining the seed bank of areas cleared for construction works to ensure that this importance resource is not lost. The retention and management of soils (and therefore the seedbanks they contain) is included in the Outline Soil Resource Management Plan (SRMP) (Document reference 7.1, DCO Volume 7).

Technical Working Group

8.3.9 The EA, NE and the MMO have been engaged on a monthly basis through the TWG. These meetings allowed for the regular communication of progress on key elements such as terrestrial and freshwater biodiversity surveys, key findings, scheme development and mitigation.

8.3.10 Key matters and issues discussed through the TWG meetings in relation to terrestrial and freshwater biodiversity included:

1. The approaches to field survey methodologies, the HRA and the GCN DL (accessed from NatureSpace on behalf of NE). This included sharing for review the terrestrial and freshwater biodiversity survey methodologies with NE and EA which were then further discussed with no concerns raised at technical meetings, described in paragraph 8.3.11. It also included sharing for review the HRA during technical engagement with NE, as described in paragraph 8.3.15.
2. Natural England confirmed that the River Meon should be considered as a SAC, even though it is not formally designated. This was agreed and has been applied throughout the assessment. Potential construction impacts to the River Meon were discussed in February 2024, including noise and vibration impacts on fish. This was noted by the Applicant and has been considered within section 8.8.
3. In June 2023, NE queried the interaction between Havant Thicket Reservoir and Hermitage stream. In January 2024, the approach to be taken to assess water quality impacts in Havant Thicket Reservoir and downstream waterbodies was discussed with the EA and NE (as a precursor to more detailed technical discussions in a separate technical meeting), refer to section 19.3 in ES Chapter 19 Water environment, Volume I (Document reference 6.1, DCO Volume 6). Water quality modelling results were presented in February 2025 and in the Spring 2025 Consultation material. The EA and NE were engaged on a regular basis through the TWG to allow for the regular communication of progress on key elements including the water quality assessment and phosphorus removal proposals.
4. In September 2023, the EA expressed concerns relating to fish and whether fish passages would need to be included in method statements. Measures providing for safe passage of fish are included within the Terrestrial and

freshwater biodiversity and the Water environment sections of the Outline CEMP (Document reference 7.1, DCO Volume 7).

5. In January 2024, NE queried whether all watercourses have had appropriate ecological surveys. It was confirmed that where access has been allowed, all watercourses within the freshwater survey area (all watercourses within the Order Limits, plus 50m upstream and all watercourses with downstream hydrological connection) have been surveyed and this was acceptable to NE. The results of these surveys are summarised within section 8.7.
6. In January 2024, NE raised the potential impact of any entrained sediment on sensitive ecological features from raw water discharged from washouts, either directly into waterbodies or through run off. An update on washout approach was provided in September 2024. In March 2025 information on Pipeline Washouts, Break Pressure Tank (BPT) Washouts and Overflows was shared with the EA and NE for comment. The testing of the pipeline during commissioning and planned operational maintenance will tanker discharges from the washouts away to ensure that there is no release of raw water into the environment. The use of washouts in an emergency scenario is considered as part of the major accidents and disasters assessment (refer to ES Chapter 14 Major accidents and disasters, Volume I (Document reference 6.1, DCO Volume 6)). NE and the EA agreed with the approach to assessment in relation to these components.
7. In May 2024, bat Habitat Suitability Modelling (HSM) was discussed. It was shared by the EA that alcathoe bat *Myotis alcathoe* has been found close to Havant Thicket Reservoir. Alcathoe, like Bechstein's bat *Myotis bechsteinii*, cannot be identified using static recordings as their calls are too similar to other species. This was noted and has been considered as part of the assessment in section 8.8.
8. In August 2024, the EA asked for justification for the use of open-cut construction methodology through a tributary to the River Meon. In November 2024, the Applicant confirmed the small ditch connected to the River Meon (where an open-cut construction methodology is proposed) has low flow (potentially ephemeral), poor condition and is heavily modified and is unsuitable for southern damselfly. In March 2025 an update on surveys was given, and it was confirmed and agreed that trenched open-cut would remain the proposed construction methodology.
9. In December 2024, the Applicant shared the BNG strategy with the TWG. It was acknowledged that the strategy was at its first stage and was still being developed. The BNG Strategy has informed the preparation of the Biodiversity Gain Plan for the Proposed Development.
10. In November 2024, it was discussed with NE that 4.3ha of good condition Open Mosaic Habitat (OMH) at the Water Recycling Plant site (WRP site) would need to be cleared for the Proposed Development. In January 2025 an additional meeting was held with NE to discuss the BNG strategy and OMH. Potential solutions were discussed including off-site compensation and the installation of green/brown roofs at the WRP site.
11. In February and September 2025, discussions with NE covered the possibility of applying Rule Four [43] to meet the needs of OMH species of importance

locally through the provision of non-OMH habitat. As per NE advice, this has been discussed with HBC who have agreed in principle with the approach.

Technical engagement – Natural England and Environment Agency

8.3.11 One-to-one technical engagement with key stakeholders on the Proposed Development and matters relating to terrestrial and freshwater biodiversity has also taken place outside of the TWG. These meetings were held to allow communication of progress on key terrestrial and freshwater biodiversity elements such as survey methodology, survey findings, licensing and an overview of mitigation.

8.3.12 A freshwater biodiversity workshop took place on 4 March 2024 with NE and the EA to discuss and agree the survey methodologies. No issues or concerns requiring further workshops over and above the regular TWG meetings already scheduled were raised.

8.3.13 A terrestrial biodiversity workshop took place on 20 March 2024 with NE. Terrestrial survey methodologies were discussed and no concerns raised. A key outcome of this workshop was the need for further discussion on the HSM methodology with NE bat specialists. This HSM meeting was held on 3 May 2024 where the approach to HSM was discussed. Natural England set out some expectations which the Applicant addressed within their approach. In November 2024, NE confirmed they had no further comment regarding HSM. A change of software used for the HSM was required and NE confirmed on 27 August 2025 that this methodology change is acceptable.

8.3.14 Regular meetings have taken place with NE to discuss the four affected SWBGS sites (H90, H130, H08 and W03G). These meetings have centred on the delivery of appropriate mitigation, particularly for the WRP site and the candidate site located on Portsdown Hill. A mitigation approach has now been agreed with NE.

8.3.15 Engagement with NE and EA regarding the HRA has been undertaken. A high-level first draft of the draft Stage 2 HRA was shared for comment in November 2024 and a second draft was then shared in September 2025.

Bilateral meetings

8.3.16 The host authorities for the Proposed Development, as described in section 2.3 of ES Chapter 2 Planning legislation and policy, Volume I (Document reference 6.1, DCO Volume 6), have been consulted on a regular basis through bilateral meetings. These meetings allowed for the regular communication of progress on key elements such as terrestrial and freshwater biodiversity features, scheme development and mitigation.

8.3.17 A series of bilateral meetings between July 2023 and February 2025 were attended by terrestrial and freshwater biodiversity with officers from EBC, FBC, HCC, HBC, WCC. During these meetings an update on terrestrial and freshwater biodiversity surveys, key findings, scheme development and mitigation was given and comments from the EBC, FBC, HCC, HBC and WCC were received. Engagement with these stakeholders is summarised in the Statements of Common Ground (Document reference 5.8, DCO Volume 5).

Water and Wildlife Interest Group

8.3.18 Engagement with non-statutory stakeholders that have an interest in terrestrial and freshwater biodiversity has taken place through the Water and Wildlife Interest Group. A full description of the Water and Wildlife Interest Group, the non-statutory stakeholders, and an overview of the topics presented can be found in ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6). This section presents a summary of the main themes and matters covered in the Water and Wildlife Interest Group which are of relevance to the terrestrial and freshwater biodiversity assessment.

8.3.19 The following overarching themes were covered across the Water and Wildlife Interest Group meetings:

1. Introduction and background to the Proposed Development, including the assessment timescales, key issues and risks.
2. Overview of the baseline environment and surveys undertaken.
3. An overview of the development of the PEI Report, including project design and responses to the EIA Scoping Report.
4. An overview of the Summer 2024 Consultation responses.
5. An overview of the Spring 2025 Consultation responses.
6. Approach to mitigation and associated management plans to be provided with the DCO application.
7. An overview of the ES, including setting out the baseline and any updates from the PEI Report, as well as providing an overview of the findings of the EIA. The significant positive impacts on sensitive chalk river habitats that the Proposed Development will deliver, as a result of a reduction in abstractions from the chalk aquifer and the River Itchen, were highlighted.

8.4 Primary and tertiary mitigation

Primary measures

8.4.1 As described in ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6) a range of measures have been embedded into the Proposed Development design to avoid or reduce likely significant environmental effects. Consideration of likely significant effects on terrestrial and freshwater biodiversity has informed the iterative scheme development from the outset. This has informed the design principles, which are set out in the Design Principles Document (Document reference 5.11, DCO Volume 5) and the locations of the EMEAs, which are shown in the Works Plans (Document reference 2.3, DCO Volume 2).

8.4.2 These primary mitigation measures specific to terrestrial and freshwater biodiversity, which form part of the design that has been assessed are:

1. Avoiding all direct impacts to statutory designated sites.
2. Designing the Proposed Development to avoid, where practicable non-statutory designated sites.

3. Designing the Proposed Development to avoid, where practicable, priority habitats especially those where there is uncertainty around the effectiveness of reinstatement, such as wetland habitats.
4. Implementing a minimum of 15m horizontal buffer between ancient woodland and all construction works and permanent infrastructure.
5. No loss or deterioration of ancient and veteran trees.
6. Implementing a minimum 4m vertical buffer between ancient or veteran trees and ancient woodlands and all trenchless excavations. For all other trees to be retained, a minimum 3m vertical buffer, subject to site location, soil type and proximity to tree centres will be implemented.
7. Operational lighting design will follow good practice to reduce illuminating hedgerows and ecologically sensitive habitats, to avoid disruption to retained vegetation and the species using these features for resting places, foraging or commuting routes.
8. All Main Rivers, and those detailed within the Trenchless Crossing Schedule contained in Appendix B of the Outline CEMP (Document reference 7.1, DCO Volume 7), will be crossed using trenchless techniques.
9. All tunnels and trenchless construction methodologies under watercourses and other barriers will use a methodology that excludes groundwater and therefore any dependant ecological features.
10. The pipeline will be installed at least 2.5m below the bed of watercourses crossed using trenchless techniques. This includes all Main Rivers and many Ordinary Watercourses. The pipeline would be installed at least 1.5m below all other watercourses (dependent on local geology and geomorphological risks); this will avoid interaction with active bed sediments and geomorphology of watercourses.
11. Avoiding the siting of the pipelines between Budds Farm Wastewater Treatment Works (WTW) and the WRP site within the chalk aquifer where practicable.
12. Designing the WRP process to ensure that the recycled water discharged to Havant Thicket Reservoir complies with water quality requirements. This includes measures for phosphorus reduction.
13. Avoiding locating temporary construction compounds, as shown on ES Figure 1.1 Location of the Proposed Development and Order Limits, Volume III (Document reference 6.3, DCO Volume 6), within flood risk zones and floodplain habitat, where practicable.
14. Use of trenchless construction methods to avoid flood zones, where reasonably practicable.
15. Including INNS treatment at Otterbourne WSW that would treat the waste flows of the existing treatment process at Otterbourne WSW to ensure any INNS in the source water would be removed and not further spread. The INNS treatment at Otterbourne WSW would produce sludge, which would be disposed of via a suitably licensed facility.
16. Designing the Proposed Development to utilise, where practicable, existing gaps in vegetation, to reduce vegetation loss and reduce the creation of new (albeit temporary) gaps in linear vegetation features.

17. Designing the Proposed Development to avoid, where practicable, known ecological features. For instance, the avoidance of main badger setts, otter holts and confirmed bat roosts is incorporated into the design to retain these ecological features and reduce the potential for impact pathways.
18. At locations of high badger activity, providing space within the Order Limits for the creation of artificial replacement setts, if deemed necessary as part of licensing requirements.
19. To mitigate for habitat loss, specific reinstatement measures will be delivered within EMEAs, which are detailed in the Design Principles Document (Document reference 5.11, DCO Volume 5), the locations of which are shown the Works Plans (Document reference 2.3, DCO Volume 2). The EMEAs could also be used to deliver wider environmental enhancement measures, subject to agreement with landowners, and those that are specific to ecology are detailed in Table 8-6. For a full list of mitigation and enhancement within EMEAs please refer to ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6).

Table 8-6 Summary of ecological mitigation and enhancement measures at the Environmental Mitigation and Enhancement Areas

EMEA	Purpose	Description
Intermediate Pumping Station E (IPS-E)	Enhancement	Outside of the operational area for Break Pressure Tank/Intermediate Pumping Station E, chalk grassland habitat will be provided throughout EMEA-E-1 to support the Portsdown SSSI to the south. Where practicable, swift boxes will be installed on Break Pressure Tank/Intermediate Pumping Station E.
EMEA_E_2	Enhancement	Creating new chalk grassland to support Portsdown SSSI.
EMEA_E_3	Enhancement	Reinstate and enhance grassland to good condition, either neutral grassland with a sward dominated by false oat-grass or other calcareous grassland to support Motte & Bailey & Chalk Pit SINC.
IPS-F	Mitigation	Woodland and scrub planting will be extended into the north-west and north-east areas of Intermediate Pumping Station F. A new woodland will be created, of a minimum of 20m width, along the length of the farm track along the south-east of Intermediate Pumping Station F, integrating into the existing woodland. Planting will be designed to allow continued use of the farm track.
	Enhancement	Existing hedgerows surrounding Intermediate Pumping Station F will be enhanced to increase biodiversity, green infrastructure connectivity and landscape pattern. Enhancements will be in keeping with the historic landscape character and dependent on the existing condition of the hedgerow.
EMEA_F_1	Mitigation	The line of trees will be reinstated after construction.
EMEA_F_2	Mitigation	Protected species mitigation will be provided as determined by pre-construction surveys. Creation of woodland to mitigate woodland loss across the Proposed Development.

EMEA	Purpose	Description
EMEA_G_1	Mitigation	Loss of woodland will be mitigated through the creation of lowland mixed deciduous woodland within grassland along the existing woodland edge and will consider the Wickham Park golf course landscape character and historic character.
EMEA_G_2	Mitigation	Hedgerow with trees and wet woodland will be reinstated and opportunities for improvement will be sought and will consider the Wickham Park golf course landscape character and historic character.
IPS-G	Mitigation	To provide visual screening for residential areas of Wickham to the east and users of the PRoW to the north, new woodland and scrub planting of a minimum of 15m wide, where reasonably practicable dependent on other operational, safety and security requirements, will be planted on the north-east and south-east side of IPS-G, connecting to the existing woodland to the west and existing hedgerow along the farm track to the south To mitigate for loss of connectivity due to access along Titchfield Lane, hedgerow will be created to the south of IPS-G along the farm track. To increase biodiversity and green infrastructure connectivity, a 20m wide band of woodland and scrub will be created to connect the visual screening planting to the wooded boundary of Park Place.
	Enhancement	To enhance connectivity and biodiversity, new woodland and scrub planting will be incorporated between the north west edge of IPS-G and the existing woodland to the west which forms the border of private properties on Titchfield Lane. Existing hedgerows surrounding IPS-G will be enhanced to increase biodiversity, connectivity and landscape pattern. Enhancements will be in keeping with the historic landscape character and dependent on the existing condition of the hedgerow.
EMEA_J_1	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_J_2	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_J_3	Mitigation	Protected species mitigation to be provided as determined by pre-construction surveys. Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_J_4		
EMEA_J_5	Mitigation	Protected species mitigation to be provided as determined by pre-construction surveys.
EMEA_K_1	Mitigation	Protected species mitigation to be provided in EMEA-K-1 as determined by pre-construction surveys.
	Enhancement	River bank restoration and species enhancements and PRoW enhancements will be considered.
EMEA_K_2	Enhancement	River bank restoration and species enhancements and PRoW enhancements will be considered.
EMEA_K_3		
EMEA_K_4	Enhancement	Creation of other neutral grassland habitat.

EMEA	Purpose	Description
BPT-K	Mitigation	The existing treeline adjacent north of Break Pressure Tank K (running NW-SE) will be reinstated and widened to a minimum of 20m through the creation of lowland mixed deciduous woodland. This planting will improve habitat connectivity and mitigate for the loss of lines of trees and woodland.
	Enhancement	Lowland mixed deciduous woodland to the south and east and the ecologically valuable line of trees north-east of Break Pressure Tank K will be protected, enhanced and widened to increase biodiversity, green infrastructure connectivity and landscape pattern. Enhancements will be in keeping with the historic landscape character.
EMEA_K_5	Enhancement	Creation of other neutral grassland habitat.
EMEA_L_1	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_L_2	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_L_3	Mitigation	Creation of lowland mixed deciduous woodland to mitigate woodland loss across the Proposed Development.
EMEA_L_4	Enhancement	Creation and enhancement of grassland areas to moderate condition grassland.
EMEA_L_5	Mitigation	Fielders Farm Meadows SINC will be reinstated and improved to good condition to mitigate impacts during construction.
EMEA_L_6	Mitigation	If otter are identified following pre-construction surveys at Bow Lake, otter mitigation will be delivered to provide additional shelter and screening.
	Enhancement	Poor-condition modified grassland will be enhanced.
EMEA_L_7	Enhancement	Creation of new wet woodland to expand the existing woodland parcel.
EMEA_M_1	Enhancement	Enhancement works to the Otterbourne Stream to improve the watercourse to deliver better-quality habitat for southern damselfly, supporting this priority species through targeted hydrological and ecological improvements.
EMEA_M_2	Enhancement	Other broadleaved woodland in this area will be improved to reach good ecological condition.
WRP	Mitigation	The main process building (within Zone 1) will have a green/brown roof, to provide OMH mitigation within the facility boundary to improve biodiversity . OMH mitigation will be delivered within areas of the WRP site not in active use, additional to the OMH that will be provided on the roof of the main process building.

Tertiary measures

8.4.3 Good construction practices are set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) which is secured by a requirement in the DCO and a detailed

CEMP will manage the effects of construction. The measures of particular relevance to terrestrial and freshwater biodiversity are:

1. Avoiding, where practicable, disturbance to breeding birds by timing vegetation clearance and removal of structures outside of the core breeding bird season (March to August inclusive).
2. Pre-construction surveys to update the biodiversity baseline to establish the presence of ecological features to inform mitigation.
3. The use of Ecological Clerks of Works (ECoW).
4. Implementation of good practice measures, including complying with relevant protected species legislation, implementation of appropriate buffer zones and timing of works for the relevant ecological features.
5. Tree protection measures, including using temporary tree protection fencing where reasonably practicable and implementing mitigation where this is not feasible. Construction activities will follow good practice guidance, and comply with the Tree Impacts Plan, as set out in ES Appendix 13.5 Arboricultural Impact Assessment, Volume II (Document reference 6.2, DCO Volume 6).
6. Implementation of good practice guidance on working near water, including measures to prevent pollution and control unexpected contamination.
7. Measures to manage environmental risks where trenched open-cut methodologies are to be carried out through a watercourse, including use of temporary dams, diversion channels and scour protection.
8. To manage environmental risks where trenched open-cut methodologies through a watercourse are to be carried out, measures are set out to maintain flows, reduce changes on downstream sediment transport and ensure that channels are reinstated appropriately.
9. To manage the effects of air quality and odour, measures are set out to mitigate risks to ecological features during construction from potential dust and particulate matter emissions and potential emissions from construction non-road mobile machinery (NRMM).
10. Implementation of a reduced working width of 20m, when going through or under sensitive features, including vegetation of ecological importance for protected species or priority habitats. The locations of the reduced working widths are detailed in the Reduced Working Width and Trenchless Crossing and Tunnelling Schedules and Plans (Appendix A of the Outline CEMP (Document reference 7.1, DCO Volume 7)).
11. Measures to manage surface water runoff and drainage, preventing changes to local drainage patterns and the wetness of terrestrial habitats at the construction stage. The Outline CEMP sets out the measures that will be included in the Construction Drainage Plan that will be produced by the Contractor to manage the quantity and quality of construction drainage.
12. A Dust Management Plan to be produced post-consent to manage dust during construction.
13. A Noise and Vibration Management Plan to be produced post-consent to manage noise and vibration.

8.4.4 An INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) has been developed for the Proposed Development. The INNS Biosecurity Plan (Document

reference 7.10, DCO Volume 7) identifies the INNS risks relevant to the assets and raw water transfers of the Proposed Development and sets out measures to mitigate these risks during construction and operation. The measures of particular relevance to terrestrial and freshwater biodiversity during construction include but are not limited to:

1. Development of site-specific method statements for INNS prior to construction.
2. Development and enforcement of 'Check-Clean-Dry' protocols for all vehicles, machinery and personnel.
3. Implementation of processes for briefing Contractors on the specific INNS issues on site, INNS identification and reporting.
4. Development of a reporting and recording process for biosecurity incidents.
5. Implementation of auditing and updating procedures for biosecurity measures.

8.4.5 The INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) also sets out measures to ensure that INNS are not introduced or released into the natural environment during operation of the Proposed Development.

8.4.6 The INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) provides an outline of the Emergency INNS Management Plan (EIMP), which will be provided by the Contractor post consent. The EIMP will set out the processes and procedures for managing INNS in an emergency incident, including pre-incident procedures for releasing and managing water during an emergency incident, procedures to rapidly assess and identify the current threat of INNS associated with the emergency event, for containment and eradication and a plan for regular monitoring and follow-up.

8.4.7 An Outline Soils Resource Management Plan has been developed for the Proposed Development and is submitted with the DCO application as Appendix D of the Outline CEMP (Document reference 7.1, DCO Volume 7). This document sets out measures to ensure the successful reinstatement of soil.

8.4.8 An Outline LEMP (Document reference 7.5, DCO Volume 7) has been developed for the Proposed Development and is submitted with the DCO application. This document is provided in support of the general and site-specific design principles contained in the Design Principles Document (Document reference 5.11, DCO Volume 5), describing how the Green Infrastructure strategy will help deliver the design principles. Together, the Design Principles Document (Document reference 5.11, DCO Volume 5) and Outline LEMP (Document reference 7.5, DCO Volume 7) secure the ecological mitigation for the Proposed Development within the DCO. The Outline LEMP (Document reference 7.5, DCO Volume 7) includes information on protection of biodiversity features, habitat creation or enhancement (including aftercare) and the long-term management and monitoring to ensure the successful establishment of new habitats. A habitat reinstatement strategy forms part of the Outline LEMP (Document reference 7.5, DCO Volume 7) and provides information on seeding and planting specifications, including plant mixes.

8.4.9 An Outline Water Monitoring Plan (ES Appendix 19.9 Outline Water Monitoring Plan, Volume II (Document reference 6.2, DCO Volume 6) has been developed for the Proposed Development. It describes monitoring of local hydrological and hydrogeological behaviour that is required prior to, during and post-construction to identify when supplementary mitigation requirements may need to be implemented

beyond those delivered as part of the Proposed Development. This includes maintaining a register of groundwater dependent terrestrial ecosystems (GWDTEs) within 200m of the Order Limits and a twice-weekly inspection of GWDTEs by the Named to assess any observed reduction in saturation or habitat deterioration.

8.4.10 An Operational Environmental Management Plan (OEMP) (Document reference 7.7, DCO Volume 7) has been developed for the Proposed Development. It secures mitigation required for the operational phase of the Proposed Development. The measures of particular relevance to terrestrial and freshwater biodiversity are:

1. Operatives requiring access to site will undertake driver awareness training, focusing on speed safety, to mitigate the risk of collision with wildlife when utilising private access roads to sites.
2. Measures specific to planned maintenance of washout valves, emergency release of washouts and emergency release of overflows.
3. Maintenance, repair and replacement of lighting at the WRP site and Above Ground Plant (AGP) sites to be in line with relevant standards and guidance [44] for lighting design.

8.5 Assessment methodology

Scope of assessment

8.5.1 Likely significant effects requiring assessment may be temporary or permanent, direct, indirect, secondary, cumulative, in-combination, beneficial or adverse and may occur during construction, operation or decommissioning. Likely significant effects on terrestrial and freshwater biodiversity features within the scope of the assessment are summarised in Table 8-7. The scope of the assessment has responded to feedback received; as detailed in section 8.3.

8.5.2 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase and are therefore assessed to be of the same significance as those assessed for construction. Refer to ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6) section 3.7 for additional information on decommissioning.

8.5.3 Cumulative effects are those arising from the interrelationship between the Proposed Development and other developments (inter-project). These are reported within ES Chapter 20 Cumulative and in-combination effects, Volume I (Document reference 6.1, DCO Volume 6).

8.5.4 In-combination effects are those that result from the interaction of individual effects combined together on a single feature or resource at a single point in time. Where the in-combination effects for terrestrial and freshwater biodiversity are inherently assessed (for example, where the noise and vibration of construction activity could result in impacts on protected species), these are reported within section 8.8 of this chapter. However, where a feature is affected by multiple topics and there is the potential for significant in-combination effects to occur, these aggregated effects are reported within ES Chapter 20 Cumulative and in-combination effects, Volume I (Document reference 6.1, DCO Volume 6).

8.5.5 Table 8-7 represents the summary of the scope for the assessment. All scoped out elements as agreed in the EIA Scoping Opinion are confirmed in ES Appendix 5.3 Response to EIA Scoping Opinion, Volume II (Document reference 6.2, DCO Volume 6).

Table 8-7 Summary of the scope for terrestrial and freshwater biodiversity assessment

Ecological feature	Construction	Operation	Decommissioning
Statutory and non-statutory designated sites within 2km of the Order Limits and NSNs and sites hydrologically connected to the Proposed Development	Scoped in	Scoped in	Scoped in
Habitats, terrestrial and freshwater, including priority habitats, hedgerows and ancient woodland	Scoped in	Scoped in	Scoped in
Badger	Scoped in	Scoped in	Scoped in
Bats	Scoped in	Scoped in	Scoped in
Breeding and non-breeding birds	Scoped in	Scoped in	Scoped in
Hazel dormouse *Muscardinus avellanarius*	Scoped in	Scoped in	Scoped in
Riparian mammals - Otter	Scoped in	Scoped in	Scoped in
Riparian mammals - Water vole *Arvicola amphibius*	Scoped in	Scoped in	Scoped in
Other notable fauna - GCN (within HBC only), brown hare, common reptile species, common toad *Bufo bufo*, European hedgehog and terrestrial invertebrates	Scoped in	Scoped in	Scoped in
Other notable fauna - GCN (outside HBC)	Scoped out	Scoped out	Scoped out
Eurasian beaver	Scoped out	Scoped out	Scoped out
Freshwater fish	Scoped in	Scoped in	Scoped in
White-clawed crayfish *Austropotamobius pallipes*	Scoped in	Scoped in	Scoped in
Aquatic macroinvertebrates	Scoped in	Scoped in	Scoped in
Aquatic diatoms, phytobenthos and macrophytes	Scoped in	Scoped in	Scoped in
Potential introduction and or spread of INNS and pathogens	Scoped in	Scoped in	Scoped in
Southern damselfly	Scoped in	Scoped in	Scoped in

8.5.6 The use of washouts in operationally exceptional events such as emergency scenarios is assessed in ES Chapter 14 Major accidents and disasters, Volume I (Document reference 6.1, DCO Volume 6) and is outside the scope of the terrestrial and freshwater biodiversity assessment.

Study area

8.5.7 This section describes the spatial scope (the area within which impacts are possible) for the assessment as it applies to terrestrial and freshwater biodiversity. The study area of the assessment has been informed by:

1. The Order Limits, which includes the components of the Proposed Development and other works (e.g. temporary land take for temporary construction compounds and access routes).
2. The likely effects of the Proposed Development on ecological features within the ZoI.

8.5.8 The ZoI is the area over which ecological features may experience impacts from the Proposed Development. It covers the Order Limits and the wider landscape where pathways (ecological or hydrological links) exist for the transfer of impacts to ecological features outside the Order Limits [39]. The ZoI for each ecological feature varies in size depending on the nature of the effects and the sensitivity of the ecological feature to those effects.

8.5.9 Following standard guidance [39], each ZoI has been determined by:

1. The scale, duration, location and timing of the construction and operational activities of the Proposed Development.
2. The abundance and distribution (in relation to the construction and operation of the Proposed Development) of ecological features, making use of ecological data, including aerial photography and Ordnance Survey (OS) mapping, biological records of protected and notable species and baseline data collected from field surveys.

8.5.10 The process for establishing the ZoI for each ecological feature is detailed within the Technical Appendices 8.1 to 8.9, which are presented within ES Volume II (Document reference 6.2, DCO Volume 6).

8.5.11 Different desk study areas have been applied for each category of ecological feature, as appropriate, to enable effective assessment of likely significant effects on each ecological feature. The desk study areas are presented in section 8.5.

8.5.12 The Proposed Development includes the use of Havant Thicket Reservoir for the storage of recycled water, and the use of the Eastney Long Sea Outfall (LSO), Eastney Pumping Station (PS), and associated Eastney Transfer Tunnel (TT) for the release of approximately 22Ml/d of reject water from the WRP site. The Proposed Development also uses Pipelines that have been consented and will be constructed separately by Portsmouth Water between Bedhampton Springs and Havant Thicket Reservoir. These components are considered as part of the future baseline and are, therefore, considered to be existing infrastructure. As such, the terrestrial and freshwater biodiversity assessment only considers the operational change of use in relation to these components.

8.5.13 The Institute for Air Quality Management guidance on construction dust assessment [45] was updated in 2024. It is recommended that ecological features within 200m of the Order Limits and within 50m of routes used by construction vehicles are considered for dust (for routes used by construction-generated traffic up to 250m from the Order Limits). For construction phase road traffic emissions ecological features within 200m of a road affected by traffic flows exceeding

relevant air quality screening criteria are considered [46]. Therefore, buffers of up to 250m from the Order Limits and 200m from the affected road network are applied for the assessment of construction dust and potential air quality changes, which could affect terrestrial and freshwater biodiversity.

8.5.14 The field survey area for each ecological feature has been determined based on the Order Limits for the Proposed Development and the ZoI of each ecological feature. The extents of the field survey areas are presented in Table 8-8.

Table 8-8 Terrestrial and freshwater biodiversity field survey and desk study areas

Ecological feature	Designation	ZoI	Desk study area	Field survey area
Statutory international[2] and national[3] designated nature conservation sites	SACs, SPAs, Ramsar sites (including candidate sites), Compensatory SAC habitat, SSSIs (including SSSI Impact Risk Zones (IRZ), National Nature Reserves (NNR) and LNR.	2km	Within 5km of the Order Limits for international designated sites and 2km of the Order Limits for national designated sites, plus, an additional search area of 10km for SACs for which bats are a qualifying feature. Downstream sites and groundwater dependant sites which are hydrologically connected to the Proposed Development.	N/A[4]
Non-statutory designated sites	SINCs and Road Verges of Ecological Importance (RVEI).	250m	Within 2km of the Order Limits.	N/A
Habitats (including Habitats of Principal Importance (HPIs), ancient woodland and hedgerows)	N/A	200m	Order Limits plus 2km for biological records. Order Limits and the affected road network plus 200m for ancient woodland. Order Limits plus 200m search area for ancient, veteran and notable trees and HPI.	Order Limits plus 50m rising to up to 200m for habitats likely to be sensitive to hydrology impacts;

[2] Statutory designated sites of international importance. SPAs and SACs form a network of sites within the UK territory protected for their nature conservation value in the European Union. Ramsar sites are wetlands of international importance designated under the Convention on Wetlands [96].

[3] Statutory designated sites of national importance comprising NNRs and LNR designated under classified under the National Parks and Access to the Countryside Act 1949 [98]

[4] N/A indicates that dedicated field surveys were not required as the habitat and protected species surveys identify if any of the designated sites' qualifying features are within the ZoI of the Proposed Development.

Ecological feature	Designation	ZoI	Desk study area	Field survey area
Badger	N/A	Order Limits plus 250m	Order Limits plus 2km.	Order Limits plus 30m.
Bats	N/A	10km	Order Limits plus an additional search area of 7km.	Bat roost surveys: Order Limits plus 10km. Habitat suitably modelling static detector surveys: Order Limits plus 7km.
Breeding and non-breeding birds	N/A	50-750m depending on bird species.	Order Limits plus an additional search area of 5km.	Order Limits plus 500m.
Hazel dormouse	N/A	Suitable habitat within Order Limits plus 500m.	Order Limits plus an additional search area of 2km.	Suitable connecting habitat that intersects the Order Limits.
Otter	N/A	200m	Order Limits plus an additional search area of 2km.	Order Limits and up to 200m of watercourses (upstream and downstream) crossed by the Proposed Development.
Water vole	N/A	200m	Order Limits plus an additional search area of 2km.	Order Limits and up to 200m of watercourses (upstream and downstream) crossed by the Proposed Development.
Other notable fauna	N/A	100m	Order Limits plus an additional search area of 2km.	N/A[5]
GCN	N/A	The Order Limits plus 500m where located within HBC only.	The Order Limits plus 2km where located within HBC only.	The Order Limits plus 250m where located within HBC only.
Freshwater ecology (all watercourses)	N/A	All watercourses crossed by the Proposed Development, from 500m upstream of the Order Limits and all	All watercourses with Order Limits and crossed by the Proposed Development, and all watercourses with downstream hydrological connection.	ZoI.

[5] Justification for why surveys for other notable species were not required is detailed in Table 8-5

Ecological feature	Designation	ZoI	Desk study area	Field survey area
Freshwater fish	N/A	watercourses with hydrological connection downstream.	All watercourses within Order Limits, including records 1km up and downstream.	All watercourses where crossings are expected in the Order Limits.
White-clawed crayfish	N/A		All watercourses within Order Limits, including records 2km up and downstream.	All watercourses where crossings are expected in the Order Limits.
Aquatic macroinvertebrates	N/A		All watercourses within Order Limits, including records 1km up and downstream.	All watercourses where crossings are expected in the Order Limits.
Aquatic diatoms, phytobenthos and macrophytes	N/A		All watercourses within Order Limits, including records 1km up and downstream.	All watercourses where crossings are expected in the Order Limits.
Southern damselfly	N/A		All watercourses within the Order Limits.	All watercourses and suitable habitat where crossings are expected in the Order Limits

Assessment scenarios

8.5.15 ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6) provides an overview of the Proposed Development's approach to the temporal scope (the timescales over which impacts may occur) of the EIA. This section describes the temporal scope for the assessment as it applies to terrestrial and freshwater biodiversity.

8.5.16 For the assessment, construction effects are taken as those for which the source begins and ends during the construction and commissioning stages prior to the Proposed Development becoming operational, including the permanent change in land use. The anticipated construction programme is set out within section 3.5 of ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6).

8.5.17 The temporal characteristics of potential impacts are considered on a feature-by-feature basis in the assessment as the response of ecological features to potential impacts can vary temporally. For example, short-term impacts on features with comparatively short life cycles can result in greater impacts than those on features with longer life cycles.

8.5.18 For the assessment, operational effects include those that start once the Proposed Development is commissioned and operational and includes the effects of the physical presence of the infrastructure, its operation, use and maintenance.

8.5.19 Effects that could occur as a result of the decommissioning of the Proposed Development are assessed as being the same as the reported construction effects. Refer to ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6) section 3.7 for additional information on decommissioning.

8.5.20 The timescales for ecological effects vary from the timescales presented in ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6). This is to reflect the characteristics (such as the lifecycle of a species) of the ecological features present and, as required by the CIEEM EcIA Guidelines [39], suitable temporal scopes are to be proposed. The duration of an activity may differ from the duration of the resulting effect caused by the activity.

8.5.21 The most appropriate ecological timescales associated with these effects, regardless of phase, are considered to be as follows:

1. Short-term – endures for up to a period of 12 months
2. Medium-term – endures for between one and five years
3. Long-term – endures for between five and 15 years
4. Permanent – endures for more than 15 years or effects which cannot be reversed

8.5.22 The following future baseline years are considered:

1. A year during peak construction activities for impacts arising from construction. Construction is anticipated to be undertaken over a period of approximately five years with the intensity and scale of construction along the route varying over this period. This approach ensures the worst case scenario is assessed.

2. A year during maximum operation of the Proposed Development (at the peak output of approximately 60Ml/d of recycled water), for impacts arising from the operation. Operation is anticipated to start following completion of commissioning works.
3. A year at the time of the decommissioning phase, linked to the time that decommissioning would be expected to start, for impacts arising from the decommissioning of the Proposed Development.

Baseline methodology

Desk study

8.5.23 Baseline data collection has been undertaken to obtain information across the study areas described in Table 8-8. This section provides the approach to collecting baseline data.

8.5.24 Further detail on the methodology used for designated sites, terrestrial habitats, badger, bats, birds, hazel dormouse, riparian mammals, other notable fauna and aquatic habitats and species is detailed within Appendices 8.1 to 8.9 within ES Volume II (Document reference 6.2, DCO Volume 6).

8.5.25 The following data sources have been accessed to inform the baseline with respect to terrestrial and freshwater biodiversity (refer to Table 8-9). In addition to these data sources the terrestrial and freshwater assessment draws on environmental baseline data collated for other topics, specifically baseline data presented in ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) and ES Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6).

Table 8-9 Data sources used to inform the terrestrial and freshwater biodiversity assessment

Source of data	Baseline data
Hampshire Biological Information Centre (HBIC)	Biological records data Priority habitats SWBGS sites Ecological Network Mapping Locally designated sites (updated October 2024)
NE [47]	Statutory designated sites Priority habitats Ancient woodland inventory (accessed March 2025)
APEM Group	Flyover Phase 1 imagery data and 3D aerial imagery (accessed October 2024)
Maps for Draft Havant Borough Local Plan 2036	Bat species data (records accessed between July 2024 and December 2024)
British Trust for Ornithology (BTO) (Bird Atlas, Breeding Bird and BirdTrack)	Bird species data (accessed October 2024)
Woodland Trust [48]	Ancient tree inventory (accessed April 2025)

Source of data	Baseline data
Multi Agency Government Information for the Countryside (MAGIC) map application [49]	Granted EPS Licences (accessed March 2025) [49]
OS Open River Dataset	Information on waterbodies (accessed March 2025)
OS MasterMap Data	UK Habitat Classification (UKHab) (accessed March 2025)
The Hampshire Bird Atlas	Bird species data (accessed April 2024)
Wetland Bird Survey (WeBS) data for Langstone Harbour (specifically Langstone Royal Society for the Protection of Birds (RSPB) Reserve and West Hayling Island sectors)	Bird species data (accessed April 2022)[6]
EA Ecology and Fish Data Explorer	Freshwater species data (accessed March 2025)

Field surveys

8.5.26 No physical works will take place within Havant Thicket Reservoir as part of the Proposed Development, although it is included within the Order Limits as the Proposed Development would use Havant Thicket Reservoir for the storage of recycled water, before transfer to Otterbourne WSW. As such, it is assumed for the assessment that habitats within the reservoir footprint will have been lost as this will happen early in the Havant Thicket Reservoir Project programme. Therefore, field survey areas for this assessment exclude the Havant Thicket Reservoir footprint.

8.5.27 Surveys have been undertaken where access has been permitted. The assumptions and limitations relating to field surveys are discussed in section 8.6, which details how a robust assessment has been undertaken. The terrestrial and freshwater biodiversity baseline surveys undertaken were:

1. UKHab survey and condition assessments, NVC and hedgerow surveys
2. Badger surveys
3. Deployment of static bat detectors, ground level and aerial bat tree roost assessment, preliminary bat roost assessments of structures, bat emergence/re-entry surveys and bat night-time walkover surveys
4. Breeding and non-breeding bird surveys
5. Barn owl *Tyto alba* surveys
6. Kingfisher *Alcedo atthis* surveys
7. Hazel dormouse surveys
8. Water vole and otter surveys
9. GCN Habitat Suitability Index (HSI) and environmental DNA (eDNA) surveys
10. Freshwater fish surveys
11. White-clawed crayfish physical and eDNA surveys

[6] It is considered that the WeBS data accessed in 2022 is sufficient for this assessment as the BTO data report accessed in 2024 includes records of both breeding and non-breeding bird species.

12. Modular River (Physical) (MoRPh) surveys
13. Aquatic macroinvertebrate surveys
14. Macrophyte and phytobenthos surveys
15. Southern damselfly surveys

8.5.28 Local record data confirms that other notable fauna is widespread within the desk study area. Due to the abundance of suitable habitat to support these species within the Order Limits and the largely temporary nature of the impacts from the Proposed Development, it is considered proportionate to assume a level of presence of these species and mitigate accordingly. Therefore, field surveys were not undertaken.

Assessment methodology

8.5.29 The approach to assessment is set out in ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6). This has informed the approach used in this terrestrial and freshwater biodiversity assessment.

8.5.30 The assessment of likely significant effects on terrestrial and freshwater biodiversity is undertaken in accordance with the Guidelines for EcIA in the UK and Ireland [50]. This guidance is used to help evaluate sites, habitats and species and to assess the effects on ecological integrity.

8.5.31 The assessment considers a reasonable worst case scenario in respect of habitat loss, in accordance with the 'Rochdale Envelope' principle detailed in section 5.3 of ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6) and as set out in ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6) , during works within the Order Limits.

8.5.32 The assessment process includes:

1. Identifying the value of ecological features potentially affected, through survey and/or research and with reference to available contextual information.
2. Assessing impacts with the potential to affect valuable ecological features. Considering effects within the Order Limits and those that could occur beyond them, within the ZoI of each ecological feature.
3. Characterising the impacts, considering the extent, magnitude, duration, reversibility, timing and frequency.
4. Identifying likely significant effects by considering the relationship between the value of the ecological features and the magnitude of impact. Effects are firstly assessed considering primary and tertiary mitigation measures but in the absence of secondary mitigation, and then with the consideration of any secondary mitigation measures that can be applied to avoid or reduce any likely significant adverse effects. Secondary mitigation may also be required to address other non-significant adverse effects, where there is a legal requirement to do so, or to ensure ecological good practice is followed.
5. Reporting on any significant residual effects.

Assigning value

8.5.33 Ecological value is determined with reference to:

1. Legal protection: level of designation (sites) or biodiversity-based protection (species and habitats).
2. Biodiversity value (e.g. rarity, scarcity, function within ecosystem, population trends).

8.5.34 The ecological importance of a feature is determined on a geographical scale, where the broader geographical context reflects an increased value and/or sensitivity to change:

1. International importance
2. National (relating to the UK, specifically England) importance
3. Regional importance (south-east of England)
4. County importance (Hampshire)
5. Local importance (Havant, Southampton, Portsmouth and Winchester)

8.5.35 The geographical context for each ecological feature has been determined on the basis of a variety of factors. For example, the quality or extent of designated sites or habitats, habitat or species rarity, the extent to which they are threatened throughout their range and/or their rate of decline.

8.5.36 In the interests of interdisciplinary consistency and in line with the approach to EIA for the Proposed Development, CIEEM feature importance [39] and evaluation of significance descriptors have been transposed in accordance with the terminology presented within ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6). The feature value descriptions are set out in in Table 8-10.

Table 8-10 Transposition of feature importance descriptions

CIEEM terminology	EIA terminology	Definition
International	Very high	Habitats or species that form part of the cited interest within an internationally protected site, such as those designated under the Conservation of Habitats and Species Regulations 2017 [6] (e.g. SPAs and SACs or potential SPAs and SACs) or other international convention (e.g. Ramsar sites). A feature (e.g. habitat or population) which is either unique or sufficiently unusual to be considered as being one of the highest quality examples in an international/national context. For example, areas which meet the published selection criteria for an international protected site (SPA, SAC and Ramsar) but which are not themselves designated as such.
National	High	Habitats or species that form part of the cited interest within a nationally designated site, such as a SSSI or NNR or LNR. A feature (e.g. habitat or population) which is either unique or sufficiently unusual to meet the published selection criteria e.g. Joint Nature Conservation Committee (JNCC) (1998) [51] for nationally designated sites but which are not themselves designated as such. Irreplaceable habitats such as ancient woodland and ancient and veteran trees. Species that are protected under the Conservation of Habitats and Species Regulations 2017 [6] (as amended) or WCA 1981 (as amended).
Regional	Medium	A feature (e.g. habitat or population), which is either unique or sufficiently unusual to meet the published selection criteria for or have been identified by a regional plan and be considered as being of nature conservation value at a regional level.
County	Medium	Habitats or species that form the cited interest for a non-statutory site (e.g. RVEI, SINC etc). Hedgerows considered to be of importance under the Hedgerows Regulations, 1997 [3]. Presence of Section 41 (S41) species (present in a sufficient population or extent that it is considered to be of importance in the context of the county) listed within the NERC Act, 2006. Species that are protected under the Presence of Conservation of Habitats and Species Regulations 2017 [6] (as amended) or WCA 1981 (as amended) species that are present in numbers that represent a population that is county significant but do not form part of the cited interest of a designated site. Presence of LBAP, habitats or species, where the LBAP states that all areas of representative habitat or individuals of the species should be protected.

CIEEM terminology	EIA terminology	Definition
Local	Low	A feature of importance at district or local level. A feature (e.g. habitat or population) that is of nature conservation value in a local context only, with insufficient value to merit a formal nature conservation designation. Badgers and their setts, protected under the Protection of Badgers Act, 1992 [2]

Assigning magnitude of impact

8.5.37 When considering the likely impacts on ecological features, whether these are adverse or beneficial, the following characteristics of environmental change have been taken into account, as per CIEEM guidance [50]:

1. Probability of the impact occurring
2. Positive or negative:
   a. positive – a change that improves the quality of the environment, e.g. by increasing species diversity, extending habitat or improving water quality. This may also include halting or slowing an existing decline in the quality of the environment.
   b. negative – a change which reduces the quality of the environment, e.g. destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution.
3. Extent – the spatial or geographical area over which the environmental change may occur.
4. Magnitude – the size, amount, intensity, or volume of the environmental change.
5. Duration – the length of time over which the environmental change may occur and whether this is permanent or temporary.
6. Frequency and timing – the number of times an environmental change may occur and the periods of the day, season or year during which an environmental change may occur; considering seasonal or life cycle constraints.
7. Reversibility – whether the environmental change can be reversed through restoration actions or regeneration.

8.5.38 Table 8-11 summarises the definitions of magnitude that have been used for ecological features. This has been adapted from the definitions in Table 5-4 of ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6).

Table 8-11 Magnitude of impact on ecological features

Magnitude	Definition
Major	Fundamental, permanent, or irreversible changes, over the whole feature and/or fundamental alteration to key characteristics or features of the particular feature's character or distinctiveness. Large scale or major improvement of resources quality; extensive restoration or major improvement of attribute quality.
Moderate	Considerable, permanent, or irreversible changes, over the majority of the feature and/or discernible alteration to key characteristics or features of the particular feature's character or distinctiveness. Benefit to, or addition of, key characteristics, features or elements; improvements of attribute quality.
Minor	Discernible, temporary (throughout a period during construction) measurable change, over a minority of the feature and/or limited but discernible alteration to key characteristics or features of the particular feature's character or distinctiveness.

Magnitude	Definition
	Minor benefit to, or addition of, one or more key characteristic, features or elements; some beneficial effect on attribute or a reduced risk of negative effect occurring.
Negligible	Discernible, temporary (throughout a period during construction) change, or barely discernible change for any length of time, over a small area of the feature and/or slight alteration to key characteristics or features of the particular feature's character or distinctiveness. Very minor benefit to, or positive addition of, one or more characteristic, feature or element.

Evaluation of effect significance

8.5.39 In determining the significance of a potential effect, the magnitude of impact arising from the Proposed Development is correlated with the importance of the ecological feature. In accordance with CIEEM Guidelines [50], a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Likely significant effects are assessed as either beneficial or adverse. Where an effect is neither beneficial nor adverse, this is assessed as neutral.

8.5.40 Except where guidance requires otherwise, the significance of effects is described using the terms neutral, minor, moderate or major. Likely significant effects are defined as those where the significance of the effect is 'moderate' or greater [52]. Effects determined to be minor or neutral are deemed 'not significant'. While such impacts do not necessarily require specific mitigation in order to reduce their significance, it may still need to be applied, for example through licensing for a protected species receiving a minor adverse effect. Neutral, minor, moderate or major effects may be beneficial or adverse. The significance matrix in Table 8-12 is used to assess the significance of effects arising from the Proposed Development.

Table 8-12 Significance of effect matrix

		Magnitude of impact			
		Major	Moderate	Minor	Negligible
Sensitivity of resource	Very high	Major	Major	Moderate	Minor
	High	Major	Moderate	Minor	Minor
	Medium	Moderate	Minor	Minor	Neutral
	Low	Minor	Neutral	Neutral	Neutral

8.5.41 Whether an effect is considered significant or not is informed by conservation objectives for the affected ecological feature, where available (for example conservation objectives set by NE for European designated sites or in habitat and species actions plans). The 'conservation status' (habitats and species) or the degree to which an ecological feature is exhibiting 'integrity' in terms of structure, function and condition (defined sites or ecosystems) is also considered. The predicted effect of natural and man-made trends in the absence of the Proposed Development is also taken into account when determining the conservation status or integrity of an ecological feature and in considering whether otherwise non-

significant effects may contribute to a significant cumulative effect when considered with other plans and projects. Further detail on the approach cumulative effects can be found in ES Chapter 20 Cumulative and in-combination effects, Volume I (Document reference 6.1, DCO Volume 6).

8.5.42 When a feature has differing value, for instance a bat species may be of high value, but it could also be of very high value if it is a qualifying species of a designated site, up to the maximum significance of effect is reported.

8.5.43 Where the assessment concludes that there would be no impacts on a receptor this is reported as no effect.

Inherent in-combination assessment

8.5.44 When there are multiple impacts for an individual ecological feature, an inherent in-combination assessment is given for each ecological feature which summarises the maximum effect considered likely for the feature. This excludes habitats, as the impact assessment is detailed by habitat type and it would not be appropriate to combine them.

8.6 Assumptions and limitations

8.6.1 This section provides a description of the assumptions and limitations to the terrestrial and freshwater biodiversity assessment.

Assumptions

8.6.2 Where it has not been possible to undertake baseline habitat surveys, the habitats have been classified assuming a reasonable worst case scenario based on the desk study information and aerial imagery, including the classification of HPI, where indicated by priority habitat data from HBIC and NE Priority Habitat Inventory. Furthermore, all hedgerows that could not be surveyed have been assumed to be HPI and important. The hedgerows are classified as important, assumed important or not important as defined in the hedgerow schedule in ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6).

8.6.3 It is assumed that the habitats that make up the current baseline reported in section 8.7 will continue to be managed as they are currently, with the exception of those noted under the future baseline subsection of section 8.7.

8.6.4 Vegetation removal is based on a reasonable worst case scenario for the construction of the Proposed Development within the Order Limits, taking account of the pipeline construction working width and areas of reduced working width as detailed in the Outline CEMP (Document reference 7.1, DCO Volume 7).

8.6.5 Where permanent access points are proposed on existing roads, it has been assumed that hedgerows or other habitats at these locations would not require removal for widening of the access point and that only trimming would be required and therefore existing hedgerows can be retained and protected during construction.

8.6.6 Where isolation, air and washout valves are required, discrete areas of permanent habitat loss will be required. The location of these assets is currently unknown and will be finalised post-consent. Therefore, for this assessment the estimated habitat

loss for isolation, air and washout valves has been calculated based on the proportion of different habitat types across the Pipeline. See paragraph 8.8.163 for further detail.

8.6.7 The assessment of effects of a year during peak construction and a year of maximum operation assumes that all land used temporarily for construction would be returned to its previous use and condition (timeframes as set out in the Outline LEMP (Document reference 7.5, DCO Volume 7)). This includes all temporary tunnel shafts. Where vegetation will be removed to facilitate construction, this will be reinstated, noting that trees and shrubs will be generally below 1m in height at the time of habitat creation.

8.6.8 The identification and evaluation of likely effects at year 15 of operation (i.e. the maximum timeframe for establishment set out in the Outline LEMP (Document reference 7.5, DCO Volume 7)) assumes that all mitigation planting incorporated into the Proposed Development will have been appropriately managed over the period and will have successfully established. Native trees and shrubs will have grown to a height of between 3.5m and 6m depending on species and specification. These measures are secured through the Design Principles Document (Document reference 5.11, DCO Volume 5) and Outline LEMP (Document reference 7.5, DCO Volume 7).

8.6.9 No physical works will take place within Havant Thicket Reservoir as part of the Proposed Development. It is therefore assumed that habitats within the reservoir footprint will have been lost as part of the Havant Thicket Reservoir development and field survey areas for this assessment have excluded the footprint of the reservoir.

8.6.10 At locations of optionality for temporary construction compounds E-4 and E-6, a reasonable worst case assumption has been made to allow for indicative habitat loss calculations.

8.6.11 Assumptions specific to particular ecological features are presented within ES Appendices 8.1 to 8.9, Volume II (Document reference 6.2, DCO Volume 6).

Limitations

8.6.12 Land access constraints have prevented some areas from being surveyed and some initial surveys were limited to Public Rights of Way or public highways. The access constraints specific to ecological features are presented within ES Appendices 8.1 to 8.9, Volume II (Document reference 6.2, DCO Volume 6) and the percentage of field survey area coverage for each feature is detailed within section 8.7. Despite these constraints, either sufficient data has been collected or data extrapolated from adjacent areas to ensure sufficient coverage of the field survey areas has been achieved to enable a robust assessment to be completed.

8.6.13 Biological records used to inform the desk study have been provided by HBIC at varying levels of locational precision and may only provide a broad rather than exact location. As a result, the location of records discussed in the desk study should be considered to be indicative. Furthermore, a lack of records for any particular species does not necessarily mean an absence of ecological interest, as species may be under-recorded. These are consistent limitations of biological recording data within the UK; further surveys undertaken within the study area address these limitations to provide a robust baseline for assessment to sit

alongside biological record data and does not affect the assessments made within this report.

8.6.14 Limitations specific to particular ecological features are presented within ES Appendices 8.1 to 8.9, Volume II (Document reference 6.2, DCO Volume 6).

8.6.15 Locations from survey data shown on figures are assumed to be accurate to within 5m, due to the variables that can affect Global Positioning System (GPS) reliability. In addition, where multiple points may overlap these will be offset to allow visibility on figures.

8.7 Baseline conditions

8.7.1 To provide an assessment of the likely significant effects from the Proposed Development (in terms of terrestrial and freshwater biodiversity), it is necessary to identify and understand the baseline conditions in the study area. This provides a reference point against which likely significant effects on terrestrial and freshwater biodiversity can be assessed.

Current baseline

8.7.2 This chapter considers the terrestrial and freshwater biodiversity baseline conditions for the Proposed Development as a whole, as set out in ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6) rather than for each individual component of the Proposed Development. This approach has been undertaken to avoid excessive repetition of the same designated sites and biological records where these sit within the desk study distances defined in section 8.5 for multiple components of the Proposed Development.

Statutory designated sites

8.7.3 Internationally and nationally designated sites and their descriptions are detailed in ES Appendix 8.1 Designated Sites, Volume II (Document reference 6.2, DCO Volume 6) and shown spatially in ES Figure 8.1 Statutory designated sites within the desk study area, Volume III (Document reference 6.3, DCO Volume 6) and Figure 8.2 Internationally designated sites within the desk study area, Volume III (Document reference 6.3, DCO Volume 6).

8.7.4 The desk study identified a total of 12 international designated sites either within 2km of the Order Limits (excluding existing infrastructure as detailed within paragraph 8.5.12), or that are hydrologically connected to the Order Limits. This includes four SPAs, five SACs and three Ramsar sites. They are:

1. Solent and Dorset Coast SPA
2. Chichester and Langstone Harbour SP
3. Chichester and Langstone Harbour Ramsar
4. Solent Maritime SAC
5. South Wight Maritime SAC
6. Solent and Isle of Wight Lagoons SAC
7. Portsmouth Harbour SPA

8. Portsmouth Harbour Ramsar
9. Solent and Southampton Water SPA
10. Solent and Southampton Water Ramsar
11. River Meon Compensatory SAC habitat
12. River Itchen SAC

8.7.5 The River Meon is crossed by the Proposed Development via trenchless construction of the Pipeline between the WRP site and Otterbourne WSW. Whilst the River Meon is not formally part of the NSN, it is referred as the River Meon Compensatory SAC in this report due to the Applicant's compensatory drought habitat (a result of the drought option on the Itchen in the Applicant's 2019 drought plan [53]), being located in the catchment. The qualifying features of the site include chalk stream habitat and Atlantic salmon.

8.7.6 There are 81 SWBGS sites within 2km of the Order Limits (excluding existing infrastructure as outlined within paragraph 8.5.12), associated with the coastal SPAs, of which nine are within the Order Limits. These are not statutory designated sites. However, they are considered to act as functionally linked land to Chichester and Langstone Harbour SPA, Portsmouth Harbour SPA and Solent and Southampton Water SPA. These are sites outside of the boundaries of the SPAs but which represent essential roosting or feeding sites identified as being key to achieving favourable conservation status for the Solent's SPA and Ramsar sites.

8.7.7 There are five SWBGS sites located within tunnelled or trenchless sections of the Order Limits (H07A, H07B, H07C, H04C, H03). The following four SWBGS sites are located within the Order Limits, where trenched open-cut construction, temporary construction compounds or AGP are proposed:

1. H90 (primary support area) located at Budds Farm WTW – temporary construction compound C-1.
2. H130 (candidate site) located adjacent to WRP site - outfall into Hermitage Stream.
3. H08 (low use site) located at the WRP site.
4. W03G (candidate site) located at Portsdown Hill – trenched open-cut construction, Section E: Portsdown Hill to Boarhunt (Section E).

8.7.8 A total of 12 SSSI sites are within 2km of the Order Limits (excluding existing infrastructure as outlined within paragraph 8.5.12) and eight hydrologically connected to the Order Limits which are located further than 2km from the Order Limits. One SSSI (St Catherine's Hill SSSI) is located further than 2km from the Order Limits and is included due to the potential for air quality impacts on this site. There are eight LNRs within 2km of the Order Limits and six LNRs that are hydrologically connected to the Order Limits located over 2km from the Order Limits.

8.7.9 Thirteen SSSIs have been identified with relevant IRZ that intersect with the Order Limits. These are:

1. Chichester Harbour SSSI
2. Langstone Harbour SSSI
3. Portsdown SSSI

4. Portsmouth Harbour SSSI
5. Warblington Meadow SSSI
6. Lye Heath Marsh SSSI
7. Hook Heath Meadows SSSI
8. Titchfield Haven SSSI (not within 2km of the Order Limits but hydrologically connected)
9. Waltham Chase Meadows SSSI
10. The Moors SSSI
11. Botley Wood and Everett's and Mushes Copse SSSI
12. Upper Hamble Estuary Woods SSSI
13. River Itchen SSSI

Non-statutory designated sites

8.7.10 Non-statutory designated sites and their descriptions are detailed in ES Appendix 8.1 Designated Sites, Volume II (Document reference 6.2, DCO Volume 6) and shown spatially in ES Figure 8.3 Non-statutory designated sites within the desk study area, Volume III (Document reference 6.3, DCO Volume 6).

8.7.11 There are 354 non-statutory designated sites within the Order Limits (excluding existing infrastructure as outlined within paragraph 8.5.12) plus a 2km buffer. These consist of 341 SINCs, twelve RVEIs and one combined RVEI and SINC. Of these, 64 sites are within 250m of the Order Limits. There are two SINCs located within the Order Limits where trenched open-cut construction or temporary construction compounds are proposed. They are:

1. Field to West of Gillman Road SINC – temporary construction compound D-1.
2. Fielders Farm Meadows (Eastleigh) SINC – trenched open-cut construction of the Pipeline between the WRP site and Otterbourne WSW and temporary construction compound L-4.

Habitats

8.7.12 Details of the methodology, desk study and field survey results for habitats, ancient woodland and veteran and notable trees are detailed in ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6) and ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6) and are shown spatially in ES Figures 8.4 to 8.10, Volume III (DCO reference 6.3, DCO Volume 6). The arboricultural survey results are within ES Appendix 13.5 Arboricultural Impact Assessment, Volume II (Document reference 6.2, DCO Volume 6).

8.7.13 Table 8-13 provides a summary of terrestrial HPIs recorded within the field survey area. Further details regarding HPIs and other habitats are provided in the following sections.

Table 8-13 Habitats of Principal Importance within the field survey area

HPI	UKHab code	Area (ha)	Length (km)	Within the Order Limits	Component
Arable field margins	c1a	1.57	-	Yes	Pipeline between the WRP site and Otterbourne WSW, sections E, F and J
Lowland acid grassland	g1a	0.02	-	No	A334 and B2177 road junction
Lowland calcareous grassland	g2a	2.80	-	Yes	Pipeline between the WRP site and Otterbourne WSW, sections D and E
Purple moor grass and rush pastures	f2b	0.36	-	No	Pipeline between the WRP site and Otterbourne WSW, section G
Reedbed	f2e	0.56	-	Yes	Pipelines between Budds Farm WTW and the WRP site
Native hedgerows	h2a	-	35.53	Yes	Pipelines between the Water Recycling Plant site and Bedhampton Springs Pipelines between Budds Farm WTW and the WRP site Pipeline between the WRP site and Otterbourne WSW, all sections
Eutrophic standing water	r1a6	1.1	-	Yes	Pipelines between Budds Farm WTW and the WRP site Pipeline between the WRP site and Otterbourne WSW section K
Ponds that may be HPI	r1a,42	0.57	-	Yes	Pipelines between Budds Farm WTW and the WRP site Pipeline between the WRP site and Otterbourne WSW, sections G, J, L and M
Rivers	r2a	-	2.97	Yes	Pipeline between the WRP site and Otterbourne WSW, sections G, L and M
Coastal sand dunes	s3a	0.05	-	Yes	Pipelines between Budds Farm WTW and the WRP site
Coastal vegetated shingle	s3b	0.17		Yes	Pipelines between Budds Farm WTW and the WRP site
Wet woodland	w1d	4.5		Yes	Pipelines between Budds Farm WTW and the WRP site Pipeline between the WRP site and Otterbourne WSW, sections G, K, L and M

HPI	UKHab code	Area (ha)	Length (km)	Within the Order Limits	Component
Lowland mixed deciduous woodland	w1f	28.09	-	Yes	A334, Blind Lane and Titchfield Lane road junction A334 and B2177 road junction A334 and Botley Road road junction Pipeline between the WRP site and Otterbourne WSW, all sections
Coastal and floodplain grazing marsh	19	14.23		Yes	Pipeline between the WRP site and Otterbourne WSW, sections F, G, K, L and M
Wood-pasture and parkland	26	7.00	-	Yes	Pipeline between the WRP site and Otterbourne WSW, section K
OMH	80	4.34	-	Yes	WRP site

Section D: The WRP site to Portsdown Hill (Section D), Section F: Boarhunt to Crockerhill (Section F), Section G: Crockerhill to Wickham (Section G), Section J: Shedfield to the River Hamble (Section J), Section K: The River Hamble to Lower Upham (Section K), Section L: Lower Upham to Brambridge (Section L), Section M: Brambridge to Otterbourne WSW (Section M).

Ancient woodland and ancient or veteran trees

8.7.14 The desk study identified 62 ancient woodland parcels, consisting of 54 parcels of Ancient Semi-Natural Woodland (ASNW), seven Plantation on Ancient Woodland Sites (PAWS) and one Infilled Ancient Wood Pasture and Parkland (IAWPP). Within 30m of the Order Limits there are 10 ASNW and three PAWS, of which four are adjacent to the Order Limits within the Pipeline between the WRP site and Otterbourne WSW component.

8.7.15 The desk study identified one ancient tree located within the Order Limits between the WRP site and Otterbourne WSW, Section L. The arboricultural field survey identified a further eight ancient or veteran trees within the Order Limits and three within 30m of the Order Limits. Of these 12 ancient or veteran trees 11 were located within the Pipeline between the WRP site and Otterbourne WSW component and one was located within the Pipeline between the WRP site and Bedhampton Springs component.

Cropland

8.7.16 Cropland habitats form the largest proportion of land within the Order Limits and comprise a mixture of cereal and non-cereals. Large parcels of temporary grass and clover leys were infrequently encountered, as well as a single orchard and a single parcel of horticulture. Arable field margins are heavily concentrated in Section E of the Pipeline, with single field margins also recorded in Sections F and J of the Pipeline.

8.7.17 Arable field margins are an HPI, they provide valuable habitat enhancing connectivity across cropland along with hedgerows, particularly for mammals, birds and invertebrates. The other cropland habitats are impoverished in biodiversity but typically provide valuable habitat for farmland bird species.

Wetland

Purple moor grass and rush pastures

8.7.18 The desk study identified an area of purple moor grass and rush pastures HPI adjacent to the Order Limits (Section G of the Pipeline). This habitat was confirmed during UKHab and NVC surveys (NVC site 13). While it is outside the Order Limits, it is a potential GWDTE and therefore is considered further with respect to impacts associated with changes to groundwater levels in paragraphs 8.8.210 - 8.8.212.

Reedbeds

8.7.19 Reedbeds at Budds Farm WTW fall outside the temporary construction compounds and will be retained as part of the Proposed Development. However, these reedbeds, and those within 200m of the Order Limits associated with the River Itchen floodplain, are GWDTEs. The hydrology assessment identified that reedbeds at Budds Farm WTW are not bedrock fed and the reedbeds within the Itchen floodplain are within low permeability strata, with limited hydraulic continuity to the Proposed Development. Reedbeds were not scoped out in the EIA Scoping Opinion as there was not sufficient data available at that time to do so. Surveys and design work have identified that no impact pathway is considered likely and therefore, reedbeds are not considered further.

Other wetland and aquatic marginal vegetation

8.7.20 Three parcels of other wetland habitat are recorded within 200m of the Order Limits. The first parcel is east of temporary construction compound L-5. An NVC survey could not be undertaken, therefore this could be a GWDTE. The second parcel is west of temporary construction compound G-3 in the River Meon floodplain and elements of the habitat mosaic identified it as a GWDTE following an NVC survey (NVC site 14). The third parcel is east of temporary construction compound M-1 and was identified as a GWDTE following an NVC survey (NVC site 42). These parcels are considered further with respect to effects associated with changes to groundwater levels.

8.7.21 Aquatic marginal vegetation is recorded within the pipeline crossing section of the River Itchen. The pipeline will be installed using the trenchless construction method at this crossing point, thus avoiding any disruption or damage to aquatic marginal vegetation. Impacts on this habitat are therefore considered unlikely, and it is not considered further.

Grassland

Acid grassland

8.7.22 Other lowland acid grassland is located east of Waltham Chase within Section K of the Pipeline marginally within and predominantly south of the Order Limits. Classification as other lowland acid grassland was confirmed during the NVC survey (NVC site 30).

Calcareous grassland

8.7.23 There are desk study records of lowland calcareous grassland HPI at Farlington WTW, including within the temporary construction compound D-1. These areas have been subject to UKHab and NVC surveys (NVC site 2) and this classification has been confirmed. The desk study returned further records of lowland calcareous grassland within Section E of the Pipeline and 50m buffer. This included a lowland calcareous grassland road verge along the western side of Pigeon House Lane which crosses the Order Limits within a section of trenched open-cut pipeline. This grassland could not be surveyed and therefore it has been assumed to meet the HPI criteria. There is a further parcel within the Order Limits immediately west of Crooked Walk Lane (NVC site 9).

8.7.24 There are three parcels of other calcareous grassland within Section E of the Pipeline, two of which could not be surveyed and have therefore been assessed based on desktop information including nearby records of lowland calcareous grassland HPI. One of these is within the Order Limits, on the corner between Widley Walk and Portsdown Hill Road. The other two parcels are within the 50m buffer to the south of Portsdown Hill Road, including one area that was subject to a UKHab survey, north of Portsdown SSSI.

Neutral grassland

8.7.25 The data search recorded two strips of lowland meadow within Section L of the Pipeline, although these areas were assessed as modified grassland during the UKHab survey. A further parcel of lowland meadow was returned from the desk study beyond 50m and within 200m of the Order Limits, south of Highbridge and associated with Section L and M of the Pipeline. This parcel was not subject to UKHab or NVC survey and has been identified as a potential GWDTE. The habitat is considered to be dependent on the water table within the superficial deposits which are anticipated to be in continuity with the River Itchen. At this location, these deposits are perched on the low permeability London Clay. The Pipeline closest to the potential GWDTE will be installed via a trenchless method through the London Clay bedrock. As such, there is limited pathway for potential impact from the Pipeline on the groundwater level below the lowland meadow. Lowland meadow was not scoped out in the EIA Scoping Opinion are there was not sufficient data available at that time to do so. Surveys and design work have identified that no impact pathway is considered likely and therefore lowland meadows are not considered further.

8.7.26 Neutral grasslands are relatively common in the east of the field survey area and small to medium-sized, generally fragmented other neutral grassland parcels were recorded within the Pipeline between the WRP site and Otterbourne WSW component. The data search returned an area of coastal and floodplain grazing marsh at Bedhampton Springs. However, there was no evidence of inundation during the UKHab survey.

8.7.27 Parcels of other neutral grassland and *Lolium-Cynosurus* neutral grassland within NVC site 39 were identified as GWDTEs following the NVC survey.

Modified grassland

8.7.28 Modified grassland is the second-most recorded habitat type by area and is distributed across all components. These are mainly used as grazing pasture and contained varying sward heights.

Heathland and shrub

Hedgerows

8.7.29 There are 274 hedgerows recorded within the field survey area, the majority of which are native. They comprise 119 species-rich native hedgerows, 135 native hedgerows and 20 non-native and ornamental hedgerows. The hedgerows predominantly border agricultural fields, but also roads, public footpaths and private residences. Several hedgerows contain features such as trees and ancient woodland indicator plant species.

8.7.30 A total of 57 hedgerows were classified as 'important' under the Wildlife and Landscape Criteria of the Hedgerows Regulations 1997. A total of 126 hedgerows were not subject to Hedgerow Regulations survey and were assumed 'important'.

Dense scrub

8.7.31 Bramble *Rubus fruticosus* agg., hawthorn *Crataegus monogyna* and mixed scrub are sparse within the field survey area. Dense scrub provides cover and a source of food for wildlife including mammals and birds.

Rivers and lakes

Eutrophic standing water

8.7.32 A large lagoon is recorded in the southern part of Budds Farm WTW, surrounded by scrub, grassland, and reedbeds; it forms part of the Southmoor Nature Reserve site. It has been assessed as r1a6 other eutrophic standing water, which is an HPI. It sits marginally within the Order Limits, but predominantly within the 50m buffer.

Ponds

8.7.33 A pond is recorded within the Order Limits between temporary construction compounds L-4 and L-5. A survey could not be undertaken and therefore on a precautionary basis, it is assumed to be an HPI and is included in the assessment. Eleven further ponds are recorded within the 50m buffer.

Other standing water

8.7.34 A total of 25 ditches were recorded within the field survey area, predominantly forming drainage features bordering and intersecting fields. The baseline is presented within the freshwater ecology section in paragraphs 8.7.109 to 8.7.223.

Priority rivers

8.7.35 Four priority chalk rivers are recorded: the River Meon; River Itchen; a tributary to the Itchen; and Bow Lake. The baseline is presented within paragraphs 8.7.109 to 8.7.223.

Other rivers and streams

8.7.36 A total of 24 non-priority rivers and streams are recorded within the survey area, of which 18 are crossed by the Pipeline. For further details regarding these watercourses and their condition assessments refer to ES Appendix 8.9 Freshwater ecology, Volume II (Document reference 6.2, DCO Volume 6). These features are presented in the freshwater ecology baseline section in paragraphs 8.7.109 to 8.7.223.

Sparsely vegetated land

Sand dunes

8.7.37 Priority habitat data indicated the presence of sand dunes at the western edge of Budds Farm WTW bordering the intertidal habitats associated with Langstone Harbour within the Order Limits that was not assessed during the surveys. On a precautionary basis, it has been assumed that this habitat is present. No impacts are considered likely as this habitat falls within the trenchless section of the Pipeline between Budds Farm WTW and the WRP site and therefore effects on sand dunes are not considered further.

Coastal vegetated shingle

8.7.38 Priority habitat data indicated the presence of coastal vegetated shingle along the southern edge of Budds Farm WTW bordering the intertidal habitats within the Order Limits that was not assessed during the surveys. On a precautionary basis, it has been assumed that this habitat is present. No impacts are considered likely as this habitat falls within the trenchless section of the Pipeline between Budds Farm WTW and the WRP site and therefore effects on coastal vegetated shingle are not considered further.

Urban

8.7.39 Urban areas are predominantly associated with Havant to the east and with other areas to the west comprising occasional tarmacked roads or suburban or residential gardens.

Woodland

Wet woodland

8.7.40 There are discrete areas of wet woodland HPI. Priority habitat data indicates that there are parcels of wet woodland along the western edge of Budds Farm WTW, which could not be assessed during the surveys. Small to medium-sized fragmented patches of wet woodland are present within the Pipeline between the WRP site and Otterbourne WSW component and 50m buffer, associated with

Sections G, L and M of the Pipeline (NVC sites 12, 15, 16, 34a, 34b, 40 and 41). Wet woodland is a GWDTE, with further areas recorded within the 200m buffer, including within the River Meon floodplain and Wickham Park Golf Course (Section G of the Pipeline). Further assessment has therefore been undertaken on all wet woodland parcels considering potential effects of changes to groundwater levels.

Lowland mixed deciduous woodland

8.7.41 There are 457 parcels of lowland mixed deciduous woodland HPI within the desk study area, which excludes those associated with Havant Thicket Reservoir and between Bedhampton Springs and the Reservoir. These records are distributed across the search area and associated with all components and sections, except for the WRP site and Pipelines between Budds Farm WTW and the WRP site. There are small, fragmented parcels of lowland mixed deciduous woodland HPI scattered across the Pipeline between the WRP site and Otterbourne WSW component.

Other broadleaved woodland

8.7.42 Other broadleaved woodland parcels are numerous and distributed across all of the Proposed Development.

Other mixed woodland

8.7.43 There are nine parcels of other mixed woodland within the field survey area. These are small parcels predominantly at the WRP site and Budds Farm, as well as Otterbourne WSW.

Coniferous woodland

8.7.44 There are six small, fragmented parcels of coniferous woodland recorded throughout the field survey area, the largest of which was a mixed woodland with areas of commercial coniferous plantation south of Shirrel Heath.

Lines of trees

8.7.45 There are 53 lines of trees recorded in the field survey area, of which 26 are ecologically valuable, due to the presence of mature, veteran or ancient trees. Many are associated with lowland mixed deciduous woodland, including linking otherwise fragmented parcels of woodland. A further 27 other lines of trees are recorded bordering field margins, public roads and private residences.

Scattered trees

8.7.46 There are 1,048 scattered trees within the field survey area. These are predominantly pedunculate oak, with another commonly recorded species including common ash. This includes 9 dead, 42 over-mature, 380 mature, 259 semi-mature, 299 early-mature and 59 young trees. Ancient and veteran trees are excluded from these numbers; they are discussed separately in paragraph 8.8.173.

Coastal and floodplain grazing marsh

8.7.47 There are areas of coastal and floodplain grazing marsh HPI recorded associated with the River Wallington, Meon, Hamble and Itchen (and tributary) and Bow Lake. These are neutral and modified grasslands and other wetland habitat. To the east of the B3345 south of Fishers Pond, there are two parcels of neutral grassland. The southern area within the Order Limits and temporary construction compound L-5 qualified as coastal and floodplain grazing marsh, is a GWDTE (NVC site 39). An area of g3c8 *Holcus-Juncus* neutral grassland is recorded within the Order Limits and temporary construction compound M-1 and beyond the Order Limits to the east (NVC site 42).

8.7.48 Impacts within the trenchless crossings and 50m buffer are not considered likely due to primary mitigation measures. However, parcels of coastal and floodplain grazing marsh within Sections L and M fall within temporary construction compounds L-5 and M-1 and are therefore included in the assessment.

Open Mosaic Habitat on previously developed land

8.7.49 Other neutral grassland and other calcareous grassland at the WRP site are classified, in conjunction with areas of bare ground, scrub and pools, as OMH on previously developed land, which is a HPI (NVC site 1).

Wood-pasture and parkland

8.7.50 To the north of Winter's Hill in Section K of the Pipeline, there is an area of wood-pasture and parkland HPI comprising blocks of lowland mixed deciduous woodland surrounded by other neutral grassland managed using grazing animals and with individual mature, over-mature and veteran trees.

Badger

8.7.51 Information on the location of badger setts is confidential, and details are given in ES Appendix 8.3 Badger CONFIDENTIAL, Volume II (Document reference 6.2, DCO Volume 6). Badger desk study results are shown spatially in Confidential ES Figure 8.12 Badger local record data within the desk study area, Volume III (Document reference 6.3, DCO Volume 6). Badger field survey results are shown spatially in Confidential ES Figure 8.13 Badger survey results, Volume III (Document reference 6.3, DCO Volume 6). This information is not to be released into the public domain.

Desk study

8.7.52 The data search returned 54 records of badger within the desk study area.

Field survey

8.7.53 The network of field boundaries, hedgerows and areas of woodland across the field study area provide suitable habitat for badger sett creation. Field surveys have identified evidence of badger across the Proposed Development indicating the presence of multiple badger clans within the field study area.

8.7.54 A total of 30 badger setts have been recorded within the field survey area, comprising three confirmed main setts, three probable main setts, six probable subsidiary setts, 14 outlier setts and four unclassified inactive setts. Of the 30 setts recorded in within the field survey area, 18 are located within the Order Limits; the remaining 12 are within 30m of the Order Limits.

8.7.55 Some areas were scoped out due to unsuitability of habitats, including areas of urban development. ES Figure 8.11 Badger field survey coverage, Volume III (Document reference 6.3, DCO Volume 6) presents the areas scoped out for field surveys.

Bats

8.7.56 Details of the desk study and field survey results for bats are detailed in ES Appendix 8.4 Bats, Volume II (Document reference 6.2, DCO Volume 6) and are shown spatially in ES Figures 8.14 to 8.33, Volume III (Document reference 6.3, DCO Volume 6).

Desk study

8.7.57 Habitats within the Order Limits provide suitability for roosting, foraging and commuting bats, including ancient woodland, broadleaved woodland, lines of trees, hedgerows, grassland, scrub and waterbodies. The Pipeline between the WRP site and Havant Thicket Reservoir is partially located within the Havant Bechstein's Bat Area while the western section of the Pipeline between the WRP site and Otterbourne WSW intersects habitat features connected to several areas of ancient woodland.

8.7.58 No SACs with bats as a qualifying feature are located within 10km of the Order Limits. Singleton and Cocking Tunnels SAC is located 15.2km north-east of the Order Limits and supports barbastelle *Barbastella barbastellus* and Bechstein's bats. The Core Sustenance Zones (CSZ) for barbastelle and Bechstein's bat are 5-7km and 3km respectively.

8.7.59 The Draft Sussex Bat SAC Planning and Landscape Enhancement Protocol [54] cites a 12km buffer referred to as a wider conservation area for Singleton and Cocking Tunnels SAC. The Havant Borough Local Plan Examination Statement Matter 4: Habitat Regulations and Mitigation Strategy document [55] states that *"whilst there is no direct evidence of a functional link between the Havant Borough population and the two Sussex SACs, it is the view of both the Council and Natural England that habitat within the Borough is highly likely to be functionally linked and therefore a robust approach to Bechstein's bat conservation is justified."* Therefore, as there is an overlap between the CSZs of barbastelle and Bechstein's bats and the wider conservation area buffer, the SAC is scoped in for potential effects within this assessment.

8.7.60 The desk study returned 11,798 records for at least 16 species of bat within 7km of the Order Limits, including records for:

1. Alcathoe
2. Barbastelle
3. Bechstein's bat
4. Brandt's bat *Myotis brandtii*

5. Brown long-eared *Plecotus auritus*
6. Common pipistrelle *Pipistrellus pipistrellus*
7. Daubenton's bat *Myotis daubentonii*
8. Greater horseshoe *Rhinolophus ferrumequinum*
9. Leisler's bat *Nyctalus leisleri*
10. Nathusius' pipistrelle *Pipistrellus nathusii*
11. Natterer's bat *Myotis nattereri*
12. Noctule *Nyctalus noctula*
13. Serotine *Eptesicus serotinus*
14. Soprano pipistrelle *Pipistrellus pygmaeus*
15. Whiskered *Myotis mystacinus*
16. Parti-coloured bat *Vespertilio murinus* (single record returned within Purbrook in 2014, approximately 1.2km north of the Order Limits)

8.7.61 Records were also returned for unidentified *Myotis*, *Nyctalus*, *Pipistrellus* and *Plecotus* species.

8.7.62 Of the 11,798 records returned, 365 were located within the Order Limits, primarily associated with Staunton Country Park and the Havant area.

8.7.63 There are 212 granted EPS mitigation licences granted for bats within 7km of the Order Limits from the last ten years. Within the Order Limits, there have been two EPS mitigation licences granted for bats; one for the destruction of a soprano pipistrelle roost and one for the destruction of a common pipistrelle and brown long-eared roost.

Field survey

8.7.64 The field survey area was split into the Bat Direct Impact Zone (BDIZ), which refers to the areas within the Order Limits that are not subject to trenchless techniques, and the Bat Indirect Impact Zone (BIIZ), which refers to a 10m buffer from the BDIZ extent within which temporary or permanent disturbance impacts may occur.

8.7.65 The ground-level tree assessments (GLTA) and aerial tree inspection surveys identified a total of 226 trees with potential roosting features (PRF) suitable for individual roosting bats (PRF-I suitability) and 63 trees with PRF suitable for multiple roosting bats (PRF-M suitability) within the BDIZ and the BIIZ. No evidence of roosting bats was identified during any of the GLTA or aerial inspection surveys.

8.7.66 Emergence surveys were carried out on ten trees with PRF-I and PRF-M suitability for roosting bats that could not have aerial tree inspections because of health and safety concerns or where features could not be fully inspected. No bat roosts were recorded within any of the ten trees.

8.7.67 Preliminary roost assessments (PRA) of 44 structures within the BDIZ were conducted. A total of 42 structures were assessed as having no suitability for roosting bats due to a lack of PRF. One structure was assessed as having low suitability for roosting bats and one structure was assessed as having high suitability for roosting bats. The PRAs did not record any evidence of roosting bats.

8.7.68 Two night-time bat walkovers (NBW) were completed at four locations across the Proposed Development, focusing on areas with the potential for significant impacts from the presence of permanent infrastructure or from habitat severance of known Annex II bat populations, Locations comprise the WRP site, Staunton Country Park, Wickham Park Golf Course and Otterbourne.

8.7.69 The majority of bat activity recorded during each of the NBWs was from common and soprano pipistrelles. Noctule was the only other species recorded at the WRP site. At Staunton Country Park, bat species recorded were common pipistrelle, noctule, *Myotis* spp. and long-eared bats. At Wickham Park Golf Course, common and soprano pipistrelle, *Myotis* spp. and noctule were recorded. At Otterbourne common and soprano pipistrelle, noctule, Leisler's, long-eared bats, *Myotis* spp. and barbastelle were recorded.

8.7.70 Static detector surveys were undertaken alongside the NBWs; these recorded eight species. Common and soprano pipistrelles, noctule, Leisler's bat, and *Myotis* spp. were regularly recorded at all four survey locations. Serotine and long-eared bats were only recorded in low numbers at Wickham Park and Otterbourne and barbastelle were only recorded at Otterbourne, albeit in relatively high numbers (57 passes at location 1 and 157 passes at location 2).

8.7.71 For HSM, an additional 36 static detectors were placed in locations identified through the HSM process within the 7km survey area and left in-situ for a minimum of ten nights. These surveys were designed to identify the presence of bat species rather than abundance. The presence of a bat species at each location was then input into the modelling process to create the HSM outputs.

8.7.72 The HSM outputs for all bat species show connectivity for bat populations along linear features expected to be used by bats, i.e. the outputs have highlighted the potential movement of bats along watercourses, hedgerows and treelines, between high suitability habitat such as woodland and waterbodies. The Order Limits provide suitable roosting, commuting and foraging habitat for a varied assemblage of bats.

8.7.73 In total, the HSM identified 21 key connective locations (KCL) spread across the Order Limits, for the following species or species groups which have been recorded within the ZoI:

1. Barbastelle
2. Bechstein's bat
3. Common pipistrelle
4. Greater horseshoe
5. Leisler's
6. Long-eared species
7. *Myotis* spp.
8. Nathusius' pipistrelle
9. Noctule
10. Serotine
11. Soprano pipistrelle

Birds

8.7.74 Details of methodology, desk study and field survey results for birds are detailed in ES Appendix 8.5 Ornithology CONFIDENTIAL, Volume II (Document reference 6.2, DCO Volume 6) and shown spatially in ES Figures 8.34 to 8.42, Volume III (Document reference 6.3, DCO Volume 6).

Desk study

8.7.75 There are four internationally designated sites, nine SSSIs and four LNR that have been designated for birds or have birds as a qualifying feature and one Important Bird and Biodiversity Area (IBA) identified within 5km of the Order Limits.

8.7.76 Statutory designated sites with birds as a qualifying feature within the desk study area included the following:

1. Solent and Dorset Coast SPA
2. Solent and Southampton Water SPA and Ramsar site
3. Portsmouth Harbour SPA, Ramsar and SSSI site
4. Chichester and Langstone Harbour SPA and Ramsar site

8.7.77 A total of 118 bird species have been recorded within 2km of the Order Limits from 2014 to 2024. These HBIC bird records consist of:

1. 45 Schedule 1 species
2. 40 UK Birds of Conservation Concern (BoCC) red listed species
3. 43 Annex 1 species
4. 20 S41 listed species

8.7.78 Data was also accessed and reviewed from the BTO including a BTO Data Report and WeBS data.

8.7.79 The Proposed Development overlaps with hedgerows, treelines, small areas of woodland, arable fields, amenity grassland and a number of watercourses that are all suitable supporting habitat for birds.

Field survey

Breeding bird surveys

8.7.80 Breeding bird habitat suitability walkovers identified supporting habitat for 27 target species including hobby *Falco subbuteo* (57 sites identified), firecrest *Regulus ignicapilla* (24 sites identified), barn owl (57 sites identified) and red kite *Milvus milvus* (29 sites identified). Of note, these sites included four occupied barn owl nest sites and one active hobby nest site. The occupied barn owl nest sites were not surveyed during the Stage 2 investigative and Stage 3 nest verification surveys for barn owl.

8.7.81 Kingfisher surveys were completed along the River Meon, River Itchen, River Hamble and unnamed watercourses. Of the 28 sites surveyed, 25 were identified as suitable to support foraging kingfisher, four sightings were recorded and no burrows or sites suitable to support nesting activity were found.

8.7.82 Barn owl Stage 2 investigative field survey and Stage 3 nest verification surveys were undertaken on ten buildings and 11 trees. These surveys identified evidence of barn owl in addition to the active nest sites. Of the buildings surveyed, one active

roost site, two potential nest sites and one temporary roost site was identified. Of the trees surveyed, one was a temporary rest site and six were potential nest sites. The remaining six buildings and four trees were deemed unsuitable for nesting barn owl upon further investigation.

Non-breeding bird surveys

8.7.83 Non-breeding bird surveys undertaken included high tide and low tide WeBS and walkover surveys.

8.7.84 During high tide surveys 42 wetland bird species/subspecies were recorded within the study area, including 12 of the 16 qualifying species of the Chichester and Langstone Harbours SPA. During low tide surveys 46 wetland bird species or subspecies were recorded within the study area, including 15 of the 16 qualifying species of the Chichester and Langstone Harbours SPA. Two species (herring gull *Larus argentatus* and black-headed gull *Chroicocephalus ridibundus*) were recorded in low numbers in Section E of the Pipeline (in the footprint of SWBGS site W03G) and 28 species were recorded at Section M of the Pipeline.

Hazel dormouse

8.7.85 Details of the methodology, desk study and field survey results for hazel dormouse are detailed in ES Appendix 8.6 Hazel dormouse, Volume II (Document reference 6.2, DCO Volume 6) and shown spatially in ES Figures 8.43 to 8.45, Volume III (Document reference 6.3, DCO Volume 6).

Desk study

8.7.86 The desk study returned 52 records of hazel dormouse from the period 2014 to 2024.

Field survey

8.7.87 Following field surveys undertaken for the Proposed Development and the desk study result, hazel dormouse is considered present or likely present in 25 of the 28 sites surveyed.

8.7.88 Likely absence of hazel dormouse has been assumed at three sites where no signs of the species were recorded during field surveys. Additionally, habitats at these sites are sub-optimal, they are adjacent to areas of urban development and there is poor habitat connectivity to the wider landscape.

Riparian mammals

8.7.89 Details of the methodology, desk study and field survey results for riparian mammals are detailed in ES Appendix 8.7 Riparian mammals, Volume II (Document reference 6.2, DCO Volume 6) and shown spatially in ES Figures 8.46 and 8.47, Volume III (Document reference 6.3, DCO Volume 6).

American mink

8.7.90 The desk study returned six records of American mink *Neovison vision* within the desk study area from the past decade along the Rivers Hamble and Itchen. Older

records dating to 2009 and 2010 were noted along the River Meon. No incidental field signs of American mink were identified during the riparian mammals field surveys. However, mink monitoring rafts were observed along the River Meon during the field surveys, suggesting continued presence in this catchment.

Otter

Desk study

8.7.91 Otter records returned for the desk study originated from the Itchen, Hamble, Meon and Wallington Rivers as well as Fisher's Pond and Bow Lake and various smaller watercourses in the upper reaches of these rivers. The closest and most abundant records were those returned for the Itchen, River Hamble, Fisher's Pond and Bow Lake.

8.7.92 Otter surveys were completed on behalf of Portsmouth Water for the Havant Thicket Reservoir by ECOSA in 2018 [56], Atkins in 2023 [57] and SWECO in 2024 [58] and 2025 [59]. No evidence of otter was reported from 2018 surveys [56], but a spraint was recorded from Riders Lane Stream in 2023 [57]. Spraints, footprints and a potential otter resting site were reported along the Hermitage Stream from the 2024 surveys [58]. The potential resting site did not show evidence of occupation at the time of discovery [58] or during subsequent monitoring [59], but was associated with recent field evidence in the form of spraint and footprints along a stretch of Hermitage Stream approximately 15m south of the potential location for temporary construction compound B1-3 and the pipeline. The other location of positive otter activity (spraint only) was further north along the Hermitage Stream, approximately 1.33km from the northern terminus of the pipeline at its closest point [58].

8.7.93 The water vole reintroduction programme on the River Meon has been credited by the SDNPA [60] for the success of otter, with three breeding females reportedly present on the river and its tributaries.

Field surveys

8.7.94 Widespread evidence of otter was recorded within the field survey area. Field signs recorded included spraints, footprints and permanent and temporary resting sites. In-combination with the desk study findings, presence of otter was confirmed in the following locations:

1. Hermitage Stream, including resting site
2. Riders Lane Stream
3. Southwick Park Lake
4. River Wallington, including resting sites (presence assumed along connected channels and upper reaches)
5. River Meon (presence assumed along connected channels and upper reaches)
6. Watercourse south of Winters Hill and to the west of the town Bishop's Waltham
7. River Hamble (presence assumed along connected channels and upper reaches)
8. Bow Lake

9. River Itchen (presence assumed along connected channels and upper reaches)
10. Watercourse north of Kiln Lane, Otterbourne

Water vole

Desk study

8.7.95 Most water vole records for the desk study originated from the River Itchen, with two originating from the Langbrook Stream (approximately 1.2km east of the WRP site in Brockhampton).

8.7.96 A reintroduction program on the River Meon has released over 2,800 water vole into the Meon Valley since 2013. Project monitoring [60] has shown that water vole has become well-established along the river and its tributaries.

Field surveys

8.7.97 A total of 29 ditches, ten ponds and drains and 33 watercourses features were subject to water vole field surveys. Water vole presence was not identified in any ditches, ponds or drains that were subject to survey.

8.7.98 Evidence of water vole was recorded on seven watercourses within the study area. All evidence was found within the Proposed Development component Pipeline between the WRP site and Otterbourne WSW, Section K and L. Water vole presence was confirmed by presence of feeding remains or latrines identified along the River Meon, a tributary of the River Hamble and Bow Lake (a tributary of the River Itchen).

8.7.99 No recent evidence of water vole was reported from surveys completed in 2018 [61] or 2023-2024 [57] on behalf of Portsmouth Water for the Havant Thicket Reservoir. Generally, waterbodies and watercourses in this locality were reported to be sub-optimal for water vole. It is considered unlikely that water vole would commute from the nearest known population at Langbrook Stream into the area around Havant Thicket Reservoir.

Other notable fauna

8.7.100 Details of the desk study and field survey results for other notable fauna are detailed in ES Appendix 8.8 Other notable fauna, Volume II (Document reference 6.2, DCO Volume 6) and shown spatially in ES Figures 8.48 to 8.50, Volume III (Document reference 6.3, DCO Volume 6).

Desk study

Brown hare

8.7.101 The data search returned 12 brown hare records within the desk study area, of which two were within the ZoI. The network of arable fields and grassland located across the Order Limits and the surrounding area, aside from Budds Farm WTW, the WRP site, Bedhampton Springs, Havant Thicket Reservoir and the Pipelines between the WRP site and Havant Thicket Reservoir are suitable to support this species.

Common reptile species

8.7.102 The data search of the desk study area returned 12 adder *Vipera berus* records (none within the ZoI), 22 records of common lizard *Zootoca vivipara* (two records within the ZoI), 31 records of grass snake *Natrix helvetica* (three records within the ZoI) and 117 records of slow worm *Anguis fragilis* (none within the ZoI). The network of habitats such as arable field margins, grasslands and residential gardens located across the Order Limits, and the surrounding area, are suitable to support common reptile species.

8.7.103 A reptile survey undertaken at the WRP site for a separate development under planning application APP/21/00189 [62] found that the site supported a 'good' population of slow worm according to the definitions provided by Froglife [63]. The population of slow worm located at the WRP site is isolated from the surrounding habitat by the A27 Havant Bypass, Harts Farm Way and the Hermitage Stream.

Common toad

8.7.104 The data search returned 104 records of common toad within the desk study area. The network of hedgerows, woodland, ponds and residential gardens located across the Order Limits, and the surrounding area, are suitable to support this species.

European hedgehog

8.7.105 The data search returned 310 records of hedgehog within the desk study area, of which none were located within the ZoI. The network of hedgerows, woodland, grassland and residential gardens located across the Order Limits, and the surrounding area, are suitable to support this species.

Great crested newt

8.7.106 The data search returned no records of GCN within the desk study area. In addition, HSI surveys concluded that there was an absence of suitable breeding habitat and the eDNA survey concluded that GCN were likely absent. Therefore, GCN are not considered further.

Harvest mouse

8.7.107 The data search returned eight records of harvest mouse within the desk study area, of which one was located within the ZoI. The network of hedgerows, tall grassland, field margins and road verges located across the Order Limits, and the surrounding area, are suitable to support harvest mouse.

Terrestrial invertebrates

8.7.108 The data search returned 3,042 records of terrestrial invertebrates comprising 229 notable species, of which 44 have been identified within the ZoI (35 within the Order Limits). The table of species are listed in ES Appendix 8.8 Other notable fauna, Volume II (Document reference 6.2, DCO Volume 6). Habitats suitable for terrestrial invertebrates have been identified throughout the Order Limits. These included woodland, grassland, hedgerows, waterbodies, watercourses and

residential gardens. Given this and the large numbers of historic records they are considered widespread in the local area. As a result of the relatively low number of notable species (35 across the whole of the Order Limits), it is considered unlikely that any of these habitats support valuable assemblages of terrestrial invertebrates.

Freshwater biodiversity features

8.7.109 Details of the desk study and field survey results for freshwater ecology are detailed in ES Appendix 8.9 Freshwater ecology, Volume II (Document reference 6.2, DCO Volume 6) and shown spatially in ES Figures 8.52 to 8.57, Volume III (Document reference 6.3, DCO Volume 6). The watercourses and watercourse crossings where the Proposed Development interacts with the freshwater environment in the Order Limits in shown in shown in ES Figures 8.51, Volume III (Document reference 6.3, DCO Volume 6).

8.7.110 This section summarises the freshwater ecology baseline within the ZoI of the Proposed Development. Baseline conditions for the following aquatic ecological receptors are assessed as they are potentially sensitive to impacts arising from the Proposed Development:

1. Aquatic habitats
2. Freshwater fish
3. Macrophytes (aquatic plants)
4. Phytobenthos (algae, including diatoms, that grow attached to submerged surfaces)
5. White-clawed crayfish
6. Aquatic macroinvertebrates

8.7.111 The Proposed Development spans a number of river catchments, including Main rivers, Ordinary Watercourses and ditches as identified in the habitat descriptions given in paragraphs 8.7.34 to 8.7.36. A description of the freshwater ecology baseline for the watercourses within the study area is presented on a catchment-by-catchment basis below.

Riders Lane Stream catchment

Overview

8.7.112 Riders Lane Stream is the main tributary of Hermitage Stream and drains the area that will be occupied by Havant Thicket Reservoir. The headwaters of Riders Lane Stream rise as a series of rivulets in the woodlands of Havant Thicket and Hammond Hands Copse to the east of Leigh Park Lake in Staunton Country Park. The two main arms of these headwater sub-tributaries dissect Thicket Lawn and join just north of Middle Park Way, flowing south and west through Great Copse to Dunsbury Way, then south and east via Riders Lane/Purbrook Way to the confluence of Hermitage Stream at Corhampton Crescent.

8.7.113 The main sub-tributaries of Riders Lane Stream display some intermittence (i.e. watercourses that experience profound changes in flow conditions, including the cessation of flow and, typically, the partial or complete loss of surface water during dry periods). Aquatic habitat walkover surveys characterised the upstream extent

of Riders Lane Stream as having no perceptible flow with areas of slow flowing run and glide habitat type observed further downstream towards the confluence with Hermitage Lane Stream.

8.7.114 Downstream of the sub-tributary confluence, Riders Lane Stream is culverted beneath Middle Park Way Road before it joins the Hermitage Stream. Substrate was predominantly cobble in this section, with some gravel and finer sediments (largely clays). Dense bank top tree growth heavily shaded the channel. Consequently, in-channel vegetation growth was largely absent.

Fish

8.7.115 There are no current or historical EA fish monitoring sites on Riders Lane Stream. Surveys undertaken for the Proposed Development at a location below the confluence of the two headwater sub-tributaries and within Staunton Country Park recorded three fish species, including two of conservation: bullhead *Cottus gobio* (Annex II species), European eel *Anguilla anguilla* (S41 species) and three-spined stickleback *Gasterosteus aculeatus*.

Macrophytes and phytobenthos

8.7.116 No macrophyte species of conservation value were identified in existing records for Riders Lane Stream or during a survey undertaken for the Proposed Development. The INNS Himalayan balsam and parrot's feather *Myriophyllum aquaticum* have both been recorded within the catchment. The macrophyte Ecological Quality Ratio (EQR) for the survey site on Riders Lane Stream corresponds to 'Poor' status, likely due to low taxonomic and functional diversity.

8.7.117 Riders Lane Stream phytobenthic community has previously been monitored by the EA. Surveys were also undertaken for the Proposed Development. Phytobenthos EQR values correspond to 'Moderate' to 'High' status, indicating that the watercourse was not nutrient enriched.

White-clawed crayfish

8.7.118 The desk study did not identify any white-clawed crayfish records for Riders Lane Stream. Surveys undertaken for the Proposed Development concluded that the habitat was not suitable to support the species.

Aquatic macroinvertebrates

8.7.119 No aquatic macroinvertebrate data were available from the EA for the Riders Lane Stream catchment and no species of conservation value were identified during surveys undertaken for the Proposed Development. The INNS Jenkins' spire snail *Potamopyrgus antipodarum* was recorded.

8.7.120 The Lotic-invertebrate Index for Flow Evaluation (LIFE) EQR indicates that the macroinvertebrate community was stressed by low flow conditions. The Proportion of Sediment-sensitive Invertebrates (PSI) EQR indicates that the macroinvertebrate community was stressed by fine sediment deposition. The overall Whalley-Hawkes-Paisley-Trigg (WHPT) EQR values corresponded to 'Bad' status, indicating that the macroinvertebrate community was severely changed from natural conditions as a result of human activity.

Catchment interactions with the Proposed Development

8.7.121 The construction of the Proposed Development will not impact the watercourse in the Riders Lane Stream catchment, but the watercourse will receive compensatory flows from Havant Thicket Reservoir once operational.

Hermitage Stream catchment

Overview

8.7.122 The Hermitage Stream catchment is predominantly urban and the channel is constrained by artificial infrastructure, having undergone significant changes through river management during the past 100 years. Riders Lane Stream and Bidbury Mead Stream are the main tributaries of Hermitage Stream and at Bell's Copse, several Ordinary Watercourses drain from east to west to join Park Lane Stream, another tributary of Hermitage Stream. The eastern side is drained by Durrants Stream, a tributary of the River Lavant. Hermitage Stream (GB107042016370) is classified as having a WFD status of 'Moderate' overall ecological potential for Cycle 3 (2019 to 2022).

8.7.123 The aquatic habitat walkover surveys undertaken for the Proposed Development characterised the surveyed reach as heavily modified. Several grey water outfalls and weirs were recorded. Dominant substrate types were gravel, cobble and silt, with areas of concrete in the vicinity of Purbrook Way and Middle Park Way road bridges.

Fish

8.7.124 A total of three fish species were identified in the Hermitage Stream catchment between existing EA monitoring records and surveys undertaken for the Proposed Development, namely European eel (S41 species), bullhead (Annex II species) and three-spined stickleback.

Macrophytes and phytobenthos

8.7.125 No macrophyte species of conservation value were identified in existing records for Hermitage Stream catchment or during a survey undertaken for the Proposed Development. The INNS Himalayan balsam was recorded in multiple locations in the Hermitage catchment in the desk study data. The macrophyte EQR for the survey site corresponds to 'Poor' status, likely due to low taxonomic and functional diversity and high filamentous algae cover.

8.7.126 Phytobenthos surveys undertaken for the Proposed Development identified average phytobenthos EQR values corresponding to 'Moderate' to 'Good' status, indicating that the phytobenthic community may be impacted by nutrient enrichment at certain locations within the catchment.

White-clawed crayfish

8.7.127 The desk study did not identify any white-clawed crayfish records for the Hermitage Stream catchment. Surveys undertaken for the Proposed Development returned a negative result for the species.

Aquatic macroinvertebrates

8.7.128 No macroinvertebrate species of conservation value were identified in either the desk study records or during surveys undertaken for the Proposed Development. Two INNS were recorded, Jenkins' spire snail and a species of planarian flatworm *Planaria torva.*

8.7.129 The LIFE and PSI EQRs for Hermitage Stream catchment indicate that the macroinvertebrate community at some sites was stressed by low flows and fine sediment deposition. The overall WHPT EQRs range from 'Bad' to 'Moderate' across the three survey sites, indicating a moderate to severe anthropogenic impact on the macroinvertebrate community.

Catchment interactions with the Proposed Development

8.7.130 The Proposed Development includes four watercourse crossings in the Hermitage Stream catchment. Crossing OPT1_WCX_B2_001 and OPT1_WCX_C_003 are trenchless crossings where the pipeline crosses the Mill Lane tributary and the main channel of the Hermitage Stream respectively. The River Condition Assessment (RCA) determined a final condition class of Fairly Poor for Mill Lane tributary. As the Hermitage Stream watercourse crossing is within the tidal reach of the Hermitage Stream, no RCA was conducted. COMP_WCX_C_001 is related to temporary construction compound C-1 and located on a ditch within Budds Farm WTW, it is not hydrologically connected to the Hermitage Stream. COMP_WCX_C_006 is related to the construction of the SuDS outfall at the WRP site on the Hermitage Stream, the final condition class for the nearest RCA site was Moderate. The Hermitage Stream will also receive compensatory flows from the operational Havant Thicket Reservoir.

River Wallington catchment

Overview

8.7.131 The River Wallington is formed at the confluence of the Upper Wallington and Potwell Tributary. It flows south-south-west for approximately 13km before discharging to Portsmouth Harbour. The catchment is predominantly rural with limited urban areas to the south and the channel appears to be largely unmodified.

8.7.132 The aquatic habitat walkover surveys undertaken for the Proposed Development identified the main habitat types as glide and shallow run, with occasional pools and riffle also present. The substrate was a mixture of gravel, cobble and silt. Broad-leafed trees were present on the bank top throughout the surveyed reach, which provided dappled shading to the channel. Vegetation growth was observed in-channel where shading was low. Large woody debris was abundant in the channel. An EA gauging weir with eel pass was recorded upstream of the M27 motorway.

8.7.133 The River Wallington below Southwick Tributary (GB107042016360) was classified as having 'Moderate' overall WFD ecological status for Cycle 3 (2019 to 2022).

Fish

8.7.134 Three fish species of conservation value were identified in the River Wallington catchment between existing EA monitoring records and surveys undertaken for the Proposed Development, namely European eel (S41 species), bullhead (Annex II species) and brown/sea trout *Salmo trutta* (S41 species). The survey results revealed a diverse assemblage of common fish species.

Macrophytes and phytobenthos

8.7.135 No macrophyte species of conservation value were identified either in existing records for the catchment or during surveys undertaken for the Proposed Development. The INNS Himalayan balsam was widespread throughout the catchment. Macrophytes EQRs correspond to 'Moderate' to 'Poor' status, likely due to low taxonomic and functional diversity, and high filamentous algae cover.

8.7.136 The phytobenthos EQRs from EA monitoring data and surveys undertaken for the Proposed Development correspond to 'Bad' to 'Good' status, with the majority of sites classified as 'Moderate'. The results indicate that the phytobenthic community was moderately impacted by nutrient enrichment.

White-clawed crayfish

8.7.137 The desk study did not identify any white-clawed crayfish records for the River Wallington catchment. Surveys undertaken for the Proposed Development returned a negative result for the species.

Aquatic macroinvertebrates

8.7.138 The Nationally Scarce purple dun mayfly *Paraleptophlebia cincta* was identified in existing EA records for the River Wallington catchment. Three INNS have been recorded in the catchment, including Jenkins' spire snail, an amphipod shrimp *Crangonyx pseudogracilis/floridanus* and the brown planarian flatworm *Girardia tigrine.*

8.7.139 The average LIFE and PSI EQRs for the catchment indicate that macroinvertebrate communities were not stressed by either low flows or fine sediment deposition. The overall WHPT EQRs range from 'Bad' to 'High' status. The majority correspond to 'Good' or 'High' status, indicating low anthropogenic impact on macroinvertebrate communities within the River Wallington catchment.

Catchment interactions with the Proposed Development

8.7.140 Three watercourses in the Wallington catchment will be crossed by the Proposed Development. OPT1_WCX_F_001 and OPT1_WCX_F_002 are open-cut pipeline crossings located on dry, terrestrialised field drains that were not subjected to aquatic ecology surveys. OPT1_WCX_F_004 is a trenchless pipeline crossing located on the River Wallington and was assigned a final condition class of Moderate.

River Meon catchment

Overview

8.7.141 The River Meon rises from chalk springs on the South Downs. It flows southward through the SDNP and Titchfield Haven SSSI, before discharging to the Solent. The River Meon is a chalk stream HPI and is referred as the River Meon Compensatory SAC in this report due to the Applicant's compensatory drought habitat being located in the catchment. The qualifying features of the site include chalk stream habitat and Atlantic salmon. The River Meon (GB107042016640) is classified as having 'Moderate' overall WFD ecological status for Cycle 3 (2019 to 2022).

8.7.142 The aquatic habitat walkover surveys on the main channel identified areas of run, glide and riffle habitat. The dominant substrate types were cobble, gravel and sand with some marginal silt deposits. The channel was shaded in areas by bank top woodland. In more open areas, dense stands of the INNS Himalayan balsam were observed. The habitat was considered suitable to support salmonid fry and juvenile lamprey.

Fish

8.7.143 Five fish species of conservation value were identified between the EA records for the catchment and surveys undertaken for the Proposed Development, namely brown/sea trout (S41 species), bullhead (Annex II species), European eel (S41 species), brook lamprey (Annex II and S41 species) and Atlantic salmon (Annex II and S41 species). The records revealed a relatively diverse assemblage of common fish species. Brook lamprey and Atlantic salmon are interest features of the River Meon Compensatory SAC.

Macrophytes and phytobenthos

8.7.144 No macrophyte species of conservation value were identified either in existing records for the catchment or during surveys undertaken for the Proposed Development. A number of INNS have been recorded, including Himalayan balsam, orange balsam *Impatiens capensis*, Canadian pondweed *Elodea canadensis* and New Zealand pigmyweed *Crassula helms*ii. Macrophyte EQRs correspond to 'Good' status.

8.7.145 Phytobenthos EQR values derived from EA monitoring data and from surveys undertaken for the Proposed Development ranged from 'Moderate' to 'High' status, indicating an up to moderately adverse impact on phytobenthic communities due to nutrient enrichment.

White-clawed crayfish

8.7.146 The desk study did not identify any white-clawed crayfish records for the River Meon catchment. Surveys undertaken for the Proposed Development returned a negative result for the species.

Aquatic macroinvertebrates

8.7.147 A number of species of conservation value were identified between the existing records for the River Meon catchment and surveys undertaken for the Proposed Development. Six Nationally Scarce species were identified, namely a riffle beetle *Riolus subviolaceus*, two species of caddisfly *Allotrichia pallicornis* and *Notidobia ciliaris*, the purple dun mayfly, a ram's horn snail *Gyraulus laevis* and the blue-winged olive mayfly *Baetis atrebatinus*. Two Nationally Notable species were identified; a trumpet-net caddisfly *Tinodes unicolor* and banded general soldier fly *Stratiomys potamida*. One Nationally Rare species was identified, a mayfly *Caenis pseudorivulorum*. Although southern damselfly was not recorded during surveys undertaken for the Proposed Development and no existing records were identified, this species has been highlighted through discussion with NE and the EA as a potential interest feature of the River Meon Compensatory SAC and therefore its potential presence is assumed in this catchment.

8.7.148 Three INNS have been recorded in the River Meon catchment, including Jenkins' spire snail, the amphipod shrimp *Crangonyx pseudogracilis/floridanus* and the brown planarian flatworm.

8.7.149 The average LIFE and PSI EQRs indicate that macroinvertebrate communities within the River Meon catchment were not stressed by either low flows or fine sediment deposition. The overall WHPT EQRs range from 'Bad' to 'High' status.

Catchment interactions with the Proposed Development

8.7.150 There are two options for trenchless construction in Section G at the River Meon, with five potential trenchless watercourse crossings proposed in the Meon catchment; only one of these options would be developed. A combination of these crossings will be required depending which pipeline route option is developed. OPT1_WCX_G_003 and OPT1_WCX_G_010 are both located on the Main River Meon, the RCA assigned a final condition class of Moderate for the nearest survey site. OPT1_WCX_G_004, OPT1_WCX_G_005 and OPT1_WCX_G_011 are located on tributary channels in the south and west of Wickam WTW that are in direct hydrological continuity with the River Meon. The ditch condition assessment resulted in a classification of Poor for this stream.

8.7.151 One watercourse is proposed for open-cut construction in the Meon catchment, a linear drainage ditch which runs along the entrance driveway to Wickam WTW and is hydrologically connected to the River Meon. Crossings OPT1_WCX_G_008 and ALTE_WCX_G_006 are both located on this watercourse, the latter included as an alternative route option. It exhibits low flows and is potentially dry for summer and autumn. The watercourse was indicated in Poor condition in the ditch condition assessment survey in May 2024; no macrophytes or aquatic vegetation were present. Although currently unsuitable for significant fish presence, given its direct connectivity to the River Meon Compensatory SAC, the possibility of this ditch being used in the future by the fish species of the designated site has been considered in the assessment. The fish assemblage of the River Meon Compensatory SAC is of very high importance given the presence of the Annex II species Atlantic salmon. Macroinvertebrate surveys in 2024 indicated a common invertebrate assemblage of low importance only, with no sensitive or rare aquatic or semi-aquatic species found. Habitat suitability assessments in 2024 also found

this watercourse to be unsuitable for southern damselfly and white-clawed crayfish are assumed absent given the lack of recent records and lack of suitable habitat.

8.7.152 The crossing indicated at COMA_WCX_G_001 is not a pipeline crossing under a watercourse but relates to access of temporary construction compound G-1 and G-2. It is located on a field drain that was not subjected to aquatic ecology surveys and was assumed to be in Good condition.

South East coastal catchment

Overview

8.7.153 The South East coastal catchment encompasses a large number of minor watercourses that drain to the tidal reach of the River Hamble, which ultimately discharges to Southampton Water. The north and eastern parts of the catchment are largely rural, and the area south of the M27 motorway is mostly urban. Watercourses within the South East coastal catchment that are relevant to the Proposed Development include Curbridge Creek and Shawford's Lake Stream.

8.7.154 An aquatic habitat walkover survey undertaken on Curbridge Creek indicated the watercourse was largely dry and overgrown with terrestrial vegetation in the upper reach and wetted but with no perceptible flow in the lower reach. The substrate comprised of clay, cobble and gravel.

8.7.155 An aquatic habitat walkover surveys undertaken on Shawford's Lake Stream indicated a watercourse largely dry with a few isolated pools of water. The stretch of Shawford's Lake Stream that flows through the Meon Valley Golf and Country Club was observed to be heavily modified, with boarded riverbanks.

Fish

8.7.156 No fish monitoring data were available from the EA for either Curbridge Creek or Shawford's Lake Stream. A single fish survey was undertaken on Shawford's Lake Stream for the Proposed Development. Three-spined stickleback was the only species recorded.

Macrophytes and phytobenthos

8.7.157 No existing macrophyte records were identified for South East coastal catchment by the desk study. One survey was undertaken on Shawford's Lake Stream for the Proposed Development. No species of conservation value or INNS were recorded. The macrophyte EQR corresponds to 'Poor' status, potentially due to the effects of nutrient enrichment on taxonomic and functional diversity.

8.7.158 Phytobenthos surveys undertaken for the Proposed Development returned average EQRs ranging from 'Moderate' to 'Good' status, suggesting that phytobenthic communities were moderately impacted by nutrient enrichment at certain locations in the catchment.

White-clawed crayfish

8.7.159 The desk study did not identify any white-clawed crayfish records for the South East coastal catchment. Surveys undertaken for the Proposed Development returned a negative result for the species.

Aquatic macroinvertebrates

8.7.160 No species of conservation value were identified in the South East coastal catchment, either in existing macroinvertebrate records or during surveys undertaken for the Proposed Development. The INNS Jenkins' spire snail has been recorded in the catchment.

8.7.161 The average LIFE and PSI EQRs suggest that macroinvertebrate communities throughout the catchment were stressed by low flow conditions and fine sediment deposition. The overall WHPT EQR values correspond to 'Bad' status for all sites, indicating that the macroinvertebrate communities were severely impacted by human activity.

Catchment interactions with the Proposed Development

8.7.162 There are five open-cut watercourse crossings proposed within the South East coastal catchment. OPT1_WCX_H_001 is located on Curbridge Creek, a small perennial Ordinary Watercourse and tributary of the River Hamble. The surveyed reach at this watercourse was indicated in Poor condition during the ditch condition assessment survey in May 2024, exhibits intermittent drying and thus is of low suitability for fish given its hydrological state. The macroinvertebrate assemblage in this catchment is of low importance, with no rare or sensitive species indicated in the desk study or field survey data. White-clawed crayfish are assumed absent from these watercourses given the lack of recent records and lack of suitable habitat.

8.7.163 Four open-cut crossings are associated with Shawford's Lake Stream, a tributary of the River Hamble. Shawford's Lake is an Ordinary Watercourse which drains a large area of the coastal catchment and joins the Main River Hamble at Curbridge. Two open-cut watercourse crossings are proposed on upstream tributaries of this watercourse at WCX_J_004 and WCX_J_005, one crossing at an upstream drain west of Little Bull Lane at WCX_J_002 and one at a connecting ditch WCX _J_001. The portion of the watercourse crossed is the upstream extent of Shawford's Lake where intermittent drying is evident and the ditch at WCX_J_001 is likely permanently dry. Condition assessments undertaken in 2024 indicated all surveyed reaches in Poor condition. A fish survey in 2023 identified only three-spined stickleback in this watercourse. The macroinvertebrate assemblages in this catchment are of low importance, with no rare or sensitive species indicated in the desk study or field survey data. White-clawed crayfish are assumed absent from these watercourses given the lack of recent records and lack of suitable habitat.

Main River Hamble catchment

Overview

8.7.164 The River Hamble rises to the north of Bishops Waltham, on the outskirts of the SDNP. It is distinct from the Upper Hamble catchment, which is the area upstream of the Moors Stream confluence. Several other tributaries join the main stem of the River Hamble between the Moors Stream confluence and the town of Botley, downstream of which the river is tidal and navigable for approximately 10km, before discharge into Southampton Water and the Solent.

8.7.165 An aquatic habitat walkover survey on the Main River Hamble indicated a reach that was flowing at the time of survey, although upstream tributaries were dry. The habitat was observed to be heterogenous in nature, comprising run, riffle and glide habitat type. The dominant substrates throughout the reach were cobble, gravel and sand, with some marginal silt deposits. Several areas of suitable juvenile lamprey habitat were identified.

8.7.166 The catchment is mostly rural with the main urban areas located in the south of the catchment. The Main River Hamble (GB107042016250) was assessed as having 'Moderate' overall WFD ecological status for Cycle 3 (2019 to 2022).

Fish

8.7.167 Four fish species of conservation value were identified in EA monitoring records for the Main River Hamble catchment, namely brown/sea trout (S41 species), bullhead (Annex II species), European eel (S41 species) and brook lamprey (Annex II and S41 species). A range of other common fish species have also been recorded in the catchment.

Macrophytes and phytobenthos

8.7.168 No macrophyte species of conservation value were identified either in the desk study records or during a survey undertaken for the Proposed Development. Records from HBIC indicate the presence of the INNS Himalayan balsam within the catchment. The macrophyte EQR corresponds to 'Good' status, likely due to relatively high functional diversity.

8.7.169 Phytobenthos surveys were undertaken at one site within the catchment for the Proposed Development. The average EQR value corresponds to 'High' status, indicating that the site was not significantly impacted by nutrient enrichment.

White-clawed crayfish

8.7.170 The desk study did not identify any white-clawed crayfish records for the Main River Hamble catchment. Surveys undertaken for the Proposed Development returned a negative result for the species.

Aquatic macroinvertebrates

8.7.171 One Nationally Scarce species, the long-horned soldier fly *Vanoyia tenuicornis*, and one Nationally Notable species, the diving beetle *Nebrioporus depressus*, were identified in the EA macroinvertebrate records for the catchment. Two INNS were also identified, Jenkins' spire snail and the amphipod shrimp *Crangonyx pseudogracilis/floridanus*.

8.7.172 The LIFE and PSI EQRs indicate that macroinvertebrate communities were generally not stressed by either low flow conditions or fine sediment deposition. The overall WHPT EQR values range from 'Poor' to 'High' status.

Catchment interactions with the Proposed Development

8.7.173 One trenchless watercourse crossing (OPT1_WCX_K_002) is proposed at the Main River Hamble, at its confluence with Moors Stream. The nearest RCA

reaches to the crossing location on the River Hamble were assigned a final condition class of Fairly Poor to Moderate.

Upper Hamble catchment

Fish

8.7.174 Between the existing EA fish monitoring data and the Proposed Development survey results, four fish species of conservation value were identified, namely brown/sea trout (S41 species), bullhead (Annex II species), European eel (S41 species) and brook lamprey (Annex II and S41 species). The only other fish species recorded within the Upper Hamble catchment was three-spined stickleback.

Macrophytes and phytobenthos

8.7.175 No macrophyte species of conservation value were identified during the desk study or surveys undertaken for the Proposed Development. The INNS Himalayan balsam and New Zealand pigmyweed were identified in HBIC records for the catchment. The macrophyte EQRs correspond to 'Moderate' status.

8.7.176 Phytobenthos surveys undertaken for the Proposed Development on the Wintershill Tributary of the Upper Hamble identified average EQRs corresponding to 'Good' to 'High' status, indicating that the tributary was not significantly impacted by nutrient enrichment.

White-clawed crayfish

8.7.177 The desk study did not identify any white-clawed crayfish records for the Upper Hamble catchment. Surveys undertaken for the Proposed Development returned a negative result for the species.

Aquatic macroinvertebrates

8.7.178 Five Nationally Scarce species were identified between EA macroinvertebrate monitoring data and Proposed Development survey results, including a true fly *Dixa maculata*, two caddisfly *Potamophylax rotundipennis* and *Limnephilus bipunctatus*, red-legged moss beetle *Hydraena rufipes* and nut orb mussel *Sphaerium rivicola*. The INNS Jenkins' spire snail was also recorded in the catchment.

8.7.179 The LIFE and PSI EQRs indicate that the macroinvertebrate communities were not stressed by low flow conditions or fine sediment deposition. The overall WHPT EQR values range from 'Bad' to 'High'.

Catchment interactions with the Proposed Development

8.7.180 The open-cut crossing OPT1_WCX_K_001 is located on the Wintershill tributary of the River Hamble. It is an Ordinary Watercourse and mostly dry or ponded in Spring, with little to no perceptible flow observed or limited to isolated pools. A nearby reach of the tributary was assigned a final condition class of 'Fairly Poor' by RCA. The watercourse is of low suitability for fish given its hydrological state. Macroinvertebrate surveys in 2024 identified a community of high conservation

value, with a Community Conservation Index (CCI) score of 26.83. The high CCI score is due to the presence of the Nationally Scarce caddisfly larvae *Phacopteryx brevipennis*, a species that requires shallow, temporary aquatic conditions. White-clawed crayfish are assumed absent from this catchment.

8.7.181 The crossing indicated at OPT1_WCX_K_008 is not a pipeline crossing but indicates where the Order Limits extend over a watercourse under the existing access road at Winters Hill. No works are proposed to this existing access road. However, it is included in the Order Limits to ensure the Applicant has sufficient rights to use this access road. As such no impacts are considered likely on this watercourse.

Horton Heath Stream catchment

Overview

8.7.182 The Upper Hamble catchment drains an area upstream of the River Hamble confluence with Moors Stream. There are two primary watercourses in the catchment, the eastern branch which drains the ridge of high ground above Bishop's Waltham, and the western channel which flows to the south of Bishop's Waltham from Wintershill before discharging to the main River Hamble south of Tangier Farm. The upper part of the catchment encompasses a large area of urban development. The rest of the catchment is predominantly rural with mixed farming land use.

8.7.183 At the time of the aquatic habitat walkover survey, the main stem of the river was mainly dry with isolated pools of no perceptible flow. The banks were heavily poached by livestock, and the channel was heavily shaded by mature trees on the bank top. The Upper Hamble (GB107042016280) was classified as being of 'Moderate' overall WFD ecological status for Cycle 3 (2019 to 2022).

8.7.184 Horton Heath Stream rises at Lower Upham and flows in a generally southerly direction before joining the Main River Hamble. The catchment is predominantly rural, with areas of riparian woodland and urban development. The aquatic habitat walkover survey covered a reach on the main stem of Horton Heath Stream and a tributary. The surrounding land use was predominantly agricultural. At the time of survey, water levels were low, sections of both watercourses were observed to be dry or containing pooled water with no perceptible flow. Substrate was predominantly silt and clay. The INNS floating pennywort *Hydrocotyle ranunculoides* was observed in the tributary.

8.7.185 Horton Heath Stream (GB107042016270) is designated as heavily modified and was assessed as having 'Good' overall WFD ecological potential for Cycle 3 (2019 to 2022).

Fish

8.7.186 Three fish species of conservation value were identified in EA records for a hydrologically connected site, namely brown/sea trout (S41 species), bullhead (Annex II species) and European eel (S41 species). The only other species recorded was minnow *Phoxinus phoxinus*.

Macrophytes and phytobenthos

8.7.187 The desk study did not identify any macrophyte records for Horton Heath Stream and no macrophyte surveys were undertaken for the Proposed Development.

8.7.188 Phytobenthos data were available from two EA monitoring sites in the catchment. The average phytobenthos EQR value for both sites equated to 'High' status, indicating that the phytobenthic community was not adversely affected by nutrient enrichment.

White-clawed crayfish

8.7.189 No white-clawed crayfish records were available for Horton Heath Stream, and no surveys were undertaken for the Proposed Development.

Aquatic macroinvertebrates

8.7.190 No macroinvertebrate species of conservation value were identified in the EA records or in the Proposed Development survey results. The INNS *Crangonyx pseudogracilis*, a species of amphipod shrimp was identified.

8.7.191 The LIFE and PSI EQRs indicate that macroinvertebrate communities at all sites were stressed by both low flow conditions and fine sediment deposition. The overall WHPT EQR values equate to either 'Poor' or 'Bad', indicating significant anthropogenic impact on macroinvertebrate communities.

Catchment interactions with the Proposed Development

8.7.192 Four open-cut watercourse crossings over Ordinary Watercourses are proposed within the Horton Heath Stream catchment around Alma Lane. WCX_K_005 and WCX_K_006 are both crossings of Ordinary Watercourses and tributary streams of the upstream extent of the Main River. The ditches at WCX _K_003 and WCX_K_007 are also crossed. All four watercourses act as drainage channels, identified as intermittent or with no perceptible flows during surveys in 2024. The condition of the two Ordinary Watercourses was Poor (WCX_K_006) and Moderate (WCX_K_005) respectively. The watercourses are of low suitability for fish given their fluctuating hydrological status. Macroinvertebrate surveys were undertaken at WCX_K_006 and WCX_K_005 in 2022, 2023 and 2024 and indicated assemblages of local importance only, with no protected or notable aquatic or semi-aquatic species present. White-clawed crayfish are assumed absent from this catchment given the lack of recent records and the lack of suitable habitat.

Bow Lake catchment

Overview

8.7.193 Bow Lake is a tributary of the River Itchen draining the south-western slopes of the South Downs. The catchment is primarily rural and characterised by large areas of arable farmland. The channel appears to have been artificially straightened over much of its course and there are several notable impoundments (small lakes) in the catchment.

8.7.194 An aquatic habitat walkover survey covered a stretch of Bow Lake and two of its tributaries. All survey reaches were predominantly dry and chocked with vegetation at the time of survey. Several potential obstructions to fish passage were observed on Bow Lake, including a sluice and a culvert beneath the B3354.

8.7.195 Bow Lake (GB107042016650) was classified as being of 'Bad' overall WFD ecological status for Cycle 3 (2019 to 2022).

Fish

8.7.196 Between the EA records and the results of surveys undertaken for the Proposed Development, two fish species of conservation value were identified, bullhead (Annex II species) and European eel (S41 species). Environment Agency records also revealed the presence of a number of exotic species (e.g. koi carp *Cyprinus rubrofuscus* var. *koi* and blue orfe *Leuciscus idus*), which are thought to have escaped from Bow Lake fish farm (NGR SU 47337 20308).

Macrophytes and phytobenthos

8.7.197 No macrophytes species of conservation value were identified by the desk study or during surveys undertaken for the Proposed Development. The INNS Himalayan balsam, Canadian waterweed and giant hogweed *Heracleum mantegazzianum* were identified. The macrophyte EQRs correspond to 'Moderate' to 'Poor' status, likely due to low taxonomic and functional diversity, and high filamentous algae cover.

8.7.198 No EA phytobenthos records were identified for the Bow Lake catchment. Phytobenthos surveys were undertaken at five sites in the catchment for the Proposed Development. The average phytobenthos EQR values equate to either 'Good' or 'Moderate' status, indicating low to moderate levels of nutrient enrichment across the catchment.

White-clawed crayfish

8.7.199 No existing, white-clawed crayfish records were identified for Bow Lake catchment. However, a single record of the INNS signal crayfish *Pacifastacus leniusculus* was identified in HBIC data. Surveys undertaken for the Proposed Development returned a negative result for the white-clawed crayfish.

Aquatic macroinvertebrates

8.7.200 No macroinvertebrate species of conservation value were identified during the desk study or by surveys undertaken for the Proposed Development. One INNS was identified, Jenkins' spire snail.

8.7.201 The LIFE and PSI EQRs indicate that some of the survey sites were stressed by low flow conditions and/or fine sediment deposition. The overall WHPT EQR values range from 'Bad' to 'Moderate', indicating that human activities in the catchment have likely had a detrimental effect on the macroinvertebrate community.

Catchment interactions with the Proposed Development

8.7.202 Five watercourse crossings are proposed within the Bow Lake catchment. Crossing OPT1_WCX_L_005 is a trenchless crossing at the Bow Lake channel, it was assigned a final condition class of Fairly Poor by RCA. Crossings OPT1_WCX_L_004 is a trenchless crossings under a ditch that is hydrologically connected to Bow Lake, it is assumed in Good condition in the absence of survey data.

8.7.203 Crossing OPT1_WCX_L_003, OPT1_WCX_L_006 and OPT1_WCX_L_007 are all open-cut crossings. WCX _L_003 crosses a tributary of Bow Lake around Park Hills Wood. This is an Ordinary Watercourse that was entirely dry in the summer of 2022, spring 2023 and autumn 2024. A macroinvertebrate survey was undertaken in spring 2024, which indicated a watercourse in Poor condition with no macrophytes or riparian vegetation present and less than 50cm water present. The watercourse is of low suitability for fish given its intermittence and flow status. The macroinvertebrate assemblage is of local importance only, with no rare or sensitive species indicated in survey. WCX _L_006 and WCX_L_007 are crossings on ditches north and upstream of the main Bow Lake channel and appear to be dry. Although there is potential for white-clawed crayfish to be present in this catchment, habitat suitability is low on these watercourses and an eDNA sample taken close to WCX _L_003 in 2022 indicated that this species was absent.

River Itchen and Itchen Navigation catchments

Overview

8.7.204 The River Itchen rises from a small spring to the south of New Cheriton and ultimately flows south before it meets the tidal estuary of Southampton Water, below Itchen Bridge. Water is drawn from the River Itchen for the Itchen Navigation, which runs parallel. The River Itchen is a chalk stream and HPI and is designated a SAC and SSSI due to the presence of a number of Annex II species including southern damselfly, bullhead, white-clawed crayfish, brook lamprey, Atlantic salmon and otter.

8.7.205 The aquatic habitat walkover surveys covered several areas of the catchment. A range of habitat types were identified in the main river, predominantly run and glide, but also pools and eddies. Macrophyte cover was abundant. Notably, several key areas of sub-optimal salmonid spawning habitat and juvenile salmonid habitat were recorded. In addition, several key areas of optimal and sub-optimal juvenile lamprey habitat were identified. Tributaries were generally dry or with little perceptible flow at the time of survey and chocked with vegetation. The Otterbourne Stream tributary was observed to be heavily modified, with multiple obstacles to fish passage.

8.7.206 The River Itchen is a WFD water body (GB107042022580). It was classified as being of ‘Good’ overall ecological status for Cycle 3 (2019 to 2022).

Fish

8.7.207 Five fish species of conservation value were identified in the desk study results and during the field survey for the River Itchen catchment, namely Atlantic salmon (S41 species), brown/sea trout (S41 species), bullhead (Annex II species),

European eel (S41 species) and brook lamprey (Annex II and S41 species). A diverse assemblage of common species has been recorded in the catchment.

Macrophytes and phytobenthos

8.7.208 One macrophyte species of conservation value was identified in records for the River Itchen catchment, water violet *Hottonia palustris* (listed as Vulnerable on the Red List). Four INNS have been identified, including Himalayan balsam, orange balsam, American skunk cabbage *Lysichiton americanus* and monkey flower *Mimulus* sp. Macrophyte EQRs for macrophyte survey sites within the River Itchen catchment correspond to 'Poor' to 'Good' status.

8.7.209 Average phytobenthos EQRs for monitoring sites within the River Itchen catchment mostly equate to 'Good' or 'High' status, indicating that they were not significantly nutrient enriched.

White-clawed crayfish

8.7.210 Although no historical records were identified for the catchment and the field survey undertaken for the Proposed Development returned a negative result, white-clawed crayfish are listed as an Annex II qualifying species (but not a primary reason for site selection) for the River Itchen SAC. It has also been reported that captively-bred white-clawed crayfish were released into the upper reaches of the catchment in 2022, but it is not known if a population has since become established (details of the desk study for freshwater ecology are detailed in ES Appendix 8.9 Freshwater ecology, Volume II (Document reference 6.2, DCO Volume 6). On these bases, the presence of white-clawed crayfish in the Itchen catchment has been assumed.

Aquatic macroinvertebrates

8.7.211 Between the desk study records and Proposed Development survey data, six Nationally Scarce aquatic macroinvertebrate species were identified, namely two caddisfly *Ylodes conspersus* and *Potamophylax rotundipennis*, dark olive mayfly, riffle beetle *Riolus subviolaceus*, diving beetle *Deronectes latus* and water beetle *Hydraena rufipes*. The Nationally Rare scarce iron blue mayfly *Baetis digitatus* and mayfly *Caenis pusilla* have also been recorded. The desk study also identified records of Southern iron blue mayfly *Baetis niger* (S41 species) for the River Itchen.

8.7.212 Although no southern damselfly were identified in the desk study or field study data, the potential presence of this species is assumed due to its listing under the River Itchen SAC designation.

8.7.213 Three macroinvertebrate INNS have been recorded, Jenkins' spire snail, amphipod shrimp, *Crangonyx pseudogracilis/floridanus* and a species of planarian flatworm.

8.7.214 The LIFE and PSI EQRs indicate that macroinvertebrate communities at sites throughout the Itchen catchment were not stressed by either low flow conditions or fine sediment deposition. The overall WHPT EQR values range from 'Bad' to 'High' status.

Catchment interactions with the Proposed Development

8.7.215 Twelve watercourse crossings are proposed within the River Itchen catchment. Two of these crossings are trenchless crossings related to the Otterbourne Stream, namely OPT1_WCX_M_001 and OPT1_WCX_M_002. There are seven crossings within the trenchless construction methodology section over the Itchen Navigation and branches of the Main River Itchen, namely OPT1_WCX_M_009 - 014 (six crossings) and OPT1_WCX_L_001, they were assigned final condition classes ranging from Moderate to Fairly Poor, by RCA.

8.7.216 OPT1_WCX_M_004 and OPT1_WCX_M_006 are open-cut crossings through the ditch network around Kiln Lane. These watercourses showed little to no flow during 2024 surveys, with no macrophytes or aquatic vegetation present. No macroinvertebrate sampling was possible due to the low flow conditions, and the condition assessment surveys indicated Poor condition. The watercourse is of low suitability for fish given its intermittent dryness. Although potentially present in the connected Otterbourne Stream and the River Itchen, southern damselfly surveys undertaken in 2024 indicated the Kiln Lane watercourses were unsuitable for this species. Habitat suitability for white-clawed crayfish is low on these watercourses and surveys undertaken in 2022 did not identify any positive results for this species, therefore white-clawed crayfish are assumed absent from the ditch network around Kiln Lane.

8.7.217 Open-cut crossing WCX_M_008 south of the Kiln Lane is a watercourse that was completely dry in 2024 and considered of negligible ecological importance.

Invasive non-native plant species

8.7.218 Details of freshwater INNS (macrophytes and invertebrates) are given in their relevant river catchment sections in the freshwater baseline from paragraphs 8.7.112 to 8.7.214.

8.7.219 For terrestrial INNS, six species listed under Schedule 2 of The Invasive Alien Species (Enforcement and Permitting) Order 2019 [64] were identified in the desk study, which three are terrestrial: Himalayan balsam, giant rhubarb *Gunnera manicata* and giant hogweed. Only the Himalayan balsam records fall within hectads (10x10km grid square from OS mapping) inside the Order Limits. There are three invasive plant species records listed under the Invasive Alien Species Regulation (Regulation (EU) 1143/2014) [65], of which one is terrestrial: American skunk cabbage.

8.7.220 Of these species, only Himalayan balsam was recorded during the surveys, which was seen in numerous locations, including within the Order Limits: along the River Wallington; along Bow Lake, in other neutral grassland within Fielders Farm Meadows (Eastleigh) SINC and a ditch and hedgerow south of Bow Lake; along the River Meon and within adjacent other wetland habitat and other broadleaved and wet woodland; along the River Hamble; and within a tributary to the River Itchen priority river and adjacent hawthorn scrub.

8.7.221 A total of 11 records of INNS plants listed under Schedule 9 of the WCA fall within or inside a hectad that intersects the Order Limits, consisting of the following terrestrial species:

1. Himalayan balsam

2. Montbretia Crocosmia *x crocosmifolia*
3. Wall cotoneaster *Cotoneaster horizontalis*
4. Three-cornered leek *Allium triquetrum*
5. Japanese knotweed *Reynoutria japonica*
6. Few flowered garlic *Allium paradoxum*
7. Japanese rose *Rosa rugosa*

8.7.222 Montbretia was recorded within other broadleaved woodland in the Pipeline between the WRP site and Havant Thicket Reservoir component and modified grassland adjacent to Section K of the Pipeline. Furthermore, Japanese rose was recorded in mixed scrub along the northern edge of Bow Lake outside the Order Limits. Three-cornered leek was recorded within a native hedgerow within the Order Limits in Section G of the Pipeline (H69).

8.7.223 ES Figure 8.6 Invasive non-native plant species within the desk study area, Volume III (Document reference 6.3, DCO Volume 6) shows the INNS of plants that have been recorded within the desk study area. This shows records returned from the desk study and therefore does not include species recorded incidentally during surveys.

Ecological feature value

8.7.224 Table 8-14 details the value of each ecological feature.

Table 8-14 Ecological receptors and their geographical value

Feature	Value	Rationale
SAC, SPA, Ramsar, or their functionally linked land[7].	Very high	Habitats or species that form part of the cited interest within an internationally protected site, such as those designated under the Conservation of Habitats and Species Regulations 2017 (as amended).
SSSI	High	Habitats or species that form the cited interest for a nationally protected site.
SINC, RVEI, LNR	Medium	Habitats or species that form the cited interest for a non-statutory site.
Ancient woodland	High	Ancient woodlands are irreplaceable habitats that have consistently been wooded areas since 1600 AD. These woodlands are nationally valuable habitats.
Ancient and veteran trees	High	This is a HPI and irreplaceable habitat.
Lowland mixed deciduous woodland; wet woodland; wood-pasture and parkland; coastal and floodplain grazing marsh; purple moor grass and rush pastures; lowland calcareous grassland; arable field margins; OMH on previously developed land	Medium	These are HPI.
Ecologically valuable lines of trees	Medium	Includes mature native trees, links areas of lowland mixed deciduous woodland HPI and provides important habitat for wildlife, particularly bats. They have been assessed as medium value due to their association with HPI woodland habitat, including ancient woodland.
Other broadleaved woodland; other woodland – mixed; coniferous woodland	Low	This habitat has limited biodiversity value, as these habitats are biologically impoverished with non-native trees, including self-sown or recently established woodland.
Dense scrub	Low	Limited biodiversity but provides cover and a source of food for wildlife including mammals and birds.

[7] Including candidate SACs and potential SPAs and Ramsar sites.

Feature	Value	Rationale
Cropland excluding arable field margins	Low	Limited biodiversity but typically provides habitat for notable farmland birds.
Other lowland acid grassland; other neutral grassland	Low	Moderately diverse and provides valuable habitat for wildlife including birds and invertebrates, but of insufficient diversity to be more than of local value.
Other wetlands	Low	Moderately diverse wetland habitat that does not fit into any of the discrete wetland habitat types and is not HPI.
Other lines of trees; scattered trees	Low	Provides valuable habitat for wildlife, including linking other habitats such as woodland, but of insufficient diversity to be more than of local value.
Native hedgerows	Medium	Native hedgerows are HPIs, which consist of more than 80% canopy cover of at least one woody UK native species. Some are also important hedgerows.
Ponds that may qualify as HPIs	Medium	Ponds (where these may qualify as HPI) provide important habitat for amphibians, water vole and aquatic invertebrates.
Priority rivers	Up to very high[8]	All chalk streams are HPI and considered rare in the UK.
Other rivers and streams	Up to medium[9]	Ordinary watercourse, agricultural ditches and field drains provide important habitat for terrestrial and freshwater species.
Aquatic and riparian habitats (excluding Annex I vegetation)	Low	Aquatic and riparian habitats are of nature conservation value in a local context only.
Badger	Low	Badger is categorised as a species of Least Concern on the International Union for Conservation of Nature (IUCN) red list, with a stable population trend and are widespread in the UK.

[8] The priority rivers in the Order Limits are assigned a value on an individual basis, based on the status of the freshwater receptors (habitats, fish, macrophytes, invertebrates) within each river. The conservation value of these communities is discussed in the freshwater ecology baseline from paragraph 8.7.109 to 8.7.217.

[9] All Ordinary Watercourses, agricultural ditches and field drains in the Order Limits are assigned a value on an individual basis, based on the status of the freshwater receptors (habitats, fish, macrophytes, invertebrates) within each watercourse. The conservation value of these communities is discussed in the freshwater ecology baseline from paragraph 8.7.109 to 8.7.217.

Feature	Value	Rationale
Assemblage of bats associated with Singleton and Cocking Tunnels SAC	Very high	Barbastelle, Bechstein's bat and greater horseshoe bat have been recorded within the Order Limits. Havant is considered to be functionally linked with Singleton and Cocking Tunnels SAC. Barbastelle, Bechstein's bat and greater horseshoe bat are listed in Annexes II and IV of the European Habitats Directive. Order Limits partially located within Havant Bechstein's bat area, with significant numbers of records for both species. Bechstein's bat, barbastelle and greater horseshoe bat are Hampshire priority species.
Assemblage of barbastelle, Bechstein's and greater horseshoe bats not associated with Singleton and Cocking Tunnels SAC	High	Barbastelle, Bechstein's bat and greater horseshoe bat have been recorded within 7km of the Order Limits. Barbastelle, Bechstein's bat and greater horseshoe bat are listed in Annexes II and IV of the European Habitats Directive. Order Limits partially located within Havant Bechstein's bat area. Bechstein's bat, barbastelle and greater horseshoe bat are Hampshire priority species. The Pipeline between the WRP site and Otterbourne WSW passes near ancient and established woodlands suitable for these species, as well as suitable foraging and commuting habitat.
Assemblage of bat species (excluding Annex II species) associated with AGP and Pipelines between WRP site and Otterbourne WSW	Up to medium	Up to five species currently confirmed within Order Limits (common pipistrelle, soprano pipistrelle, long-eared species and noctule). Brandt's, brown long-eared, Daubenton's, Nathusius' pipistrelle, Natterer's, serotine and whiskered bats recorded within 7km of Order Limits. All UK bat species are designated under the European Habitats Directive. Common pipistrelle, grey long-eared and serotine are Hampshire priority species. The Pipeline between the WRP site to Otterbourne WSW passes through suitable roosting, foraging and commuting habitat for these species.
Assemblage of bats associated with the WRP site	Low	Records for common pipistrelle, noctule and soprano pipistrelle. All UK bat species are designated under the European Habitats Directive. Common pipistrelle is a Hampshire priority species.

Feature	Value	Rationale
		The WRP site falls outside of the Havant Bechstein's bat area and is isolated from other suitable foraging and commuting areas by the A27. Site offers limited suitable habitat for barbastelle and Bechstein's bat as the wooded areas are immature.
Wild birds: Assemblages associated with sand-dunes and saltmarsh, lowland open water and their margins, lowland damp grassland	Very high	Qualifying features of Chichester and Langstone Harbours SPA and Ramsar and Portsmouth Harbour SPA and Ramsar, Schedule 1 of the WCA 1981 species, Section 41 species, Red or Amber listed BoCC, SWBGS species and/or Hampshire priority species.
Wild birds: Assemblages associated with woodland, lowland farmland, lowland scrub	High	Schedule 1 of the WCA 1981 species, Section 41 species, farmland birds of conservation priority, defined by the farmland indicator species list, Red or Amber BoCC or Hampshire priority species, SWBGS site species and Hampshire priority species.
Hazel dormouse	Medium	Hazel dormouse is widespread throughout the Order Limits. Hazel dormouse is rare and vulnerable to extinction in the UK. Section 41 species. They are protected under the WCA 1981. Hazel dormouse is referenced specifically in the local plans of EHDC, FBC, HBC and WCC.
Otter	Medium	There is confirmed presence of otter and habitat suitability at various catchments including the Itchen, River Meon, River Hamble and Hermitage Stream and it is considered likely that otter is active, in some form, throughout the Order Limits. Otter is designated and protected under the Conservation of Habitats and Species Regulations 2017. Otter is a qualifying feature of the River Itchen SAC. Otter is also protected under the WCA 1981 and is a Section 41 species.
Water vole	Medium	The River Meon is also the site of a recent re-introduction of the species undertaken by the Local Wildlife Trust. Evidence of a good active population of water vole was confirmed during surveys undertaken on the River Meon in 2023. These results are now outside of the Order Limits survey are but provide context of populations in the wider area. Water vole is protected under the WCA 1981 and is a Section 41 species.
Common reptile species	Low	Common reptiles are listed as Section 41 species. Slow worm and common lizard are listed in the WCC BAP and all common reptile species are listed on the EBC and FBC BAP. All common reptile species are also protected under the WCA 1981. Records of common reptile species within the study area are numerous and there are significant areas of suitable habitat to support these species present.

Feature	Value	Rationale
Section 41 species: Brown hare, common toad, harvest mouse, hedgehog	Low	These are Section 41 species. Brown hare is an HBC BAP species. Common toad and harvest mouse are EBC BAP species. Hedgehog is listed in the WCC, EBC and FBC BAPs. Harvest mouse is listed as near threatened in the Great British Red List. Hedgehog is listed as vulnerable in the Great British Red List. These species are assumed to be present in suitable habitats.
Terrestrial invertebrates	Low	The highest classification of any species identified in the desk study is S41.
Great crested newt	High	These are Section 41 species and protected under the Conservation of Habitats and Species Regulations 2017. Desk study and field survey results found GCN to be rare in HBC, therefore, they are given a high level of value.
Common fish assemblage	Low	Common fish assemblage is of nature conservation value in a local context only. Fish assemblage is not cited as an interest feature for any statutory or non-statutory sites within the Order Limits.
Section 41 fish species that are not Annex II species (European eel, brown/sea trout) Annex II fish species bullhead	Medium	These are Section 41 species, potentially present in Riders Lane Stream, Hermitage Stream, River Wallington, River Meon, South East Coastal catchment watercourses, the main River Hamble, Upper Hamble, Horton Heath Stream, Bow Lake, River Itchen and Itchen Navigation (for bullhead) and the River Wallington, River Meon, the South East coastal catchment watercourses, Moors Stream, the Main and Upper River Hamble, Horton Heath Stream and the Itchen catchment (for brown/sea trout). Although bullhead forms part of the cited interest within an internationally designated site, (in this case the River Itchen SAC), it is prevalent locally and has a widespread distribution throughout the Order Limits.
Annex II fish species (lamprey species, Atlantic salmon)	Very high	Fish species that form part of the cited interest within an internationally protected site, in this case the River Meon Compensatory SAC and the River Itchen SAC. Lamprey species have also been identified in the catchment of the Upper Hamble and the Main River Hamble.
Freshwater and riparian invertebrate assemblage including nationally notable and/or red listed macroinvertebrate species	Low	Common aquatic invertebrate assemblage is of nature conservation value in a local context only. Aquatic invertebrate assemblage is not cited as an interest feature for any statutory or non-statutory sites within the Order Limits and any occurrence of nationally notable and/or red listed species (in this case in the Wallington, Meon, Hamble and Itchen catchments) nor are LBAP species.

Feature	Value	Rationale
Common macrophyte and phytobenthic assemblages	Low	Common macrophyte and phytobenthic assemblages are of nature conservation value in a local context only. Macrophyte assemblage is not cited as an interest feature for any statutory or non-statutory sites within the Order Limits.
Annex I *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Very high	Unique chalk stream vegetation that forms part of the cited interest within an internationally protected site, in this case the River Itchen SAC and the River Meon Compensatory SAC.
Section 41 invertebrate species Southern iron blue mayfly *Baetis niger*	Medium	Section 41 species. This species has been recorded as present in the River Itchen catchment from desk study data between 2003-2023.
Annex II invertebrate species (southern damselfly, white clawed crayfish)	Very high	Invertebrate species that form part of the cited interest within an internationally protected site, in this case the River Itchen SAC and the River Meon Compensatory SAC for southern damselfly and the River Itchen SAC for white-clawed crayfish.

Future baseline

8.7.225 A description of the anticipated changes in future baseline conditions for terrestrial and freshwater biodiversity has been carried out and is described within this section.

Havant Thicket Reservoir

8.7.226 The Proposed Development includes the storage of recycled water in Havant Thicket Reservoir, which prior to the implementation of the Proposed Development, will be operated by Portsmouth Water utilising surplus water from the Havant and Bedhampton Spring source.

8.7.227 A modelling exercise was undertaken by the Applicant to investigate the effect of source water changes on reservoir water quality during the different phases of operation. The model scenario focussed on the three main phases of reservoir operation; the initial filling phase, the currently consented 'classic' phase (i.e. the period during which Havant Thicket Reservoir will be filled with water from spring and surface sources only and has a two year period of stabilisation) and the 'post-WRP' phase (i.e. the period during which Havant Thicket Reservoir will be supplied with recycled water from the WRP). The 'classic' phase therefore serves as the future baseline, against which impacts of the Proposed Development (specifically the introduction of recycled water to the reservoir) are assessed. The reservoir water quality modelling exercise is presented in detail in ES Appendix 19.6 Havant Thicket Reservoir Compensatory Flows water quality modelling, Volume II, (Document reference 6.2, Volume 6).

8.7.228 The model outputs predict that, following an initial period of variation as the reservoir is filled with spring water, rainfall and surface runoff (from what are currently the headwaters of Riders Lane Stream), water quality would stabilise at the beginning of the 'classic' phase. Concentrations of total phosphorus (TP) and chlorophyll-a (a proxy for phytoplankton biomass) in Havant Thicket Reservoir during the 'classic' phase would correspond to mesotrophic status, characterised by intermediate nutrient levels and moderate phytoplankton growth. Under these conditions, the reservoir has the potential to support diverse communities of aquatic plants and invertebrates that prefer clear, well-oxygenated water and have a low tolerance of poor water quality. The reservoir fish assemblage could potentially evolve under mesotrophic conditions to include minor and coarse fish, including native species such as stickleback, tench, roach and perch.

Riders Lane Stream and Hermitage Stream

8.7.229 The current headwater streams that flow into Riders Lane Stream and Hermitage Stream will be lost as a result of the construction of Havant Thicket Reservoir, and there will be compensatory flow from the reservoir which aim to provide the same volume of water per annum that would naturally occur without the reservoir back into the downstream watercourses. Flows will be discharged to Riders Lane Stream in all but the dryest of periods, when flows at the EA's gauging station in the lower Hermitage Stream are below 0.005 m^3s^{-1}.

8.7.230 Currently, the upper reaches of Riders Lane stream are intermittent, and dry up in periods of low rainfall. By ensuring a regulated minimum flow (except in periods of

severe drought), the stream will no longer dry up regularly and the habitat for many aquatic species in the Riders Lane Stream will be improved. Maintaining a regulated minimum flow will also help transport fine sediment rather than encouraging it to deposit on the channel bed, and there will be less stagnant water, which often has higher levels of organic matter that consume oxygen. Thus, the future baseline accounts for these changes in Riders Lane Stream and for their potential impact on associated ecological communities.

8.7.231 The future baseline of Hermitage Stream, Riders Lane Stream and Park Lane Stream will also be affected by Portsmouth Water's package of river channel improvement measures, which are designed to mitigate the impacts of constructing Havant Thicket Reservoir. These measures include a range of geomorphological and habitat improvements for fish, macrophytes and macroinvertebrate communities, with the expectation that the baseline conditions of the watercourse will improve in the future. An overview of these improvement packages is given in ES Chapter 19 Water environment, Volume I (Document reference 6.1, DCO Volume 6).

8.7.232 Although the hydrological changes and improvement works to the Hermitage catchment are considerable, they are not expected to alter the ecological baseline for the Hermitage catchment currently described in section 8.7. The works are intended to address pressures associated with physical modifications and changes to the hydrological regime associated with construction of the reservoir. The changes are unlikely to address the water quality pressures that affect the water body.

8.7.233 Under the conditions of its Impoundment Licence for Havant Thicket Reservoir, Portsmouth Water is also required to deliver fish passage easements at two large weir structures downstream of New Road. These easements are likely to deliver considerable benefits for fish passage in the Hermitage catchment which may result in changes to the freshwater biodiversity baseline. The potential future presence of migratory fish such as Atlantic salmon and lamprey species that are already present in the Solent has been considered in the assessment of likely significant effects on freshwater biodiversity in the Hermitage catchment.

General changes to terrestrial and freshwater ecology baseline

8.7.234 A review has been undertaken of committed developments (see ES Chapter 20 Cumulative and in-combination effects, Volume I (Document reference 6.1, DCO Volume 6)) that will be delivered prior to commencement of construction that may impact the terrestrial and freshwater biodiversity baseline within the order limits. Developments may result in changes to the habitats baseline. These would be minor changes to habitats of up to low value (agricultural fields or amenity grassland) and are unlikely to negatively affect distribution or abundance of species and habitats, therefore it cannot result in a significant effect and is not considered further. It is anticipated that in the absence of other development, the Order Limits will continue to be managed as farmland, where currently present. Depending on the farming regime, the quality of habitats and opportunities for different species may vary slightly over time, particularly for farmland birds. However, the farmland, hedgerows, woodlands, grassland and scrub are likely to be retained by landowners and management will continue as it is currently. Such

variations are not considered to be significant and are considered as normal fluctuations in a dynamic farming environment.

8.7.235 No significant change to watercourses or ponds is anticipated in the foreseeable future, although it is recognised that some ponds may disappear (as a result of drying or infilling) and others may be created during this time due to the ephemeral nature of some waterbodies.

8.7.236 During the survey period, there have been some extremes of weather including the period of heat and drought particularly in July/August 2022. Although these weather systems are beyond what could previously be expected over a five-year period, it is likely that with future climate change they will become more frequent and therefore the conditions that were experienced during the baseline surveys may not necessarily be regarded as atypical of a future baseline at the start of operation. However, it is not possible to accurately predict future changes in climate and so these extreme weather events are not considered further.

8.7.237 It is anticipated that climate change will result in a possible 2-4°C increases in mean summer temperatures in the longer term, with milder winters, changes in rainfall distribution and seasonality, more extremes of weather and sea level rise [66]. As such, it is expected that the biogeographic envelope for species and habitats will shift northwards. However, these changes are not predicted within the future baseline timeframes considered in absence of the Proposed Development.

8.7.238 It is therefore not considered that the baseline described in section 8.7 will appreciably change.

8.8 Assessment of likely significant effects

8.8.1 This section presents the assessment of likely significant effects on terrestrial and freshwater biodiversity resulting from the construction, operation and decommissioning of the Proposed Development. The likely significant effects of the Proposed Development are identified taking into account primary and tertiary mitigation. Effects relevant to all components are assessed first followed by effects that are relevant to specific components. Components are only assessed individually if there is a feature or location specific impact related to a component, otherwise the assessment considers the Proposed Development as a whole, under the 'all components' heading. Following the assessment, the need for further mitigation is considered in section 8.9.

Construction effects

Statutory designated sites

All statutory designated sites

All components

8.8.2 The following effects are relevant to all statutory designated sites and across all components within the ZoI of the Proposed Development. Where an effect is site specific, it is presented by site under the relevant component section.

Disturbance

8.8.3 Construction lighting has the potential to disturb qualifying features of statutory designated sites within the ZoI medium-term. The construction lighting will follow good practice to reduce illuminating hedgerows and ecologically sensitive habitats, to avoid disruption to the species using these features, including qualifying features, for resting places, foraging or commuting routes, avoiding likely significant effects. This measure is secured within the Outline CEMP (Document reference 7.1, DCO Volume 7) and is in accordance with the Institution of Lighting Professionals (ILP) and Bat Conservation Trust (BCT) good practice guidelines for lighting [44]. The magnitude of this impact is negligible, on features of medium to very high value; therefore, this is an up to minor adverse effect which is not significant.

Killing or injury

8.8.4 The killing or injury of qualifying features of a statutory designated site potentially caused by an increased number of vehicles, vehicle movements and changes in movement patterns medium-term would be mitigated by speed restrictions within construction working areas. Night-time working will be limited to some trenchless and tunnel construction works (within or near highways and railways and abnormal road deliveries), if it is required at these locations, speed restrictions will be implemented. These tertiary measures are secured within the Outline CEMP (Document reference 7.1, DCO Volume 7) and Framework Construction Traffic Management Plan (CTMP) (Document reference 7.2, DCO Volume 7). The implementation of primary and tertiary measures mitigate for these effects to statutory designated sites. The magnitude of this impact is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

Invasive non-native species

8.8.5 The introduction or spread of INNS during construction may result in habitat degradation of a statutory designated site long-term. The management of INNS during construction is set out within the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7). This sets out the management techniques to be employed to avoid and reduce likely significant effects on sensitive ecological receptors. Measures include enforcement of 'Check-Clean-Dry' protocols for all vehicles, machinery and personnel and site-specific method statements for INNS. As there are recognised standard practices for controlling INNS during construction this effect is considered addressed by tertiary mitigation measures. The magnitude of this impact is negligible, on features of medium to very high value; therefore, this is an up to minor adverse effect which is not significant.

Hydrological change - drainage

8.8.6 Changes to water abstraction, release or storage during construction activities and changes in local drainage to facilitate works, such as alteration to drainage or run-off pathways including surface water connections, may cause areas to become wetter or drier medium-term. This could lead to changes in a statutory designated site's vegetation community and the species it supports. However, measures secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) and the Construction Drainage Plan will manage the quantity and quality of construction

drainage and reduce or remove risk of sediment entrainment to mitigate for this impact. The magnitude of this impact is negligible, on features of medium to very high value; therefore, this an up to minor adverse effect which is not significant.

Changes to air quality – vehicle emissions

8.8.7 Screening of traffic flows and air quality modelling has been undertaken to assess the effects of nitrogen oxides (NOx), ammonia, nitrogen deposition and acid deposition within 200m of the affected road network (the routes used by construction generated traffic). Peak traffic flows have been screened against the thresholds set by Highways England in their Design Manual for Roads and Bridges [67], which is 1,000 annual average daily traffic (AADT) in light duty vehicles (LDV) and 200 AADT in heavy duty vehicles (HDV). This is the level below which increases in traffic flows associated with development are considered to be imperceptible. The LDV thresholds were not exceeded along any road links. For further details regarding the screening of traffic flows refer to ES Appendix 6.2 Air quality assessment traffic data, Volume II (Document reference 6.2, DCO Volume 6).

8.8.8 Screening of traffic flows and air quality modelling has been undertaken to assess the effects of nitrogen oxides (NOx), ammonia, nitrogen deposition and acid deposition within 200m of the affected road network (the routes used by construction generated traffic). Peak traffic flows have been screened against the thresholds set by Highways England in their Design Manual for Roads and Bridges [67], which is 1,000 annual average daily traffic (AADT) in light-duty vehicles (LDV) and 200 AADT in heavy duty vehicles (HDV). This is the level below which increases in traffic flows associated with the development are considered to be imperceptible. The LDV thresholds were not exceeded along any road links. For further details regarding the screening of traffic flows refer to ES Appendix 6.2 Air quality assessment traffic data, Volume II (Document reference 6.2, DCO Volume 6). Baseline air quality information for ecological receptors is contained in ES Appendix 6.4 Ecological features, background concentrations, background deposition rates and Critical Loads (CLo), Volume II (Document reference 6.2, DCO Volume 6) and the transect locations are shown on ES Figure 6.4 Air quality construction phase road traffic emissions – Ecological receptors, Volume III (Document reference 6.3, DCO Volume 6). Refer to ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) for a summary of the results of air quality modelling for ecological receptors and screened in cumulative projects. For full details refer to ES Appendix 6.5 Construction road vehicle exhaust emissions assessment – ecological features transect results – nitrogen oxides, Volume II (Document reference 6.2, DCO Volume 6), ES Appendix 6.6 Construction road vehicle exhaust emissions assessment – ecological features transects results – ammonia, Volume II (Document reference 6.2, DCO Volume 6), ES Appendix 6.7 Construction road vehicle exhaust emissions assessment – ecological features transects results – nitrogen deposition, Volume II (Document reference 6.2, DCO Volume 6) and ES Appendix 6.8 Construction road vehicle exhaust emissions assessment – ecological features results – acid deposition, Volume II (Document reference 6.2, DCO Volume 6).

8.8.9 The ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) includes sensitivity testing undertaken in 2026 to compare the results of the Calculator for Road Emissions of Ammonia (CREAM) [68] between CREAM

V1A and V2A, following the release of V2A. It is understood that CREAM V1A is generally more conservative than CREAM V2A. However, there are some cases where CREAM V2A ammonia emissions can be higher than those derived using CREAM V1A – particularly at lower speeds. Overall, it was found that in the majority of cases, using CREAM V2A derived NH_3 emissions resulted in no material change or increase in modelled PCs (i.e. going from less than or equal to 1% to greater than 1% of the relevant Critical Level (CLe) or Critical Load (CLo) and therefore the CREAM V1A derived emissions are reported on in this assessment. The two locally designated sites that showed a potential increase in modelled acid deposition using CREAM V2A are presented in paragraph 8.8.126.

8.8.10 In order to assess the potential effects of airborne pollution during construction, traffic modelling and modelling of associated emissions from vehicles has been undertaken along the affected road network where this is within 200m of a statutory designated site. The increase in traffic flows along the affected road network would be temporary, during construction, up to medium-term. The model has used the peak traffic flows in 2031 and the pipeline construction work is expected to take place between 2029 and 2032, with enabling works starting in 2028. Additional traffic flows along the affected road network are predicted for part of the construction period, not the entirety; they would therefore not experience peak flows throughout. Road traffic emissions factors used in the model were representative of a 2028 fleet (i.e. the first year of construction). Emissions factors are anticipated to improve over time, therefore, application of 2028 emissions factors represents a conservative approach.

Waterborne pollution

8.8.11 The Outline CEMP (Document reference 7.1, DCO Volume 7) includes good practice mitigation measures to be implemented to manage the risk of pollution incidents during construction to reduce risk and ensure rapid response to any incidents. This ensures that during construction there would be no adverse effects on the integrity of the designated site because of pollution incidents during construction. The magnitude of this impact is negligible, on features of high to very high value; therefore, this is considered to be a minor adverse effect which is not significant.

River Itchen SAC and SSSI

All components

Changes to air quality – vehicle emissions

River Itchen SAC

8.8.12 A summary of key findings relevant to the River Itchen SAC and changes to air quality are discussed in paragraph 8.8.13 to 8.8.25.

8.8.13 The Proposed Development will result in a short-term increase in nitrogen deposition which will be over 1% of minimum CLo at locations which are already in excess of the minimum CLo. This will be for a short distance from the affected road network of up to 30m downstream of the M3 River Itchen Bridge and 20m upstream of the M3 River Itchen Bridge at Hockley Link. The banks of the River

Itchen along these short distances either side of the motorway bridge are artificial and therefore do not support dense marginal vegetation with potential to be used by southern damselfly.

8.8.14 Exceedances in the CLe (pollutant concentrations in the atmosphere) and CLo (deposition of pollutants) caused by the construction of the Proposed Development could lead to habitat degradation and or loss within the River Itchen SAC, negatively impacting the qualifying features of the River Itchen SAC. The River Itchen SAC is within 200m of the affected road network (and within 50m of construction access routes) and is modelled to experience a change greater than 1% of a CLo or CLe.

8.8.15 The Air Pollution Information System (APIS) provides CLo and CLe for air pollution for statutory designated sites which defines a level below which adverse impacts to a particular qualifying habitat or species (or the habitat which the species relies on) would not occur. The only qualifying species with an identified nutrient nitrogen CLo for the River Itchen SAC is southern damselfly. For this species, APIS use 'dwarf shrub heath' as the habitat on which to base CLo, due to this species' preference for this habitat in key locations such as the New Forest. However, the populations of southern damselfly found within and around the River Itchen SAC are associated with habitats best described as the EUNIS habitat classification Rich Fens (EUNIS D4.1). According to APIS, Rich Fen habitats have a CLo for nutrient nitrogen of 15-30 kgN/ha-year and is not sensitive to acid deposition. Air quality modelling used the lower, most precautionary, CLo for southern damselfly based on the dwarf shrub heath habitat listed on APIS (5-15 kgN/ha-year). However, following interrogation of the habitats present within the areas subject to potential change in air quality, the interpretation of this data and an assessment of the potential for likely significant effects is based on the slightly higher CLo of rich fen habitat as this is representative of the habitats present within the potentially affected area.

8.8.16 The air quality modelling of the Proposed Development and the affected road network identified two key areas where the affected road network crosses the River Itchen SAC namely the M3 near Hockley Link and Bishopstoke Road near Eastleigh. At both these locations the affected road network crosses over the River Itchen SAC and so the closest modelled points are 0m from the SAC. With an adjusted minimum CLo for southern damselfly of 15kgN/ha-year (rich fen habitat), the process contribution (PC) (the additional pollutant loading to a receptor as a result of the Proposed Development) is at most 3.01% of the minimum CLo, at the modelled point 0m from the affected road network at the M3 Hockley Link (at this location the PC from the Proposed Development alone is 0.451kgN/ha-year). The model shows that nitrogen deposition decreases with distance from the affected road network, with levels from the Proposed Development alone dropping to 1.21% of minimum CLo 20m from the affected road network at the M3 Hockley Link and falling below 1% of minimum CLo at 30m from the affected road network. Although 1.2% has been reported, it is worth noting that the criterion (the screening threshold under which changes are so low as to be unequivocally 'inconsequential') is recognised as 1% not 1.0%, and a change of 1.2% is considered to be 'about 1%' rather than 'clearly above 1%' [69].

8.8.17 If the maximum CLo of 30kgN/ha-year is applied, the River Itchen is modelled to experience a change of above 1% at only the 0m transect point, on the road, and this falls below 1% by 10m from the road.

8.8.18 Potential adverse effects from the Proposed Development alone are therefore restricted to within 20m of the affected road network at the M3 Hockley Link, approximately 0.03ha upstream and 0.04ha downstream, equating to approximately 0.019% of the total SAC area. Bishopstoke Road, the highest PC is 0.067kgN/ha-year, equating to 0.45% of the minimum CLo where the affected road network crosses the River Itchen SAC and therefore the Proposed Development alone in this location will not exceed 1% of minimum CLo. As such, adverse effects that could damage the habitat are not considered likely.

8.8.19 In all modelled locations along the River Itchen SAC air quality transects, background nitrogen deposition is already in excess of minimum CLo for rich fen habitat, with a background of 26.03kgN/ha-year at the M3 Hockley Link, which is 173.53% of the minimum CLo. The Predicted Environmental Concentration (PEC) (the baseline plus the Proposed Development alone) results in a maximum of 26.48kgN/ha-year 0m from the affected road network where the road crosses the SAC, which is 176.54% of the minimum CLo. The Proposed Development will therefore result in temporary up to medium-term increases in nitrogen deposition in locations already in excess of minimum CLo. Local background contributions of nitrogen deposition are largely attributed to livestock and Europe import (transboundary pollution arriving from the continent) with less than 10% of the contributions in these locations attributed to all road transport.

8.8.20 Natural England guidance [70] indicates that habitats that have already been subject to high background nitrogen deposition can develop an effective tolerance to the effects of further deposition. This is not to say that increases in nitrogen deposition in areas already exceeding CLo will not have any adverse effects; however, it is likely that due to the high levels of exceedances due to the proximity of the M3 motorway, that vegetation within the River Itchen SAC within 30m (and further) of the M3 is already being impacted by nitrogen deposition that is significantly over minimum CLo.

8.8.21 The effects of changes in air quality on ecological receptors occur gradually as a result of long-term trends and processes; considering the increases occur over a short duration during the construction phase of the Proposed Development, and which affect habitat unlikely to support southern damselfly, no adverse effects on this qualifying species or the structure and function of their supporting habitat, are likely as a result of the Proposed Development. The predicted deposition rates associated with temporary construction traffic in the context of background deposition are not considered to be significant, bearing in mind the contributions from other sources. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.22 The APIS website identifies CLe for atmospheric ammonia of 1 or 3 µg/m³ for the qualifying habitat *Water courses of plain to montane levels with the Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. The CLe of 1 is set for highly sensitive lower plant species such as lichens and bryophytes. For higher plants the threshold is set at 3. As the species which make up this qualifying habitat are higher plants such as water-crowfoot species and water-starwort species, the higher CLe is considered appropriate. As largely submerged or floating vegetation,

they are less likely to be affected by atmospheric ammonia and nitrogen due to the presence of a high flow rate and the positive effect of dilution.

8.8.23 For the River Itchen SAC, the air quality transects identified levels in excess of 1% of the higher CLe from the Proposed Development at the 0m modelling point for both the upstream and downstream transects at the M3 Hockley Link bridge location, with 0.04µg/m³ (1.3%) upstream and 0.05µg/m³ (1.7%) downstream. Atmospheric ammonia levels reduced to below 1% at the 10m transect points upstream and downstream. Due to the short duration of the works and the small area affected (largest area of SAC affected is approximately 0.03ha which accounts for 0.009% of total SAC area) by increases of over 1% of CLe, the Proposed Development alone is not likely to result in any adverse effects which could damage the qualifying habitat. The predicted contributions from other schemes are larger; however, the cumulative effect of the Proposed Development plus other development does not result in additional areas reaching the 1% threshold. Further details are within ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) and ES Chapter 20 Cumulative and in-combination effects, Volume I (Document reference 6.1, DCO Volume 6). Therefore, the magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.24 The APIS website identifies CLe for nitrogen oxides (NOx) of 30µg/m³ for the qualifying habitat Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation. For the River Itchen SAC, the air quality transects identified levels in excess of 1% of the CLe from the Proposed Development at the 0m modelling point for both the upstream and downstream transects at the M3 Hockley Link bridge location, with 0.55µg/m³ (1.8%) upstream and 0.74µg/m³ (2.5%) downstream. Levels reduced to below 1% at the 10m transect point upstream, but remain at 1% at the 10m downstream point (1.3%) before falling below 1% at 20m. No modelled point exceeds 1% of the maximum CLe for NOx.

8.8.25 Together with NOx background the predicted values are all below the CLe, with a maximum of 12.63µg/m³ (42.1% of CLe) at the Bishopstoke transect, and lower at the M3 transects. Due to the short duration of the works, the small increases over 1% of minimum CLe, the small area affected (largest area of SAC affected is approximately 0.02ha which accounts for 0.005% of total SAC area), and the fact that the CLe is not exceeded, the Proposed Development is not likely to result in any adverse effects which could damage the qualifying habitat. The predicted contributions from other schemes are larger; however, the cumulative effect of the Proposed Development plus other development does not result in additional areas reaching the 1% threshold and therefore the magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

River Itchen SSSI

8.8.26 Similar to the discussion for the River Itchen SAC in paragraphs 8.8.12 to 8.8.25, the River Itchen SSSI will also be subject to exceedances above 1% of a CLo or CLe.

8.8.27 The air quality modelling of the Proposed Development and the affected road network identified the same two key areas where the affected road network

crosses the River Itchen SSSI (the M3 near Hockley Link and Bishopstoke Road near Eastleigh). At both these locations the affected road network crosses over the River Itchen SSSI and so the closest modelled points are 0m from the SAC. The minimum CLo applied for the SSSI is 10kgN/ha-year (for grassland and woodland habitats), and the PC is at most 4.60% of the minimum CLo, at the modelled point 0m from the affected road network at the M3 Hockley Link (at this location the PC from the Proposed Development alone is 0.46kgN/ha-year). The model shows that nitrogen deposition decreases with distance from the affected road network, with levels from the Proposed Development alone dropping to 1.08% of the minimum CLo 30m from the affected road network at the M3 Hockley Link. Potential adverse effects from the Proposed Development alone are therefore restricted to within 30m of the affected road network at the M3 Hockley Link, this area equates to approximately 2ha (excluding the M3 carriageway) which is 0.27% of the SSSI. At Bishopstoke Road, the highest PC is 0.067kgN/ha-year, equating to 0.67% of the minimum CLo where the affected road network crosses the River Itchen SSSI and therefore the Proposed Development alone in this location will not exceed 1% of minimum CLo. As such, adverse effects that could damage the habitat are not considered likely

8.8.28 Considering the increases occur over a short duration during the construction phase of the Proposed Development, and which affect habitat unlikely to support southern damselfly, no adverse effects on this qualifying species or the structure and function of their supporting habitat, are likely as a result of the Proposed Development. The magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

8.8.29 The APIS website identifies CLe for atmospheric ammonia of 1 or 3 µg/m³ for the habitats of the River Itchen SSSI. As with the SAC, it is higher plant species which make up the habitats for which the SSSI is designated and therefore the CLe of 3 µg/m³ is applied. The air quality transects identified levels in excess of 1% of the higher CLe from the Proposed Development at the 0m modelling point for both the upstream and downstream transects at the M3 Hockley Link bridge location, with 0.04µg/m³ (1.3%) upstream and 0.05µg/m³ (1.7%) downstream. Atmospheric ammonia levels reduced to below 1% at the 10m transect points upstream and downstream. Due to the temporary duration of construction works and the small area affected (largest area of SSSI affected is approximately 0.5ha which accounts for 0.06% of total SSSI area) by increases of over 1% of CLe, the Proposed Development alone is not likely to result in any adverse effects which could damage the qualifying habitat; therefore, the magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

8.8.30 The CLe identified for the River Itchen SSSI for atmospheric nitrogen is the same as that for the SAC, 30µg/m³, for the habitats present. The air quality transects identified levels in excess of 1% of the CLe from the Proposed Development at the 0m modelling point for both the upstream and downstream transects at the M3 Hockley Link bridge location, with 0.55µg/m³ (1.8%) upstream and 0.75µg/m³ (2.5%) downstream. Levels reduced to below 1% at the 10m transect point upstream, but remain at 1% at the 20m downstream point (1.1%) before falling below 1% at 30m.

8.8.31 Together with NOx background levels the predicted values are all below the CLe, with a maximum of 14.35µg/m³ (47.8% of CLe) at the Bishopstoke transect, and lower at the M3 transects. Due to the short duration of the works, the minor increases over the 1% of CLe, the small area affected (largest area of SSSI equating to approximately 0.27% of the SSSI total area), and the fact that the CLe is not exceeded, the Proposed Development is not likely to result in any adverse effects which could damage the qualifying habitat. Therefore, the magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

Changes to air quality - construction dust and fine particulate matter emissions

8.8.32 Detailed results and methods for the air quality modelling are provided within the ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) and ES Appendix 6.5 Ecological Transect Results, Volume II (Document reference 6.2, DCO Volume 6).

8.8.33 The air quality assessment identified a high risk of impacts to the River Itchen SAC and SSSI resulting from dust as a result of 'trackout' (where construction site traffic joins the public road network) at the temporary access from Highbridge Road (B3335) for temporary construction compound L10.

8.8.34 Tertiary mitigation is secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) which outlines the good practice measures in relation to control of pollutants in order to reduce the potential for likely effects of airborne pollutants on sensitive features associated with the listed designated sites. A Construction Traffic Management Plan, Dust Management Plan and a Pollution Prevention Management Plan to accompany the detailed CEMP will be prepared post-consent.

8.8.35 With implementation of standard mitigation measures, generation of airborne dust and particulate matter would be reduced, such that the overall effect can be considered to be 'not significant', in accordance with guidance provided by the IAQM [45]. Impacts to qualifying species and habitats as a result of construction dust and NRMM emissions are therefore likely to be small scale and short-term. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.36 Detailed results and methods for the air quality modelling are provided within the ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) and ES Appendix 6.5 Ecological Transect Results, Volume II (Document reference 6.2, DCO Volume 6).

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

Habitat loss or degradation

8.8.37 Isolation, air and washout valves will be required along the Pipeline between the WRP site and Otterbourne WSW. These would result in permanent habitat loss of 2x2m for each washout or air valve and 1x1m for each isolation valve (two isolation valves required per washout or air valve). The estimated habitat loss for isolation, air and washout valves has been calculated based on the proportion of different habitat types present across the Pipeline as the final location of these assets is

currently unknown and will be finalised post-consent. The location of these assets is constrained by topography and distance between them as described within ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6). The River Itchen SSSI is located within the pipeline Limits of Deviation and the whole designated site covers an area of 748.02ha. Therefore, there is potential for a very small area (up to 10m^2 at each location) of discrete permanent loss of habitat within the River Itchen SSSI. The magnitude of this impact is negligible on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

Habitat fragmentation

8.8.38 Otter is a qualifying species of the River Itchen SAC and SSSI and surveys have confirmed presence on Bow Lake, which is connected to the SAC. Temporary construction compounds L-5, L-6, L-7 and L-8 are located within 30m of Bow Lake. Of the four locations night works will take place over a short-term duration of construction nights at temporary construction compounds L-5 and L-6 to facilitate the trenchless construction works under the B2334 Winchester Road. No night works, when otter are most active, will take place at temporary construction compounds L-7 or L-8, which are on either side of Bow Lake, and there is sufficient corridor width between all these temporary construction compounds along the watercourse for undisturbed passage. Additionally, primary and tertiary mitigation measures secured within the Outline CEMP (Document reference 7.1, DCO Volume 7) include construction lighting following good practice to reduce illuminating ecologically sensitive habitats, including Bow Lake. These measures would, in-combination, avoid disruption to otter utilising these features for resting places, foraging or commuting. The magnitude of this impact is negligible on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

Disturbance

8.8.39 The ditch north of Kiln Lane will be crossed by the Pipeline through trenched open-cut construction. This ditch is a seasonally dry distant tributary considered to be a surface water run-off ditch for Kiln Lane. The tributary is short, shallow and terminates at Otterbourne village to the west with suitability for potential passage of otter only. For a short period otter, a qualifying species of the River Itchen SAC and SSSI, may be deterred from moving through this section whilst construction works are ongoing. However, this would be temporary up to medium-term and would be reversed on completion of the works. Additionally, the construction lighting design (as secured within the Outline CEMP (Document reference 7.1, DCO Volume 7)) follows good practice to reduce direct illumination of ecologically sensitive habitats, including areas of the Kiln Lane ditch and Bow Lake that are not within the construction working width, which would avoid disruption to otter utilising these features. Therefore, the magnitude of this impact is negligible, on features of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.40 Trenchless construction under the River Itchen may also result in disturbance to susceptible species due to the presence of noise and vibration, resulting in barriers to fish migration, permanent or temporary injury or induced behavioural changes in fish and macroinvertebrate populations short-term. The assessment of

underwater noise and vibration disturbance on fish species is given in the freshwater biodiversity section in paragraphs 8.8.344 to 8.8.351. No adverse effects for the identified impact are considered likely. The magnitude of this impact is negligible, on features of low to high value; therefore, this is an up to minor adverse effect which is not significant.

Killing or injury

8.8.41 There are four open-cut watercourse crossings over tributaries of the River Itchen within the River Itchen and Itchen Navigation catchment. Paragraph 8.8.361 details the impact assessment with regards to the potential killing or injury of qualifying aquatic species for the River Itchen SAC. The magnitude of this impact is minor, on features of high to very high value; therefore, this is an up to moderate adverse effect which is significant.

8.8.42 Otter, a qualifying species of the River Itchen SAC and SSSI, is a naturally inquisitive animal and is likely to investigate a construction site. Temporary construction compounds L-5, L-6 and L-7 are located within 16m of Bow Lake which has connectivity to the SAC. No night works, when otter are most active, will take place at temporary construction compounds L-7 and L-8 and there is sufficient corridor width between these temporary construction compounds along the watercourse for undisturbed passage. Temporary construction compounds L-5 and L-6 are likely to be in use over a short duration of consecutive nights for the trenchless construction works under the B3354 Winchester Road. Although no resting sites were located along this watercourse, spraints and prints were identified. Otter is a mobile species and there is suitable habitat for resting sites along Bow Lake, introducing a risk of resting sites being created prior to or during construction. Paragraph 8.8.294 details the impact assessment with regards to the potential killing or injury of Otter within the River Itchen SAC and SSSI. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

Hydrological change

8.8.43 During construction there is a risk of changes to groundwater which could impact groundwater dependent ecosystems including the River Itchen SAC and SSSI. Qualifying habitats of these sites could become degraded through changes in water quality or quantity up to medium-term. This could have indirect negative effects on qualifying species of these sites. Water quality may change due to accidental pollution events during construction up to medium-term. Groundwater flows and levels may be affected by temporary short-term physical modifications (e.g. excavations or tunnelling), which would interrupt the natural groundwater flow pathways. The other potential risks to groundwater associated with excavations or tunnel construction include temporary short-term dewatering, if required, for the tunnel or shafts, diverting water away from the waterbodies or bypassing part of the system, leading to reduced groundwater flow.

8.8.44 The Outline CEMP (Document reference 7.1, DCO Volume 7) includes mitigation for this effect and measures include:

1. A Construction Drainage Plan to be prepared post-consent. Measures will include managing site drainage and runoff during construction, as well as measures to reduce or remove the risk of sediment erosion.
2. A Drilling Fluid Management Plan to be developed post-consent to document how risks of any fluid breakouts would be reduced, and in the event of an outbreak from drilling or tunnelling works during construction how any breakout would be managed and mitigated, to reduce environmental impacts.
3. A Voids Treatment Protocol to be developed post-consent to document how voids encountered during construction within the chalk would be mitigated to avoid impacts on groundwater bodies.
4. A Water Monitoring Plan to be developed post-consent to ascertain the pre-construction baseline and verify predicted impacts to the local surface water and groundwater regime from temporary and permanent construction effects during and post-construction.

8.8.45 With the implementation of these tertiary measures the magnitude of this impact is negligible, on features of very high value; therefore, this is a minor adverse effect which is not significant.

Inherent in-combination assessment for River Itchen SAC and SSSI

8.8.46 The overall assessment for the River Itchen SAC and SSSI concludes the magnitude of this impact is minor, on features of high value (the SSSI) to very high value (the SAC); therefore, this is an up to moderate adverse effect which is significant. This is because killing or injury of qualifying aquatic species, as discussed in paragraph 8.8.41 for the River Itchen SAC, concludes a moderate adverse effect, which is significant. Changes to air quality, habitat loss or degradation, habitat fragmentation, disturbance and hydrological change are addressed with the implementation of primary and tertiary mitigation and are therefore minor adverse effects which are not significant.

River Meon Compensatory SAC habitat

All components

Changes to air quality - vehicle emissions

8.8.47 Anticipated traffic levels within the affected road network within 200m of the River Meon Compensatory SAC are below the threshold to require modelling as the AADT is not exceeded and this is the level below which increases in traffic flows associated with the development are considered to be imperceptible. Therefore, adverse effects on the River Meon Compensatory SAC or its qualifying species or habitats as a result of emissions during construction are not considered likely. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

Construction dust and fine particulate matter emissions

8.8.48 The air quality assessment identified a high risk of impacts as a result of dust during trackout works associated with open-cut pipeline installation. The assessment also identified a medium risk of dust during open-cut pipeline

installation. The closest open-cut construction to the River Meon is 100m north-west. Temporary construction compound G-5 is located at its closest point 50m from the River Meon Compensatory SAC and all the compound is located within 250m of the SAC. Impacts from dust are therefore restricted to trackout works and open-cut construction works within 250m of the River Meon Compensatory SAC and works associated with temporary construction compound G-5.

8.8.49 With implementation of tertiary mitigation measures, generation of airborne dust and particulate matter would be reduced, such that the overall effect can be considered to be 'not significant', in accordance with guidance provided by the IAQM [45]. Impacts to qualifying species and habitats as a result of construction dust are therefore likely to be small scale and short-term. The magnitude of this impact is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

8.8.50 Detailed results and methods for the air quality modelling are provided within the ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) and ES Appendix 6.5 Ecological Transect Results, Volume II (Document reference 6.2, DCO Volume 6).

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

Disturbance

8.8.51 Trenchless construction under the River Meon may result in disturbance to susceptible species due to the presence of noise and vibration, resulting in barriers to fish migration, permanent or temporary injury or induced behavioural changes in fish and macroinvertebrate populations short-term. The assessment of underwater noise and vibration disturbance on fish species is given in the freshwater ecology section in paragraphs 8.8.344 to 8.8.351. No adverse effects for the identified impact are considered likely. The magnitude of this impact is negligible, on features of low to high value; therefore, this is an up to minor adverse effect which is not significant.

Killing or injury

8.8.52 There are two open-cut crossings located on a drainage ditch within the River Meon catchment. Paragraph 8.8.356 details the impact assessment with regards to the potential killing or injury of qualifying aquatic species for the River Meon Compensatory SAC habitat. The magnitude of this impact is minor, on features of high to very high value; therefore, this is an up to moderate adverse effect which is significant.

Hydrological Change

8.8.53 During construction there is a risk of changes to groundwater which could impact groundwater dependent ecosystems including the River Meon Compensatory SAC habitat. Qualifying habitats of this site could become degraded through changes in water quality or quantity. This could have indirect negative effects on qualifying species of these sites. Water quality may change due to accidental pollution events during construction. Groundwater flows and levels may be affected by temporary short-term physical modifications (e.g. excavations or tunnelling), which would

interrupt the natural groundwater flow pathways. The other potential risks to groundwater associated with excavations or tunnel construction include temporary short-term dewatering, if required, for the tunnel or shafts, diverting water away from the waterbodies or bypassing part of the system, leading to reduced groundwater flow.

8.8.54 With the implementation of tertiary measures as detailed within paragraph 8.8.44 the magnitude of this impact is negligible, on features of very high value; therefore, this is a minor adverse effect which is not significant.

Inherent in-combination assessment for River Meon Compensatory SAC Habitat

8.8.55 The overall assessment for the River Meon Compensatory SAC habitat is that the magnitude of this impact is minor, on features of high to very high value; therefore, this is a minor to moderate adverse effect which is significant. This is because killing or injury of qualifying aquatic species, as discussed in paragraph 8.8.356 for the River Meon Compensatory SAC Habitat, concludes a moderate adverse effect, which is significant. Changes to air quality and hydrological change are addressed with the implementation of primary and tertiary mitigation and are therefore minor adverse effects which are not significant.

Chichester and Langstone Harbour SPA and Ramsar, Langstone Harbour SSSI and Chichester Harbour SSSI

All components

Changes to air quality - vehicle emissions

8.8.56 Exceedances in the CLe (pollutant concentrations in the atmosphere) and CLo (deposition of pollutants) caused by the construction of the Proposed Development could lead to habitat degradation and or loss within the Chichester and Langstone Harbour SPA and Ramsar, negatively impacting the qualifying features of the Chichester and Langstone Harbour SPA and Ramsar and Langstone Harbour SSSI.

8.8.57 Chichester and Langstone Harbour SPA and Ramsar and Langstone Harbour SSSI is within 200m of the affected road network (or within 50m of access routes) and is modelled to have a change greater than 1% of the CLe or above 1% of the CLo.

8.8.58 There is potential for effects to occur within the SPA, Ramsar and SSSI, including smothering qualifying habitats. This could result in habitat degradation potentially impacting food availability for qualifying birds and assemblages. Air quality modelling undertaken for Chichester and Langstone Harbour SPA and Ramsar and Langstone Harbour SSSI was based on the most sensitive qualifying species (terns). In all modelled locations background nitrogen deposition is already in excess of minimum CLo for qualifying birds (220.8% of the minimum CLo for the most sensitive species and 110.04% of minimum CLo for other qualifying birds). The PEC (baseline plus the Proposed Development) results in 220.99% of the minimum CLo for terns.

8.8.59 Marine and inter-tidal systems will be subject to tidal flushing. The Solent has a high tidal range and the regular inundation is likely both to have a much greater

influence on botanical composition than atmospheric nitrogen inputs and will remove a large proportion of any nitrogen that does deposit from atmosphere, thus preventing it from accumulating to the same extent as in terrestrial habitats. Based on the very minor increases over a short duration within areas where background deposition is already in excess of CLo, the Proposed Development would not undermine the conservation objective of maintaining deposition of air pollutants to, at or below the site-relevant CLo as a result of nitrogen deposition. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.60 The Proposed Development would result in well below the acid deposition 1% of CLo threshold (0.06%). Together with background deposition this increases to 79.96% of the minimum CLo. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.61 The qualifying species of the SPA and Ramsar are not sensitive to atmospheric nitrogen or ammonia and there are therefore no relevant CLe and no impacts associated with atmospheric nitrogen or ammonia. The qualifying habitats of the Ramsar are sensitive to atmospheric nitrogen. However, the air quality modelling shows that the Proposed Development contributes well below 1% of the CLe (0.1%). The qualifying habitats of the Ramsar are sensitive to atmospheric ammonia. The atmospheric ammonia at the closest modelled point within the Ramsar site is 0.1% of the minimum CLe, together with background levels it is 81.1% of the minimum CLe. Due to the short-term nature of the Proposed Development's contribution together with the very low levels of atmospheric nitrogen or ammonia, no significant adverse effects are likely. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

Changes to air quality - construction dust and fine particulate matter emissions

8.8.62 The air quality assessment identified a low risk of impacts to Chichester and Langstone Harbour SPA and Ramsar and Langstone Harbour SSSI resulting from earthworks and construction activities at the WRP site and no impact associated with trackout from the WRP site. With implementation of standard mitigation measures as secured in the Outline CEMP (Document reference 7.1, DCO Volume 7), generation of airborne dust would be reduced, such that the overall effect can be considered to be 'not significant', in accordance with guidance provided by the IAQM [45].

8.8.63 In addition, due to the distance of the SPA and SSSI from the WRP site (approximately 170m south) and due to the prevailing south-west winds, emissions from NRMM would be dispersed away from the designated site for the majority of the time. There would therefore be sufficient dilution and dispersion of pollutant emissions from NRMM. Impacts to qualifying species and habitats as a result of construction dust and NRMM emissions are therefore likely to be small scale and short-term. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.64 Detailed results and methods for the air quality modelling are provided within the ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO

Volume 6) and ES Appendix 6.5 Ecological Transect Results, Volume II (Document reference 6.2, DCO Volume 6).

Water Recycling Plant Site

Habitat loss or degradation

8.8.65 More than 98% of SWBGS site H08, functionally linked habitat to Chichester and Langstone Harbours SPA and Ramsar, is located within the Order Limits at the WRP site. Vegetation removal would be required to facilitate the construction of the WRP site. This would result in the permanent loss of dense scrub and grassland which currently forms OMH. Some of the SWBGS site covers the adjacent road network and an area of mature trees adjacent to the A27 slip road, which have never been suitable for wintering waders or brent geese. As a result, the area of functionally linked habitat that will be lost is approximately 4.6ha (rather than the total area of the SWBGS site, which is 5.2ha). Based on non-breeding bird surveys undertaken at H08 from October to March inclusive in 2021/22, 2022/23 and 2023/24, qualifying bird species did not regularly use this habitat. HBIC SWBGS records show the site was categorised as low use due to eight records: six which pertain to brent geese and two for oystercatcher [71]. The highest counts were for 69 brent geese and 15 oystercatcher in 2008. This could be due to the undulating nature of the site and a reduction in suitability of supporting vegetation for foraging and roosting by qualifying species. However, due to the area of functionally linked habitat loss at H08, the magnitude of this impact is moderate, on a feature of very high value; therefore, this is a major adverse effect which is significant.

8.8.66 The WRP SuDS outfall at Hermitage Stream is located within SWBGS site H130, functionally linked habitat to Chichester and Langstone Harbours SPA. The construction of this outfall would result in the permanent loss of habitat functionally linked to the SPA. The habitat at the location of the outfall is artificial hard structures and littoral mud that could be used by qualifying species for feeding and roosting. Due to the small area of habitat affected and low use of the bank by qualifying species demonstrated by non-breeding bird surveys, the magnitude of this impact is negligible on features of very high value; therefore, this is a minor adverse effect which is not significant.

Disturbance

8.8.67 The WRP site is within 180m of Chichester and Langstone Harbour SPA and Ramsar and part of the WRP site is classified as SWBGS site H08, habitat functionally linked to the SPA. Due to this, there is potential for construction activities to cause disturbance to qualifying species of the SPA up to medium-term, through both visual, noise and vibration stimuli. It is noted that the construction of the Pipelines between Budds Farm WTW and the WRP site are screened via hedgerows and a road to the south. A further nine SWBGS sites are within 650m of the WRP site. There is a range of noise disturbance tolerance thresholds for the qualifying species of the SPA, ranging from 50m to 650m depending on the species and source of disturbance, which determine the noise level and regularity of the noise. Construction noise levels greater than or equal to 50dB at the relevant sensitive feature or 20dB or more above baseline are considered likely to cause

disturbance to qualifying species [72]. Four acoustic receivers were deployed either within (ER4), along the northern boundary of (ER2 and ER3) or adjacent to (ER1) Chichester and Langstone Harbour SPA and Ramsar. The majority of estimated noise levels during construction works at the WRP site were below 50 equivalent continuous sound pressure level (LAeq). However, at ER3, noise levels are estimated to be 50LAeq during pilling works and 51LAeq during pile caps and civil works. The Outline CEMP (Document reference 7.1, DCO Volume 7) secures tertiary mitigation measures to reduce disturbance to birds. This includes avoiding, where practicable, disturbance to breeding birds by timing vegetation clearance and removal of structures outside of the bird nesting season (March to August inclusive). This is relevant to common tern *Sterna hirundo*, little tern *Sternula albifrons* and sandwich tern *Thalasseus sandvicensis*. If this is not practicable, preconstruction bird surveys and supervision will be undertaken by an ECoW. Known tern breeding sites within Chichester and Langstone Harbour are sufficiently distant from the Proposed Development at the WRP site where noise levels are likely to be below 50LAeq. Therefore, the magnitude of this impact is negligible, on qualifying breeding bird features of very high value, resulting in a minor adverse overall effect which is not significant.

8.8.68 For non-breeding qualifying species associated with the SWBGS, construction works undertaken during the non-breeding bird period (September to March inclusive, March being a passage period), could cause significant disturbance up to medium-term and potentially displacement of qualifying species (if present) closer to the WRP site than the acoustic receivers deployed. This refers to SWBGS site H08, H07A, H07B and H07C. Therefore, the magnitude of this impact is minor due to temporary up to medium-term disturbance considered likely on features of very high value; therefore, this is a moderate adverse effect which is significant.

8.8.69 SWBGS site H130 is located within the Order Limits at Hermitage Stream at the WRP SuDS outfall and connection to the WRP and is designated as functionally linked land to Chichester and Langstone Harbour SPA and Ramsar. Due to the high mobility of birds, there is potential that qualifying non-breeding bird species of the SPA or Ramsar may occupy land within the Order Limits, including SWBGS site H130. Therefore, there is potential for both visual and noise stimuli during construction works within H130 which could cause disturbance to these species in the short-term.

8.8.70 If piling is required within H130, tertiary mitigation measures secured through the Outline CEMP (Document reference 7.1, DCO Volume 7) include timing construction works to be undertaken outside of the non-breeding period as detailed within the Outline CEMP (Document reference 7.1, DCO Volume 7). Therefore, the magnitude of this impact is negligible on features of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.71 For non-breeding qualifying species associated with the SWBGS, construction works, including enabling works, for the WRP SuDS outfall and connection undertaken during the non-breeding bird period (September to March inclusive, March being a passage period), could cause disturbance and potentially displacement of qualifying species. The magnitude of this impact is minor due to temporary disturbance up to medium-term considered likely, on features of very high value; therefore, this is a moderate adverse effect which is significant.

Pipelines between Budds Farm Wastewater Treatment Works and the Water Recycling Plant site

Disturbance

8.8.72 The Pipelines between Budds Farm WTW and the WRP site cross via trenchless construction under Chichester and Langstone Harbour SPA and Ramsar and Langstone Harbour SSSI. In addition, temporary construction compound C-1 and the Budds Farm Pumping Station are located adjacent to SWBGS site H90 and there are nine SWBGS sites within 650m of the trenched open-cut section of the Pipeline at Budds Farm. Therefore, due to the proximity of construction works to these sites there is potential for construction activities, for example piling, to cause disturbance and displacement of breeding and non-breeding qualifying bird species through both visual and noise stimuli up to medium-term.

8.8.73 Based on noise model outputs, construction noise levels at Budds Farm (ER1) are estimated to be greater than or equal to 50 equivalent continuous sound pressure level (LAeq) during construction of the compound (65LAeq, moderate disturbance), trenchless construction works for pipe installation (69LAeq, moderate disturbance) and shaft construction (75LAeq, moderate to high disturbance). The Outline CEMP (Document reference 7.1, DCO Volume 7) includes tertiary mitigation measures to reduce disturbance to birds. This includes avoiding, where practicable, disturbance to breeding birds by timing vegetation clearance and removal of structures outside of the bird nesting season (March to August inclusive). This is relevant to common tern, little tern and sandwich tern. If this is not practicable, preconstruction bird surveys and supervision will be undertaken by an ECoW. Known tern breeding sites within Chichester and Langstone Harbour are sufficiently distant from the Proposed Development at the WRP site where noise levels are likely to be below 50LAeq. Therefore, the magnitude of this impact is negligible, on qualifying breeding bird features of very high value, resulting in a minor adverse overall effect which is not significant.

8.8.74 For non-breeding qualifying species associated with the SWBGS, construction works undertaken during the non-breeding bird period (September to March inclusive, March being a passage period), could cause significant disturbance and potentially displacement of qualifying species, particularly populations using the adjacent lagoon and upper shore for feeding and roosting. The magnitude of this impact is minor due to temporary disturbance up to medium-term considered likely, on features of very high value; therefore, this is a moderate adverse effect which is significant.

Hydrological change

8.8.75 Piling activities at the WRP site have the potential to create a preferential pathway between the historical landfill and aquifers. Should a pathway be created there is the potential for large scale, long-term impacts on groundwater quality. This could have a negative impact on the water quality of Chichester and Langstone Harbour SPA and Ramsar and Langstone Harbour SSSI as they are hydraulically connected to hermitage stream. This is detailed within ES Chapter 11 Land quality and ground conditions, Volume I (Document reference 6.1, DCO Volume 6). However, with the implementation of mitigation including casting in situ piles and undertaking remediation works as detailed within the Outline CEMP (Document

reference 7.1, DCO Volume 7), the magnitude of this impact is negligible on a feature of very high value; therefore, this is a neutral effect which is not significant.

Inherent in-combination assessment of Chichester and Langstone Harbour SPA, Ramsar and SSSI

8.8.76 The overall assessment for the Chichester and Langstone Harbour SPA, Ramsar and SSSI is the magnitude of this impact is moderate, on a feature of very high value; therefore, this is a major adverse effect which is significant. This is because habitat loss, as discussed in paragraph 8.8.65 of SWBGS site H08, which is functionality linked habitat to Chichester and Langstone Harbour SPA and Ramsar at the WRP site concludes a major adverse effect which is significant. In addition, disturbance to non-breeding qualifying species associated with SWBGS sites, as discussed in paragraphs 8.8.71, 8.8.68 and 8.8.74 concludes a moderate adverse effect which is significant. Changes to air quality and hydrological change are addressed with the implementation of primary and tertiary mitigation and are therefore neutral to minor adverse effects which are not significant.

Solent Maritime SAC

All components

Changes to air quality - vehicle emissions

8.8.77 Exceedances in the CLe (pollutant concentrations in the atmosphere) and CLo (deposition of pollutants) caused by the construction of the Proposed Development could lead to habitat degradation and or loss within the Solent Maritime SAC, negatively impacting the qualifying features of the SAC.

8.8.78 The Solent Maritime SAC is within 200m of the affected road network (or within 50m of access routes) and is modelled to have a change greater than 1% of the CLe or above 1% of the CLo.

8.8.79 Air quality modelling for Solent Maritime SAC is based on the most sensitive qualifying habitat's nutrient nitrogen CLo (fixed coastal dunes and perennial vegetation of stony banks) which are present at the shoreline. The PC of the Proposed Development is much less than 1% of the minimum CLo (less than 0.19%). The increase in nitrogen deposition as a result of the Proposed Development is therefore very minor. In all modelled locations along the Solent Maritime SAC air quality transects, background nitrogen deposition is already in excess of minimum CLo for qualifying habitats with a background of 220.8% of the minimum CLo for the most sensitive habitat type. The PEC, which consists of the baseline plus the Proposed Development, results in a maximum of 220.99% of the minimum CLo for the most sensitive qualifying habitat. The Proposed Development would therefore result in very minor temporary up to medium-term increases in nitrogen deposition in locations already in excess of minimum CLo.

8.8.80 Marine systems are nitrogen-limited. As such, nitrogen inputs are more likely to affect marine systems than freshwater systems. However, consideration should also be given to the relative scale of nitrogen inputs from air into marine habitats compared to those from other sources. In most cases, nitrogen inputs from the atmosphere are likely to be miniscule compared to inputs from marine and riverine sources [73]. In addition, marine and inter-tidal systems will be subject to tidal flushing. The Solent has a high tidal range and the regular inundation is likely both

to have a much greater influence on botanical composition than atmospheric nitrogen inputs and will remove a large proportion of any nitrogen that does deposit from atmosphere, thus preventing it from accumulating to the same extent as in terrestrial habitats. Overall, based on the minor increases over a short duration within areas where background deposition is already in excess of CLo, the Proposed Development would not undermine the conservation objective of maintaining deposition of air pollutants to at or below the site-relevant CLo and would not result in any likely significant effects as a result of nitrogen deposition. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.81 The qualifying habitats of the SAC are sensitive to atmospheric nitrogen. However, the Proposed Development contribution is 0.19% of the CLe and therefore also well below 1% of the CLe. Due to the short-term nature of the Proposed Development's contribution together with the very low levels, no adverse effects are considered likely. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.82 The qualifying habitats of the SAC are sensitive to atmospheric ammonia. Atmospheric ammonia as a result of the Proposed Development at the closest modelled point within the Ramsar site is 0.1% of the minimum CLe. Together with background levels (81%), the level is 81.1% of the minimum CLe. Due to the short-term nature of the Proposed Development's contribution together with the very low levels, no adverse effects from atmospheric ammonia are likely. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.83 The only qualifying habitat sensitive to acid deposition is Fixed coastal dunes, which are not present within the area affected by the Proposed Development. Therefore, acid deposition would have no adverse effect and would not result in likely significant effects.

Changes to air quality - construction dust and fine particulate matter emissions

8.8.84 Detailed results and methods for the air quality modelling are provided within the ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) and ES Appendix 6.5 Ecological Transect Results, Volume II (Document reference 6.2, DCO Volume 6).

8.8.85 The air quality assessment identified a low risk of impacts to Solent Maritime SAC resulting from earthworks and construction activities at the WRP site and no impact associated with trackout from the WRP site due to the distance of the SAC from the WRP site (approximately 200m). With implementation of standard mitigation measures as secured in the Outline CEMP (Document reference 7.1, DCO Volume 7), generation of airborne dust would be reduced, such that the overall effect can be considered to be 'not significant', in accordance with guidance provided by the IAQM [45].

8.8.86 Additionally, due to the prevailing south-west winds, emissions from NRMM and other construction dust and fine particulate matter, would be dispersed away from the designated site for the majority of the time during construction at the WRP site. There would therefore be sufficient dilution and dispersion of pollutant emissions from NRMM to avoid any effects. Impacts to qualifying species and habitats as a

result of construction dust and NRMM emissions are therefore likely to be small scale and short-term. The magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant.

Inherent in-combination assessment of Solent Maritime SAC

8.8.87 The overall assessment for Solent Maritime SAC is the magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant. This is because changes to air quality is concluded with the implementation of primary and tertiary mitigation to be minor adverse effect which is not significant.

Portsmouth Harbour SPA, Ramsar and SSSI

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

Habitat loss or degradation

8.8.88 Isolation, air and washout valves will be required along the Pipeline between the WRP site and Otterbourne WSW. These would result in permanent habitat loss of 2x2m for each washout or air valve and 1x1m for each isolation valve (two isolation valves required per washout/air valve). The estimated habitat loss for isolation, air and washout valves has been calculated based on the proportion of different habitat types across the Pipeline as the location of these assets is currently unknown and will be finalised post-consent. The location of these assets is constrained by topography and distance between them as described within ES Chapter 3 Description of Proposed Development, Volume I (Document reference 6.1, DCO Volume 6). SWBGS site W03G (candidate site), functionally linked land to Portsmouth Harbour SPA is located within the pipeline Limits of Deviation. Therefore, there is potential for a small area (up to 10m^2 at each location) of discrete permanent loss of habitat functionally linked to the SPA. The magnitude of this impact is negligible on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

8.8.89 Solent Waders Brent Goose Strategy candidate site W03G is located within the Order Limits at Portsdown Hill. Vegetation removal would be required within the south-eastern section of the site W03G to facilitate the trenched open-cut construction of the Pipeline between the WRP site and Otterbourne WSW. Construction works could also cause soil compaction at site W03G resulting in damage or loss of retained surrounding habitat. This would result in the temporary loss and degradation up to medium-term of improved grassland, which is functionally linked habitat to Portsmouth Harbour SPA. Habitat will be reinstated following construction, as secured in the Outline LEMP (Document reference 7.5, DCO Volume 7). The construction works in this location would take place outside of the non-breeding period of qualifying features of the designated site, as secured through the Outline CEMP (Document reference 7.1, DCO Volume 7). The magnitude of this impact is negligible, on features of very high value; therefore, this is a minor adverse effect which is not significant.

Disturbance

8.8.90 Portsmouth Harbour SPA, Ramsar and SSSI, designated for their internationally important bird assemblages, are located 1.6km from Portsdown Hill and SWBGS site W03G which is designated as functionally linked land to Portsmouth Harbour SPA. The SWBGS site W03G is located within the Order Limits at Portsdown Hill and due to the high mobility of birds, there is potential that qualifying bird species of the SPA or Ramsar may occupy land within the Order Limits, including SWBGS site W03G. Therefore, there is potential for both visual and noise stimuli during trenched open-cut construction which could cause disturbance to these species up to medium-term. However, tertiary mitigation measures secured through the Outline CEMP (Document reference 7.1, DCO Volume 7) include carrying out construction works within W03G and an adjacent buffer of at least 175m outside of the non-breeding period. Therefore, the magnitude of this impact is negligible, on features of very high value; therefore, this is a minor adverse effect which is not significant.

Inherent in-combination assessment of Portsmouth Harbour SPA and Ramsar

8.8.91 The overall assessment for Portsmouth Harbour SPA, Ramsar and SSSI is the magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant. This is because habitat loss or fragmentation and disturbance are concluded with the implementation of primary and tertiary mitigation to be minor adverse effects which are not significant.

Singleton and Cocking Tunnels SAC

Pipelines between the Water Recycling Plant site and Bedhampton Springs

Habitat fragmentation

8.8.92 The Pipelines between the WRP site and Bedhampton Springs are partially located within the Havant Bechstein's Bat Area. There is suitable habitat for Bechstein's and barbastelle within Staunton Country Park and for barbastelle along Hermitage Stream and along the coastal habitats. Even though construction works will only be undertaken up to Bedhampton Springs, because of the functional connectivity between Havant and Singleton and Cocking Tunnels SAC and as movements between summer and winter roosts are not well known generally (owing to the ecology of the species, rather than from lack of survey data), there remains potential for bats from within the SAC to be present within the Order Limits and, similarly, for bats within the Order Limits to hibernate within the SAC. As such, any adverse effects on Bechstein's bats and barbastelle associated with the Proposed Development could impact the bat populations associated with the SAC.

8.8.93 At Bedhampton Springs, the pipeline will be constructed using trenched open-cut and above-ground construction. The temporary vegetation removal required for construction of the Proposed Development would not result in the loss of ecological connectivity as habitats to the south that provide connectivity with the SAC would not be impacted. This construction activity would result in the loss of a discrete area of foraging and commuting habitat within Bedhampton Springs. However, the impacts would be temporary up to medium-term with alternative foraging and commuting habitat including the woodland strip to the south available. This part of the Proposed Development is outside of functionally linked habitat to the SAC. The

magnitude of this impact is negligible on features of very high value; therefore, this is a minor adverse effect which is not significant.

Disturbance

8.8.94 Noise and vibration from construction activities have the potential to disturb roosting bats up to medium-term, refer to paragraph 8.8.249 for additional information. To date, no confirmed roosts have been identified at Bedhampton Springs. However, given the habitat availability and the roost switching behaviour of tree roosting bats, there remains potential that roost features within Bedhampton Springs may be used in the future by barbastelle, a qualifying species for Singleton and Cocking Tunnels SAC. However, precautionary working measures secured by the Outline CEMP (Document reference 7.1, DCO Volume 7) ensure that sufficient distances will be maintained from any confirmed roosts at the time of works to reduce disturbance. As such, the magnitude of this impact is negligible on features of very high value; therefore, this is a minor adverse effect which is not significant.

Inherent in-combination assessment of Singleton and Cocking Tunnels SAC

8.8.95 The overall assessment for Singleton and Cocking Tunnels SAC is the magnitude of this impact is negligible, on a feature of very high value; therefore, this is a minor adverse effect which is not significant. This is because habitat fragmentation and disturbance are concluded with the implementation of primary and tertiary mitigation to be minor adverse effects which are not significant.

Sites of Special Scientific Interest

All components

Changes to air quality - vehicle emissions

8.8.96 In order to assess the potential effects of airborne pollution during construction, traffic modelling and modelling of associated emissions from vehicles has been undertaken along the affected road network where this is within 200m of SSSI's. The increase in traffic flows along the affected road network would be temporary, during construction, up to medium-term. The model has used the peak traffic flows in 2031 and the pipeline construction work is expected to take place between 2029 and 2032, with enabling works starting in 2028. Additional traffic flows along the affected road network are predicted for part of the construction period, not the entirety; they would therefore not experience peak flows throughout. Road traffic emissions factors used in the model were representative of a 2028 fleet (i.e. the first year of construction). Emissions factors are anticipated to improve over time, therefore, application of 2028 emissions factors represents a conservative approach.

River Itchen SSSI

8.8.97 Air quality impacts on the River Itchen SSSI are described in paragraphs 8.8.26 to 8.8.36 following on from the related River Itchen SAC air quality impacts. There is assessed to be a temporary negligible impact, on a feature of high value; therefore, there is a minor adverse effect which is not significant.

Langstone Harbour SSSI

8.8.98 Air quality impacts on Langstone Harbour SSSI are the same as those described in paragraphs 8.8.56 to 8.8.64 relating to the Chichester and Langstone Harbour SPA and Ramsar assessment. There is assessed to be a temporary negligible impact, on a feature of high value; therefore there is a minor adverse effect which is not significant.

Portsdown SSSI

8.8.99 Predicted changes in nutrient nitrogen deposition rates at Portsdown SSSI are predicted to be below 1% of the lower nitrogen deposition CLo for qualifying habitats (minimum CLo for SSSI habitats is 10kgN/ha-year) within the SSSI from the Proposed Development alone. However, in-combination with other cumulative developments, all air quality transect locations within the SSSI are predicted to be over 1% of minimum CLo for the qualifying calcareous grassland habitats. There is therefore a potential for an adverse effect in-combination with other developments. Total nitrogen deposition rates for both the Proposed Development alone and cumulatively are in exceedance of the lower CLo at Portsdown SSSI for all modelled transect points. However, background nutrient nitrogen deposition rates already exceed the lower CLo at all modelled points within the SSSI by 119%. There is therefore a potential that some deterioration of qualifying habitats has occurred as a result of nitrogen deposition. The increases as a result of the Proposed Development do not result in any additional areas of the SSSI becoming in excess of CLo. The Process Contribution from the Proposed Development alone is very low (between 0.038kgN/ha-year and 0.005kgN/ha-year) and would be temporary for the duration of construction only. CLo for nitrogen deposition are based on an assumption of exposure to those nitrogen loadings for periods of 20-30 years. As the Proposed Development will only result in impacts to traffic during construction, approximately a five-year period in total, there is a reduced likelihood of a negative effect, because it is less likely to result in a material change in the annual average value and, by definition, will not contribute to long-term exposure.

8.8.100 Overall, based on the minor increases over a short duration, the Proposed Development is unlikely to result in any significant habitat degradation or adverse impacts to habitats within the SSSI and will therefore not have an adverse effect on the integrity of the site as a result of nitrogen deposition. This is a negligible impact, on a feature of high value; therefore there is a minor adverse effect which is not significant.

8.8.101 The predicted changes in acid deposition rates along air quality transect points at Portsdown SSSI are predicted to be well below 1% of the lower CLo with the Proposed Development alone (between 0.32% at 0.7m and 0.03% at 200.7m), but are predicted to be above 1% of the lower CLo between 0.7m and 110.7m from the road edge when the Proposed Development is assessed cumulatively with other developments. When combined with background deposition rates, total acid deposition for both the Proposed Development alone and cumulatively are in exceedance of the lower CLo Portsdown SSSI for all modelled transect points. However, background acid deposition rates already exceed the lower CLo by 109% and the Proposed Development does not result in any additional areas within the SSSI exceeding the lower CLo. As with nitrogen deposition, the changes as a result of the Proposed Development are minor and temporary, for the duration of

the construction only and unlikely to result in any significant habitat degradation or adverse impacts to habitats within the SSSI.

8.8.102 The CLe of ammonia for habitats are either 1ug/m^3 or 3ug/m^3. The lower level is relevant for more sensitive bryophytes and lichen communities. The SSSI citation does not identify bryophyte or lichens and therefore the higher CLe has been applied. Predicted ammonia concentrations as a result of the Proposed Development alone and in-combination with other developments are predicted to be well below this CLe (maximum in-combination of 1.23ug/m^3 at the 0.7m transect point). No adverse effects as a result of atmospheric ammonia are therefore anticipated.

8.8.103 The predicted changes in atmospheric nitrogen (NOx) as a result of the Proposed Development are predicted to be below 1% of CLe for the Proposed Development alone, but are in excess of 1% of CLe between 0.7m and 160.7m from the road edge when the Proposed Development is assessed cumulatively with other developments. However, the PEC is well below the CLe for all transect locations both alone and in-combination (maximum of 18.64 ug/m^3 which is 62.1% of CLe). No adverse effect is therefore likely as a result of atmospheric nitrogen.

8.8.104 Overall, air quality impacts as a result of traffic changes during the construction of the Proposed Development are assessed to result in a temporary negligible impact, on a feature of high value; therefore there is a minor adverse effect which is not significant.

St. Catherine's Hill SSSI

8.8.105 Predicted changes in nutrient nitrogen deposition rates at St. Catherine's Hill SSSI are predicted to be above 1% of the lower nitrogen deposition CLo for qualifying habitats within the SSSI from the Proposed Development alone between 0m and 20m (drops below CLo between the 10m and 20m transect points) to the west of the M3 and between 0m and 30m (drops below CLo between the 20m and 30m transect points) to the east of the M3. There is therefore a potential for an adverse effect on qualifying habitats as a result of the Proposed Development alone. In-combination with other developments, air quality transect locations within the SSSI between 0m and 90m to the west of the M3 and between 0m and 60m to the east of the M3 are predicted to be over 1% of minimum CLo for the qualifying calcareous grassland habitats. Total nitrogen deposition rates for both the Proposed Development alone and cumulatively are in exceedance of the lower CLo for all modelled transect points. However, background nutrient nitrogen deposition rates already exceed the lower CLo at all modelled points within the SSSI by 147%. There is therefore a potential that some deterioration of qualifying habitats has occurred as a result of nitrogen deposition due to the proximity of the M3 motorway and the long-term exposure to nitrogen deposition in excess of CLo. The increases as a result of the Proposed Development do not result in any additional areas of the SSSI becoming in excess of CLo. The Process Contribution from the Proposed Development alone is low (between 0.3kgN/ha-year and 0.03kgN/ha-year and would be temporary for the duration of construction only. As the Proposed Development will only result in impacts to traffic during construction, approximately a five-year period in total, there is a reduced likelihood of a negative effect, because it is less likely to result in a material change in the annual average value and, by definition, will not contribute to long-term exposure.

8.8.106 Overall, based on the minor increases over a short duration, the Proposed Development is unlikely to result in any significant habitat degradation or adverse impacts to habitats within the SSSI and will therefore not have an adverse effect on the integrity of the site as a result of nitrogen deposition. This is a negligible impact, on a feature of high value; therefore there is a minor adverse effect which is not significant.

8.8.107 The predicted changes in acid deposition rates along air quality transect points at St, Catherine's Hill SSSI are predicted to be above 1% of the lower CLo from the Proposed Development alone at the 0m transect point to the west of the M3 (dropping below 1% between the 0m and 10m transect points) and at the 0m and 10m transect points (dropping below 1% between the 10m and 20m transect points). In-combination with other developments predicted acid deposition is above 1% of the lower CLo between 0m and 70m west of the M3 and between 0m and 50m east of the M3. When combined with background deposition rates, total acid deposition for both the Proposed Development alone and cumulatively are in exceedance of the lower CLo for all modelled transect points. However, background acid deposition rates already exceed the lower CLo by 127% and the Proposed Development does not result in any additional areas within the SSSI becoming over minimum CLo. The changes as a result of the Proposed Development are minor and temporary, for the duration of the construction only and unlikely to result in any significant habitat degradation or adverse impacts to habitats within the SSSI.

8.8.108 The CLe of ammonia for habitats are either 1ug/m^3 or 3ug/m^3. The lower level is relevant for more sensitive bryophytes and lichen communities. The SSSI citation does not identify bryophyte or lichens and therefore the higher CLe has been applied. PECs of ammonia as a result of the Proposed Development alone and in-combination with other developments are predicted to be well below this higher CLe (maximum in-combination of 1.58ug/m^3 at the 0m eastern transect point). No adverse effects as a result of atmospheric ammonia are therefore anticipated.

8.8.109 The changes in atmospheric nitrogen (NOx) as a result of the Proposed Development are predicted to be above 1% of CLe for the Proposed Development alone at the 0m transect point west of the M3 and at the 0m and 10m transect points to the east of the M3. In-combination with other developments, NOx is predicted to be in excess of 1% of CLe between the 0m and 100m transect points west of the M3 and between the 0m and 50m transect points east of the M3. However, the PEC is well below the CLe for all transect locations both alone and in-combination. No adverse effect is therefore likely as a result of atmospheric nitrogen.

8.8.110 Overall, air quality impacts as a result of traffic changes during the construction of the Proposed Development are assessed to result in a temporary negligible impact, on a feature of high value; therefore there is a minor adverse effect which is not significant.

Changes to air quality - construction dust and fine particulate matter emissions

8.8.111 There is potential for risk of impacts as a result of dust during trackout works associated with open-cut pipeline installation and installation of the pipeline itself where these activities are within 250m of SSSIs.

8.8.112 With implementation of tertiary mitigation measures, generation of airborne dust and particulate matter would be reduced, such that the overall effect can be considered to be 'not significant', in accordance with guidance provided by the IAQM [69]. Impacts to qualifying species and habitats as a result of construction dust are therefore likely to be small scale and short-term. The magnitude of this impact is negligible, on features of high value; therefore, this is a minor adverse effect which is not significant.

8.8.113 Detailed results and methods for the air quality modelling are provided within the ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) and ES Appendix 6.5 Ecological Transect Results, Volume II (Document reference 6.2, DCO Volume 6).

Local Nature Reserves

All components

8.8.114 No LNRs are located within the Order Limits. For waterborne pollution construction impacts to LNRs that are hydrologically connected to the Proposed Development, the Outline CEMP (Document reference 7.1, DCO Volume 7) includes good practice mitigation measures to be implemented to manage the risk of pollution incidents during construction. These measures reduce risk and ensure rapid response to any incidents. This ensures that during construction there would be no adverse effects. The magnitude of this impact is negligible, on features of medium value; therefore, this is considered to be a neutral effect which is not significant.

8.8.115 The introduction or spread of INNS during construction may result in habitat degradation of LNRs site long-term which is hydrologically connected to the Order Limits. The management of INNS during construction is set out within the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) as detailed in paragraph 8.8.5. The magnitude of this impact is negligible, on features of medium value; therefore, this is neutral effect which is not significant.

8.8.116 No other impacts to LNR are anticipated.

Inherent in-combination assessment of statutory designated sites

8.8.117 The overall assessment for international sites, part of the NSN within the ZoI concludes the magnitude of this impact is moderate adverse, on a feature of very high value; therefore, this is a major adverse effect which is significant. This is because habitat loss at SWBGS site H08, as discussed in paragraph 8.8.65, which is functionality linked habitat to Chichester and Langstone Harbour SPA and Ramsar at the WRP site concludes a major adverse effect which is significant. In addition, disturbance to non-breeding qualifying species associated with SWBGS sites, as discussed in paragraphs 8.8.67 to 8.8.74 concludes a moderate adverse effect which is significant. Finaly, the killing or injury of qualifying aquatic species, as discussed in paragraph 8.8.41 for the River Itchen SAC and paragraph 8.8.52 for the River Meon Compensatory SAC Habitat, concludes a moderate adverse effect, which is significant.

8.8.118 The overall assessment for SSSIs within the ZoI concludes the magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse

effect which is not significant. This is because INNS, hydrological change, changes to air quality, disturbance to qualifying features, killing or injury and habitat loss or fragmentation are concluded with the implementation of primary and tertiary mitigation to be minor adverse effects which are not significant.

8.8.119 The overall assessment for LNRs within the ZoI concludes the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant. This is because INNS and waterborne pollution are concluded with the implementation of tertiary mitigation to be neutral effects which are not significant.

Non-statutory designated sites

All non-statutory designated sites

All components

8.8.120 The following effects are relevant to all non-statutory designated sites and across all components within the ZoI of the Proposed Development. Where an effect is site specific, it is presented by site under the relevant component section.

Invasive non-native species

8.8.121 The introduction or spread of INNS during construction may result in habitat degradation of a non-statutory designated site long long-term. The management of INNS during construction is set out within the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7). This sets out the management techniques to be employed to avoid and reduce the potential for likely effects on sensitive ecological receptors. Measures include enforcement of 'Check-Clean-Dry' protocols for all vehicles, machinery and personnel and site-specific method statements for INNS. As there are recognised standard practices for controlling INNS during construction this effect is considered addressed by tertiary mitigation measures. The magnitude of this impact is negligible, on features of medium value; therefore, this is a neutral effect which is not significant.

Hydrological change- drainage

8.8.122 Changes to water abstraction, release or storage during construction activities causing areas to become wetter or drier may lead to changes in vegetation species and communities supported by non-statutory designated sites. However, mitigation measures secured within the Outline CEMP (Document reference 7.1, DCO Volume 7) and that will be included within the Construction Drainage Plan will be prepared post-consent, will manage the quantity and quality of construction drainage and reduce or remove risk of sediment entrainment to mitigate for this impact. The magnitude of this impact is negligible, on features of medium value; therefore, this is considered to be a neutral effect which is not significant.

Changes to air quality - vehicle emissions

8.8.123 Habitat degradation may occur through the creation of airborne particles or introduction of toxic pollutants or sediments into the environment during construction (e.g. construction dust and fine particulate matter). In addition,

construction traffic (temporary traffic management measures and or additional vehicles travelling to and from the construction locations) and NRMM emissions could result in changes to air quality.

8.8.124 Exceedances greater than 1% of the respective CLo or CLe of pollutants caused by the construction of the Proposed Development could lead to habitat degradation and or loss within a non-statutory designated site.

8.8.125 Baseline air quality information for ecological receptors is contained in ES Appendix 6.4 Ecological features, background concentrations, background deposition rates and CLo, Volume II (Document reference 6.2, DCO Volume 6) and the transect locations are shown on ES Figure 6.4 Air quality construction phase road traffic emissions – Ecological receptors, Volume III (Document reference 6.3, DCO Volume 6). Refer to ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) for a summary of the results of air quality modelling for ecological receptors.

8.8.126 The ES Chapter 6 Air quality and odour, Volume I (Document reference 6.1, DCO Volume 6) includes sensitivity testing undertaken in 2026 to compare the results of the road traffic emissions assessment using the Air Quality Consultants tool [68] CREAM V1A derived ammonia emissions against CREAM V2A derived ammonia emissions, following the release of CREAM V2A. It is understood that CREAM V1A is generally more conservative than CREAM V2A. However, there are some cases where CREAM V2A ammonia emissions can be higher than those derived using CREAM V1A – particularly at lower speeds. Overall, it was found that in the majority of cases, using CREAM V2A derived NH_3 emissions resulted in no material change or improvement in modelled PCs and therefore the CREAM V1A derived emissions are reported on in this assessment. Two SINCs (out of the 801 ecological feature receptor points assessed) were considered to show a worsening of potential likely significant effects, specifically for acid deposition for the Proposed Development alone scenario. These were Stoke Park Wood SINC and The Mount, Fair Oak and Horton Heath SINC. However, in both cases the change was at 1% of the lower CLo and therefore imperceptible.

8.8.127 Non-statutory designated sites that may be sensitive to the effects of air pollution within 200m of the affected road network (or within 50m of access routes) and have been modelled to experience a change, attributed to the Proposed Development, of greater than 1% of the respective minimum CLo or CLe are summarised in Table 8-15. The SINCs are shown on ES Figure 8.3 Non-statutory designated sites within the desk study area, Volume III (Document reference 6.3, DCO Volume 6).

Table 8-15 Non-statutory sites subject to changes in air quality exceeding 1% of minimum Critical Load or Level

SINC name	SINC Criteria	Pollutant			
		Nitrogen deposition kgN/ha/yr	NOx ug/m^3	Atmospheric ammonia ug/m^3	Acid deposition kgN/ha/yr
Great Moorlands Copse Complex	1A- Ancient Semi-natural Woodlands	PC- 0.21 **2% change** PEC- 25.57 256% CL 1% at 37.6m from road	Insignificant change (1% or below)	PC- 0.02 **2% change** PEC- 1.22 122% CL 1% at 25.6m from road	PC- 0.015 **5% change** PEC- 1.92 674% CL 1% at 65.6m from road
Hockley Golf Course	2Aiii- Lowland Calcareous Grassland 2B- Semi-improved grasslands with unimproved grassland	PC- 0.23 **2% change** PEC- 26.26 263% CL 1% at 13.6m from road	Insignificant change (1% or below)	PC- 0.02 **2% change** PEC- 1.41 141% CL 1% at 23.6m from road	PC- 0.016 **11% change** PEC- 1.94 1368% CL*
Fielders Farm Meadows (Eastleigh)	2Aiii- Lowland Calcareous Grassland 2B- Semi-improved grasslands with unimproved grassland	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.02 **2% change** PEC- 1.15 115% CL Below 1% at 30m from road	Insignificant change (1% or below)
Land to the South of Portsdown Hill Road	2B- Semi-improved grasslands with unimproved grassland	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.02 **2% change** PEC- 1.01 101% CL 1% at 12.3m from road	Insignificant change (1% or below)

SINC name	SINC Criteria	Pollutant			
		Nitrogen deposition kgN/ha/yr	NOx ug/m^3	Atmospheric ammonia ug/m^3	Acid deposition kgN/ha/yr
Shawford Down	2B- Semi-improved grasslands with unimproved grassland 6A- Supports one or more Hampshire Notable Species	PC- 0.18 **2% change** PEC- 25.96 260% CL 1% at 10.9m from road	Insignificant change (1% or below)	PC- 0.02 **2% change** PEC- 1.28 128% CL 1% at 20.9m from road	PC- 0.013 **9% change** PEC- 1.93 1358% CL 1% at 50.9m from road
Birkdale Avenue	2Aiii- Lowland Calcareous Grassland	Insignificant change (1% or below)	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.007 **2% change** PEC- 1.67 469% CL Below 1% at 24.8m from road
Otterbourne Hill Common	1D- Pasture woodland and wooded commons (not included in other woodland criteria) 2B- Semi-improved grasslands with unimproved grassland	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.01 **2% change** PEC- 1.21 122% CL 1% at 42m from road	PC- 0.01 **4% change** PEC- 1.92 672% CL 1% at 132m from road
Colden Common Wood & Blacknells Copse	1A- Ancient Semi-natural Woodlands	Insignificant change (1% or below)	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.007 **2% change** PEC- 1.87 525% CL Below 1% at 10m from road

SINC name	SINC Criteria	Pollutant			
		Nitrogen deposition kgN/ha/yr	NOx ug/m^3	Atmospheric ammonia ug/m^3	Acid deposition kgN/ha/yr
Gore Copse	1A- Ancient Semi-natural Woodlands	Insignificant change (1% or below)	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.002 **2% change** PEC- 1.80 1266% CL Below 1% at 19.7m from road
Long Mead	2A- Agriculturally unimproved grasslands which are not of recent origin	Insignificant change (1% or below)	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.005 **2% change** PEC- 1.91 671% CL*
Swamp West of Recreation Grounds	5A- Areas of open freshwater 5B- Fens, flushes, seepages, springs and inundation grasslands of floodplains 6A- Support one or more Hampshire Notable Species	Insignificant change (1% or below)	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.005 **3% change** PEC- 1.84 1296% CL Below 1% at 20.4m from road
Blakes Copse	1A - Ancient Semi-natural Woodlands	Insignificant change (1% or below)	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.004 **3% change** PEC- 1.69 1190% CL*
Pitmore Copse	1A - Ancient Semi-natural Woodlands	Insignificant change (1% or below)	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.008 **2% change** PEC- 1.89 531% CL 1% at 77m from road
Pitmore Copse (West)	1B - Other woodland where there is a	Insignificant change (1% or below)	Insignificant change (1% or below)	Insignificant change (1% or below)	PC- 0.007 **3% change** PEC- 1.91 671.13% CL

SINC name	SINC Criteria	Pollutant			
		Nitrogen deposition kgN/ha/yr	NOx ug/m^3	Atmospheric ammonia ug/m^3	Acid deposition kgN/ha/yr
	significant element of ancient semi-natural woodland surviving				1% at 58.5m from road
*Does not drop to 1% or below at any modelled transect point.					

8.8.128 For simplicity, as per guidance [69], Table 8-15 presents the percentage change to whole numbers, as the criterion is recognised as 1% not 1.0%. The predicted change in NOx attributed to the Proposed Development (the PC) does not exceed 1% of the minimum CLe for any SINCs.

8.8.129 The PC is projected to exceed 1% of the minimum CLo for nitrogen deposition at three SINCs - Great Moorlands Copse Complex, Hockley Golf Course and Shawford Down - falling to 1% (or below) at approximately 30m, 10m, and 10m from the respective site boundaries.

8.8.130 The PC is only projected to exceed 1% of the maximum CLo for nitrogen deposition at a single transect point: the first modelling point at Hockley Golf Course SINC, with a 1.51% change at 3.6m from the M3 Hockley Link off-slip, dropping to 1% (1.1%) by 13.6m distance. The vegetation within the narrow roadside area projected to experience a greater than 1% change comprises woodland and scrub, habitat types which are not directly to the interest features for which the SINC is designated.

8.8.131 The PC is projected to reach 2% of the minimum CLe for ammonia at six SINCs - Great Moorlands Copse Complex, Hockley Golf Course, Fielders Farm Meadows (Eastleigh), Land to the South of Portsdown Hill Road, Shawford Down and Otterbourne Hill Common - falling to 1% (or below) between 10 to 30m from the respective site boundaries. All SINCs are modelled to experience a change below 1% of the maximum CLe for ammonia.

8.8.132 Although the minimum CLo for acid deposition are exceeded by as much as 11% (at Hockley Golf Course SINC), no site is subject to an exceedance of 1% of the maximum CLo, with the greatest percentage change being 1.23% of the maximum CLo for Great Moorlands Copse Complex SINC, adjacent to the M3 (Junction 11 to 12). This is in the context of extremely high predicted background levels, including PECs of over 1000% of the minimum CLe at five SINCs - Hockley Golf Course, Shawford Down, Gore Copse, Swamp West of Recreation Grounds and Blakes Copse.

8.8.133 Local background contributions of nitrogen deposition are largely attributed to livestock and Europe import (transboundary pollution arriving from the continent) with less than 10% of the contributions in these locations attributed to all road transport. Irrespective of the contribution attributed to the Proposed Development, background levels or deposition rates are modelled to exceed the minimum and maximum CLo for nitrogen deposition (except at Fielders Farm Meadows

(Eastleigh) SINC and Land to the South of Portsdown Hill Road SINC which do not exceed the maximum); the minimum CLe for atmospheric ammonia; and the minimum CLo for acid deposition. The maximum CLo for acid deposition is exceeded only at Great Moorlands Copse Complex SINC, Otterbourne Primary School Meadow SINC, Long Mead SINC, Swamp West of Recreation Grounds SINC and Otterbourne Hill Common SINC, with all these modelling PEC of 128% to 160% of the maximum CLo.

8.8.134 Whereas the effects of changes in air quality on ecological receptors occur gradually as a result of long-term trends and processes, the increase in traffic flows along the affected road network would be temporary. The model has used the peak traffic flows in 2031 as the pipeline construction work is expected to take place between 2029 and 2032, with enabling works starting in 2028. Additional traffic flows along the affected road network are predicted for part of the construction period, not the entirety; these sites would therefore not experience peak flows throughout. The predicted deposition rates associated with temporary construction traffic in the context of background deposition are not considered to be significant, bearing in mind the contributions from other sources.

8.8.135 Considering the temporary nature of the impact and the minimal contribution of ammonia, nitrogen and acid from the Proposed Development in the context of background deposition, adverse effects on any of the non-statutory sites are considered unlikely to arise as a result of the Proposed Development. The magnitude of the effect is negligible, on a feature of medium value; therefore, this is a is neutral effect which is not significant, for each SINC.

Changes to air quality - construction dust and fine particulate matter emissions

8.8.136 There is potential for risk of impacts as a result of dust during trackout works associated with open-cut pipeline installation and installation of the pipeline itself where these activities are within 250m of SINCs.

8.8.137 With implementation of tertiary mitigation measures, generation of airborne dust and particulate matter would be reduced, such that the overall effect can be considered to be 'not significant', in accordance with guidance provided by the IAQM [69]. Impacts to qualifying species and habitats as a result of construction dust are therefore likely to be small scale and short-term. The magnitude of this impact is negligible, on features of medium value; therefore, this is considered to be a neutral effect which is not significant.

Waterborne pollution

8.8.138 The Outline CEMP (Document reference 7.1, DCO Volume 7) includes good practice mitigation measures to be implemented to manage the risk of pollution incidents during construction to reduce risk and ensure rapid response to any incidents. This ensures that during construction there would be no adverse effects on the integrity of the designated site because of pollution incidents during construction. The magnitude of this impact is negligible, on features of medium value; therefore, this is considered to be a neutral effect which is not significant.

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

Habitat loss or degradation

8.8.139 Isolation, air and washout valves will be required along the Pipeline between the WRP site and Otterbourne WSW. These would result in permanent habitat loss of 2x2m for washout valves and air valves and 1x1m for isolation valves (two isolation valves required per washout/air valve). The estimated habitat loss for isolation, air and washout valves has been calculated based on the proportion of different habitat types across the Pipeline as the location of these assets is currently unknown and will be finalised post-consent. The location of these assets is constrained by topography and distance between them as described within ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6). The River Meon SINC and Fielders Farm Meadows (Eastleigh) SINC are located within the Order Limits of the Pipeline between the WRP site and Otterbourne WSW. Therefore, there is potential for small areas of discrete permanent habitat loss, up to 10m^2 at each location within the River Meon SINC and Fielders Farm Meadows (Eastleigh) SINC. The magnitude of this impact is negligible on features of medium value; therefore, this is a neutral effect which is not significant.

8.8.140 Field to West of Gillman Road SINC is located within the Order Limits, south of Portsdown Hill. Up to 1000m^2 of vegetation removal will be required within the northern central section of this SINC to facilitate temporary construction compound D-1. This would result in the medium-term, temporary loss and degradation of calcareous grassland (for which it is designated) within the SINC. The calcareous grassland will be reinstated as soon as reasonably practicable following construction, as per the Outline LEMP (Document reference 7.5, DCO Volume 7). Construction works could also cause soil compaction at the SINC, resulting in damage or temporary loss of retained surrounding habitat. Full details of habitat presence and condition at Field to West of Gillman Road SINC is described within paragraph 8.7.12. The magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

8.8.141 Fielders Farm Meadows (Eastleigh) SINC is located within the Order Limits, east of Winchester Road. Vegetation removal, comprising approximately 0.62ha of other neutral grassland would be temporarily required within the south-western section of the SINC to facilitate trenched open-cut construction and temporary construction compound L-5 associated with the trenchless construction works under Winchester Road. Full details of habitat presence and condition at Fielders Farm Meadows (Eastleigh) SINC is described within paragraph 8.7.12. Through scheme development, the Limits of Deviation of the pipeline and extent of the temporary construction compound L-5 have been refined to be located within neutral grassland which is in poor condition to reduce impacts. However, it would still result in the temporary up to medium-term loss and degradation of habitat within the SINC. Construction works could also cause soil compaction at the site resulting in damage or temporary up to medium-term loss of retained surrounding habitat. EMEA_L_4 allows space for the potential enhancement of coastal and floodplain grazing marsh HPI within the SINC and reinstatement and enhancement of grassland from poor to good condition. EMEA_L_5 includes the reinstatement

and improvement of Fielders Farm Meadows SINC to good condition to mitigate impacts during construction. The magnitude of this impact is negligible, on features of medium value; therefore, this is a neutral effect which is not significant.

Hydrological change

8.8.142 During construction there is a risk of changes to groundwater which could impact groundwater dependent habitats within Wickham Meadow SINC, Wintershill Farm Woodland SINC, Fielders Farm Meadows (Eastleigh) SINC and River Meon SINC. Qualifying habitats of the SINCs could become degraded through changes in water quality or quantity up to medium-term. Water quality may change due to accidental pollution events during construction up to medium-term. Groundwater flows and levels may be affected by temporary short-term physical modifications (e.g. excavations or tunnelling), which would interrupt the natural groundwater flow pathways. Other potential risks to groundwater associated with excavations or tunnel construction include temporary short-term dewatering, if required, for the tunnel or shafts, diverting water away from the waterbodies, or bypassing part of the system, leading to reduced groundwater flow.

8.8.143 With the implementation of tertiary measures as detailed within paragraph 8.8.43 the magnitude of this impact is negligible, on features of medium value; therefore, this is a neutral effect which is not significant.

Inherent in-combination assessment of non-statutory designated sites

8.8.144 The overall assessment for SINCs within the ZoI concludes the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant. This is because INNS, hydrological change, changes to air quality and habitat loss or fragmentation are concluded with the implementation of primary and tertiary mitigation to be neutral effects which are not significant.

Habitats

All components

Habitat loss or degradation

All habitats

8.8.145 Table 8-16 summarises the total terrestrial habitat loss for features of ecological value across all components. This does not include rivers and lakes, which are assessed in the freshwater biodiversity section. This includes permanent and temporary habitat loss. The table includes estimated habitat loss for isolation, air and washout valves based on the proportion of different habitat types across the Pipeline as the location of these assets is currently unknown.

Table 8-16 Total predicted habitat loss across all components

Habitat	UKHab code	Habitat loss	
		Area (ha)	Length (km)
Cropland	c1	71.93	-
Other neutral grassland	g3c	11.38	-
Open Mosaic Habitat on previously developed land	80	4.32	-
Dense scrub	h3	2.24	-
Wood-pasture and parkland	26	1.79	-
Other broadleaved woodland	w1g	1.33	-
Coastal and floodplain grazing marsh	19	0.62	-
Lowland calcareous grassland	g2a	0.57	-
Lowland mixed deciduous woodland	w1f	0.48	-
Other mixed woodland	w1h	0.04	-
Other coniferous woodland	w2c	0.03	-
Other calcareous grassland	g2c	0.01	-
Wet woodland	w1d	0.01	-
Other lowland acid grassland	g1d	0.002	-
Native hedgerows	h2a	-	4.49
Ecologically valuable line of trees	34	-	0.82
Other lines of trees	33	-	0.09

Other neutral grassland

8.8.146 Loss of other neutral grassland would occur across the Order Limits, apart from at the WRP site, where neutral grassland was recorded but is assessed separately as OMH HPI, and Section F of the Pipeline, where this habitat was recorded but would be retained. The predicted total area of habitat loss is approximately 11.38ha.

8.8.147 In general, the loss of other neutral grassland would be temporary up to medium-term as it will be reinstated following construction, as secured in the Outline LEMP (Document reference 7.5, DCO Volume 7). However, permanent loss would occur within four locations where this habitat would be replaced by lowland mixed deciduous woodland (EMEAs J_1 and J_2). The magnitude of this impact is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Scattered trees

8.8.148 The arboricultural survey data contained in ES Appendix 13.5 Arboricultural Impact Assessment, Volume II (Document reference 6.2, DCO Volume 6) states that within the Order Limits up to 267 individual trees and 15 tree groups would need

to be removed in full and up to 74 groups of trees and five woodlands would be partially removed.

8.8.149 Works are taking place within the RPAs of up to 52 retained trees, including trenched open-cut works, temporary construction compounds, permanent access, construction access, provision of working space and storage of materials. Furthermore, pruning will be required to 15 trees to allow access for machinery and pedestrians beneath the canopy without causing damage to the branches of retained trees.

8.8.150 Measures described in the ES Appendix 13.5 Arboricultural Impact Assessment, Volume II (Document reference 6.2, DCO Volume 6) and secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) will be implemented to reduce impacts to retained trees. All tree works should be carried out in accordance with BS3998:2010 [74] and BS 5837:2012 [75]. The tree protection fence will protect retained trees during construction; its location will be confirmed post-consent. It will be installed before any site works commence and will be removed only once all site works in the location are complete.

8.8.151 Additional tree planting is proposed within the Order Limits, comprising the planting of three trees for each category A tree lost, two trees for each category B tree lost and one for each category C/U tree lost. The magnitude of the effect is moderate on features of low value; therefore, this is a neutral effect which is not significant.

Changes to air quality – vehicle emissions

Ancient woodland

8.8.152 Screening of traffic flows and air quality modelling has been undertaken to assess the effects of nitrogen oxides, ammonia, nitrogen deposition and acid deposition within ancient woodlands within 200m of roads receiving additional construction traffic. Screening has shown that the HDV thresholds have been exceeded along the M3, between junctions 11 and 12. The LDV thresholds were not exceeded along any road links. For further details regarding the screening of traffic flows refer to ES Appendix 6.2 Air quality assessment traffic data, Volume II (Document reference 6.2, DCO Volume 6).

8.8.153 Ancient woodlands that may be sensitive to the effects of air pollution within 200m of the affected road network (or within 50m of access routes) and are modelled to experience a change, attributed to the Proposed Development, of greater than 1% of the respective minimum CLo or CLe are summarised in Table 8-17. Where ancient woodlands are also designated as SINCs those sites are discussed under the non-statutory designated sites heading, paragraphs 8.8.123 to 8.8.135. Ancient woodlands are shown on ES Figure 8.5 Ancient woodland and ancient, veteran and notable trees within the desk study area, Volume III (Document reference 6.3, DCO Volume 6).

Table 8-17 Ancient woodlands subject to changes in air quality exceeding 1% of minimum Critical Load or Level

Ancient Woodland ID	Pollutant			
	Nitrogen deposition kgN/ha/yr	NOx ug/m^3	Atmospheric ammonia ug/m^3	Acid deposition kgN/ha/yr
AW 1488547	PC- 0.23 **2% change** PEC- 25.73 257% CL 1% at 31m from road	Insignificant change (1% or below)	PC- 0.03 **3% change** PEC- 1.21 121% CL 1% at 41m from road	PC- 0.016 **5% change** PEC- 1.92 538% CL
AW 1489079	PC- 0.31 **3% change** PEC- 25.81 258% CL 1% at 20m from road	PC 0.34 **2% change** PEC 10.16 34% Below 1% at 10m from road	PC- 0.04 **4% change** PEC- 1.22 122% CL 1% at 20m from road	PC- 0.022 **6% change** PEC- 1.93 540% CL

8.8.154 Aerial imagery and priority habitat data were reviewed to identify the broad habitat type within each modelled location, comprising specific points at 10m intervals within each of the two ancient woodlands set out in Table 8-17 to inform the processing of the air quality model outputs. Both of these ancient woodlands are adjacent to the M3 (Junction 11 to 12).

8.8.155 The PC from the Proposed Development exceeds 1% of the minimum NOx CLe for 1489079 ASNW; however, the PEC does not exceed the NOx CLe at any of the modelled points as shown in Table 8-17.

8.8.156 The PC is projected to exceed 1% of the minimum CLo for nitrogen deposition at both ancient woodlands, falling to 1% (or below) at approximately 20m from each of the respective ancient woodland boundaries.

8.8.157 The PC is projected to exceed 1% of the maximum CLo for nitrogen deposition at the first modelling point for both ancient woodlands: with a 1.53% change at 11m from the M3 for 1488547 ASNW, dropping to 1.14% by 21m distance, and a 2.09% change at 0m from the M3 for 1489079 ASNW, dropping to 1% (1.08%) by 10m distance.

8.8.158 The PC is projected to reach 3% and 4% of the minimum CLe for ammonia at 1488547 ASNW (2.5%) and 1489079 ASNW (3.6%), falling to 1% (or below) between 40m and 0m from the respective site boundaries. Both ancient woodlands are modelled to experience a change below 1% of the maximum CLe for ammonia.

8.8.159 Although the minimum CLo for acid deposition are exceeded by 5% and 6% respectively, neither site is subject to an exceedance of 1% of the maximum CLo, with the greatest percentage change being 0.77% of the maximum CLo for 1489079 ASNW. This is in the context of very high predicted background levels, with PECs of over 500% of the minimum CLe for both ancient woodlands.

8.8.160 Concentrations of ammonia along with the deposition of nitrogen and acid, associated with construction traffic, within 1488547 ASNW and 1489079 ASNW

have the potential to result in habitat degradation. In particular, relating to damage to or the loss of bryophytes and lichens which are particularly sensitive to acid inputs. Further potential effects are a reduction in the species richness of the ground flora and associated increases in grasses and ruderal species; poor general tree health, including damage to fine roots, branch dieback, reduced crown density and leaf discolouration and tree destabilisation due to increased growth.

8.8.161 Local background contributions of nitrogen deposition are largely attributed to livestock and Europe import with less than 10% of the contributions across each of the ancient woodlands attributed to all road transport. The most significant exceedances are related to acid; background deposition rates exceed the minimum CLo in all the ancient woodlands by more than 500%.

8.8.162 Whereas the effects of changes in air quality on ecological receptors occur gradually as a result of long-term trends and processes, the increase in traffic flows along the affected road network would be temporary up to medium-term. The model has used the peak traffic flows in 2031 as the pipeline construction work is expected to take place between 2029 and 2032, with enabling works starting in 2028. Additional traffic flows along the roads near to ancient woodlands are predicted for part of the construction period, not the entirety; they would therefore not experience peak flows throughout. Road traffic emissions factors used in the model were representative of a 2028 fleet (i.e. the first year of construction). Emissions factors are anticipated to improve over time; therefore, application of 2028 emissions factors represents a conservative approach. The predicted deposition rates associated with temporary construction traffic in the context of background deposition are not considered to be significant, bearing in mind the contributions from other sources. The magnitude of the impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

Isolation valves, air valves and washout valves

Habitat loss or degradation

8.8.163 Isolation, air and washout valves will be required along the Pipeline between the WRP site and Otterbourne WSW. These would result in permanent habitat loss of up to 2x2m for washout and air valves and 1x1m for isolation valves (two isolation valves required per washout/air valve). The estimated habitat loss for isolation, air and washout valves has been calculated based on the proportion of different habitat types across the Pipeline as the location of these assets is currently unknown and will be finalised post-consent. The location of these assets is constrained by topography and distance between them as described within ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6). It is assumed that they would be in habitats in the same ratio as these habitats are found along the pipeline route. Of the habitats present, cropland makes up 47.4% and modified grassland makes up 45.4% and therefore it was extrapolated that the valves would result in the permanent loss of these habitats. The effects on modified grassland have not been assessed as this feature is of less than local value. As such, the magnitude of this impact on cropland is minor, on features of low value; therefore, this is a neutral effect which is not significant.

Water Recycling Plant site

Habitat loss or degradation

Open Mosaic Habitat on previously developed land

8.8.164 The OMH at the WRP site, comprising both other calcareous and other neutral grassland, and associated features would be permanently lost. The total area of habitat loss is 4.32ha, of which 1.57ha is other calcareous grassland and 2.75ha is other neutral grassland.

8.8.165 A green/brown roof is proposed on the main building of the WRP site in part to mitigate for the loss of OMH. This primary measure is secured through the Design Principles Document (Document reference 5.11, DCO Volume 5). The precise area of the green/brown roof will be confirmed post-consent but is expected to be approximately 0.8ha. The roof will be dual aspect and of a north and south facing orientation with a pitch between 2° and 9° and no steeper to prevent erosion. A low nutrient substrate will be used to ensure that areas of bare ground persist. The depth of the substrate will vary from 80mm to 150mm, with areas remaining largely exposed, or covered with only very sparse vegetation.

8.8.166 Open Mosaic Habitat, including calcareous grassland, as well as areas of open and wildflower-rich grassland and ruderal habitat including potential inundation communities and associated pools, will be created within areas of landscaping in the eastern part of the WRP site, comprising approximately 2.5ha as set out in the Outline LEMP (Document reference 7.5, DCO Volume 7).

8.8.167 Open Mosaic Habitat on the green/brown roof and landscaped areas will replicate the mosaic of habitats on the site, providing habitat for notable species including aquatic and terrestrial invertebrates. Whilst the quantity of habitat that will be created at this location is less than that lost, it will be maintained and managed as OMH on a long-term basis (as secured in the Outline LEMP (Document reference 7.5, DCO Volume 7)) which will delay or prevent natural succession processes that would otherwise occur. The magnitude of this impact is moderate, on a feature of medium value; therefore, this is a minor adverse effect which is not significant.

Dense scrub

8.8.168 A large strip of mixed scrub predominantly around the western and southern edges of the WRP site and extending into central areas of the WRP site would be removed, with limited areas around the perimeter being reinstated. The predicted total area of habitat loss is approximately 1.5ha, of which approximately 0.15ha would be reinstated. The duration of this temporary effect is up to medium-term. Approximately 1.35ha of mixed scrub would be permanently lost.

8.8.169 Areas of tree and scrub planting to the south and west of the WRP site will mitigate for the loss of mixed scrub at this location. These areas are secured through the Design Principles Document (Document reference 5.11, DCO Volume 5) and the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of this impact is moderate, on a feature of low value; therefore, this is a neutral effect which is not significant.

Other broadleaved woodland

8.8.170 Approximately 0.37ha of habitat would be removed around the northern and eastern edges of the WRP site, which will be reinstated as per the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of this impact is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Pipelines between Budds Farm Water Treatment Works and the Water Recycling Plant site

Habitat loss or degradation

Dense scrub

8.8.171 An area of mixed scrub would be removed at the location of temporary construction compound C-1. The predicted total area of habitat loss is approximately 0.48ha. The loss of this habitat would be temporary up to medium-term as the habitat will be reinstated following construction, as per the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of this impact is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Other broadleaved woodland

8.8.172 A parcel of other broadleaved woodland covering an area of approximately 0.03ha would be temporarily lost up to long-term and reinstated following construction at the location of temporary construction compound C-1, as per the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of effect is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Pipelines between the Water Recycling Plant site and Bedhampton Springs

Habitat loss or degradation

Ancient or veteran trees

8.8.173 One ancient tree (T1430) is located within this component, inside the Limits of Deviation at Bedhampton Springs. The Proposed Development has committed to no loss or deterioration of ancient or veteran trees, as per the Outline CEMP (Document reference 7.1, DCO Volume 7), and in accordance with this secured commitment any chosen route would not result in unacceptable impact (i.e. loss or deterioration) of this ancient tree. Therefore, there will be no effect on ancient or veteran trees.

Dense scrub

8.8.174 A parcel of dense scrub (approximately 0.12ha) would be temporarily lost up to medium-term and reinstated following construction at the northern side of Bedhampton Springs. The magnitude of effect is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Other broadleaved woodland

8.8.175 A parcel of other broadleaved woodland (approximately 0.08ha) would be temporarily lost up to long-term and reinstated following construction at the location

of temporary construction compound B1-2, as per the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of effect is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Other mixed woodland

8.8.176 A parcel of other mixed woodland (approximately 0.03ha) adjacent to the A27 would be temporarily lost up to long-term, to provide access to temporary construction compound B1-1. This would be reinstated as other broadleaved woodland following construction, as per the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of effect is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Pipelines between the Water Recycling Plant site and Otterbourne Water Supply Works

Habitat loss or degradation

Ancient or veteran trees

8.8.177 There are eight veteran trees within, or that have canopies that extend into, the Order Limits within this component. The Proposed Development has, however, committed to no loss or deterioration to an ancient or veteran tree. Therefore, in accordance with the secured commitment the Proposed Development would not result in unacceptable impact (i.e. loss or deterioration) to any ancient or veteran tree, as per the Outline CEMP (Document reference 7.1, DCO Volume 7). The magnitude of effect is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

Cropland

8.8.178 The total area of cropland habitat loss (excluding arable field margins HPI) is approximately 71.93ha. This total excludes habitat loss associated with valves, which is assessed in paragraph 8.8.163. Permanent loss of cropland would occur at seven locations where cropland will be replaced by other habitats: lowland mixed deciduous woodland (F_3 and L_1); tree planting (EMEA_F_2); other calcareous grassland (EMEAs E_1 and E_2); and other woodland, scrub and hedgerows (EMEA G_3). The magnitude of the impact is moderate, on a feature of low value; therefore, this is a neutral effect which is not significant.

8.8.179 Four arable field margins (approximately 0.24ha) would be lost up to medium-term and reinstated at the location of trenched open-cut construction within Sections E and J of the Pipeline. The magnitude of the impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Other lowland acid grassland

8.8.180 One area of other lowland acid grassland (approximately 0.002ha) would be lost within Section K of the Pipeline. The loss of this habitat would be temporary up to long-term as the habitat would be reinstated following construction, as secured in the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of

the impact is negligible, on feature of low value; therefore, this is a neutral effect which is not significant.

Lowland calcareous grassland

8.8.181 One area of lowland calcareous grassland HPI would be lost at Farlington WTW within temporary construction compound D-1, and two parcels within Section E of the Pipeline comprising a road verge along the western side of Pigeon House Lane and a field immediately west of Crooked Walk Lane. The total area of habitat loss is predicted to be approximately 0.57ha. The loss of this habitat would be temporary up to long-term as it would be reinstated as soon as reasonably practicable following construction, as per the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of the impact is minor, on a feature of medium value; therefore, this is a minor adverse effect which is not significant.

Other calcareous grassland

8.8.182 There is potential for the loss of a small area (approximately 0.01ha) of other calcareous grassland on the corner of Widley Walk and Portsdown Hill Road due to highways works to regrade land in the verge to provide a safe waiting area for pedestrians to cross the road. There is also potential for the loss of other calcareous grassland (approximately 1.4ha) to the east of B2177 for construction compound E-4a.

8.8.183 To mitigate for the loss of other calcareous grassland, its creation is proposed within EMEA E_1 and E_2. For this assessment, it is assumed that 'other' calcareous grassland would be created rather than lowland calcareous grassland HPI, as the feasibility of HPI habitat creation would need to be confirmed prior to creation. This will require soil testing as well as consideration of whether suitable management practices such as grazing could be implemented. These measures are secured through the Design Principles Document (Document reference 5.11, DCO Volume 5). This would increase the area of calcareous grassland across the Order Limits and habitat diversity compared to the existing cropland. The magnitude of this effect is minor, on a feature of low value; therefore, this is a neutral, beneficial effect which is not significant.

Native hedgerows

8.8.184 Species-poor and species-rich native hedgerows would be partially or entirely removed within all sections within the Pipeline between the WRP site and Otterbourne WSW to facilitate the installation of sections of open-cut pipeline and associated temporary construction compounds. The total length of native hedgerows proposed for removal is approximately 4.89km. In general, the loss of species-poor and species-rich hedgerows would be temporary up to medium-term as they will be reinstated following construction, except for:

1. Part of a native hedgerow (H17, not important) would be permanently removed to provide access to AGP site Break Pressure Tank/Intermediate Pumping Station E from New Down Lane.
2. Part of a native hedgerow with trees (H65, not important) would be permanently removed to provide access to IPS F from Chalk Lane, which would require the removal of trees in the hedgerow.

8.8.185 The following hedgerows require temporary up to medium-term removal as they fall within temporary construction compounds; they will be reinstated:

1. A species-rich hedgerow (H15) intersects temporary construction compound E-1.
2. Two important species-rich hedgerows with trees, one (H36) intersects temporary construction compound E-4a and the other (H37) falls across a temporary access to compound E-4b.
3. Part of a hedgerow with trees (H69) and a species-rich hedgerow (H70) fall within temporary construction compound G-2 and across a temporary access to this temporary construction compound.
4. A species-rich hedgerow with trees (H78) falls across a temporary access to temporary construction compound H-2.
5. Two hedgerows (H105 and H112) intersect temporary construction compound H-4, with the former relating to temporary access.
6. A hedgerow with trees (H171) falls within temporary construction compound K-3.
7. A hedgerow with trees (H222) falls across a temporary access to temporary construction compound L-1 and a second hedgerow with trees (H224) intersects this temporary construction compound.
8. Most of the hedgerow along the eastern side of Winchester Road (H247) is within temporary construction compound L-4.
9. A hedgerow (H251) falls across a temporary access to temporary construction compound L-6.
10. A hedgerow with trees (H272) intersects temporary construction compound L-10.
11. Part of a hedgerow (H274) intersects temporary construction compound M-3.

8.8.186 The trenched open-cut sections of the Pipeline between the WRP site and Otterbourne WSW intersects 83 native hedgerows (refer to the hedgerow schedule in ES Appendix 8.2 Habitats, Volume II (Document reference 6.2, DCO Volume 6) for details, including the hedgerow IDs and crossing IDs). These hedgerows would also require temporary up medium-term removal and will be reinstated following construction. The working width will be narrowed to 20m for these crossings.

8.8.187 While the enhancement of species-rich native hedgerows within EMEAs F_1 and G_2 and G_3 and reinstatement across the wider area would increase the extent of hedgerows and improve connectivity across the Pipeline between the WRP site and Otterbourne WSW, these features would take time to mature. As such, the magnitude of this impact is moderate, on a feature of medium value; therefore, this is a minor adverse effect which is not significant.

Dense scrub

8.8.188 There are areas of dense scrub that would be removed in isolated areas across the pipeline between the WRP site and Otterbourne WSW. Four strips of bramble scrub would be lost where trenched open-cut construction takes place. A small area of mixed scrub would also be lost to allow access to temporary construction

compound L-1 (Section L of the Pipeline) and west of Crooked Walk Lane (Section E of the Pipeline). The total area of dense scrub removal is approximately 0.14ha.

8.8.189 At the locations of trenched open-cut construction, the working width will be narrowed to 20m. In all locations, habitat loss would be temporary up to medium-term as the habitat will naturally regenerate following construction, as secured in the Outline CEMP (Document reference 7.1, DCO Volume 7). The magnitude of this impact is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Wet woodland

8.8.190 Within Wickham Golf Course in Section G of the Pipeline, the Limits of Deviation for the Pipeline extends into an area of wet woodland (NVC site 16). Approximately 0.01ha of habitat would be removed. The reinstatement strategy as set out in the Outline LEMP (Document reference 7.5, DCO Volume 7) prevents the reinstatement of wet woodland within the 20m working width. This is expected to permanently limit the value of the reinstated habitat.

8.8.191 As secured in the Outline CEMP (Document reference 7.1, DCO Volume 7), the wet woodland around the temporary construction compound L-9 (NVC site 40) would be retained and protected during construction. Furthermore, with reference to EMEA_L_7, wet woodland could be created within the footprint of the compound and an additional area of modified grassland. This could mitigate for wet woodland habitat loss within Section G of the Pipeline and provide an enhancement.

8.8.192 The potential effect of habitat loss and creation is minor on a feature of medium value in the short to medium term, which is a minor adverse effect which is not significant. However, in the long-term and with habitat management as secured through the Outline LEMP (Document reference 7.1, DCO Volume 7), the effect is minor beneficial, once the trees mature and the ground flora becomes more established and diverse.

Lowland mixed deciduous woodland

8.8.193 Strips of lowland mixed deciduous woodland HPI would be lost within Sections F, G, H, J, K, L and M for pipeline construction.

8.8.194 The following describes permanent habitat loss within each section. These parcels of woodland fall within the construction footprint for the trenched open-cut Pipeline, where the reinstatement of lowland mixed deciduous woodland is not feasible above the Pipeline as specified in the reinstatement strategy set out in the Outline LEMP (Document reference 7.5, DCO Volume 7). The working width has been narrowed from 40m to 20m in these locations. The area of permanent habitat loss is predicted to be approximately 0.327ha:

1. Section F – Trenched open-cut pipeline east of Crockerhill will cross a strip of woodland.
2. Section G – The trenched open-cut pipeline to the north of G-4 crosses a narrow strip of woodland.
3. Section J – The trenched open-cut pipeline south and south-west of Waltham Chase crosses five strips of woodland.

4. Section K – Woodland along the eastern edge of Winters Hill wood-pasture and parkland falls marginally within temporary construction compound K-5 and the working width for the open-cut pipeline. The trenched open-cut pipeline will cross one parcel of woodland within this section, east of Break Pressure Tank K.
5. Section L – Part of two parcels of woodland south of Bow Lake, one of which is contiguous with ASNW ID 0319 and a further parcel which is contiguous with Chestnut Gully Wood SINC is fully within the working width. The trenched open-cut pipeline crosses two narrow parcels of lowland mixed deciduous woodland that are linked to Park Hills Wood ASNW ID 2968.

8.8.195 As per the reinstatement strategy secured in the Outline LEMP (Document reference 7.5, DCO Volume 7), lowland mixed deciduous woodland cannot be planted within 10m of the pipeline. The reinstatement strategy specifies that:

1. Scrub species could be planted within 3m of the pipeline, which will be planted and maintained at no more than 2m in height and planted at no more than 1m apart.
2. Specific small to medium-sized trees could be planted 5-10m from the pipeline.

8.8.196 This is expected to permanently limit the value of the reinstated habitat, particularly 3m either side of the pipeline, where there would be an absence of ground flora associated with the adjacent parcels of retained woodland. Habitat loss is compensated through the creation of lowland mixed deciduous woodland within EMEAs, as described in section 8.4 and the Outline LEMP (Document reference 7.5, DCO Volume 7). The area of temporary, long-term habitat loss is predicted to be approximately 0.184ha:

1. Section G - To facilitate temporary access to temporary construction compound G-7 a narrow strip of woodland would be lost.
2. Section H – Marginal encroachment within temporary construction compound H-5 and 40m working width.
3. Section K – Woodland falls marginally within the north-east corner of temporary construction compound K-6.
4. Section M – Woodland within Otterbourne WTW.

8.8.197 Lowland mixed deciduous woodland would be created across sections F, G, J, K and L to mitigate for habitat loss. It is proposed that new areas of woodland are created and retained areas of woodland are widened to enhance areas of retained woodland, strengthen existing corridors and link areas of existing woodland that were not previously connected (relevant EMEA references: F_3, G_1, J_1-3, K_6 and L_1-3). In addition, a strip of lowland mixed deciduous woodland is proposed adjacent to the south-eastern edge of EMEA F_1. This is secured via the Design Principles Document (Document reference 5.11, DCO Volume 5) and the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of this impact is moderate, on features of medium value; therefore, this is a minor adverse effect which is not significant.

Other broadleaved woodland

8.8.198 Parcels of other broadleaved woodland (approximately 0.84ha) are to be lost up to long-term and reinstated at the location of trenched open-cut construction and

temporary construction compound within Sections E, F, G, K, L and M, as secured through the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of this impact is minor, on a feature of low value, therefore, this is a minor adverse effect which is not significant.

Other mixed woodland

8.8.199 A parcel of other mixed woodland within Section M of the Pipeline would be temporarily lost, long-term (approximately 0.01ha). This would be reinstated as other broadleaved woodland, as secured by the Outline LEMP (Document reference 7.5, DCO Volume 7), which stipulates planting only broadleaved species. The magnitude of effect is negligible, on a feature of low value; therefore, therefore this is a neutral effect which is not significant.

Other coniferous woodland

8.8.200 A parcel of other coniferous woodland within Section J of the Pipeline would be partially lost (approximately 0.03ha). This would be reinstated as other broadleaved woodland (described in paragraph 8.8.198) as secured by the Outline LEMP (Document reference 7.5, DCO Volume 7). The magnitude of effect is negligible, on a feature of low value; therefore this is a neutral effect which is not significant.

Ecologically valuable line of trees

8.8.201 Ecologically valuable lines of trees would be crossed by the open-cut pipeline in 12 locations within Sections G (VX_G_001), H (VX_H_009), J (VX_J_003 and VX_J_005), K (VX_K_002, VX_K_035 and VX_K_036) and L (VX_L_012, VX_L_021, VX_L_022, VX_L_035, and VX_L_023 which links with ASNW ID 0319 to the north) resulting in habitat loss and fragmentation. A further ecologically valuable line of trees is located within Otterbourne WSW. The total length of habitat proposed for removal is approximately 0.82km. These features would be reinstated following construction. As per the reinstatement strategy, large trees cannot be planted within 10m of the pipeline. However, habitat fragmentation would be reduced by scrub planting within 3m of the pipeline. The retention and protection of retained trees is secured through the Outline CEMP (Document reference 7.1, DCO Volume 7).

8.8.202 The magnitude of this effect is moderate, on features of medium value; therefore, this is a minor adverse effect which is not significant.

8.8.203 In addition, EMEA_K_6 includes the potential enhancement of a line of trees. This measure is detailed in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Other lines of trees

8.8.204 Other lines of trees would be crossed by the open-cut pipeline in two locations within Sections F and L (vegetation crossing IDs VX_F_004 and VX_L_002). The total length of habitat loss is approximately 0.09km. These features will be lost up to medium-term and reinstated following construction. As per the reinstatement strategy, large trees cannot be planted within 10m of the pipeline. However, habitat

fragmentation would be mitigated by scrub planting over the pipeline. The magnitude of this impact is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Coastal and floodplain grazing marsh

8.8.205 One area of coastal and floodplain grazing marsh within Fielders Farm Meadows (Eastleigh) SINC and comprising approximately 0.62ha of other neutral grassland would be temporarily lost up to long-term to facilitate temporary construction compound L-5 and the trenched open-cut pipeline. This habitat will be reinstated as detailed and secured within the Outline LEMP (Document reference 7.5, DCO Volume 7) and retained habitat around compound L-5 will be protected as secured by the Outline CEMP (Document reference 7.1, DCO Volume 7). The magnitude of effect is minor, on a feature of medium value; therefore, this effect is minor adverse in the short to medium-term, which is not significant.

8.8.206 In addition, EMEA L_4, includes the potential creation and enhancement of grassland areas to moderate condition grassland. This measure is detailed in the Design Principles Document (Document reference 5.11, DCO Volume 5).

Wood-pasture and parkland

8.8.207 An area of wood-pasture and parkland would be lost up to medium-term and reinstated. The open-cut pipeline passes through the habitat north of Winters Hill within Section K, totalling approximately 1.79ha. Temporary construction compound K-5 is also located within this HPI. The Order Limits have been altered to avoid mature and veteran trees that will be protected throughout construction as secured in the Outline CEMP (Document reference 7.1, DCO Volume 7). The magnitude of this effect is minor, on a feature of medium value; therefore, this effect is minor adverse in the short to medium-term, which is not significant.

Habitat degradation due to hydrological changes

Neutral grassland

8.8.208 There is potential for a temporary short-term local reduction in groundwater levels due to dewatering required during the open-cut excavations and trenchless construction works under the Pipeline that could reduce baseflow to three parcels of neutral grassland associated with temporary construction compound L-5 (NVC sites 39a, 39b, 39c, and 39d (39e did not qualify as a GWDTE)).

8.8.209 There is potential for reduced groundwater levels to cause habitat degradation as the grasslands could become drier. However, this is not considered likely to cause significant changes to the habitat composition or condition due to the temporary nature of the change as it would be short-term. The habitats are expected to revert to the baseline conditions as groundwater will return to baseline levels following installation of the pipeline. Monitoring measures are outlined in ES Appendix 19.9 Outline Water Monitoring Plan, Volume II (Document reference 6.2, DCO Volume 6). The magnitude of the effect is minor on a feature of low value; therefore, this is a neutral effect which is not significant.

Purple moor grass and rush pastures

8.8.210 There is potential for a temporary short-term local reduction in groundwater levels due to dewatering required during the open-cut excavations and trenchless construction works that would reduce baseflow to this habitat, adjacent to the Order Limits, north of Section G (NVC site 13).

8.8.211 The habitat is adjacent to a tributary of the River Meon. which is entirely within head deposits immediately north of the Order Limits, so the watercourse could be dependent on the superficial water table.

8.8.212 There is potential for reduced groundwater levels to cause habitat degradation as the habitat could become drier. However, it is not considered that this would cause significant changes to the habitat composition or condition due to the temporary short-term nature of the change. Any changes to the habitat are expected to revert to the baseline conditions once the groundwater returns to baseline levels following installation of the pipeline. Monitoring measures are outlined in ES Appendix 19.9 Outline Water Monitoring Plan, Volume II (Document reference 6.2, DCO Volume 6). The magnitude of effect is minor on a feature of medium value; therefore, this is a minor adverse effect in the short to medium-term which is not significant.

Other wetlands

8.8.213 There is potential for a temporary short-term local reduction in groundwater levels due to dewatering required during the open-cut excavation for the Pipeline. Dewatering would reduce baseflow to two parcels of other wetlands identified as GWDTEs. The first parcel is immediately west of compound G-3 and is intersected by a trenchless section in Section G. The second is located outside the Order Limits, east of temporary construction compound M-1 (NVC site 42).

8.8.214 Excavations are anticipated to be primarily in low permeability deposits fed by surface water or shallow perched water rather than bedrock. This means that drawdown impacts are likely to be localised to the excavation area, with reductions in baseline to surface features limited.

8.8.215 There is potential for reduced groundwater levels to cause habitat degradation as the habitat could become drier. However, it is not considered that this would cause significant changes to the habitat composition or condition due to the temporary short-term nature of the change. The habitats are expected to revert to the baseline conditions once the groundwater returns to baseline levels following installation of the pipeline. Monitoring measures are outlined in ES Appendix 19.9 Outline Water Monitoring Plan, Volume II (Document reference 6.2, DCO Volume 6). The magnitude of effect is minor on a feature of low value; therefore, this is a neutral effect which is not significant.

Wet woodland

8.8.216 There is potential for a temporary short-term local reduction in groundwater levels due to dewatering required during the following open-cut excavations and trenchless construction works under the Pipeline that would reduce baseflow to eight parcels of wet woodland both within and outside the Order Limits:

1. One parcel north of the Order Limits, Section G (NVC site 12).

2. A cluster of six parcels associated with the trenchless construction works under the River Meon floodplain and trenched open-cut pipeline construction works across Wickham Park Golf Club, Section G.
3. A parcel within the Order Limits between compounds L-9 and L-10 (NVC site 40).

8.8.217 Excavations are anticipated to be primarily in low permeability deposits fed by surface water or shallow perched water rather than bedrock. This means that drawdown impacts are likely to be localised to the excavation area, with reductions in baseline to surface features limited.

8.8.218 There is potential for reduced groundwater levels to cause habitat degradation as the woodlands could become drier. However, it is not considered that this would cause significant changes to the habitat composition or condition due to the temporary short-term nature of the change. The habitats are expected to revert to the baseline conditions once the groundwater returns to baseline levels following the installation of the pipeline. Monitoring measures are outlined in ES Appendix 19.9 Outline Water Monitoring Plan, Volume II (Document reference 6.2, DCO Volume 6). The magnitude of effect is minor on a feature of medium value; therefore, this is a minor adverse effect in the short to medium-term which is not significant.

Above Ground Plant

Habitat loss or degradation

Cropland

8.8.219 Cropland comprising cereal and non-cereal crops, temporary grass and clover leys and horticulture associated with Break Pressure Tank/Intermediate Pumping Station E, Intermediate Pumping Station F and IPS-G would be permanently lost. The magnitude of the impact is moderate, on a feature of low value; therefore, this is a neutral effect which is not significant.

Native hedgerows

8.8.220 Part of a native hedgerow (H17, not important) would be permanently lost to provide access to AGP site Break Pressure Tank/Intermediate Pumping Station E from New Down Lane. To mitigate for this the creation of species-rich native hedgerows within EMEA G_3 and potential enhancement of hedgerows surrounding F_1 would increase the extent of hedgerows and improve connectivity across the Order Limits. The magnitude of this effect is moderate, on a feature of medium value; therefore, this is a minor adverse effect which is not significant.

Badger

All components

Habitat loss or degradation

8.8.221 Vegetation removal required for construction of the Proposed Development and soil compaction of trenched open-cut sections during construction may result in

loss of habitat used for badger sett creation and foraging. Primary measures have avoided sensitive habitats as far as practicable, and the working width will be reduced to 20m at the majority of crossings of linear vegetation. The locations of these reduced working width areas are detailed in Appendix A of the Outline CEMP (Document reference 7.1, DCO Volume 7). The linear nature of the Proposed Development also ensures that the majority of habitat available to badger clans within the ZoI is retained during construction of the Proposed Development, as it would pass through clan territory rather than encompass it.

8.8.222 The Outline LEMP (Document reference 7.5, DCO Volume 7) includes a habitat reinstatement strategy which will be implemented on an at least like-for-like basis. This primary measure would ensure the effect of habitat loss is temporary only, of up to long-term duration. With the implementation of primary measures and considering that the quantity of habitat to be removed is small in relation to available habitat in the wider area, the magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Habitat fragmentation

8.8.223 Vegetation removal required for construction of the Proposed Development causing a loss of ecological connectivity may result in severance of habitats and disruption to badger dispersal and formation of breeding pairs. Tertiary measures as detailed in section 8.4 would ensure the effect of habitat fragmentation is temporary up to medium-term only.

8.8.224 Further tertiary measures are detailed in the Outline CEMP (Document reference 7.1, DCO Volume 7) to address this effect including no blocking of retained badger or mammal paths, ensuring the majority of land required for construction allows movement of terrestrial mammals between dusk and dawn, facilitating movement of badger across territories and measures to prevent entrapment in excavations. With the implementation of these tertiary measures the magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Disturbance

8.8.225 Disturbance of badger may occur as a result of temporary lighting used to illuminate construction working areas between dusk and dawn in the winter months, for up to medium-term duration. Night working may take place at certain locations including trenchless construction works. Badger is a light sensitive species and light spill may result in avoidance of habitats used for foraging or territorial behaviours. The construction lighting design will follow good practice to reduce light spill into sensitive habitats. This is secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) and is in accordance with the ILP and BCT guidelines for lighting [44]. With the implementation of these tertiary mitigation measures, the magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

8.8.226 Disturbance of badger may occur as a result of noise and vibration from construction activities, including vehicular movements, and trenchless construction techniques, for up to medium-term duration. Tertiary measures include good practice measures for noise and vibration reduction as included in the Outline

CEMP (Document reference 7.1, DCO Volume 7), with further detail to be included within the Noise and Vibration Management Plan that will be prepared post-consent. Measures include locating plant away from sensitive receptors and switching off equipment when not in use. Suitable exclusion zones are to be demarcated around retained setts to prevent any disturbance as a result of construction activities. Badger occupying a sett can be disturbed by construction works even if there is no direct interference with the sett. Noise or vibration associated with any construction activities including temporary construction compounds for trenchless or tunnelling construction activities, have the potential to disturb badger occupying setts. Implementation of tertiary measures would reduce this effect but badger occupying setts may still be subject to disturbance above which they can tolerate. The magnitude of this impact is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Killing or injury

8.8.227 Stored materials including spoil resulting from excavations may be used by badger for sett creation during construction. Removal of these materials may result in killing or injury of badger occupying these setts. Tertiary mitigation measures secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) require all these materials to be fenced off in a way that is impermeable to badger, preventing the creation of new setts. With the implementation of this tertiary measure, the magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

8.8.228 Killing or injury of badger may occur as a result of road traffic collisions where vehicle movements occur between dusk and dawn. Tertiary measures detailed in the Outline CEMP (Document reference 7.1, DCO Volume 7) and Framework CTMP (Document reference 7.3, DCO Volume 7) to reduce the likelihood of this happening include implementing speed restrictions and providing toolbox talks to promote awareness of badger and highlighting key areas of high activity. With the implementation of these tertiary measures the magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

8.8.229 Killing or injury of badger may occur as a result of individuals becoming trapped in excavations created for construction of the Proposed Development. Tertiary mitigation measures within the Outline CEMP (Document reference 7.1, DCO Volume 7) include allowing a means of escape for mammals including badger. This includes covering excavations between dusk and dawn or the installation of ramps of a suitable type and placement that allows mammals to escape. With the implementation of these tertiary measures the magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

8.8.230 There remains the potential for direct killing or injury of individual badger through removal of, or damage to, setts during clearance activities, due to soil compaction at locations of access tracks and destabilisation of substrate caused by vibration at trenchless construction works. Known badger setts, including large multi-entrances setts, have been avoided, where reasonably practicable through the design process, reducing the risk of killing or injury of badger across the Proposed Development. Other primary mitigation measures include:

1. Inclusion of flexibility within the Order Limits to allow micro-siting for avoidance of newly created setts following pre-construction surveys.
2. Increasing the Order Limits at some locations of high badger activity and main setts to allow space for creation of artificial replacement setts, if this is deemed necessary as part of licensing requirements for badger.

8.8.231 As badger is a mobile species, the number and type of setts impacted by the Proposed Development may change. These changes will be identified during the pre-construction surveys and any impacts to setts will be addressed through secondary mitigation. The magnitude of this impact is moderate, on a feature of low value; therefore, this is a neutral effect which is not significant.

8.8.232 Killing or injury of badger could occur for up to medium-term duration.

Invasive non-native species and disease

8.8.233 There is the potential for construction activities to spread bovine tuberculosis (TB) amongst badger clans with territories within and connected to the Proposed Development. This effect could last for up to long-term duration. The risk of spread is highest at locations of high badger activity (e.g. main setts) and at locations of dairy farms. Currently there are no outbreaks in proximity to the Proposed Development but these could occur prior to, or during construction. Tertiary measures secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) include biosecurity measures, regular monitoring for outbreaks and implementation of an Infectious Disease Risk Assessment if necessary. The magnitude of this impact is moderate, on a feature of low value; therefore, this is a neutral effect which is not significant.

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

Habitat fragmentation

8.8.234 The majority of main sett 062 is to be retained during construction. However, there is a risk of isolating the badger clan associated with this sett from their wider territory and foraging habitats for up to medium-term duration. This is due to the location of temporary construction compounds (required for tunnelling), trenched open-cut areas of pipeline installation surrounding the sett to the north and west, and the presence of a main road and development to the south and east. The magnitude of this impact is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Inherent in-combination assessment for badger

8.8.235 The overall assessment for badger concludes the magnitude of impact is moderate on a feature of low value; therefore, this is a neutral effect which is not significant. This is because killing or injury of badger through removal or damage to setts, and risk of the spread of disease, as discussed in paragraphs 8.8.230 and 8.8.233, concludes a neutral effect which is not significant. The effects of habitat loss or degradation, habitat fragmentation and disturbance are addressed with the implementation of primary and tertiary mitigation and are therefore neutral effects which are not significant.

Bats

All components

Habitat loss or degradation

8.8.236 Soil compaction during construction activities may cause damage to the roots of trees with bat roosting suitability resulting in habitat loss or degradation up to medium-term. The Outline CEMP (Document reference 7.1, DCO Volume 7) secures measures to mitigate risks in root protection zones. The design of the Proposed Development has avoided, as far as practicable, trees with suitable roosting features for bats and no works will occur within 10m of trees identified as suitable for roosting bats.

8.8.237 Creation of airborne particles (e.g. dust and particulate matter emissions) during construction activities and vehicle movements and the deposition of nitrogen and sulphur from vehicles and generators may result in loss or degradation of bat habitat up to medium-term. The Outline CEMP (Document reference 7.1, DCO Volume 7) requires a Dust Management Plan post-consent, to control pollutants to reduce the potential for likely effects on habitats used by bats.

8.8.238 The introduction or spread of INNS during construction may result in habitat loss or degradation up to long-term. The management of INNS during construction and operation is set out within the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7). This sets out the management techniques to be employed to avoid and reduce the potential for likely effects on sensitive ecological receptors. Measures include enforcement of 'Check-Clean-Dry' protocols for all vehicles, machinery and personnel and site-specific method statements for INNS. As there are recognised standard practices for controlling INNS during construction this effect is considered addressed by tertiary mitigation measures.

8.8.239 Vegetation removal required for construction of the Proposed Development may result in the temporary loss or degradation up to medium-term of bat habitat used for roosting and foraging, including for Annex II species. Primary and tertiary measures have been implemented to reduce this effect as following completion of reinstatement planting the continuity of linear features relied upon by commuting bats will be restored. However, due to the timescales for reinstated vegetation to fully mature to baseline conditions, minor, temporary habitat loss or degradation is still considered likely; and in some areas will be up to medium-term. This reflects, for example, the time taken for reinstatement planting to establish to the height of a mature hedgerow.

8.8.240 For all bat species except Annex II species, the magnitude of habitat loss or degradation is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant. For all Annex II species, the magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

8.8.241 Demolition of structures required for construction of the Proposed Development may result in the permanent loss of potential roosting features. One structure has been identified with a potential roosting feature of high suitability (a bat box attached to the side of the structure) but there is no evidence to confirm the feature has been in-use by bats. Tertiary measures, which include undertaking pre-

construction surveys following good practice guidance and is set out in the Outline CEMP (Document reference 7.1, DCO Volume 7), reduce this effect to negligible.

8.8.242 For all bat species excluding Annex II species, the magnitude of habitat loss through demolition of structures is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant. For all Annex II species, the magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

Habitat loss or degradation

8.8.243 Isolation, air and washout valves will be required along the Pipeline between the WRP site and Otterbourne WSW. These would result in permanent loss of habitat of value to bat species. This is 2x2m for washout and air valves and 1x1m for isolation valves (two isolation valves required per washout and air valve). The estimated habitat loss for isolation, air and washout valves has been calculated based on the proportion of different habitat types across the Pipeline as the location of these assets is currently unknown and will be finalised post-consent. The location of these assets is constrained by topography and distance between them as described within ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6). Therefore, there is potential for small areas of discrete permanent loss of bat habitat. The magnitude of this impact is minor, on features of medium to high value; therefore, this is an up to minor adverse effect which is not significant.

Habitat fragmentation

8.8.244 Vegetation removal of linear habitats including hedgerows and lines of trees, required for construction of the Proposed Development may result in the loss of ecological connectivity through severance of habitats, resulting in the isolation of populations up to medium-term. Primary and tertiary measures have been implemented to reduce this effect, but habitat fragmentation is still considered likely. Due to the timescales for reinstated vegetation to mature into suitable commuting habitat, this is a medium-term temporary effect. For all bat species except Annex II species, the magnitude of this impact is minor, on a feature of medium value; therefore, this is a minor adverse effect which is not significant. For all Annex II species, the magnitude of this impact is moderate, on a feature of high value; therefore, this is a moderate adverse effect which is significant.

8.8.245 The loss of ecological connectivity may occur through severance of commuting routes for bat populations, including those of Annex II species, as a result of temporary lighting up to medium-term used to illuminate construction working areas for security purposes during the construction of the Proposed Development, which may lead to the isolation of bat populations. Tertiary mitigation includes good practice lighting design following the ILP and BCT guidance [44] during construction to prevent light spill onto all suitable commuting and foraging habitat, including the KCLs. Tertiary measures for construction lighting design are secured in the Outline CEMP (Document reference 7.1, DCO Volume 7). For all bat species

the magnitude of this impact is minor, on features of high value; therefore, this is a minor adverse effect which is not significant.

8.8.246 The loss or modification of waterbodies and watercourses may cause the loss of ecological connectivity through the severance of habitats resulting in the isolation of populations up to medium-term. Primary measures using trenchless construction methodologies, as secured in Appendix B of the Outline CEMP (Document reference 7.1, DCO Volume 7), would avoid direct impacts to significant watercourses and tertiary measures outlining the reinstatement of directly impacted habitats are provided in the Outline LEMP (Document reference 7.5, DCO Volume 7).

8.8.247 The implementation of primary and tertiary mitigation measures is discussed within section 8.4. For all bat species except Annex II species, the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant. For all Annex II species, the magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

8.8.248 The impact of habitat fragmentation on qualifying bat species of Singleton and Cocking Tunnels SAC is assessed within paragraphs 8.8.92 and 8.8.93.

Disturbance

8.8.249 Disturbance of bats may occur as a result of temporary lighting up to medium-term used to illuminate construction working areas for security purposes during the construction of the Proposed Development, which may lead to changes in roosting and foraging behaviour of bats, and a reduction in the distribution species, potentially leading to a reduction in survival and productivity rates. Tertiary measures for lighting are detailed in paragraph 8.8.246. For all bat species except Annex II species, the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant. For all Annex II species, the magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

8.8.250 Temporary disturbance of bats, up to medium-term, may occur as a result of noise and vibration from construction activities including trenchless or tunnelling construction activities and vehicular movements and may result in the loss of foraging and roosting opportunities and the loss of ecological connectivity. Bat species are particularly sensitive to noise and vibration at night when they are active. These works are expected to be at habitats identified as highly suitable for foraging and roosting bats. Primary and tertiary measures have been implemented to reduce this effect, but disturbance is still considered likely and will be addressed through secondary mitigation. For all bat species except Annex II species, the magnitude of this impact is minor, on a feature of medium value; therefore, this is a minor adverse effect which is not significant. For all Annex II species, the magnitude of this impact is moderate, on a feature of high value; therefore, this is a moderate adverse effect which is significant.

Killing or injury

8.8.251 At all locations where trees and structures with roosting suitability for bats are present, there is the possibility of killing or injury of bats due to entrapment when

felling trees and demolishing structures. Tertiary measures, including pre-demolition inspections, pre-felling inspections and sectional felling, are included in the Outline CEMP (Document reference 7.1, DCO Volume 7) to reduce this effect and secondary mitigation will also address this effect. The magnitude of this impact is minor, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

Inherent in-combination assessment for bats

8.8.252 The overall magnitude of impact for all bats (except Annex II species) is minor on a feature of medium value; therefore, this is a minor adverse effect which is not significant. This is because habitat loss or degradation, habitat fragmentation, disturbance, and killing or injury as discussed in paragraphs 8.8.236 to 8.8.251 concludes a minor adverse effect, which is not significant. The effect of demolition of structures is assessed as a neutral effect which is not significant.

8.8.253 The overall magnitude of impact for Annex II bat species is moderate on a feature of high value; therefore, this is a moderate adverse effect which is significant. This is because habitat fragmentation and disturbance, as discussed in paragraphs 8.8.236 to 8.8.251 concludes a moderate adverse effect, which is significant. The effects of habitat loss or degradation, demolition of structures and killing or injury are addressed with the implementation of primary and tertiary mitigation and are therefore minor adverse which is not significant.

Birds

All components

Habitat loss or degradation

8.8.254 Construction works have the potential to cause temporary up to medium-term wild bird habitat loss and degradation via direct loss of supporting habitat. This is relevant to all wild birds within the ZoI of the Proposed Development. Primary mitigation measures have reduced this effect through design of the Proposed Development to avoid, as far as practicable, valuable habitats including designated sites, priority habitats such as deciduous woodland, coastal and floodplain grazing marsh, mudflats, lowland fen and Main Rivers (key supporting habitat for wild birds). Sensitive crossing points will have a maximum working width of 20m, including hedgerows and ditches. The Outline LEMP (Document reference 7.5, DCO Volume 7) includes a habitat reinstatement strategy which details the at least like-for-like habitat reinstatement with native species planting of value to wild birds. These primary and tertiary measures would ensure that loss of key supporting wild bird habitat is temporary only. These impacts are addressed for qualifying species of a designated site and Schedule 1 listed species in paragraphs 8.7.74 to 8.7.84.

8.8.255 The introduction or spread of INNS during construction may result in wild bird habitat loss or degradation long-term. Tertiary mitigation includes measures to ensure that INNS are managed effectively during construction through the application of the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) including implementation of a Check-Clean-Dry protocol at construction sites, monitoring of INNS during construction and restrictions on movement of materials and protocols for control should any new INNS pathways be identified.

8.8.256 Pollution from run off may lead to the introduction of toxic pollutants or sediments into receiving watercourses, impacting on habitat suitability and prey availability for waterbird assemblages medium-term. Pollution prevention measures are included in the Outline CEMP (Document reference 7.1, DCO Volume 7) and further detail will be contained within the Construction Drainage Plan to be prepared post-consent.

8.8.257 With the implementation of primary and tertiary mitigation measures as set out in section 8.4, the magnitude of these impacts is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

Habitat fragmentation

8.8.258 Construction works have the potential to cause fragmentation via direct loss of supporting habitat medium-term. This is relevant to all wild birds within the ZoI of the Proposed Development. This could impact on overall breeding success of species present by increasing energetic costs for commuting between feeding, roosting and nesting sites. Additionally, habitat fragmentation is likely to reduce clear lines of sight between feeding and roosting grounds, which is particularly important for waders and wildfowl.

8.8.259 Primary mitigation measures have reduced this effect through design of the Proposed Development to avoid, as far as practicable, valuable habitats including designated sites, priority habitats such as deciduous woodland, coastal and floodplain grazing marsh, mudflats, lowland fen and Main Rivers (key supporting habitat for wild birds). Primary measures as detailed in paragraph 8.4.2, would ensure that fragmentation of key supporting wild bird habitat is temporary up to medium-term only. These impacts are addressed for qualifying species of a designated site and Schedule 1 listed species in paragraphs 8.7.74 to 8.7.84.

8.8.260 With the implementation of primary and tertiary mitigation measures, as discussed within paragraphs 8.4.1 to 8.4.10. The magnitude of this impact is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

Disturbance

8.8.261 Disturbance to wild birds present during construction activities can occur via noise, vibration and visual disturbance up to medium-term. This is relevant to all wild birds within the ZoI of the Proposed Development. The sensitivity of birds to disturbance can vary between species and time of year (breeding or non-breeding season). Significant disturbance will be mitigated by implementation of tertiary measures detailed within the Outline CEMP (Document reference 7.1, DCO Volume 7) to be supported by the Noise and Vibration Management Plan that will be prepared post-consent. Vegetation clearance and removal of structures will be undertaken outside of the breeding bird season (March to August inclusive) where practicable. Additionally, pre-construction breeding bird surveys will be undertaken to update baseline survey information and to inform Contractors and site ECoW of the presence of any active nests and implementation of suitable buffer zones. Tertiary mitigation measures to address disturbance from construction activities on wild birds are set out in section 8.4. The magnitude of this impact is negligible, on

features of high value; therefore, this is a minor adverse effect which is not significant.

8.8.262 Construction works associated with the Proposed Development have the potential to cause disturbance to Schedule 1 listed species under the Wildlife and Countryside Act 1981 (as amended), protected from the intentional destruction or disturbance of active nest sites up to medium-term. Breeding bird habitat suitability surveys have identified the following Schedule 1 species as potentially present during construction works within the Order Limits: barn owl, firecrest, red kite, Cetti's warbler *Cettia cetti*, peregrine *Falco peregrinus*, kingfisher, hobby, quail *Coturnix coturnix*, mediterranean gull *Ichthyatus melanocephalus* and goshawk *Accipiter gentilis*. This effect will be addressed by tertiary mitigation, and secondary mitigation, where required. The magnitude of this impact is minor on features of high value; therefore, this is a minor adverse effect which is not significant.

8.8.263 The impact of habitat loss, degradation and fragmentation, disturbance and killing or injury on qualifying bird species of designated sites during construction is assessed within paragraphs 8.8.401 to 8.8.411.

Killing or injury

8.8.264 Killing or injury caused by an increased number of vehicles, vehicle movements and changes in movement patterns during construction will be mitigated by speed restrictions within construction working areas and limiting night-time working where practicable. These tertiary measures are secured within the Outline CEMP (Document reference 7.1, DCO Volume 7) and detailed in the Framework CTMP (Document reference 7.3, DCO Volume 7). This is relevant to all wild birds within the ZoI of the Proposed Development. With the implementation of the mitigation measures, the magnitude of this impact is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

Water Recycling Plant site

Habitat loss or degradation

8.8.265 Permanent loss of potential nesting, roosting and feeding habitat is considered likely for breeding and non-breeding birds within the footprint of the WRP site and SuDS outfall, particularly ground and scrub nesting birds and non-breeding waterbirds. No suitable habitat for target bird species was identified during habitat suitability surveys in 2022 and 2024. During non-breeding bird surveys undertaken between 2021 and 2024, the WRP site and area of the proposed SuDS outfall was used by a low diversity and low number of waterbirds. Based on the permanent loss of low quality habitat within the WRP site and small area of habitat loss proposed within the footprint of the SuDS outfall, the magnitude of this impact is moderate on features of low to medium value; therefore, this is an up to minor adverse effect which is not significant.

Inherent in-combination assessment for birds

8.8.266 The overall magnitude of impact on Schedule 1 listed bird species is minor on a feature of high value; therefore, this is a minor adverse effect which is not significant. This is because the effect of disturbance is addressed with the

implementation of primary and tertiary mitigation and is therefore a minor adverse effect which is not significant.

8.8.267 The overall magnitude of impact for wild birds (excluding Schedule 1 listed bird species) is negligible on a feature of high to very high value; therefore, this is a minor adverse effect which is not significant. This is because the effects of habitat loss and degradation, habitat fragmentation, disturbance and killing or injury are addressed with the implementation of primary and tertiary mitigation and are therefore minor adverse effect which is not significant.

8.8.268 See paragraphs 8.8.76 and 8.8.91 for the inherent in-combination assessment for qualifying bird species of associated Habitat Sites.

Hazel dormouse

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

Habitat loss or degradation

8.8.269 Vegetation removal required for construction of the Proposed Development may result in loss or degradation of hazel dormouse habitat used for dispersal, nesting and foraging. Primary measures have reduced this effect through design of the Proposed Development to avoid, as far as practicable, valuable habitats as well as locating compounds and operational sites (including air, washout and isolation valves) outside of these sensitive habitats. In addition, a maximum working width of 20m will apply at all crossings with suitable connected habitat and dormouse presence, reducing the area of habitat lost for construction as mentioned in the Reduced Working Width and Trenchless Crossing and Tunnelling Schedules and Plans in Appendix A of the Outline CEMP (Document reference 7.1, DCO Volume 7). The Outline LEMP (Document reference 7.5, DCO Volume 7) includes a habitat reinstatement strategy that details the at least like-for-like habitat reinstatement with native species planting of value to hazel dormouse. This ensures that this effect is temporary up to medium-term only. Additionally, the quantity of habitat to be removed is small in relation to available habitat in the wider area.

8.8.270 Airborne pollution (e.g. construction dust and fine particulate matter) during construction activities and vehicle movements may result in loss or degradation of habitat through enrichment with dust deposition impacting habitats supporting hazel dormouse for up to medium-term duration. Tertiary measures are secured via the Outline CEMP (Document reference 7.1, DCO Volume 7), Framework CTMP (Document reference 7.2, DCO Volume 7) and the Dust Management Plan to be prepared post-consent as secured by the Outline CEMP). These will be implemented to mitigate risks of air quality to sensitive habitats during construction as well as potential emissions from construction NRMM.

8.8.271 Due to the size of the Proposed Development, there is a risk of potential introduction or spread of INNS between different construction areas as well as a risk of seeds spreading by wind and establishing on disturbed ground. INNS can spread rapidly and out-compete native species on which hazel dormouse rely for foraging and nest creation. This could result in a reduction of habitat available to hazel dormouse in the wider area for up to permanent duration. The management of INNS during construction is set out within the INNS Biosecurity Plan (Document

reference 7.10, DCO Volume 7). This sets out the management techniques to be employed to avoid and reduce the potential for likely effects on sensitive ecological receptors. Measures include enforcement of 'Check-Clean-Dry' protocols for all vehicles, machinery and personnel and site-specific method statements for INNS. As there are recognised standard practices for controlling INNS during construction this effect is considered addressed by tertiary mitigation measures.

8.8.272 Following the implementation of primary and tertiary mitigation measures, the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Habitat fragmentation

8.8.273 Hazel dormouse populations within suitable habitat and connected by it to the Proposed Development may be subject to potential disruption to dispersal and isolation of populations as a result of severance of habitats following vegetation clearance. This loss of ecological connectivity has the potential to cause habitat fragmentation. This effect is relevant to trenched open-cut construction works that have confirmed or likely dormouse presence. Primary measures include maximum working width of 20m will apply at all crossings with suitable connected habitat and dormouse presence. Secondary mitigation is also required to address this impact as discussed in paragraph 8.9.29. This effect would be temporary, of up to medium-duration only. The magnitude of this impact is minor, on a feature of medium value; therefore, this is a minor adverse effect which is not significant.

Disturbance

8.8.274 Disturbance of hazel dormouse may occur as a result of temporary lighting used to illuminate construction working areas. Working hours will result in lighting requirements between dusk and dawn in the winter months when hazel dormouse are hibernating and therefore would not result in impacts to foraging to dispersing animals. Night working may be undertaken at a limited number of locations including trenchless compounds and highways works which will require artificial lighting. Hazel dormouse is a light sensitive species; light spill onto habitats may result in loss of foraging, nesting and dispersal opportunities. The construction lighting will follow good practice guidelines to direct lighting away from sensitive habitats, use of visual screening and turning off lighting when not required. This is secured through the Outline CEMP (Document reference 7.1, DCO Volume 7) and is in accordance with ILP and BCT guidance [44].

8.8.275 Disturbance of hazel dormouse may occur as a result of noise and vibration from construction activities including vehicular movements and at trenchless or tunnel temporary construction compounds. This may result in loss of foraging, nesting and dispersal opportunities. Impacts are likely to be increased at night when hazel dormouse are active. In the unlikely event that night-time working is required, it will be reduced as far as practicable and limited to specific locations including trenchless temporary construction compounds and highways works locations. Tertiary good practice measures for noise and vibration reduction are secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) and will be included within the Noise and Vibration Management Plan prepared post-consent. Disturbance to hazel dormouse during construction could occur for up to medium-term duration.

8.8.276 Following the implementation of primary and tertiary mitigation measures, the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Killing or injury

8.8.277 Presence of construction plant and vehicles may result in potential killing or injury of hazel dormouse. Hazel dormouse may be at risk if access tracks are used at night, particularly if existing gaps in hedgerows are widened or new gaps created for access. Hazel dormouse may try to cross these gaps on the ground, where continuous connecting habitat was previously present. In the unlikely event that night-time working is required, it will be reduced as far as practicable and limited to specific locations including trenchless compound and highways works locations. Therefore, the likelihood of killing or injury of individual hazel dormouse is low. Tertiary measures in the Outline CEMP (Document reference 7.1, DCO Volume 7) and Framework CTMP (Document reference 7.2, DCO Volume 7) include implementing speed restrictions.

8.8.278 Where the Proposed Development bisects habitat in which hazel dormouse are present, there is the possibility of killing or injury of hazel dormouse due to entrapment in excavations. Tertiary measures secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) include covering excavations between dusk and dawn or the installation of ramps of a suitable type and placement that allows mammals to escape.

8.8.279 The magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

8.8.280 There is the potential for killing or injury of individual hazel dormouse as well as damage to or destruction of nests as a result of vegetation clearance during construction. Breeding nests may be present during the summer and hibernation nests may be present at ground level during the hibernation period. This effect is relevant to trenched open-cut construction works through habitats which have confirmed or likely dormouse presence. This will be addressed by secondary mitigation. The magnitude of this impact is minor, on a feature of medium value; therefore, this is a minor adverse effect which is not significant.

8.8.281 Killing or injury of hazel dormouse could occur for up to medium-term duration.

Inherent in-combination assessment for hazel dormouse

8.8.282 The overall assessment for hazel dormouse concludes the magnitude of impact is minor on a feature of medium value; therefore, this is a minor adverse effect which is not significant. This is because habitat fragmentation and killing or injury of hazel dormouse, as discussed in paragraphs 8.8.273 and 8.8.281, conclude a minor adverse effect, which is not significant. Habitat loss or degradation and disturbance are addressed with the implementation of primary and tertiary mitigation and are therefore neutral effects which are not significant.

Riparian mammals

All components

Habitat loss or degradation

8.8.283 All Main Rivers will be crossed using trenchless techniques, along with those detailed within the ES Appendix 19.4 Watercourse crossing schedule, Volume II (Document reference 6.2, DCO Volume 6). This would avoid loss of essential riparian habitat for breeding, commuting, foraging and resting riparian mammals.

8.8.284 Vegetation removal required for construction of the Proposed Development at compounds and open-cut sections may result in temporary up to medium-term habitat loss or degradation for otter when within 200m of a watercourse. This would be temporary and would affect small, localised areas. The Outline CEMP (Document reference 7.1, DCO Volume 7) includes tertiary measures to reduce the impacts of temporary watercourse crossings by open-cut construction works.

8.8.285 In all locations where construction is within 5m of a watercourse, these watercourses are either dry, ephemeral or suboptimal for water vole due to dense shading, high levels of disturbance and or isolation and likely water vole absence has been confirmed. Therefore, vegetation removal for construction of the Proposed Development would not impact water vole.

8.8.286 Pollution from run off may lead to the introduction of toxic pollutants or sediments into receiving watercourses, impacting on habitat suitability and resource availability for riparian mammals up to medium-term. Pollution prevention measures are detailed in the Outline CEMP (Document reference 7.1, DCO Volume 7) and will be included within the Construction Drainage Plan prepared post-consent.

8.8.287 The introduction and or spread of INNS during construction may result in riparian mammal habitat loss or degradation long-term. Tertiary mitigation includes measures to ensure that INNS are managed effectively during construction through the application of the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) including implementation of a Check-Clean-Dry protocol at construction sites, monitoring of INNS during construction and restrictions on movement of materials and protocols for control should any new INNS pathways be identified.

8.8.288 The magnitude of habitat loss and degradation impacts is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Habitat fragmentation

8.8.289 Habitat fragmentation of main watercourses is avoided through trenchless construction methodologies. Compound locations, including those within 30m of a watercourse, provide sufficient corridor width along a watercourse for undisturbed passage or otherwise compounds are located only to one side of the watercourse. Therefore, no habitat fragmentation or barrier effects to otter would result from the construction of the Proposed Development. The magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

8.8.290 Open-cut construction works affect minor watercourses, ditches and drains. Some are intermittent and likely to support otter only seasonally when connected with other watercourses supporting otter or permanently dry and therefore unsuitable or suboptimal as they were subject to disturbance and or isolated. Trenched open-cut construction works, such as at Kiln Lane discussed in paragraph 8.8.39, will be temporary up to medium-term and will be reinstated as soon as practicable on an at least like-for-like basis. Habitat fragmentation effects are not considered likely, as otter habitat affected would be peripheral to main catchments and localised. The magnitude of this impact would be negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

8.8.291 No construction is located within 5m of watercourses confirmed to support water vole. No watercourses confirmed to support water vole are subject to open-cut construction works. Therefore, habitat fragmentation impacts on water vole are not considered likely from the Proposed Development.

Disturbance

8.8.292 Otter using watercourses for foraging, commuting or occupying resting sites may be disturbed by construction works even without any direct interference. Noise, vibration, and lighting associated with construction activities, including temporary construction compounds, may disturb otter while using watercourses, riparian habitats or resting sites up to medium-term.

8.8.293 Temporary construction compound B1-3, north of Hermitage Stream, is located within 30m of a potential otter resting site. Although this feature is not currently in use, as otter is a mobile species there is a risk of it becoming utilised prior to or during construction. Vegetation removal within 30m of a potential otter resting site would be required for the construction of B1-3. Habitats recorded within the footprint of B1-3 comprised of sealed surface, ephemeral ruderal vegetation and heathland and scrub. The latter habitat would provide suitable shelter opportunities for otter and is connected to bankside vegetation but is located more than 30m from the potential resting site. Vegetation removal to enable construction of B1-3 would therefore not present a risk of reduction or degradation of the vegetation containing and surrounding the potential resting site. Proximity of the vegetation removal works would risk visual or noise disturbance, were the resting site to become occupied prior to or during works. Given the localised nature of the works, potential disturbance effects would therefore be short to medium term, temporary and highly limited in extent. Occupancy would be determined through implementation of tertiary mitigation measures prior to the start of works as secured in the Outline CEMP (Document reference 7.1, DCO Volume 7). If the potential resting site were to become occupied prior to or during works, the magnitude of this impact would be minor, on a receptor of medium value, therefore, this would be a minor adverse effect which is not significant.

8.8.294 Temporary construction compounds L-5, L-6, L-7 and L-8 are both located approximately 16m south of Bow Lake. No night works, when otter are most active, will take place at temporary construction compounds L-7 and L-8 and there is sufficient corridor width between these compounds along the watercourse for undisturbed passage. Temporary construction compounds L-5 and L-6 are likely to be in use over a short duration of consecutive nights for the trenchless construction works under the B3354 Winchester Road. Although no resting sites

were located along this watercourse, spraints and prints were identified. Otter is a mobile species and there is suitable habitat for resting sites along Bow Lake, introducing a risk of resting sites being created prior to or during construction. Occurrence and occupancy of resting sites would be determined through implementation of tertiary mitigation measures prior to the start of works as detailed in the Outline CEMP (Document reference 7.1, DCO Volume 7). Primary and tertiary measures will limit disturbance effects from lighting, noise and vibration. These measures, in-combination with existing natural screening present on the Bow Lake north of the temporary construction compounds L-5 and L-6, will avoid disturbance to otter utilising Bow Lake for foraging or commuting. In the unlikely event of a resting site being confirmed during pre-construction surveys, the ECoW will advise of any licensing requirements. Given the short-term, localised, temporary and reversible nature of night-time working and in consideration of the primary and tertiary measures secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) to reduce noise, light and vibration effects, the magnitude of this impact would be minor, on a feature of medium value; therefore, this is a minor adverse effect which is not significant.

8.8.295 Across the Proposed Development as a whole, works within 30m of a watercourse would be localised, temporary and at sufficient distances apart that potential for disturbance events would not be expected to occur simultaneously. Primary and tertiary measures detailed in the Outline CEMP (Document reference 7.1, DCO Volume 7) will limit disturbance effects from lighting, noise and vibration. Measures include construction lighting following good practice to reduce illuminating watercourses and ecologically sensitive habitats, to avoid disruption to the species using these features for resting places, foraging or commuting routes avoiding the potential for likely effects. Good practice includes following the ILP and BCT good practice guidelines for lighting [44]. The magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Killing or injury

8.8.296 Killing or injury of otter may occur as a result of road traffic collisions where vehicle movements occur between dusk and dawn. Killing or injury of water vole by vehicle or machinery movements is extremely unlikely except within the immediate vicinity of a watercourse, for example at open-cut crossing locations. Tertiary mitigation measures detailed in the Outline CEMP (Document reference 7.1, DCO Volume 7) and Framework CTMP (Document reference 7.2, DCO Volume 7) include implementing speed restrictions, locating machinery as far from sensitive receptors as reasonably practicable and providing toolbox talks to promote awareness of otter and water vole. With the combined implementation of these tertiary mitigation measures, the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

8.8.297 Otter are naturally inquisitive animals and are likely to investigate a construction site. Killing or injury of otter may occur as a result of entrapment within excavations, exposed pipework and other elements of construction. Tertiary mitigation measures secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) include covering excavations between dusk and dawn or the installation of ramps of a suitable type and placement that allows mammals to escape. Exposed pipework will be sealed overnight to prevent access. Any other construction element, such as stored soils, will be fenced off either within compound fencing or

site-specific wildlife exclusion fencing. With the implementation of these tertiary mitigation measures, the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

8.8.298 Primary mitigation through designing the Proposed Development to avoid known resting sites have avoided impacts to otter resting places, reducing the risk of killing or injury of otter across the Proposed Development. Otter are highly mobile species and the number and type of resting places within the Order Limits may change. These changes will be identified during the pre-construction surveys. If a resting site was created and became occupied prior to or during works, the magnitude of this impact would be moderate, on a feature of medium value; therefore, this is a minor adverse effect which is not significant.

8.8.299 No construction is located within 5m of watercourses confirmed to support water vole. No evidence of burrows or other field signs was recorded from any proposed open-cut construction works locations. These construction works would present low risk to water vole, but being a mobile species there is potential opportunity for water vole to change their distribution relative to the proposed construction works. Pre-commencement surveys, use of an ECoW and sensitive timing of vegetation removal would avoid the risk of killing or injuring water vole during construction. These tertiary mitigation measures are secured in the Outline CEMP (Document reference 7.1, DCO Volume 7). The magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Water Recycling Plant site

Habitat loss or degradation

8.8.300 Construction of the WRP site would require permanent habitat loss. However, primary mitigation has reduced this effect by designing the WRP site to avoid the loss of woodland habitat west of Hermitage Stream, and therefore no habitat suitable for riparian mammals would be impacted. Permanent habitat loss would be required for the new SuDS outfall within Hermitage Stream. The habitats present at the outfall location are artificial hard structures and littoral mud, which are unsuitable for otter resting sites and for water vole. The construction of a SuDS outfall would not result in loss of habitat for either species. The magnitude of this impact would be negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Habitat fragmentation

8.8.301 The new SuDS outfall in the Hermitage Stream would not introduce obstruction or habitat fragmentation for otter. No permanent in-channel structures are proposed that would create barrier effects or result in habitat fragmentation. The magnitude of this impact is negligible, on a receptor feature of medium value; therefore, this is a neutral effect which is not significant.

Inherent in-combination assessment for riparian mammals

8.8.302 The overall assessment for otter concludes the magnitude of impact is moderate on a feature of medium value; therefore, this is a minor adverse effect which is not significant. This is because disturbance and killing or injury, as discussed in

paragraph 8.8.293 and 8.8.298 concludes a minor adverse effect which is not significant. Habitat loss and degradation and habitat fragmentation are addressed with the implementation of primary and tertiary mitigation and are therefore neutral effects which are not significant.

8.8.303 The overall assessment for water vole concludes the magnitude of impact is negligible on a feature of medium value; therefore, this is a neutral effect which is not significant. This is because the effects of habitat loss and degradation, disturbance and killing or injury are addressed with the implementation of primary and tertiary mitigation and are therefore neutral effects which are not significant.

Other notable fauna

All components

Habitat loss or degradation

8.8.304 Vegetation clearance required for construction of the Proposed Development would result in the temporary up to medium-term reduction in habitat available for other notable fauna for foraging, commuting, resting, breeding, and hibernation. It could also cause the fragmentation or isolation of populations and potentially result in the killing or injury of other notable fauna. To mitigate for this impact and the associated effects, other notable fauna would be encouraged to disperse away from the Order Limits and towards suitable retained habitat with connectivity to the wider landscape. Methods to achieve this are set out and secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) and include vegetation clearance that will be undertaken under the supervision of a suitably experienced ECoW. Vegetation clearance would reduce the suitability of habitats within the Order Limits and will include, where required, directional phased clearance, staged cutting, fingertip searches and supervised destructive searches of potential refuges. Areas that have been cleared will then be kept unsuitable for other notable fauna for the duration of the works to discourage recolonisation.

8.8.305 Good practice measures to reduce the potential for likely effects of habitat degradation by the creation of airborne particles (e.g. dust), introduction of toxic pollutants or sediments are included within the Outline CEMP (Document reference 7.1, DCO Volume 7) and will be included within the Dust Management Plan prepared post-consent. The Outline CEMP contains good practice measures in relation to construction to control pollutants in order to reduce the potential for likely effects of airborne pollutants on sensitive habitat that other notable fauna may be utilising.

8.8.306 Habitat within the Order Limits will be reinstated at least like-for-like as soon as practicable post-construction to ensure that habitat loss is only temporary up to medium-term. Soil compaction and incorrect storage could make it difficult for at least like-for-like habitat reinstatement of habitat suitable for other notable fauna due to the difficulty of roots penetrating compacted soil and potential loss of the seedbank. The Outline SRMP has been produced for the construction and operation of the Proposed Development, refer to Appendix D of the Outline CEMP (Document reference 7.1, DCO Volume 7). Reinstatement of soil following good practices in the Outline SRMP and the reinstatement plan within the Outline LEMP

(Document reference 7.5, DCO Volume 7) will facilitate the successful reinstatement of habitat suitable for other notable fauna.

8.8.307 Habitat suitable to support other notable fauna is widespread in the local area and these species will be able to successfully utilise retained habitat for the duration of the construction. The magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Disturbance

8.8.308 Presence of noise, visual stimuli and vibration from construction activities, vehicular movements, site personnel and temporary lighting close to retained habitat could disturb other notable fauna if present up to medium-term. Construction lighting design will follow good practice to reduce illuminating ecologically sensitive habitats, retained vegetation and the other notable species using these features for resting, foraging, commuting, breeding and hibernating. Good practice measures for noise, vibration and lighting are secured in the Outline CEMP (Document reference 7.1, DCO Volume 7) and a Noise and Vibration Management Plan will be prepared post-consent for inclusion within or accompanying the detailed CEMP. Measures to reduce disturbance during day works and any potential overnight works include preventing light spill into ecologically sensitive habitats, protection of retained habitats, driving with dipped headlights, reduced speed restrictions and restricting noise levels during night works.

8.8.309 Habitat suitable to support other notable fauna is widespread in the local area and these species would be able to successfully utilise retained habitat for the duration of the construction. The magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Killing or injury

8.8.310 Killing or injury of other notable fauna may occur as a result of individuals becoming trapped in excavations created for construction of the Proposed Development. Tertiary measures are included in the Outline CEMP (Document reference 7.1, DCO Volume 7) to allow a means of escape. This includes covering excavations between dusk and dawn or installation of ramps of a suitable type and placement that allows other notable fauna to escape.

8.8.311 Killing or injury of other notables may occur during vegetation clearance of habitats that could support hibernating other notable fauna (such as log piles, rock piles and dense understory) if undertaken during the hibernation period. Tertiary measures in the Outline CEMP (Document reference 7.1, DCO Volume 7) include the avoidance of removing these features between November and March without supervision by the suitability experienced ECoW. Where practicable, replacement hibernacula, including features such as stumperies for terrestrial invertebrates, will be provided within retained habitat using arisings from vegetation clearance within the Order Limits to mitigate for the loss of hibernacula.

8.8.312 The increased number of vehicles, vehicle movements and changes in movement patterns and timings could result in the killing or injury of other notable fauna through road traffic collisions. Vegetation clearance will have taken place prior to

the commencement of construction activities and other notable fauna are not considered to enter areas without suitable habitat present.

8.8.313 Aside from common reptiles and some terrestrial invertebrate species, all other notable fauna are most active between dusk and dawn. Overnight works will be limited and the Outline CEMP (Document reference 7.1, DCO Volume 7) and Framework CTMP (Document reference 7.3, DCO Volume 7) include general measures such as speed restrictions and providing toolbox talks to promote awareness of other notables, highlighting key areas of high activity.

8.8.314 Habitat suitable to support other notable fauna is widespread in the local area and it is considered unlikely that these species would be present within the construction footprint following vegetation removal. The magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Invasive non-native species and disease

8.8.315 During construction there is the potential for the introduction and spread of diseases that could infect amphibians long-term. Chytrid fungi and ranaviruses can infect amphibians and are frequently found to be spread by human activities [1].

8.8.316 The Proposed Development has been designed to avoid waterbodies where reasonably practicable. Good practice biosecurity measures, including a protocol for washing down all footwear, PPE, equipment and vehicles or plant before they are moved between construction sites are included within the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) will also prevent the spread of disease. The magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Hydrological change

8.8.317 During construction there is a risk of changes to hydrology such as water flows, quality, qualities and drainage pathways. These changes could cause the temporary loss and or degradation up to medium-term of habitat and the species and features they support. Common toad, grass snake and terrestrial invertebrates rely on a combination of terrestrial and freshwater habitats for breeding, hibernation and foraging. Changes to hydrology could result in habitat becoming drier reducing the suitability of these habitats and the other notable species they support. Habitats could also become wetter, causing the loss of habitats that were previously suitable for other notable fauna.

8.8.318 All Main Rivers will be crossed using trenchless techniques, along with those detailed within ES Appendix 19.4 Watercourse crossing schedule, Volume II (Document reference 6.2, DCO Volume 6). Trenchless techniques will reduce direct disturbance of groundwater. The Pipeline will be installed at least 2.5m below the bed of Main Rivers and at least 1.5m below all other watercourses (dependent on local geology and geomorphological risks); this will avoid interaction with active bed sediments and reduce the chances of exposure and interference with the natural geomorphology of watercourses.

8.8.319 Soil compaction during the construction of the Proposed Development could cause runoff and potential flooding of the surrounding retained habitat where other notable fauna could be present up to medium-term. The Construction Drainage Plan to be prepared post-consent for inclusion within or accompanying the detailed

CEMP will include measures such as managing site drainage and runoff during construction, measures for pollution prevention and to remove the risk of runoff, flooding and sediment erosion. Good practice measures to be included within the Drainage Strategy include the retention of strips of vegetation on the edge of the working area and temporary interceptor drainage ditches parallel to soil storage areas and the pipeline corridor to intercept surface water runoff.

8.8.320 Habitat suitable to support other notable fauna is widespread in the local area and these species will be able to utilise retained habitat for the duration of the construction. The magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Water Recycling Plant site

Habitat loss or degradation

8.8.321 Much of the habitat suitable for common reptile species (in particular, slow worm) at the WRP site would be permanently lost during construction. This includes OMH on previously developed land and mixed scrub. Although habitat suitable for common reptile species is widespread in the local area, the WRP site is isolated by Harts Farm Way to the south and west, the A27 (Havant Bypass) to the north and Hermitage stream to the east.

8.8.322 Permanent habitat loss would reduce the carrying capacity at the WRP site due to a reduction in suitable habitat for foraging, basking and breeding. This will require secondary mitigation measures to address this effect as set out in paragraph 8.9.38. The magnitude of this impact is moderate, on a feature of low value; therefore, this is a neutral effect which is not significant.

Inherent in-combination assessment for other notable fauna

8.8.323 The overall magnitude of impact for other notable species (aside from common reptiles) is negligible on features of low value; therefore, this is a neutral effect which is not significant. This is because the effects of habitat loss or degradation, disturbance, killing or injury, INNS and disease, and hydrological change are neutral effects which are not significant.

8.8.324 The overall magnitude of impact for common reptiles is moderate, on a feature of low value; therefore, this is a neutral effect which is not significant. This is because the effect of habitat loss or degradation as discussed in paragraphs 8.8.321 and 8.8.322 concludes a neutral effect which is not significant.

Freshwater biodiversity features

All components

Habitat loss or degradation

Trenched open-cut construction

8.8.325 In-channel works required for construction during trenched open-cut watercourse construction works may result in the loss or degradation of aquatic and riparian habitat or the loss of macrophyte and phytobenthic communities up to medium-

term. Such in-channel works include vegetation removal, dewatering of channels, construction of temporary dams or pipes, pumps or flumes required for maintenance of flows in the open-cut working corridor.

8.8.326 Loss or degradation of aquatic and riparian habitat may also occur through accidental pollution events at open-cut watercourse construction works resulting in water quality changes in the receiving water body, including through increased sedimentation. The potential introduction or spread of INNS during construction may also lead to habitat loss or degradation through the out-competition of native species and increased competition for natural resources long-term.

8.8.327 Open-cut construction in watercourses may also result in the reduction in availability of foraging and commuting habitat for fish and aquatic macroinvertebrate species, through physical presence in the watercourse, vegetation removal or accidental pollution events resulting in habitat loss or degradation up to medium-term.

8.8.328 Primary mitigation will ensure that 21 watercourses are crossed using trenchless methods, including all 14 Main River crossings and seven Ordinary Watercourses. Trenchless construction methodologies will ensure that sensitive habitats, including Priority Habitats are avoided as far as practicable, including the River Meon Compensatory SAC and the River Itchen SAC where there is potential for *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation of high value to be present. No watercourse crossings are proposed in the precautionary S41 priority headwater river habitat identified at Riders Lane Stream. Trenchless construction methodologies will ensure that no aquatic or riparian habitat will be lost or degraded.

8.8.329 There are a further 20 watercourses where trenched open-cut construction is proposed. These are Ordinary Watercourses, mainly agricultural field drains and ditches, a number of which are temporary in nature (either ephemeral or intermittent) or dry with no aquatic or riparian habitat present. Where these Ordinary Watercourses have been surveyed containing water, no sensitive habitat or species of conservation value has been identified, and they are not considered primary routes for fish migration.

8.8.330 Tertiary mitigation measures set out in the Outline CEMP (Document reference 7.1, DCO Volume 7) manage environmental risks at trenched open-cut watercourse crossings to ensure that good practice guidance in relation to working near water would be adhered to and thus water quality is controlled. Measures are also set out so that flows are maintained through the use of diversion channels around the crossing and that sediment transport is reduced.

8.8.331 Tertiary mitigation also includes measures to ensure that INNS are managed effectively during construction through the application of the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7), including implementation of a Check-Clean-Dry protocol at construction sites, monitoring of INNS during construction and restrictions on movement of materials and protocols for control should any new INNS pathways be identified.

8.8.332 The ECoW will ensure that the detailed CEMP and all measures within the INNS Biosecurity Plan are appropriately delivered. These measures are secured through the Outline CEMP (Document reference 7.1, DCO Volume 7) and the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7).

8.8.333 Trenched open-cut construction at watercourses will be temporary (i.e. confined to the duration of construction for the crossing to which they relate) and will be reversed once the temporary impounding structures were removed. The Outline LEMP (Document reference 7.5, DCO Volume 7) includes a habitat reinstatement strategy detailing at least like-for-like habitat reinstatement which will ensure that habitat loss or degradation is temporary only. The Outline CEMP (Document reference 7.1, DCO Volume 7) includes tertiary measures to reduce the impacts of temporary watercourse crossings, including natural regeneration of bankside habitat.

8.8.334 With the implementation of primary and tertiary measures and considering that the working corridors are small in relation to available aquatic and riparian habitat in the wider area (maximum 20m working corridor, as outlined in the Reduced Working Width and Trenchless Crossing and Tunnelling Schedules and Plans in Appendix A of the Outline CEMP (Document reference 7.1, DCO Volume 7)), no adverse effects for the identified impacts are considered likely. The magnitude of this impact is negligible, on features of low to high value; therefore, this is a up to minor adverse effect which is not significant.

Habitat fragmentation

Trenched open-cut construction

8.8.335 In-channel works required for construction during trenched open-cut construction works under through watercourses may result in the loss of ecological connectivity causing barriers to fish movement and severance of habitat suitable for fish movement, feeding and breeding up to medium-term. Isolation of mobile freshwater invertebrate populations may also occur.

8.8.336 Loss of ecological connectivity may also occur through accidental pollution events at trenched open-cut watercourse construction works through exposure of previously submerged habitats and vice versa, resulting in fragmentation and isolation of freshwater populations up to medium-term.

8.8.337 With the implementation of primary and tertiary measures presented in section 8.4 and discussed in relation to freshwater ecological receptors in paragraph 8.8.328 to 8.8.334, and considering that the working corridors are small in relation to available aquatic and riparian habitat in the wider area (maximum 20m working corridor, as outlined in the Reduced Working Width and Trenchless Crossing and Tunnelling Schedules and Plans in Appendix A of the Outline CEMP (Document reference 7.1, DCO Volume 7)), no adverse effects for the identified impacts are considered likely. The magnitude of this impact is negligible, on features of low to high value; therefore, this is an up to minor adverse effect which is not significant.

Disturbance

Trenched open-cut construction

8.8.338 The presence of additional noise, light, vibration or visual stimuli from construction activities at trenched open-cut crossings may result in the disturbance or displacement of susceptible fish and freshwater invertebrate species up to medium-term. This effect may be evident through active avoidance of the affected area, or indirectly through the loss of foraging and commuting habitat or resting

and feeding sites resulting in alteration of fish migration patterns, reduction in distribution of mobile species within suitable habitats or increase in energy expenditure of mobile species potentially leading to a reduction in survival and productivity rates.

8.8.339 Loss of ecological connectivity through severance (due to introduction of light) of habitats resulting in fragmentation may also occur short-term. Disruption of the physiology of species reliant on natural day, night and seasonal light level changes may result in loss of fitness or reduction in survival rates.

8.8.340 With the implementation of primary and tertiary measures presented in section 8.4 and discussed in relation to freshwater ecological receptors in paragraph 8.8.328 to 8.8.334, this effect is limited to the 20 open-cut crossings at smaller Ordinary Watercourses, ditches and field drains only, a number of which are temporary in nature (either ephemeral or intermittent) or dry with no aquatic or riparian habitat present. Where these Ordinary Watercourses have been surveyed containing water, no sensitive species of conservation value has been identified.

8.8.341 Night-time working maybe required at specific locations including, but not restricted to, construction works within or near highways and railways, tidal working and abnormal load deliveries. Tertiary measures include implementation of good practice lighting design for the duration of construction to prevent light spill into sensitive habitats when day working. These measures are set out in the Outline CEMP (Document reference 7.1, DCO Volume 7). As open-cut construction is limited to the watercourses described in paragraph 8.8.329 and all Main Rivers will be crossed using trenchless construction, watercourses considered migration corridors for fish species will not be crossed using open-cut techniques.

8.8.342 Tertiary measures including good practice measures for noise and vibration reduction are secured within the Outline CEMP (Document reference 7.1, DCO Volume 7) and will be included within the Noise and Vibration Management Plan prepared post-consent. This will include locating plant away from sensitive receptors and switching off equipment when not in use.

8.8.343 The magnitude of this impact is negligible, on features of low to high value; therefore, this is a up to minor adverse effect which is not significant.

Trenchless construction

8.8.344 Trenchless construction under watercourses may also result in disturbance to susceptible species due to the presence of noise and vibration, resulting in barriers to fish migration, permanent or temporary injury or induced behavioural changes in fish and macroinvertebrate populations short-term. Trenchless construction methods are described in the ES Chapter 3 Description of Proposed Development, Volume I (Document reference 6.1, DCO Volume 6). Noise and vibration from tunnelling propagating into the water column and potentially causing a barrier to migration, disturbing spawning or damaging fish eggs was also raised as a concern during Summer 2024 Consultation (summarised within the Consultation Report (Document reference 5.1, DCO Volume 5)). Fish species that have been identified as potentially at risk are migratory salmonids, lamprey and European eel. Atlantic salmon are present in the River Meon and River Itchen catchments; lamprey species in the Meon, Hamble and Itchen catchments; and European eel have a wide distribution throughout the Order Limits. The future baseline of the Hermitage

Stream considers the potential presence of migratory fish such as Atlantic salmon and lamprey species in this catchment also.

Underwater noise

8.8.345 Thresholds for the effects of underwater noise on fish and fish eggs are not well defined, but Popper et al [76] suggests that potential effects of continuous underwater noise on fish are defined in terms of near, far and intermediate distance from the sound rather than providing a definitive threshold value. The only exception to this are fish with a swim bladder involved in hearing such as salmon [76]. It should be noted that no thresholds exist for potential effects of continuous underwater noise on fish eggs and larvae.

8.8.346 The hearing threshold for Atlantic salmon is approximately 105dB re 1µPa at the most sensitive frequency band of 100Hz to 200Hz. As the frequency increases so does the hearing threshold and the sound needs to be louder to be detected. For lamprey, hearing seems to be limited to frequencies below 300Hz and between 144 and 155dB re 1µPa [77] and European eel hearing appears most sensitive at approximately 80Hz frequency and 95dB re 1µPa. As the frequency increases, the threshold for detection also increases, such that at approximately 300Hz the threshold of detection is over 140db re 1µPa [78].

8.8.347 The trenchless Pipelines would be constructed using microtunnelling that utilises microtunnel boring machine (MTBM), as outlined in ES Chapter 3 Description of Proposed Development, Volume I (Document reference 6.1, DCO Volume 6). Few studies of noise and vibration from drilling under watercourses exist and those that do are for tunnel boring machine (TBM) or from horizontal directional drilling (HDD). For TBM, the Lower Thames Crossing project has modelled and predicted underwater noise at the worst case location above the TBM with a peak of 130dB re 1µPa at 100Hz one third octave band which would diminish with increasing distance [79]. For HDD, existing studies10 have recorded an underwater sound peak of 100dB re 1µPa at 600Hz one third octave band.

8.8.348 The MTBM used for the Pipelines emits lower levels of noise compared to TBM especially when using remote controlled equipment from the surface, and sound from microtunnelling would be continuous rather than impulsive. As such it can be assumed that any noise from the construction of the Pipelines using MTBM could be similar as that has been measured in other studies of HDD and lower than that of TBM and therefore lower than the thresholds for harm.

Underwater vibration

8.8.349 In considering the potential impact of vibration from MTBM on fish, the industry standard guidance developed by Popper *et al.* (2014) [76] suggests a suitable criterion for risk to fish eggs and larvae is 13mm/s Peak Particle Velocity (PPV). Thresholds for potential mortality or mortal injury from impulsive vibration on fish eggs and larvae have also been stated as 1.3cm/s from Canadian standards [76, 80], or two inches/s (5.08cm/s) from Alaskan standards [81]. Continuous vibration thresholds have not been determined to date.

[10] Data has been informed by a confidential report prepared by Mott MacDonald for National Grid, which includes proprietary survey results not available in the public domain [87].

8.8.350 A Transport Research Laboratory (TRL) paper from 2000 [82] suggests that vibration from tunnelling is dependent on the geology through which the tunnel is being bored; excavation of softer materials (e.g. clay and sand) causes lower vibration than stronger or harder rock. For the Proposed Development, the trenchless tunnels are proposed to be driven with an absolute minimum cover of 2.5m, but likely to be at a much greater depth. The tunnels would be driven through London Clay, which overlies chalk under the River Itchen and the River Meon. Vibration data extrapolated from similar tunnelling project examples in the TRL paper indicated PPV values significantly less than the 13mm/s threshold where harm to fish or fish eggs would be expected. For the Lower Thames Crossing TBM example the project modelled the worst case vibration (in terms of particle velocity) at 0.01mm/s [79]. For the HDD confidential study, an underwater vibration of 1.4mm/s was recorded [83]. All the available literature suggests that underwater vibration from tunnelling is significantly below the 13mm/s threshold where harm to fish or fish eggs would be expected.

8.8.351 Noise and vibration from trenchless construction is not expected to cause any likely significant effects on freshwater biodiversity receptors, including any detrimental effects of vibration from construction on fish, fish eggs or larvae, or barriers to fish migration, as the levels of vibration and underwater noise are predicted to be extremely low. Thus, no adverse effects for the identified impact are considered likely. The magnitude of this impact is negligible, on features of low to high value; therefore, this is an up to minor adverse effect which is not significant.

Killing or injury

Trenched open-cut construction

8.8.352 In-channel works required for trenched open-cut construction through watercourses may result in the killing or injury of aquatic or riparian fish or macroinvertebrate species. Such in-channel works include vegetation removal, dewatering of channels, construction of temporary dams or pipes, pumps or flumes required for maintenance of flows in the open-cut working corridor. Killing or injury of aquatic or riparian species may occur directly by construction activities, or indirectly through the reduction or removal of occupied resting or breeding habitat.

8.8.353 With the implementation of primary and tertiary measures presented in section 8.4 and discussed in relation to freshwater ecological receptors in paragraph 8.8.328 to 8.8.334, particularly application of the measures for watercourse construction secured in the Outline CEMP (Document reference 7.1, DCO Volume 7)), the risk of killing or injury of fish and macroinvertebrate species is reduced and considered low. The residual risk of killing or injury of freshwater fish and macroinvertebrate species will be addressed through secondary mitigation. This effect is limited to the 20 open-cut (trenched) crossings at smaller Ordinary Watercourses, ditches and field drains only, a number of which are temporary in nature (either ephemeral or intermittent) or dry with no aquatic or riparian habitat present.

8.8.354 The significance of the impact is considered separately for each river catchment in the Order Limits where trenched open-cut construction over watercourses is proposed. Given the temporary (ephemeral or intermittent) nature of many of the watercourses for which open-cut construction is proposed, all are considered to have potential for fish to be present by applying a precautionary approach, based

on their connectivity to a Main River or potential to contain significant flow in the future.

River Wallington catchment

8.8.355 OPT1_WCX_F_001 and OPT1_WCX_F_002 are open-cut pipeline crossings located on dry, terrestrialised field drains, where aquatic and riparian species of low value only are expected. For the Wallington catchment, the magnitude of this impact is minor, on features of low value; therefore, this is a neutral effect which is not significant.

River Meon catchment

8.8.356 Open-cut crossings OPT1_WCX_G_008 and ALTE_WCX_G_006 (alternative route option) are located on a drainage ditch within the River Meon catchment. Aquatic ecological features of this watercourse are generally of low value, there was no macrophyte growth at the time of surveys and the aquatic macroinvertebrate community did not comprise species of conservation value. However, given its hydrological connection to the River Meon, it is possible that the crossed watercourse could provide functional habitat to Atlantic salmon (Annex II species) under certain hydrological conditions. If present during construction, Atlantic salmon and any other aquatic species present would be at risk of death or injury due to open-cut construction. For the Meon catchment the magnitude of this impact is minor, on features of low to very high value; therefore, this is an up to moderate adverse effect which is significant.

South East coastal catchment (below Moors Stream)

8.8.357 None of the five proposed open-cut watercourse crossings within the South East Coastal catchment are located on watercourses that support aquatic ecology features of conservation value. Only aquatic and riparian species of low value could be at risk of death or injury due to open-cut construction. For the South East coastal catchment (below Moors Stream) the magnitude of this impact is minor, on features of low value; therefore, this is a neutral effect which is not significant.

Upper Hamble catchment

8.8.358 One open-cut watercourse crossing is located on a small tributary of the River Hamble within the Upper Hamble catchment. Hydrological conditions in this watercourse are not considered suitable to support fish species of conservation value. Aquatic macroinvertebrates are present within the watercourse, including the Nationally Scarce caddisfly *Phacopteryx brevipennis*, which would be at risk of death or injury due to open-cut construction. For the Upper Hamble catchment the magnitude of this impact is minor, on features of low value; therefore, this is a neutral effect which is not significant.

Horton Heath Stream catchment

8.8.359 None of the four proposed open-cut watercourse crossings within the Horton Heath Stream catchment are located on watercourses that support aquatic ecology features of conservation value. Only aquatic and riparian species of low value could be at risk of death or injury due to open-cut construction. For the Horton

Heath Stream catchment, the magnitude of this impact is minor, on features of low value; therefore, this is a neutral effect which is not significant.

Bow Lake catchment

8.8.360 None of the three proposed open-cut watercourse crossings within the Bow Lake catchment are located on watercourses that support aquatic ecology features of conservation value. Only aquatic and riparian species of low value could be at risk of death or injury due to open-cut construction. For the Bow Lake catchment, the magnitude of this impact is minor, on features of low value; therefore, this is a neutral effect which is not significant.

River Itchen catchment

8.8.361 Four open-cut watercourse crossings are proposed over field drains within the River Itchen and Itchen Navigation catchment. Although no aquatic features of conservation value were identified in the affected watercourses, the Itchen catchment as a whole is of very high conservation value, given the Main River designation as an SAC. Therefore, the possibility of these watercourses being of higher value in the future needs to be considered, such as if hydrological conditions were to alter and these watercourses become supporting or functional habitat to the SAC. Medium to high value species such as southern damselfly, Southern iron blue mayfly, white-clawed crayfish, bullhead, Atlantic salmon, European eel and brook lamprey all currently present within the wider catchment, could be at risk of death or injury due to open-cut construction. As a precautionary approach, the magnitude of this impact is minor, on features of low to very high value; therefore, this is an up to moderate adverse effect which is significant.

Inherent in-combination assessment for freshwater biodiversity

8.8.362 The overall assessment for freshwater biodiversity features concludes the magnitude is minor on features of low to very high value; therefore, this is an up to moderate adverse effect. This is because killing or injury of freshwater biodiversity features within the River Meon and Itchen catchments, as discussed in paragraphs 8.8.356 and 8.8.361, concludes moderate adverse effects which are significant.

8.8.363 Habitat loss and degradation, habitat fragmentation, disturbance are addressed with implementation of primary and tertiary mitigation and are therefore up to minor adverse effects which are not significant. Killing or injury of freshwater biodiversity features within the River Wellington, South East coastal catchment, Upper Hamble catchment, Horton Heath Stream catchment and Bow Lake catchment addressed with implementation of primary and tertiary mitigation and are therefore neutral effects which are not significant.

Operational effects

Statutory designated sites

Above Ground Plant and pumping stations

Disturbance

8.8.364 Presence of noise and visual stimuli produced by operation of AGP and pumping stations may cause disturbance to a qualifying species of a statutory designated site. Disturbance during operation can result from noise and vibration from increased levels of activity within permanent structures. However, operational noise of AGP would be short-term in nature, associated with operational tasks, rather than constant. The design of pumping stations includes sound proofing and vegetation screening around AGP and pumping stations, as part of the Outline LEMP (Document reference 7.5, DCO Volume 7) and reinstatement strategy, would also mitigate the effects.

8.8.365 Sensitive lighting design will be embedded into the Proposed Development through primary mitigation to avoid impacts to wildlife. The lighting design set out in the Design Principles Document (Document reference 5.11, DCO Volume 5) will follow good practice [44] to reduce illuminating hedgerows and ecologically sensitive habitats, to avoid disruption to retained vegetation and the species using these features for resting places, foraging or commuting routes, avoiding the potential for likely effects.

8.8.366 Operation and maintenance of air valves and isolation chambers may cause disturbance to ecological receptors. These activities will be infrequent short-term (approximately yearly) and effects on ecological receptors would be consistent with baseline disturbance levels from agricultural activity or within urban settings.

8.8.367 The magnitude of this impact is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

Killing or injury

8.8.368 Increased vehicle movements associated with operational traffic and plant from the Proposed Development has the potential to kill or injure otter a qualifying feature of the River Itchen SAC and SSSI. Most operational work would take place in the daytime, when the likelihood of encountering otter is low. Operational traffic would be on access roads and the speeds of vehicles used on site will be low, reducing the risk of collision with otter. Tertiary measures included in OEMP (Document reference 7.7, DCO Volume 7) include anyone driving on operational business will undertake driver awareness training which will include specific reference to ecological features, particularly protected species The magnitude of this impact is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

Invasive non-native species

8.8.369 The Proposed Development would move source water from Havant Thicket Reservoir in the East Hampshire River WFD operational management catchment to Otterbourne WSW in the Test and Itchen WFD operational management

catchment. The following activities have the potential to create new INNS pathways to statutory designated sites long-term during operation. These potential new INNS pathways are discussed in more detail in the freshwater INNS assessment in paragraphs 8.8.451 to 8.8.459:

1. Use of the washout valves for maintenance and testing during normal operation of the pipeline between the WRP and Otterbourne WSW has the potential to result in the uncontrolled release of raw source water (approximately 4.5m^3) containing INNS to statutory designed sites.
2. Source water bypassing treatment at Otterbourne WSW and entering the sewer network at Chickenhall WTW has the potential to result in INNS from an outside catchment entering the River Itchen.

8.8.370 The Proposed Development has applied a robust physical management approach to mitigate the risk of INNS spread through the washouts, to ensure that there will be no discharge of source water into the natural environment (land or watercourse) during maintenance and testing. A capture and dispose process will be applied ensuring any releases of source water resulting from the testing and maintenance of washout valves would be collected directly by a tanker. Testing of a washout valve would result in the release of approximately 4.5m^3 of source water from the Pipelines, requiring the installation of temporary pumping and flexible pipework to connect the tanker to the washout valve. Only one tanker and is expected to be required once every six months.

8.8.371 The scenarios in which washouts would be used and the commitments to ensure that adverse effects are mitigated as far as practicable are set out in the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7).

8.8.372 For the potential impacts around INNS entering the River Itchen from Chickenhall WTW, INNS Treatment at Otterbourne WSW has been included in the design of the Proposed Development, to treat the waste flows entering the sewer network from Otterbourne WSW. Once flows have passed through Otterbourne WSW and directed to supply, the waste stream will be subject to the following process to remove INNS: Lamella settlers to help settle the high solid loading from centrate, and two stages of filtering to remove any INNS or particles containing INNS. The first filtering process will use coarse 1mm Boll type pressure strainers and the second filtering process will use fine 25µm Boll type pressure strainers. Any liquid waste from the INNS Treatment at Otterbourne WSW will be considered INNS free and discharged to the existing foul sewer network at Chickenhall WTW. Any sludge waste from the Lamella settlers or from the washwater from Boll type strainers will be returned to the head of the works for reprocessing through the wastewater system at Otterbourne WSW. Any solid sludge arising from this process will be transferred to a suitable licensed disposal facility and any liquid waste arising from the wastewater treatment system will be sent back through the INNS Treatment plant at Otterbourne WSW.

8.8.373 The measures included in the design of the Proposed Development, as described in paragraph 8.8.456 will reduce the potential introduction or spread of INNS. Therefore, no effects from INNS during operation are anticipated on statutory designated sites.

8.8.374 Tertiary mitigation measures as set out in the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) will further ensure that INNS are managed

effectively during operation. The tertiary measures include a commitment to continued collaboration with Portsmouth Water to ensure development of a monitoring and management programme at Havant Thicket Reservoir to identify any new establishment of INNS in the reservoir is supported, thus limiting the presence of INNS in the source water to as low as is reasonably practicable.

Water Recycling Plant site

Disturbance

8.8.375 Presence of noise, vibration and visual stimuli produced by operation of the WRP site may cause disturbance to qualifying bird species of a designated site. Disturbance during operation is envisaged in the form of noise and vibration from increased levels of activity within permanent structures. The WRP site is surrounded by existing urban infrastructure, and the area is already subject to high levels of disturbance to which birds would have habituated. Tertiary measures such as vegetation screening secured through the Outline LEMP (Document reference 7.5, DCO Volume 7) and reinstatement strategy would also mitigate potential disturbance effects during operation of the WRP site.

8.8.376 Sensitive lighting design is included in the Design Principles Document (Document reference 5.11, DCO Volume 5) to avoid impacts to birds via visual disturbance. The lighting design will follow good practice [44] to reduce illuminating hedgerows and ecologically sensitive habitats, to avoid disruption to retained vegetation and the species using these features for roosting, foraging or commuting.

8.8.377 The magnitude of this impact is negligible, on features of very high value; therefore, this is a minor adverse effect which is not significant.

Water quality change

8.8.378 The proposed discharge of treated surface runoff from the WRP site SuDS outfall into the Hermitage Stream has the potential to reduce the salinity within the watercourse permanently. Hermitage Stream forms part of SWBGS site H130 (candidate site) and is hydraulically connected to the Solent Maritime SAC, Chichester and Langstone Harbours SPA and Ramsar and Langstone Harbour SSSI. Full details of the SuDS modelling in relation to the marine environment and designated sites are within ES Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6). The magnitude of this impact is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

Pipeline between the Water Recycling Plant site and Otterbourne Water Supply Works

Water quality change

8.8.379 Operation of the Proposed Development will reduce the requirements for water abstractions from the River Itchen SSSI and SAC. This reduction in abstractions will help maintain natural watercourse flow and contribute to the conservation objective of maintaining or restoring the structure and function of habitats and species long-term. The magnitude of this impact is moderate, on features of high

to very high value; therefore, this is an up to major beneficial effect which is significant.

Eastney Long Sea Outfall

Water quality change

8.8.380 Atlantic salmon, a qualifying feature of both the River Itchen SAC and River Meon Compensatory Habitat SAC, may pass through the Solent and adjacent to the Eastney LSO. Dispersion modelling detailed in ES Appendix 19.5 Eastney Long Sea Outfall Solent dispersion modelling, Volume II (Document reference 6.2, DCO Volume 6) and summarised within ES Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6), predicted that the calculated difference (change) in water quality from the LSO as a result of the 22Ml/d of reject water release is very small and likely to be within baseline variation. Additionally, any change in water composition as a result of the 22Ml/d of reject water release is likely to be localised around the LSO as the released water dilutes through mixing. Atlantic salmon are highly mobile, so they are likely to have a limited duration of exposure to any discharged compounds before they move away from the LSO or the discharge will be sufficiently diluted by the Solent to below thresholds of effect. Consequently, this is not considered to result in significant ecological effect to the species as a qualifying feature of the River Itchen SAC and River Meon Compensatory Habitat SAC. The magnitude of this impact is negligible, on features of high value; therefore, this is a minor adverse effect which is not significant.

8.8.381 Four internationally designated sites with birds or assemblages of birds as a qualifying feature have connectivity to the Solent and the Eastney LSO. These are Solent and Dorset Coast SPA, Solent and Southampton Water SPA, Portsmouth Harbour SPA and Ramsar and Chichester and Langstone Harbour SPA and Ramsar. Given the likely very small changes in water composition as a result of the 22Ml/d of reject water release from the Eastney LSO, effects on these designated sites and their qualifying features are unlikely. The magnitude of this impact is negligible, on features of high value; therefore, this is a minor adverse effect which is not significant.

Inherent in-combination assessment for statutory designated sites

8.8.382 The overall magnitude of impact for statutory designated sites is negligible on features of medium to very high value; therefore, this is a minor adverse effect which is not significant. As discussed in paragraph 8.8.380 water quality change of the River Itchen SSSI and SAC concludes a up to major beneficial effect which is significant due to the reduced requirements for water abstraction. However, disturbance, killing or injury and INNS all conclude a minor adverse effect which are not significant.

Non-statutory designated sites

Above Ground Plant, Water Recycling Plant and pumping stations

Invasive non-native species

8.8.383 The INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) sets out measures to reduce INNS risk for the Proposed Development during routine operation and maintenance. The measures included in the design of the Proposed Development, as described in paragraph 8.8.456 will reduce the potential introduction or spread of INNS. Therefore, no effects from INNS during operation are anticipated on non-statutory designated sites.

Inherent in-combination assessment for non - statutory designated sites

8.8.384 No effects are anticipated to non-statutory designated sites during operation.

Habitats

Above Ground Plant

Hydrological change

8.8.385 Permanent operational drainage strategies to control runoff and off-site flood risk from permanent above-ground infrastructure have been developed as part of the Flood Risk Assessment process. These will incorporate SuDS measures to promote infiltration, manage the rate at which water is discharged, and control water quality and are presented within the Sustainable Drainage Systems Strategy in ES Appendix 19.1 Flood Risk Assessment, Volume II (Document reference 6.2, DCO Volume 6). Therefore, no operational impacts on habitats are considered likely.

Badger

Water Recycling Plant site and Above Ground Plant

Disturbance

8.8.386 Operational lighting from the AGP close to retained habitat could disturb badger if present. To mitigate for these potential effects sensitive lighting design will be embedded into the Proposed Development through primary mitigation to avoid impacts to wildlife. The lighting design set out in the Design Principles Document (Document reference 5.11, DCO Volume 5) will follow good practice [44] to reduce illuminating ecologically sensitive habitats, retained vegetation and badger using these features for foraging, commuting or sett creation.

8.8.387 This effect could occur for up to permanent duration or until badger become habituated to operational light levels. The magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Killing or injury

8.8.388 Vehicular movements have the potential to cause killing or injury of badger via road traffic accidents between dusk and dawn at the WRP site or AGP. No active badger setts have been identified within 30m of the WRP site, badgers are highly mobile and may create new setts across the Proposed Development. This effect could occur for up to permanent duration. Tertiary measures included in OEMP (Document reference 7.7, DCO Volume 7) include anyone driving on operational business will undertake driver awareness training which will include specific reference to ecological features, particularly protected species. The magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

In-combination assessment for badger

8.8.389 The overall assessment for badger concludes the magnitude of impact is negligible on a feature of low value; therefore, this is a neutral effect which is not significant. This is because both disturbance and killing or injury conclude a neutral effect.

Bats

Water Recycling Plant site

Habitat fragmentation

8.8.390 The use of lighting for safety and security purposes or to illuminate operational working areas at the WRP site may cause the loss of ecological connectivity through severance (due to introduction of light) of habitats resulting in the isolation of populations short-term. Primary mitigation measures will be implemented whereby lighting design will follow good practice lighting design following the ILP and BCT guidance [44] to reduce illuminating hedgerows and ecologically sensitive habitats and use light sources that reduce impacts on bats.

8.8.391 For all bat species except Annex II species, the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant. For all Annex II species, the magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

Disturbance

8.8.392 The presence of noise and visual stimuli produced by the operation of the WRP site may result in behavioural avoidance of bat species from areas with high levels of noise or vibration. Sensitive species may actively avoid these stimuli and search for alternative foraging and commuting habitat resulting in a reduction of energy intake or an increase in energy expenditure potentially leading to a reduction in survival and productivity rates. Primary mitigation measures have been included in the design to ensure WRP site is constructed at least 10m away from commuting habitat along the Hermitage Stream corridor. Furthermore, fewer bat species are known to be present within the Order Limits at the WRP site.

8.8.393 The use of lighting for safety and security purposes or to illuminate operational working areas at the WRP site may cause the disturbance and displacement of

bats sensitive to lighting, resulting in indirect loss of roosting, foraging and commuting habitat or resting or breeding sites and, therefore, reduced reproductive success. The Design Principles Document (Document reference 5.11, DCO Volume 5) sets out implementation of primary mitigation whereby operation lighting design will follow good practice lighting design following the ILP and BCT guidance [44] to reduce illuminating hedgerows and ecologically sensitive habitats and use light sources that reduce impacts on bats.

8.8.394 The magnitude of this impact is negligible, on features of low to high value; therefore, this is considered to be an up to minor adverse effect which is not significant.

Above Ground Plant and associated pumping stations

Habitat fragmentation

8.8.395 The use of lighting for safety and security purposes or to illuminate operational working areas at the AGP may cause the loss of ecological connectivity through severance (due to introduction of light) of habitats resulting in fragmentation. The Design Principles Document (Document reference 5.11, DCO Volume 5) sets out implementation of primary mitigation whereby lighting design will follow good practice lighting design following the ILP and BCT guidance [44] to reduce illuminating hedgerows and ecologically sensitive habitats and use light sources that reduce impacts on bats.

8.8.396 For all bat species except Annex II species, the magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant. For all Annex II species, the magnitude of this impact is negligible, on a feature of high value; therefore, this is a minor adverse effect which is not significant.

Disturbance

8.8.397 The presence of noise and visual stimuli produced by the operational pumping at AGP may result in behavioural avoidance of species from areas with high level of noise or vibration, including the known presence of Annex II species short-term. Sensitive species may actively avoid these stimuli and search for alternative foraging and commuting habitat leading to a reduction in the distribution of these species within suitable habitats or resulting in a reduction of energy intake or an increase in energy expenditure potentially leading to a reduction in survival and productivity rates. Break Pressure Tank/Intermediate Pumping Station E is located adjacent to a KCL. Primary measures have been included in the design to ensure the AGP is constructed with a suitable buffer between permanent infrastructure and existing tree lines, hedgerows and other suitable foraging and commuting habitat. Primary measures in the Design Principles Document (Document reference 5.11, DCO Volume 5) include a commitment to reinstate hedgerows (should removal be required) at the location of at AGP Break Pressure Tank/Intermediate Pumping Station E.

8.8.398 The magnitude of this impact is negligible, on features of low to medium value; therefore, this is considered to be a neutral effect which is not significant.

Inherent in-combination assessment for bats

8.8.399 The overall magnitude of impact for all bats (except Annex II species) is negligible on a feature of medium value; therefore, this is a neutral effect which is not significant. This is because habitat fragmentation and disturbance as discussed in paragraphs 8.8.391 to 8.8.395 concludes a neutral effect which is not significant.

8.8.400 The overall magnitude of impact for Annex II bat species is negligible on a feature of high value; therefore, this is a minor adverse effect which is not significant. This is because habitat fragmentation and disturbance as discussed in paragraphs 8.8.391 to 8.8.395 concludes a minor adverse effect which is not significant.

Birds

Water Recycling Plant site

Disturbance

8.8.401 Presence of noise, vibration and visual stimuli produced by operation of the WRP site may cause disturbance to wild birds. Disturbance during operation is envisaged in the form of noise and vibration from increased levels of activity within permanent structures. The WRP site is surrounded by existing urban infrastructure and the area is already subject to high levels of disturbance to which wild birds would have habituated. Tertiary measures such as vegetation screening secured through the Outline LEMP (Document reference 7.5, DCO Volume 7) and reinstatement strategy would also mitigate potential disturbance effects during operation of the WRP site.

8.8.402 Sensitive lighting design is included in the Design Principles Document (Document reference 5.11, DCO Volume 5) to avoid impacts to wild birds via visual disturbance. The lighting design will follow good practice [44] to reduce illuminating hedgerows and ecologically sensitive habitats, to avoid disruption to retained vegetation and the species using these features for roosting, foraging or commuting.

8.8.403 The magnitude of this impact is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant.

8.8.404 The assessment of effects from the WRP site during operation on qualifying wild bird species of designated sites is assessed within paragraphs 8.8.375 to 8.8.377.

Water quality change

8.8.405 The proposed discharge of treated surface runoff from the WRP site SuDS outfall into the Hermitage Stream has the potential to reduce the salinity within the watercourse permanently. Preliminary findings of the SuDS modelling identified a decrease in salinity along the bank of Hermitage Stream within proximity to the new outfall during spring tide. This could result in habitat loss or degradation potentially impacting on the suitability of breeding, roosting and feeding habitat present for wild birds. In addition, water quality changes could result in a reduction or change in food availability. However, the habitats (artificial hard structures and littoral mud) and dominant intertidal species (horned wrack) identified along the bank are not likely to be sensitive to salinity decrease. The WRP site SuDS

modelling predicted that there would be no change in salinity at the northern end of Langstone Harbour due to additional SuDS discharge. Further details of the SuDS modelling in relation to the marine environment are included in ES Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6). The magnitude of this impact is negligible, on features of very high value; therefore, this is a minor adverse effect which is not significant.

8.8.406 The assessment of effects from the WRP site during operation on qualifying wild bird species of designated sites is assessed within paragraphs 8.8.378 to 8.8.381.

Above Ground Plant and associated pumping stations

Disturbance

8.8.407 Presence of noise, vibration and visual stimuli produced by operational pumping at the AGP and pumping stations are discussed in paragraph 8.8.401. Primary mitigation measures including sensitive lighting design are discussed in section 8.4. The magnitude of this impact is negligible, on features of high to very high value; therefore, this is a minor adverse effect which is not significant. The assessment of effects from AGP during operation on qualifying wild bird species of designated sites is assessed within paragraphs 8.8.378 to 8.8.381.

Eastney Long Sea Outfall

Habitat loss or degradation

8.8.408 The full assessment of effects from the Eastney LSO during operation on qualifying bird species of designated sites is assessed within 8.8.378 to 8.8.381. Other potential impacts from the Eastney LSO are assessed in ES Chapter 9 Marine biodiversity, Volume I (Document reference 6.1, DCO Volume 6).

8.8.409 Given that the calculated difference (change) in water quality from the LSO, as a result of the 22Ml/d reject water release, is very small and likely to be within baseline variation, it is unlikely that effects to marine habitats and seabirds present between the existing and future scenarios will be observed. The magnitude of this impact is negligible, on features of very high value; therefore, this is a minor adverse effect which is not significant.

Inherent in-combination assessment for birds

8.8.410 The overall magnitude of impact on Schedule 1 listed bird species is negligible on a feature of high value; therefore, this is a minor adverse effect which is not significant. This is because the effects of disturbance, water quality change and habitat loss or degradation conclude a minor adverse effect which is not significant.

8.8.411 The overall magnitude of impact for wild birds (excluding Schedule 1 listed bird species) is negligible on a feature of high value; therefore, this is a minor adverse effect which is not significant. This is because the effects of disturbance, water quality change and habitat loss or degradation conclude a minor adverse effect which is not significant.

Hazel dormouse

Above Ground Plant

8.8.412 No operational impacts on hazel dormouse are considered likely because AGP would be located outside of suitable hazel dormouse habitat. Additionally, AGP footprints are small relative to available habitat in the wider area and they are not located adjacent to woodland or hedgerows likely to be valuable for dispersing hazel dormouse.

Riparian mammals

All components

Hydrological change

8.8.413 The operation of the Proposed Development would result in a reduction in the volume of water abstraction required during drought conditions. This would have a positive effect on otter and water vole and the riparian habitats available to these species along watercourses currently affected by abstraction long-term. The magnitude of this impact is minor, on a feature of medium value; therefore, this is a minor beneficial effect which is not significant.

Disturbance

8.8.414 The Design Principles Document (Document reference 5.11, DCO Volume 5) includes primary mitigation to ensure that operational lighting design follows good practice lighting design [44] to reduce illuminating hedgerows and ecologically sensitive habitats, to avoid disruption to retained vegetation and the species using these features for resting places, foraging or commuting routes. This measure would ensure that watercourses and waterbodies will not be lit or otherwise subject to light spill effects from the WRP site and AGP. This would avoid disturbance of otter and would avoid indirect habitat fragmentation from light disturbance. The magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Water Recycling Plant site

Habitat loss or degradation

8.8.415 Design of the new SuDS outfall in Hermitage Stream would avoid erosion of the bank or channel sediment, sedimentation and change to water quality. No additional effects upon otter are expected relating to habitat degradation. The magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Disturbance

8.8.416 The operation of the WRP site has the potential to disturb otter from noise and vibration. However, as Hermitage Stream is surrounded by existing urban infrastructure, the area is already subject to high levels of disturbance to which otter would have habituated. The woodland belt to the west side of Hermitage Stream will be retained and will act as a noise and visual screen for the

watercourse from the operation of the WRP site. The magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Above Ground Plant

Killing or injury

8.8.417 New permanent access tracks are proposed to facilitate access to Intermediate Pumping Station F. Intermediate Pumping Station F is located approximately 20m from a field drain to the north. This is an intermittent watercourse but has connectivity with the Wallington River, which supports otter. It is expected that existing field tracks would be used to provide access to this AGP, but should a new track be required this may introduce a risk of killing or injuring to otter through road traffic collisions until otter become habituated. Given the distance of the River Itchen from the AGP and that the species is active between dusk and dawn when few vehicles are expected to require access, the killing or injury of otter is unlikely. See paragraph 8.8.368 regarding the impact assessment for otter as a qualifying species of the river Itchen SAC and SSSI. Tertiary measures included in OEMP (Document reference 7.7, DCO Volume 7) include anyone driving on operational business will undertake driver awareness training which will include specific reference to ecological features, particularly protected species. In the event of a wildlife collision, an assessment into the risk of further incidents will be undertaken and remedial action taken if there is a risk to riparian mammals.

8.8.418 The magnitude of this impact is negligible, on a feature of medium value; therefore, this is a neutral effect which is not significant.

Inherent in-combination assessment for riparian mammals

8.8.419 The overall assessment for otter concludes the magnitude of impact is negligible on a feature of medium value; therefore, this is a neutral effect which is not significant. This is because disturbance, habitat loss and degradation and killing or injury, as discussed in paragraphs 8.8.414 to 8.8.417 conclude a neutral effect which is not significant. Hydrological change is a non-significant minor beneficial effect.

8.8.420 The overall assessment for water vole concludes the magnitude of impact is minor on a feature of medium value. This is because disturbance and habitat loss and degradation as discussed in paragraphs 8.8.415 to 8.8.416 conclude a neutral effect which is not significant. Hydrological change is a non-significant minor beneficial effect.

Other notable fauna

Water Recycling Plant site and Above Ground Plant

Disturbance

8.8.421 Operational lighting from the AGP and WRP site close to retained habitat could disturb other notable fauna if present. To mitigate for these potential effects operational lighting design, as set out in the Design Principles Document (Document reference 5.11, DCO Volume 5), will follow good practice [44] to reduce

illuminating ecologically sensitive habitats, retained vegetation and the other notable species using these features for resting, foraging, commuting, breeding and hibernating.

8.8.422 Other notable fauna are likely to become habituated to operational light levels. Until that time habitat suitable to support other notable fauna is widespread in the local area and these species will be able to successfully utilise it for resting, foraging, commuting, breeding and for hibernation. The magnitude of this impact is negligible, on a feature of low value; therefore, this is a neutral effect which is not significant.

Killing or injury

8.8.423 New permanent access tracks will facilitate access to Break Pressure Tank K and Intermediate Pumping Station F. The access route to Break Pressure Tank K will follow an existing track that will require no works. As there is no existing track for access to Intermediate Pumping Station F, there is an increased risk of killing or injuring other notable fauna through road traffic collisions as they would not be habituated to the new access track. Most other notable fauna are active between dusk and dawn when few vehicles are expected to utilise the track. Tertiary measures included in OEMP (Document reference 7.7, DCO Volume 7) include anyone driving on operational business will undertake driver awareness training which will include specific reference to ecological features, particularly protected species. The magnitude of this impact is minor, on a feature of low value; therefore, this is a neutral effect which is not significant.

Inherent in-combination assessment for other notable fauna

8.8.424 The overall magnitude of impact for other notable fauna is minor on features of low value; therefore, this is a neutral effect which is not significant. This is because the effect of killing or injury and disturbance concludes a neutral effect which is not significant.

Freshwater biodiversity features

All components

Reservoir water quality change

8.8.425 During the operational phase of the Proposed Development, recycled water from the WRP will be transferred to Havant Thicket Reservoir for storage (i.e. the 'post-WRP' operation phase). Prior to the introduction of recycled water, the reservoir will predominantly be supplied with water from the chalk aquifer (pumped into the reservoir from Bedhampton Springs by Portsmouth Water), with smaller contributions derived from the headwaters of Riders Lane Stream (which will be intercepted by the reservoir) and rainfall (i.e. the 'classic' operation phase). Water chemistry varies between the baseline sources and recycled water. Therefore, the introduction of recycled water to the reservoir has the potential to alter water quality and consequently result in changes to the ecological potential of the reservoir. The principal ecological concern was that recycled water would be relatively enriched with plant nutrients (specifically phosphorus) and that its introduction would shift

the reservoir system towards a eutrophic state (i.e. elevated nutrient concentrations and a consequent increase in phytoplankton growth).

8.8.426 A water quality modelling exercise was undertaken to assess the sensitivity of reservoir water chemistry to the introduction of recycled water. The characterisation of recycled water accounted for the high phosphorus removal capacity of a high rejection rate membrane (HRRM) system at the WRP, which is considered as primary mitigation and embedded into the design of the Proposed Development (see ES Chapter 3 Description of the Proposed Development, Volume I (Document reference 6.1, DCO Volume 6) and ES Chapter 19 Water environment, Volume I (Document reference 6.1, DCO Volume 6)).

8.8.427 The model predicted that concentrations of total phosphorus (TP) and chlorophyll-a (a proxy for phytoplankton biomass) in the reservoir would correspond to mesotrophic status in the absence of recycled water input (i.e. characterised by intermediate nutrient levels and moderate phytoplankton growth). Following the introduction of recycled water to the reservoir, TP concentration was predicted to decrease and chlorophyll-a concentration was predicted to remain similar (see Appendix 19.11 Havant Thicket Reservoir water quality modelling).

8.8.428 These results suggest that the reservoir will persist in a mesotrophic state following the introduction of recycled water. Under these conditions, the reservoir has the potential to support diverse communities of aquatic plants and invertebrates that prefer clear, well-oxygenated water and have a low tolerance of poor water quality. The reservoir fish assemblage could potentially evolve under mesotrophic conditions to include minor and coarse fish, including native species such as stickleback, tench, roach and perch.

8.8.429 In summary, the implementation of primary mitigation measures (i.e. the inclusion of a HRRM system at the WRP) is expected to prevent water quality deterioration in Havant Thicket Reservoir following the introduction of recycled water. The overall magnitude of this impact is assessed as negligible, on ecological features of low to medium value (assigned precautionarily based on the ecological potential of Havant Thicket Reservoir in the absence of recycled water input); therefore, this is a neutral effect which is not significant.

8.8.430 As described in paragraph 8.8.425, the assessment of Havant Thicket Reservoir water quality impacts principally considered a ‘classic’ phase (i.e. the period of reservoir operation prior to the introduction of recycled water) and a ‘post-WRP’ phase (i.e. the period of reservoir operation following the introduction of recycled water). An additional operational scenario was tested to account for a situation in which the ‘classic’ phase does not occur (for example, in the event of an extended construction period for Havant Thicket Reservoir) and the initial filling of the reservoir is achieved through a combination of spring water and recycled water inputs. This scenario is referred to as the ‘alternative reservoir fill’ scenario.

8.8.431 A major drought model scenario was used in the assessment of the alternative reservoir fill scenario. This model scenario was selected because, out of all the model scenarios considered in ES Appendix 19.11 Havant Thicket Reservoir water quality modelling, Volume II (Document reference 6.2, DCO Volume 6), it most closely represents the alternative reservoir fill scenario (i.e. it encompasses a period of substantial water level drawdown followed by refill of the reservoir to top water level using both spring water and recycled water, as opposed to just spring water).

8.8.432 To determine if the alternative fill scenario would have a significantly different effect on reservoir water quality compared to the original reservoir operational scenario, surface water TP and chlorophyll-a concentrations predicted for the two scenarios were compared. The analysis focussed on the 13-month period immediately following reservoir refill in the alternative reservoir fill scenario, which corresponds to a period during the 'post-WRP' phase of the original reservoir operational scenario.

8.8.433 A Wilcoxon signed-rank test[11] was used to determine if there was a statistically significant difference in surface water TP and chlorophyll-a concentrations predicted for the two operational scenarios. The results of this statistical analysis indicated that concentrations of both TP and chlorophyll-a would be significantly higher during the 14-month assessment period of the alternative reservoir fill scenario than for the corresponding period in the 'post-WRP' phase of the original reservoir operational scenario.

8.8.434 Although TP and chlorophyll-a concentrations are statistically significantly higher in the alternative reservoir fill scenario, they both remain within the range expected for a mesotrophic water body. As this trophic status aligns with the 'post-WRP' phase of the original reservoir operational scenario, the long-term ecological potential of Havant Thicket Reservoir is unlikely to be adversely affected. Furthermore, if the alternative reservoir fill scenario is implemented, the source water balance following achievement of top water level will be the same as that represented in the 'post-WRP' phase of the original reservoir operational scenario. Water quality impacts arising from implementation of the alternative fill scenario are therefore likely to be short-lived, as the relatively enriched water will be flushed from the reservoir within two years.

8.8.435 In summary, the differences in surface water TP and chlorophyll-a concentrations between the alternative reservoir fill scenario and the original operational scenario, although statistically significant, are considered insufficient to alter the conclusions of the assessment for releases of recycled water from the WRP into Havant Thicket Reservoir. Implementation of the alternative reservoir fill scenario is not expected to have a likely significant effect on the long-term ecological potential of the reservoir.

8.8.436 It is possible that other alternative reservoir fill scenarios could arise from programme changes; for example, recycled water could be introduced to the reservoir before the post-fill stabilisation[12] described in ES Appendix 19.11 Havant Thicket Reservoir water quality modelling, Volume II (Document reference 6.2, DCO Volume 6).

8.8.437 While the timing of the source water inputs might change, the quality of the recycled water, spring water and hydrological catchment inputs would remain constant. Consequently, reservoir water quality would align with the 'post-WRP' phase of the original operational scenario once the reservoir has stabilised. The analysis for the alternative reservoir fill scenario supports this by demonstrating that any changes in 'post-stabilisation' water quality are relatively small and is not

[11] Wilcoxon signed-rank test: a non-parametric statistical procedure used to determine if the median difference between paired samples is significantly different from zero, i.e. tests if one group is significantly higher or lower than the other.

[12] Stabilisation: the first few years after initial inundation of the reservoir basin when terrestrial biomass is decomposed or mineralised, resulting in higher fluxes of organic and inorganic matter than is observed once the reservoir has stabilised.

expected to have a likely significant effect on the long-term ecological potential of the reservoir.

Downstream water quality change

8.8.438 Compensatory flows from Havant Thicket Reservoir during its operation (i.e. water released to maintain flows in the surface streams whose headwaters are intercepted by the reservoir, without the influence of the Proposed Development) could affect downstream surface water receptors (Riders Lane Stream and Hermitage Stream) and associated aquatic ecological receptors (e.g. habitats and species). As described in section 8.7, Riders Lane Stream and Hermitage Stream catchments are inhabited by protected fish species (bullhead and European eel), as well as assemblages of common macroinvertebrates and macrophytes. Portsmouth Water's package of river channel improvement measures, which are designed to mitigate the impacts of constructing Havant Thicket Reservoir [73] are expected to improve continuity in the Hermitage Stream and thus improve habitat for migratory fish species in the future. These aquatic ecological receptors are sensitive to water quality variability and could therefore be impacted by any changes in the water quality of compensatory flows resulting from the introduction of recycled water to the reservoir.

8.8.439 The Havant Thicket Reservoir water quality modelling exercise included a prediction of the water quality profile of compensatory flows [84]. This was used to define the input parameters for further downstream dispersion modelling to investigate the mixing and dispersion of compensatory flows into downstream water bodies (Riders Lane Stream and Hermitage Stream). The results of the water quality modelling exercise are presented in detail in ES Appendix 19.6 Havant Thicket Reservoir Compensatory Flows water quality modelling, Volume II (Document reference 6.2, DCO Volume 6) and summarised in ES Chapter 19 Water environment, Volume I (Document reference 6.1, DCO Volume 6).

8.8.440 Downstream dispersion modelling for Riders Lane Stream predicted that dissolved oxygen (DO) concentration would increase (+2%) during the 'post-WRP' phase relative to the 'classic' phase. Additionally, concentrations of biochemical oxygen demand (BOD; -28%), orthophosphate (-17%), nitrate (-19%) and dissolved organic carbon (DOC; -33%) were predicted to decrease, whilst pH, alkalinity, ammonia and dissolved inorganic carbon (DIC) were not predicted to change.

8.8.441 Concentrations of some water quality parameters in Hermitage Stream were also predicted to change between the 'classic' phase and the 'post-WRP' phase. Orthophosphate (-8%) and DOC (-5%) concentrations were predicted to decrease. All other modelled water quality parameters were predicted to remain at very similar concentrations to those predicted for the 'classic' phase.

8.8.442 Overall, the predicted changes were considered to represent a minor improvement in water quality in Riders Lane Stream and Hermitage Stream. Therefore, it is not considered likely that the introduction of recycled water to Havant Thicket Reservoir would have an adverse effect on any aquatic ecological receptors within either of the downstream watercourses in the present or in the future. It is possible that the predicted water quality improvements could cause a shift in aquatic macroinvertebrate and macrophyte assemblages towards species that are less tolerant of poor water quality (e.g. nutrient enrichment and low DO). Such species are generally considered to be of higher conservation value.

8.8.443 The overall magnitude of this impact is assessed as minor, on ecological features of low to medium value; therefore, this is a up to minor beneficial effect which is not significant.

8.8.444 An 'alternative reservoir fill' scenario was tested to account for a situation in which the 'classic' phase does not occur and the initial filling of the reservoir is achieved through a combination of spring water and recycled water inputs. This scenario is referred to as the 'alternative reservoir fill' scenario.

8.8.445 To determine if the alternative fill scenario would have a significantly different effect on downstream water quality compared to the original reservoir operational scenario, compensatory flow water quality predictions for the two scenarios were compared. The analysis focussed on the 14-month period immediately following reservoir fill in the alternative reservoir fill scenario, which corresponds to a period during the 'post-WRP' phase of the original reservoir operational scenario.

8.8.446 Statistical analysis, including a Wilcoxon signed-rank test and a Cohen's *d* test[13], was used to determine whether there are any significant differences in compensatory flow water quality predictions between the two operational scenarios.

8.8.447 Results of the statistical analysis are presented in detail in ES Chapter 19 Water environment, Volume I (Document reference 6.1, DCO Volume 6). In summary, predicted mean concentrations of total nitrogen, nitrate, total phosphorus and orthophosphate are statistically significantly higher in compensatory flows for the alternative reservoir fill scenario than for the 'post-WRP' phase of the original reservoir operational scenario. Conversely, predicted mean concentrations of ammonium, DIC, BOD and DO are statistically significantly lower for the alternative reservoir fill scenario than for the 'post-WRP' phase of the original reservoir operational scenario.

8.8.448 While these results do appear to indicate an overall deterioration in compensatory flow water quality between operational scenarios, the magnitude of difference in predicted concentrations for each water quality parameter is actually very small. For each of the assessed water quality parameters, the difference in mean concentration is smaller than the very minor differences identified between the 'classic' and 'post-WRP' phases of the original reservoir operational scenario.

8.8.449 Furthermore, a sensitivity analysis undertaken as part of the compensatory flows modelling (presented in ES Appendix 19.6 Havant Thicket Reservoir Compensatory Flows water quality modelling, Volume II (Document reference 6.2, DCO Volume 6)) demonstrated that changes to input concentrations (i.e. compensatory flow water quality) of a similar magnitude to those described in paragraph 8.8.448 result in very limited differences in water quality in Riders Lane Stream and Hermitage Stream.

8.8.450 Therefore, it is not considered likely that implementation of the alternative reservoir fill scenario would have a significantly different effect on aquatic ecological receptors within either of the downstream watercourses compared to implementation of the original reservoir operational scenario, either in the 14-month period immediately following reservoir fill or in the longer-term.

[13] Cohen's *d* test: a statistical test to quantify the size of effect when comparing two groups of data.

Freshwater invasive non-native species

8.8.451 The Proposed Development will move source water from Havant Thicket Reservoir in the East Hampshire River WFD operational management catchment to Otterbourne WSW in the Test and Itchen WFD operational management catchment. The Test and Itchen is specified as an isolated catchment in the EA's Isolated Catchment Management document [85], i.e. a catchment without any identified natural or artificial hydrological pathways connecting it to other catchments. Thus, the Proposed Development has the potential to introduce or spread INNS between two catchments which would otherwise be isolated, or unconnected from each other, should source water be released to the natural environment. The EA state in their 2022 position statement on *Managing the risk of spread of Invasive Non-Native Species through raw water transfers* [41] that new schemes that create a hydrological connection between isolated catchments are required to have mitigation measures in place to ensure that INNS cannot be spread by the new transfer, that environmental objectives in River Basin Management Plans are met, and that all other legislative requirements are met.

8.8.452 Although microorganisms are not considered as INNS under key legislation, the 2025 Natural England advice note on INNS for RAPID [42] states that a project's overall management of INNS should include consideration of pathogenic microorganisms alongside plant and animal INNS. Therefore, consideration is also given to invasive non-native pathogens in the INNS assessment. The Proposed Development's approach to pathogen management during operation is given in the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7).

8.8.453 The accidental introduction or spread of INNS or pathogens during operation of the Proposed Development could result in the loss or degradation of aquatic and riparian habitat, killing or injury of aquatic or riparian species in the receiving habitat, should source water be released to the natural environment. Although the presence of INNS in the water being transferred from Havant Thicket Reservoir to Otterbourne WSW would be as low as reasonably practicable due to the management measures outlined by Portsmouth Water in the Havant Thicket Reservoir INNS Biosecurity Plan [86], there is still a low risk of INNS being present in the source water due to its proposed use as an open storage reservoir with public access and recreational use.

8.8.454 The following potential pathways by which INNS could be introduced or spread by the Proposed Development during operation have been identified in the INNS pathway mapping assessment, available in the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7):

1. Transfer of recycled water from the WRP to Havant Thicket Reservoir. The WRP will receive treated wastewater from Budds Farm WTW which would firstly be pumped through two filtering processes; microfiltration followed by reverse osmosis (RO) which has an average pore size of 0.001 to 0.0001 microns, and aims to removes dissolved salts, impurities, bacteria and pharmaceuticals. After the RO, the water will be subject to an advanced oxidation process (UV-AOP) involving the use of ultraviolet light and hydrogen peroxide to remove any remaining impurities. These processes are considered sufficient to remove even the smallest functional groups of plant and animal INNS. Thus, recycled water is considered to pose a negligible risk of transferring INNS.

2. Releases from the WRP to the Solent through the Eastney LSO. Any reject water produced by the WRP would be discharged through a new connection to the existing Eastney TT and Eastney PS and released through the Eastney LSO. This reject water would not be exposed to any possible additional INNS before it is released and does not present as a viable new INNS pathway.

   The WRP operating in run to waste mode may require drain down of sections of the pipeline connected to the WRP, specifically the Bedhampton Springs to the WRP pipeline and the WRP to Break Pressure Tank/Intermediate Pumping Station E section of the pipeline which both convey source water from Havant Thicket Reservoir This source water would also be discharged to the Solent through the existing Eastney TT, Eastney PS and Eastney LSO. The WRP operating in run to waste mode is an emergency scenario and is considered as part of the major accidents and disasters assessment (refer to ES Chapter 14 Major accidents and disasters, Volume I (Document reference 6.1, DCO Volume 6)).

3. Recreation and operational use of Havant Thicket Reservoir. Havant Thicket Reservoir will be filled by groundwater from Bedhampton Springs and recycled water from the WRP, both of which pose a negligible risk of containing INNS. This source water will be supplemented by a natural inflow from the upstream catchment, and the reservoir will be operated as an open storage reservoir with public access and recreational use, all of which poses an increased risk of INNS presence in the reservoir. This risk is managed by Portsmouth Water and is managed through actions in the Havant Thicket Reservoir INNS Biosecurity Plan [86]. It is therefore outside the scope of the terrestrial and freshwater biodiversity assessment and is not considered further.

4. Transfer of source water from Havant Thicket Reservoir to Otterbourne WSW. This transfer would move an approximate maximum flow of 90Ml/d of source water during periods of peak shortfall to Otterbourne WSW, where it will be treated to drinking water standards. Along the route of the pipeline, a number of washout valves would be required. Washouts pose a new risk of introducing or spreading INNS to the natural environment, between WFD waterbody catchments and potentially from otherwise isolated WFD management catchments, should the washout be located across the catchment boundary. Washouts would be used during operation of the Proposed Development as follows:

   a. To facilitate testing and commissioning of the Proposed Development. This would comprise pressure testing the pipelines by filling and pressurising sections to check for leaks.

   b. For routine maintenance testing and repair during operation. Regular testing of washouts would be required in accordance with the relevant operating regime.

   c. The use of washouts in an emergency scenario is considered as part of the major accidents and disasters assessment (refer to ES Chapter 14 Major accidents and disasters, Volume I (Document reference 6.1, DCO Volume 6)).

5. Otterbourne WSW waste management processes. All process waste from treatment at Otterbourne WSW enters the sewer network which is within the Chickenhall WTW catchment. Overflows from the inlet balancing tank or

washout from the inlet pipeline at Otterbourne WSW when operating in run to waste mode would result in source water bypassing treatment and also being discharged to the sewer.

The wastewater treatment process of trickling filters and tertiary sand filters at Chickenhall WTW is unlikely to remove all INNS functional groups, As the final effluent from the treatment process is discharged directly to the River Itchen, this poses a risk of INNS from an outside catchment entering the River Itchen, should INNS be present in the process waste or run to waste flows from Otterbourne WSW entering the sewer network. Storm tank overflows from Chickenhall WTW also discharge to the River Itchen. Although the storm overflow will have some level of screening (inlet screens and Copa trawls), it is not sufficient to remove all INNS functional groups and therefore increases the risk of INNS from an outside catchment entering the River Itchen.

The disposal of sludge waste from Chickenhall WSW to Budds Farm WTW also poses a potential new INNS pathway, due to the potential presence of INNS from the untreated source water being present in the cake.

8.8.455 The INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7) sets out the measures to reduce the INNS and pathogen risk for the Proposed Development during operation and maintenance. A layered approach to INNS management has been applied, to ensure that there will be no operational discharge of source water into the natural environment (land or watercourse). The following measures are included in the design of the Proposed Development which will reduce the potential introduction or spread of INNS:

1. Ensuring treatment of raw water to full potable standards at Otterbourne WSW thus ensuring INNS are fully removed at the terminus of the raw water transfer. Although this is not specific mitigation designed to control the presence of INNS, this advanced water treatment will remove INNS from the water processed at Otterbourne WSW.
2. Inclusion of the INNS Treatment at Otterbourne WSW to treat the process waste and run to waste flows from Otterbourne WSW before they enter the sewer network. Once flows have passed through Otterbourne WSW, the waste stream will be subject to the following process to remove INNS: Lamella settlers to help settle the high solid loading from centrate, and two stages of filtering to remove any INNS or particles containing INNS. The first filtering process will use coarse 1mm Boll type pressure strainers and the second filtering process will use fine 25µm Boll type pressure strainers. Any liquid waste from the INNS treatment at Otterbourne WSW will be considered INNS free and discharged to the existing foul sewer network at Chickenhall WTW. Any sludge waste from the Lamella settlers or from the washwater from Boll type strainers will be returned to the head of the works for reprocessing through the wastewater system at Otterbourne WSW. Any solid sludge arising from this process will be transferred to a suitable licensed disposal facility and any liquid waste arising from the wastewater treatment system will be sent back through the INNS Treatment plant at Otterbourne WSW.

8.8.456 The following measures are included as primary mitigation secured by the INNS Biosecurity Plan (Document reference 7.10, DCO Volume 7), thus removing all INNS risks to the receiving catchment during operation of the Proposed Development:

1. During pressure testing of the pipelines water from the following sources will be passed through sections of the pipeline to ensure that the risk of introduction of INNS is negligible:
    a. The pipelines between Budds Farm WTW and the WRP site will use treated wastewater from Budds Farm WTW.
    b. The pipelines between the WRP site and Bedhampton Springs will use potable water from Otterbourne WSW.
    c. The pipeline between the WRP site and Otterbourne WSW will use potable water from Otterbourne WSW.
2. Water storage lagoons will be used to store the potable water used for the testing of the pipeline between the WRP site and Otterbourne WSW, and this water will be cleaned using a silt buster. Once testing is complete, the potable water stored in the storage lagoons will be transferred to tankers for de-chlorination and then disposed of at a suitably licenced disposal facility. Treated wastewater used for pressure testing of the of the pipelines between Budds Farm WTW and the WRP site and the Pipelines between the WRP site and Bedhampton Springs will be returned to Budds Farm WTW for release from the Eastney LSO.
3. Full system testing will use water from the following sources to ensure there is no risk of introducing INNS during the testing and commissioning phase:
    a. The Pipelines between Budds Farm WTW and the WRP site will use treated wastewater from Budds Farm WTW.
    b. The Pipelines between the WRP site and Bedhampton Springs will use source water from Havant Thicket Reservoir.
    c. The Pipeline between the WRP site and Otterbourne WSW will use source water from Havant Thicket Reservoir.
4. Inclusion of leak detection measures on the pipeline transfer, whether via flow and pressure monitoring or active acoustic monitoring. This will be designed to automatically shut the pipeline system down in the event a leak starts, therefore no long-term leakages of raw source water are likely to occur.
5. No operational discharge of source water into the natural environment (land or watercourse) during operation. This will be achieved firstly by the inclusion of minimum operation, which reduces the need for regular maintenance. On top of this, a capture and dispose process will be applied ensuring any releases of source water through the washout valves during routine maintenance testing will be collected directly by a tanker and disposed of in a suitably licensed disposal facility. This could require the installation of temporary pumping and flexible pipework to connect the tanker to the washout valve. Testing of a washout valve would result in the release of approximately 4.5m^3 of source water from the Pipelines, requiring only one tanker and would be required a minimum of once every six months, or in accordance with the relevant operating regime. There would be no discharges to surface or groundwater during operation and maintenance (see ES Chapter 3 Description of Proposed Development, Volume I (Document reference 6.1, DCO Volume 6)).

8.8.457 The continued management and mitigation of INNS is considered to be appropriate pathogen management at this stage, as set out in the INNS Biosecurity Plan

(Document reference 7.10, DCO Volume 7, section 4.3). This aligns with the EA's position statement on INNS and raw water transfers [41] and the Natural England advice note for the same [42]. Should pathogen treatment become a requirement in the future, space for UV or chlorine dosing disinfection has been allowed so that it can be retro-fitted to the INNS Treatment at Otterbourne WSW plant in the future.

8.8.458 The measures included in the design of the Proposed Development described in paragraph 8.8.455 and the primary mitigation measures described in 8.8.456 will ensure that the potential introduction or spread of INNS or pathogens by the Proposed Development is negligible. Therefore, no effects from INNS during operation are anticipated on freshwater features.

Inherent in-combination assessment for freshwater biodiversity

8.8.459 The overall assessment for freshwater biodiversity features concludes the magnitude of impact is minor beneficial on features of low to medium value; therefore, this is an up to minor beneficial effect which is not significant. This is because reservoir and downstream water quality change are neutral and minor beneficial effects, respectively, and are not significant.

Decommissioning

8.8.460 Effects from decommissioning of the Proposed Development are considered to be no greater than those identified during the construction phase and are therefore assessed as being the same as construction effects. The significance of effects resulting from decommissioning is therefore the same as reported as for the construction effects as presented in section 8.8.

8.9 Mitigation, monitoring and enhancement

8.9.1 Mitigation measures are defined in ES Chapter 5 EIA approach and methodology, Volume I (Document reference 6.1, DCO Volume 6) with primary mitigation and tertiary mitigation for terrestrial and freshwater ecology being presented in section 8.4 of this chapter.

Secondary mitigation

Statutory designated sites

8.9.2 To mitigate for the potential permanent loss of habitat should the siting of isolation, air and washout valves be required within a SWBGS site, a bespoke reinstatement plan will be produced. Any permanent habitat loss required for the construction of these valves will amount to no more than 10m^2 at each location. Mitigation will comprise reinstatement of the temporarily impacted habitat to a better than like-for-like condition and will be secured through the Outline LEMP (Document reference 7.5, DCO Volume 7). This bespoke reinstatement plan will consider:

1. The existing habitat species diversity and composition.
2. Reinstatement methods, timings, monitoring and remedial actions.

8.9.3 Where the loss of SWBGS sites has been identified at the WRP site (SWBGS H08), Budds Farm WTW (SWBGS H90) and Portsdown Hill (SWBGS W03G)

engagement has been undertaken with NE to ensure appropriate mitigation is provided. An off-site mitigation site adjacent to Chichester Harbour has been identified. Securing the management of the site will ensure it is consistently available to the birds and in a good condition. At present, the site is used for arable crops and owing to rotation can be unsuitable for the birds for considerable periods of time including during the key winter season. The proposed mitigation for the site will create high quality, optimal habitat (i.e. permanent grassland, of short, lush grass with a varied sward) that will be continually available and suitable for brent geese and other waders. As a site already in use by the birds (albeit infrequently), there is considered to be a high probability of them using it more consistently once it is made more suitable.

8.9.4 It is considered that the specific mitigation requirements of the loss of H08 would be met through the securing of a minimum of 2.5ha of suitable habitat for at least the lifetime of the asset delivered by the Proposed Development. The overall site is bigger than 2.5ha and the final area delivered will ultimately depend how the topography and shape could be best divided up to ensure the best outcome for the birds while allowing the current owner to continue farming the remainder of the site.

8.9.5 This mitigation would ensure no loss in the overall quality of functionally linked land available to the birds in the wider area through altering site management on a long-term basis. This is detailed within the Habitats Regulations Assessment – Stage 2 Appropriate Assessment and Marine Conservation Zone – Stage 1 Assessment (Document reference 5.2, DCO Volume 5) which lists the site-specific mitigation to ensure no adverse effects on site integrity of relevant NSN (Chichester and Langstone Harbour SPA and Ramsar and Portsmouth Harbour SPA and Ramsar).

8.9.6 The insulating of pumps or generators, plant or fencing of distinct areas of the construction footprint with acoustic fencing in particularly sensitive areas would reduce noise levels outside the boundaries of Proposed Development.

8.9.7 Watching briefs will be required during the non-breeding bird season (September to March inclusive) when construction noise is predicted to be greater than 50LAeq at the boundaries of sites H08, H130 and H90 and Chichester and Langstone Harbours SPA and Ramsar. Watching briefs will be undertaken for at least two hours either side of high tide as this is deemed the most sensitive time period for qualifying species due to the reduced availability of feeding and roosting areas within the intertidal zone. Therefore, significant numbers of qualifying species are more likely to be present within the ZoI during this time period and at risk of being exposed to anthropogenic disturbance. If 1% or more of the estimated population of any one qualifying species of the Chichester and Langstone Harbours SPA and Ramsar and Portsmouth Harbour SPA and Ramsar are present within the ZoI, enabling or construction works estimated to produce noise above 50dB LAeq or an agreed level above baseline will cease to prevent adverse effects on site integrity due to anthropogenic disturbance. The number of birds considered to be 1% of the qualifying species population will be informed by the estimated citation population for the Habitats Site and recent WeBS core count data. For qualifying species locally or regionally in decline, the 1% threshold may not be sufficient to ensure no adverse effects on site integrity and therefore, this threshold will be considered on a species-specific basis. Watching briefs may also be required during construction works predicted to be greater than 50LAeq and undertaken

outside of this timeframe (two hours either side of high tide). The approach to undertaking watching briefs outside of this timeframe will be discussed and agreed under consultation with NE prior to any noisy works commencing.

8.9.8 Based on noise modelling outputs, cessation of enabling and construction works may be required during compound construction (65LAeq), compound operation (67LAeq), trenchless pipe installation (69LAeq) and shaft construction (75LAeq) at Budds Farm. The watching briefs will identify the species present and their abundance within the ZoI. The ZoI and the required survey area for watching briefs will be up to 300m depending on the type of construction works being undertaken. This ZoI will be agreed based on noise contour figures and consultation with NE. Noise model outputs are detailed in ES Chapter 15 Noise and vibration, Volume I (Document reference 6.1, DCO Volume 6). These measures are secured in the Outline CEMP (Document reference 7.1, DCO Volume 7).

8.9.9 If temperatures of 0ºC or lower occur within a 24-hour period, for five consecutive days, leading up to or during any activities that will produce noise levels above 50dB LAeq at the boundaries of sites H08, H130 and H90, then works estimated to produce noise levels above 50dB LAeq or an agreed level above baseline noise levels (to be agreed with NE) must cease. Once temperatures have been above 0ºC for three consecutive days works can then recommence.

8.9.10 To mitigate for potential disturbance to qualifying species from construction noise an additional 'soft start' methodology will be implemented if percussive or vibration piling works is required at Budds Farm. For example, a soft start methodology adopted for percussive piling maintains the hammer energy at 10% for approximately 35 minutes and increases the hammer energy to between 20 – 95% for a maximum of 200 minutes [87]. The slow increasing of noise levels will avoid a sudden impulsive loud noise and the subsequent startle effect on qualifying species present.

8.9.11 To mitigate for the potential temporary loss of connectivity through fragmentation for qualifying fish species of the River Itchen SAC during trenched open-cut construction outside of the SAC boundary, the following measures included in the Outline CEMP (Document reference 7.1, DCO Volume 7) will be undertaken:

1. Fish rescue will only be used if required to prevent short-term fragmentation during construction and construction methods will maintain flow across dammed sections.
2. Where suitable habitat is present for qualifying species, trenched open-cut watercourse construction works will be timed to avoid key fish migration and spawning periods.

8.9.12 To mitigate for potential disturbance and habitat fragmentation to otter associated with the River Itchen mitigation measures including pre-construction surveys, implementation of exclusion zones, habitat enhancement and timing of works will be undertaken where relevant. For additional information, please refer to paragraphs 8.9.32 to 8.9.37.

Non-statutory designated sites

8.9.13 To mitigate for the permanent loss of habitats within a SINC site at the location of isolation, air and washout valves, a bespoke reinstatement plan will be produced

where relevant, as secured through the Outline LEMP (Document reference 7.5, DCO Volume 7).

Field to West of Gillman Road Site of Importance for Nature Conservation

8.9.14 To mitigate for temporary habitat loss or fragmentation within Field to West of Gillman Road SINC, a bespoke reinstatement plan will be produced prior to any reinstatement work, as secured through the Outline LEMP (Document reference 7.5, DCO Volume 7). This will include any requirements for bespoke soil handling over and above that already set out in the Outline SRMP appended to the Outline CEMP (Document reference 7.1, DCO Volume 7), for example in order to reinstate the ground flora seed bank.

Fielders Farm Meadows (Eastleigh) Site of Importance for Nature Conservation

8.9.15 To mitigate for temporary habitat loss or fragmentation within Fielders Farm Meadows (Eastleigh) SINC, a bespoke reinstatement plan will be produced prior to any reinstatement work, as secured through the Outline LEMP (Document reference 7.5, DCO Volume 7). This will consider the following:

1. Enhancement of other neutral grassland to good condition.
2. Removal of INNS.
3. Management of scrub encroachment.
4. Soil translocation.

Badger

8.9.16 To mitigate for the effect of potential killing, injury or disturbance of badger occupying a sett, a draft licence application to interfere with badger setts for the Proposed Development is included with the DCO application (Protected Species Licensing (Doc Ref 7.14, DCO Vol 7)). The licence will be updated following pre-construction surveys for setts that are likely to be impacted by the Proposed Development.

8.9.17 Sett closures will be implemented in accordance with the conditions of the licence. The method statement for sett closure and any monitoring requirements is set out in full in the draft Badger Licence Method Statement (Protected Species Licensing (Doc Ref 7.14, DCO Vol 7)). Artificial replacement setts may be required for some multi-entrance setts to be closed if the majority of the sett cannot be retained and no suitable alternative sett is identified. Full details and specifications are included in the draft Badger Licence Method Statement (Protected Species Licensing (Doc Ref 7.14, DCO Vol 7)).

8.9.18 To mitigate for the effect of habitat fragmentation potentially leading to isolation of the badger clan associated with main sett 062 from its wider territory and foraging habitats, a badger path will be provided and maintained for the duration of construction between setts 062 and 071. The path will be unlit between dusk and dawn and always remain clear and accessible for the duration of construction works in this area between dusk and dawn. No construction traffic will be permitted in vicinity of the path between dusk and dawn, the area will be marked out with traffic cones (or similar). Monitoring will be undertaken to ensure badger are using the path. Full details of the specifications and maintenance of this path are set out

in the draft badger licence application and the Outline CEMP (Document reference 7.1, DCO Volume 7).

8.9.19 There is potential for the introduction and spread of bovine TB during construction of the Proposed Development. To mitigate for this, local outbreaks will be regularly reviewed prior to and throughout the construction period[14]. At the time of this assessment there are no local or major outbreaks (the closest is over 3km away). Biosecurity measures will be implemented at high-risk areas (locations of high badger activity and sett closures), including disinfection of footwear and equipment. In the case of a severe outbreak, an Infectious Disease Risk Assessment will be produced in consultation with NE.

Bats

8.9.20 Mitigation measures for bats are secured through the Outline CEMP (Document reference 7.1, DCO Volume 7).

8.9.21 To mitigate for the loss of suitable roosting habitat (trees with PRF) and where roosting features confirmed during pre-construction surveys would be lost, measures will be implemented through the placement of bat boxes in suitable retained habitat. For the loss of a PRF-I, one bat box will replace every two features lost and for the loss of a PRF-M, two bat boxes will be erected for every feature lost; these will be implemented within the proposed mitigation areas of the Proposed Development as mitigation for habitat loss. Therefore, the impact would be temporary and short-term.

8.9.22 At present, there are no confirmed roosts and therefore, the Proposed Development is not expected to require a mitigation licence for bats. However, it is acknowledged that bats are highly mobile and can move between roosts both intra-annually and interannually. It is, therefore, possible that roosts will be found during pre-construction surveys (undertaken post consent) and a licence may be required. In this eventuality, for tree roosts, the known roosting features will be sectionally removed from the tree with the PRF intact and reinstated onto retained trees nearby and two additional bat boxes provided as compensation. For structure roosts, compensatory boxes will be erected prior to the start of demolition works, the number of which will be determined following pre-construction surveys. Therefore, as roosting features will not be lost, the impact would be temporary and short-term until or bat boxes are found and utilised by bats.

8.9.23 To mitigate for habitat fragmentation during construction, temporary fencing (Heras-style fencing with camouflage windbreak mesh) will be installed at the sections of suitable habitat removed at KCLs (KCL-A to KCL-U) along the Proposed Development. This would create temporary flightlines to ensure continuity of the ecological features (hedgerows and treelines) at locations identified to be important to the movement of bats between suitable roosting and foraging areas. During the operational phase, the reinstatement of hedgerows and treelines will be with 1.5m standards rather than whips to ensure impacts are as short-term as practicable with a quicker establishment period. Once planted, the reinstated habitat will require the retention of temporary fencing to ensure flightlines are retained whilst the habitat becomes sufficiently established.

[14] Outbreaks will be reviewed through this website: ibTB - Mapping bovine TB (bTB) in England and Wales

Monitoring will be required to advise if any remedial action is required as well as when the removal of temporary fencing is practicable.

8.9.24 Acoustic barriers are to be implemented where noise from night-time construction activities will encroach on KCLs. The presence of noise and vibrations from construction activities may result in the loss of ecological connectivity due to behavioural avoidance of species from areas with high level of noise or vibration. Acoustic barriers will be implemented where the noise levels exceed that of the baseline levels at the KCLs, particularly at the WRP site, the Pipelines between Budds Farm WTW and the WRP site, the Pipelines between the WRP site and Havant Thicket Reservoir and the AGP sites; these are areas identified to be KCLs for Annex II species. Habitat reinstatement and enhancement will be implemented at KCLs in order to retain dark, undisturbed corridors for bats.

8.9.25 Acoustic barriers are to be used where the presence of noise and vibrations from construction activities may result in the loss of roosting habitat or the abandonment of a roost due to behavioural avoidance of species from areas with high level of noise or vibration. Any confirmed roosts that may be disturbed, where the noise levels exceed those of the baseline, will be treated as lost under the draft bat licence and compensated for appropriately.

8.9.26 A draft bat licence application (Protected Species Licensing (Doc Ref 7.14, DCO Vol 7)) has been developed for the Proposed Development. The killing or injuring of bats, including through the removal of roost sites, will be mitigated through good practice measures included in the draft Bat Method Statement (Protected Species Licensing (Doc Ref 7.14, DCO Vol 7)) and recorded in the Outline CEMP (Document reference 7.1, DCO Volume 7). These measures will safeguard roosting bats during habitat clearance and will be applied at all locations where PRF have been identified. Measures are set out in full in the draft bat licence application.

Birds

Active nesting Schedule 1 species within the construction Zone of Influence

8.9.27 Where avoidance of impact to active nesting Schedule 1 species via primary and tertiary mitigation is not practicable, permits or licences may be required in order to disturb Schedule 1 breeding species during pre-construction surveys and during construction. For barn owl, a CL29 survey licence for development projects will be required to undertake pre-construction surveys, where previous records of barn owl have been identified or evidence of barn owl during surveys undertaken to date, within the ZoI. Specific mitigation will be required to reduce the impact on local population dynamics if barn owl is found. This could include the installation of species-specific nest boxes or creation and enhancement of suitable supporting habitat.

Hazel dormouse

8.9.28 A draft hazel dormouse licence application (Protected Species Licensing (Doc Ref 7.14, DCO Vol 7)) has been developed for the Proposed Development. Killing or injury of dormouse, including through the removal of occupied resting or breeding sites, will be mitigated through good practice measures. These measures will safeguard individual hazel dormouse during habitat clearance and will be applied

at all locations of confirmed or likely hazel dormouse presence. Measures are detailed in full in the draft hazel dormouse licence application (Protected Species Licensing (Doc Ref 7.14, DCO Vol 7)) and will include sensitive seasonal clearance methodology, provision of nest boxes and protocols for encountering live hazel dormouse, including hibernation and breeding nests.

8.9.29 Loss of ecological connectivity through severance of habitats may result in fragmentation of habitat and isolation of populations. Measures to prevent this would include use of temporary connective fencing (of a structure suitable for hazel dormouse) overnight at important crossings. These locations have been selected where hedgerow removal will delete important connections within the landscape, especially in proximity to large and ancient woodlands. Additionally, dead-hedging from vegetation arisings will be used to provide additional hibernation sites or fill in gaps in retained hedgerows.

8.9.30 Directional clearance is also included in the secondary measures for the potential effect of habitat fragmentation to ensure individual hazel dormouse are encouraged to move into habitat that is well-connected to the wider landscape during vegetation clearance.

8.9.31 These measures will be undertaken at every suitable habitat crossing where dormouse presence is confirmed or considered likely. This will form part of the licensable works and full details are set out in the draft hazel dormouse licence application.

Riparian mammals

8.9.32 Following pre-construction surveys, further monitoring of potential occurrence of otter and water vole within potential influence of works during construction would be advised by the ECoW as appropriate to site-specific risk.

8.9.33 If the baseline for otter changes following pre-construction surveys, there may be a requirement for mitigation licensing.

8.9.34 To mitigate for disturbance events in proximity of watercourses, including along Bow Lake where localised habitat fragmentation may result, and other localised disturbance events where works are unavoidable within 30m of a watercourse. Measures may include any or a combination of the following, as set out in the Outline CEMP (Document reference 7.1, DCO Volume 7):

1. Pre-construction monitoring using trail cameras to determine the presence of otter holts or resting places and associated risk of disturbance before works commencement, on a site-by-site basis.
2. Habitat enhancement or creation as appropriate to the site-specific impact upon otter or their habitats. For example, enhancement of habitats along Bow Lake to provide additional shelter and screening along the watercourse channel, supplemented, if required, by artificial screening while vegetation establishes. In the unlikely event that any resting places are identified within 30m of the working area it would be necessary to create new features on the same stretch of watercourse in similar habitat but beyond the 30m buffer zone. This would be completed in advance of works commencing to ensure undisturbed resting sites are available during construction and may need to be completed under a NE licence, which would be accessed in advance of these activities.

3. Adoption of sensitive construction methods and working practices to ensure continued access for otter to the majority of suitable foraging and commuting habitats while securing works areas where the risk to individual otter is greatest.
4. The 30m buffer would be imposed around any resting site before any work starts on site using fencing to restrict construction disturbance, whilst not affecting otter movement through suitable retained habitats. It would be clearly demarcated using coloured tape, chestnut pale fencing, steel mesh fencing or similar.
5. Additional noise or light screening or other suitable light and noise abatement measures (in place of or additional natural screening that might be delivered through habitat enhancement along the watercourse) may be implemented according to risk and as advised by the ECoW.
6. If a natal site is confirmed or suspected to support otter cubs, the buffer will be extended to 200m of the natal site, with works within this buffer being suspended for approximately eight to ten weeks until it has been confirmed the cubs are mobile, or presence of cubs is ruled out.
7. Access for otter to the riparian zones utilised by otter would be maintained at all times, including through the provision of temporary bypasses if determined to be required following pre-commencement surveys.
8. Impacts to established otter paths and traditional routes along watercourses and within supporting riparian zones during the construction phase would be reduced.
9. Cessation of certain works during night-time hours, or curtailment of works within two hours of sunset or sunrise.

8.9.35 Mitigation for water vole may include the following measures, as set out in the Outline CEMP (Document reference 7.1, DCO Volume 7), if required:

1. Completion of pre-construction checks for evidence of water vole field signs within 5m of watercourse or works crossing ditches prior to commencement of works and completion of ongoing checks as may be appropriate to site-specific activities during construction.
2. Displacement to be undertaken in the spring window (between 15 February and 15 April), when water vole is establishing breeding territories. If this is not reasonably practicable, it should be carried out in the autumn window (between 15 September and 31 October). Timing of displacement activities would also need to consider sensitive timings of mitigation for other species, for example where the affected watercourse is assessed as suitable for in-channel fish presence, works would need to be timed to avoid fish migration or spawning periods and water vole displacement would need to be implemented within the optimum window preceding this.
3. Displacement to be carried out under the supervision of an appropriately licensed individual.
4. Displacement would be permitted to affect no more than a 50m of continuous bank top on one side of a bank and must provide at least 50m undisturbed bank top between locations to be subject to displacement, should multiple locations be required on the same watercourse. Displacement will only be undertaken if sufficient habitat remains to support the water vole population.

8.9.36 Habitat enhancement or creation as appropriate to the site-specific impact upon water vole or its habitat.

8.9.37 Construction traffic would be controlled around otter resting sites and water vole habitats when working after dark and where night-time working is required. This may include the creation of mammal underpasses to provide safe passage below operational access routes or mammal overpasses to provide safe crossing oversailing trenched open-cut sections, as required to satisfactorily address risk. Risk would be assessed, and appropriate measures would be recommended by the ECoW.

Other notable fauna

8.9.38 Reptile translocation will be undertaken to mitigate for the potential killing or injury of common reptile species by the permanent loss of suitable habitat at the WRP site.

8.9.39 As set out in the Outline CEMP (Document reference 7.1, DCO Volume 7), a Reptile Translocation Strategy will be prepared post-consent to provide additional mitigation, produced in line with standard guidance [88] that will include details on:

1. How the suitable receptor site has been identified, including surveys of any existing reptile population to confirm it has sufficient carrying capacity for the translocated slow worm.
2. Any required preparations of the receptor site, including habitat enhancement and creation such as scrub clearance and creation of hibernaculum.
3. ECoW requirements for supervising any necessary preparations to the receptor site and the WRP site, including habitat enhancement and creation and installation of exclusion fencing.
4. Trapping methodology, including the required density of refugia and bedding in period, expected trapping period, weather restrictions and suitable reptile handling techniques.
5. Any required habitat manipulation at the WRP site to increase capture efficiency such as reducing the habitat suitability and the hand removal of natural refugia features such as rubble piles.
6. Site clearance methodology on completion of the trapping period, including the final stripping of remaining vegetation and ‘moon-scaping’ the area to prevent reptile re-colonisation.
7. Post-translocation fence inspection requirements.
8. Post-translocation monitoring of the receptor sites reptile population and suggested remedial actions, if required.

Freshwater ecology

8.9.40 Given the temporary nature of many of the watercourses in the Order Limits, a pre-construction habitat suitability assessment will be undertaken at all watercourses where open-cut construction is proposed to identify the hydrological conditions and the potential for fish or notable macroinvertebrates to be present, the following secondary mitigation for freshwater ecology is secured in the Outline CEMP (Document reference 7.1, DCO Volume 7).

Macroinvertebrates

8.9.41 Should the potential for any notable macroinvertebrate species be identified in the pre-construction habitat suitability assessments, appropriate mitigation will be applied specific to the nature of that species. Mitigation could include relocating of any larger species to safe locations to avoid direct impacts, or consideration of the timing of the construction works to avoid key lifecycle stages for very sensitive species. Measures which also ensure that flows are maintained through the use of diversion channels around the crossing and that sediment transport is reduced will allow free flow of water so that mobile macroinvertebrate species can move away from the construction zone.

8.9.42 As a precautionary approach to the potential presence of Southern iron blue mayfly and white-clawed crayfish in the Itchen catchment and southern damselfly in both the Itchen and Meon catchments, specific habitat suitability assessment surveys will be undertaken at all open-cut watercourse crossings in both catchments to identify any risks to these S41 and Annex II invertebrate species. Should suitable habitat for these species be identified, dedicated surveys will be undertaken to establish their presence or absence prior to construction and works will only proceed under a method statement for that species. The ECoW will deliver the method statement including appropriate mitigation to ensure no adverse effects on these species. Appropriate mitigation could include (but is not limited to) ensuring appropriate timing of the works, exclusion works or altering the construction method to ensure damage or removal of suitable habitat is limited.

Fish

8.9.43 If the pre-construction habitat suitability assessments establish that fish could be present, works will proceed under a method statement for fish during open-cut trenching at watercourse crossings. The method statement will be agreed with the EA and delivered by the ECoW, as outlined in the Outline CEMP (Document reference 7.1, DCO Volume 7). The method statement will include appropriate mitigation to ensure no adverse effects on the species potentially present, such as (but not limited to) the following measures:

1. Prior to commencing on site, all relevant legislation, including requirements for licences, and consents will be identified and confirmation of full compliance obtained.
2. The ECoW will ensure that a watching brief is in place during construction, checking the working area for signs of spills, pollution and during all operations regarded as high risk of potential harm to the environment.
3. If dewatering of a works area within a watercourse with the potential for fish to be present is required, the ECoW will advise on risks and monitor as necessary.
4. The method statement will include measures for a fish rescue to be undertaken prior to dewatering. The depth and size of the rescue area will determine the method used (electric fishing backpack or generator or hand netting if a small area). The dewatered area will be assessed as the water levels are lowered, including checks of the substrate to be confident that no fish remain in the area. Fish will temporarily be stored in an aerated holding tank before being returned to the watercourse at the nearest suitable location, where safe release is practicable.

5. Large boulders or stones, gravels and pebbles will be moved from the working area prior to dewatering and retained to be used for reinstatement.
6. Any cofferdams will be monitored regularly to ensure that no fish enter the area and become entrapped or in distress. If fish do get into the works area such as through flooding of the area, works must stop and a fish rescue team will be employed to ensure safe removal of any fish that get trapped.
7. EA permits will be sought to ensure that the fish rescue team can use the appropriate methodology and move the fish, prior to any rescue (electric fishing or fish movement permits as necessary).
8. If fish are discovered in a watercourse undergoing dewatering or damming works where a fish rescue need has not previously been identified, works will stop immediately and a fish rescue will be undertaken before works can recommence. Unexpected fish rescue will only proceed with the necessary permissions or permits from the EA and carried out by appropriately trained staff.

8.9.44 A summary of residual effects on terrestrial and freshwater biodiversity, taking into consideration secondary mitigation for construction of the Proposed Development are presented within Table 8-18.

Table 8-18 Summary of construction effects that require secondary mitigation

There are no secondary mitigation requirements to address operational impacts as these are addressed by primary and tertiary mitigation measures and no residual effects are anticipated.

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
Statutory designated sites	Vegetation removal for construction	Permanent habitat loss or fragmentation of SWBGS site H08 Major adverse (significant) Paragraph 8.8.65	SWBGS site creation and enhancement	Minor adverse (not significant)
		Habitat fragmentation for otter at Bow Lake (qualifying feature of River Itchen SAC) Minor adverse (not significant) Paragraph 8.8.38	Pre-construction monitoring Timing of works Habitat enhancement Light and noise abatement measures	Minor adverse (not significant)
	Presence of noise, visual stimuli and vibration during construction	Disturbance to non-breeding qualifying bird species of Chichester and Langstone Harbour SPA and Ramsar and Portsmouth Harbour SPA, Ramsar and SSSI Moderate adverse (significant)	Pre-construction surveys Timing of works in relation to high tide (secondary mitigation) Acoustic barriers Watching brief	Minor adverse (not significant)

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
		Paragraph 8.8.68 and 8.8.71		
		Disturbance to breeding qualifying bird species of Chichester and Langstone Harbour SPA and Ramsar and Portsmouth Harbour SPA, Ramsar and SSSI Minor adverse (not significant) Paragraph 8.8.69	Pre-construction surveys Timing of works outside of the breeding season (if possible) Acoustic barriers	Minor adverse (not significant)
		Disturbance to otter at Bow Lake (qualifying feature of River Itchen SAC) Minor adverse (not significant) Paragraph 8.8.39	Pre-construction surveys Monitoring Timing of works Additional light and noise abatement measures Avoidance buffers if natal sites confirmed	Minor adverse (not significant)
	Vegetation removal for construction of isolation, air and washout valves	Permanent and temporary habitat loss or fragmentation of W03G SWBGS site Minor adverse (not significant) Paragraphs 8.8.88	Site specific reinstatement strategy	Neutral adverse (not significant)
	Trenched open-cut crossings of tributaries	Killing or injury of qualifying fish species of River Itchen	Pre-construction surveys Timing of works Fish rescue	Minor adverse (not significant)

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
	to River Itchen and River Meon	SAC and River Meon Compensatory SAC habitat Moderate adverse (significant) Paragraph 8.8.52		
	Vegetation removal for construction of isolation valves, air valves and washout valves	Permanent habitat loss or fragmentation of River Itchen SSSI Minor adverse (not significant) Paragraph 8.8.37	Habitat reinstatement and enhancement	Minor adverse (not significant)
	Vegetation removal for construction	Habitat fragmentation for otter at Bow Lake (qualifying feature of River Itchen SAC) Minor adverse (not significant) Paragraph 8.8.38	Pre-construction survey Timing of works Habitat enhancement	Minor adverse (not significant)
Non-statutory designated sites	Vegetation removal for construction of isolation valves, air valves and washout valves	Permanent habitat loss or degradation of River Meon SINC and Fielders Farm Meadows (Eastleigh) SINC Neutral (not significant)	Bespoke reinstatement strategy	Neutral (not significant)

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
		Paragraphs 8.8.139 and 8.8.141		
	Vegetation removal for construction	Temporary habitat loss or degradation within Field to West of Gillman Road SINC and Fielders Farm Meadows (Eastleigh) SINC Neutral (not significant) Paragraph 8.8.140 and 8.8.141	Bespoke reinstatement strategy Specific measures to protect Field to West of Gilman Road SINC	Neutral (not significant)
Badger	Vegetation removal for construction	Killing or injury Neutral (not significant) Paragraphs 8.8.221, 8.8.230, 8.8.164 and 8.8.231	Closure of setts under licence from NE Creation of artificial setts if required Exclusion zones set up around retained setts	Neutral (not significant)
		Habitat fragmentation (sett 062) Neutral (not significant) Paragraphs 8.8.223 and 8.8.234	Provision of mammal path connecting sett 062 with sett 071 and wider territory during construction	Neutral (not significant)

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
	Presence of construction vehicles on site	Killing or injury Neutral (not significant) Paragraphs 8.8.228, 8.8.231 and 8.8.232	Closure of setts under licence from NE Creation of artificial setts if required Exclusion zones set up around retained setts	Neutral (not significant)
	Trenchless techniques causing vibration and destabilisation of soil	Killing or injury Neutral (not significant) Paragraphs 8.8.230 to 8.8.232	Closure of setts under licence from NE Creation of artificial setts if required.	Neutral (not significant)
	Presence of noise, visual stimuli and vibration from construction activities at tunnel or trenchless compound locations	Disturbance Neutral (not significant) Paragraph 8.8.226	Closure of setts under licence from NE Creation of artificial setts if required Exclusion zones set up around retained setts	Neutral (not significant)
	Potential introduction or spread of INNS and disease	INNS and disease (bovine TB) Neutral (not significant) Paragraph 8.8.233	Regularly review local outbreaks prior to and throughout the construction period. Implement biosecurity measures at high-risk areas and in the case of a severe outbreak, consult NE for the production of an Infectious Disease Risk Assessment	Neutral (not significant)
Bats (All)	Vegetation removal for construction	Habitat loss or degradation (including for Annex II species) Minor adverse (not significant)	*Tree roosts (if identified pre-construction)* Confirmed roosting features and PRF suitable for multiple bats: a ratio of	Neutral (not significant)

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
		Paragraph 8.8.239	two bat boxes per one roosting feature lost. Roosting features suitable for individual bat: a ratio of one bat box per two roosting features *Structure roosts (if identified pre-construction)* Confirmed roosting features: the number of bat boxes will be dependent on the type of roost determined through pre-construction surveys	
		Habitat fragmentation All bat species except Annex II Minor adverse (not significant) Paragraph 8.8.249 and 8.8.244 Annex II species Moderate adverse (significant) Paragraph 8.8.244 and 8.8.250	Temporary flightlines and reinstated habitat at KCLs Temporary flightline to be maintained whilst reinstated habitat establishes	Neutral (not significant)
		Killing or injury Minor adverse	Confirmed roosts will be removed under a licence from NE where required	Minor adverse (not significant)

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
		(not significant) Paragraph 8.8.251	*Tree roosts (if identified pre-construction)* Pre-felling inspections, soft-felling, supervision by a licensed ecologist and the provision of bat boxes *Structure roosts (if identified pre-construction)* Supervision by a licensed ecologist and the provision of bat boxes as compensation under a NE licence	
	Presence of noise and vibration from construction	Disturbance All bat species except Annex II Minor adverse (not significant) Paragraph 8.8.249 Annex II species Moderate adverse (significant) Paragraph 8.8.250	Acoustic barriers Adhering to appropriate licensing procedures for the disturbance of roosts	Neutral (not significant)
Wild birds (Schedule 1 listed bird species only)	Presence of noise, visual stimuli and vibration during construction	Disturbance to Schedule 1 breeding birds Minor adverse (not significant)	If required, the installation of species-specific nest boxes or creation and enhancement of suitable supporting habitat	Neutral (not significant)

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
		Paragraph 8.8.261		
Hazel dormouse	Vegetation removal for construction	Habitat fragmentation Minor adverse (not significant) Paragraphs 8.8.273 and 8.8.273	Hazel dormouse licence from NE Temporary connective fencing or dead hedging overnight at important crossings Directional vegetation clearance	Neutral (not significant)
		Killing or injury Minor adverse (not significant) Paragraph 8.8.280	Hazel dormouse licence from NE will detail: Seasonal vegetational clearance methods Licensed supervision Provision of nest boxes	Neutral (not significant)
Riparian mammals	Vegetation removal for construction	Disturbance along Bow Lake (otter) Minor adverse (not significant) Paragraph 8.8.293	Pre-construction monitoring Timing of works Habitat enhancement Light and noise abatement measures	Neutral (not significant)
	Presence of noise, visual stimuli and vibration during construction	Disturbance Minor adverse (not significant) Paragraph 8.8.294	Pre-construction monitoring Timing of works Habitat enhancement or creation Light and noise abatement measures Avoidance buffers Protection and maintenance of otter paths and access routes	Neutral (not significant)

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
Other notable fauna: Common reptile species	Vegetation removal for construction at the WRP site	Habitat loss or degradation Neutral (not significant) Paragraphs 8.8.321 to 8.8.322	Reptile translocation	Neutral (not significant)
Freshwater ecology: Common fish assemblage	Construction at open-cut watercourse crossings, including indirect reduction or removal of occupied resting or breeding habitat	Killing or injury Neutral (not significant) Paragraphs 8.8.357 to 8.8.361	Pre-construction surveys Method statement Fish rescue	Neutral (not significant)
Freshwater ecology: Annex II fish species (lamprey species and Atlantic salmon)	Construction at open-cut watercourse crossings, including indirect reduction or removal of occupied resting or breeding habitat	Killing or injury Moderate adverse (significant) Paragraphs 8.8.357 to 8.8.361	Pre-construction surveys Method statement Fish rescue	Minor adverse (not significant)
Freshwater ecology: S41 fish species that are not Annex II species (European eel, brown, sea trout and bullhead)	Construction at open-cut watercourse crossings, including indirect reduction or removal of occupied resting or breeding habitat	Killing or injury Minor adverse (not significant) Paragraphs 8.8.357 to 8.8.361	Pre-construction surveys Method statement Fish rescue	Neutral (not significant)
Freshwater ecology:	Construction at open-cut watercourse crossings, including	Killing or injury Neutral	Pre-construction surveys Method statement	Neutral (not significant)

Feature	Impact	Effect and location in assessment	Secondary mitigation	Residual effects
Common freshwater and riparian invertebrate assemblage including nationally notable and red listed macroinvertebrate species	indirect reduction or removal of occupied resting or breeding habitat	(not significant) Paragraphs 8.8.357 to 8.8.361		
Freshwater ecology: Annex II invertebrate species (southern damselfly and white-clawed crayfish)	Construction at open-cut watercourse crossings, including indirect reduction or removal of occupied resting or breeding habitat	Killing or injury Moderate adverse (significant) Paragraphs 8.8.357 to 8.8.361	Pre-construction surveys Method statement	Minor adverse (not significant)
Freshwater ecology: S41 invertebrate species (Southern iron blue mayfly *Baetis niger*)	Construction at open-cut watercourse crossings, including indirect reduction or removal of occupied resting or breeding habitat	Killing or injury Minor adverse (not significant) Paragraphs 8.8.357 to 8.8.361	Pre-construction surveys Method statement	Neutral (not significant)

Monitoring

Statutory designated sites

8.9.45 See paragraph 8.9.52 for monitoring required for SWBGS sites.

Habitats

8.9.46 Appropriate adaptive monitoring will be maintained for individual habitat types to enable effective and timely management of the habitat management programme to meet target conditions. Plants and trees will be monitored for overall health status, including pests and diseases, once a year to reduce negative impacts on woodland. Where necessary for the habitat, monitoring practices will include undertaking structured walks in created habitat areas, species lists, and conducting condition assessments line with the UK Habitat Classification guidelines. Corresponding current status and on-going reviews of objectives for each habitat type will occur to adaptively manage long-term maintenance. Pollution and contamination of road chemicals and materials that have leached onto land will also be monitored.

8.9.47 Where the removal of vegetation for construction is not required, existing hedgerows, trees and other vegetation will be retained and will be protected by measures set out in the Outline CEMP (Document reference 7.1, DCO Volume 7). The management of retained vegetation within areas of permanent land-take post construction will be the same as the long-term management prescriptions of new planting as secured in the Outline LEMP (Document reference 7.5, DCO Volume 7).

Badger

8.9.48 In instances where a large multi-entrance sett may require closure, an artificial replacement sett may need to be provided. The artificial sett will be installed a minimum of six months prior to closure of the existing sett and monitoring will include trail cameras, sand and lightly placed sticks outside the artificial sett entrances to assess whether the sett has been discovered by the badger clan. When confirmation that the badger clan are using the artificial sett regularly is obtained, closure of the existing sett can commence. Monitoring will continue to record badger activity and integration at the replacement sett during and beyond completion of construction for as long as deemed necessary by the Named Ecologist.

8.9.49 All monitoring related to badger sett closures will be undertaken by the Named Ecologist or an Accredited Agent. All monitoring will be undertaken in accordance with the conditions of the NE licence. The outcomes of the monitoring relating to sett closures will be reported via the licence return form to NE.

Bats

8.9.50 Post-construction surveys of the 23 KCLs will be required to monitor the effects of construction and operational activities on the populations of all bat species. A minimum of six 60-minute crossing surveys (including at least three dusk surveys)

will be conducted at each KCL every two years up to ten years post-construction [89].

8.9.51 If pre-construction surveys identify any important bat roosts, dependent on value of feature as defined in the Bat Mitigation Guidelines [90], which are subject to significant impacts, these would also be subject to monitoring requirements. Post-construction monitoring of reinstated habitat such as growth of whips and standards will be required prior to the removal of temporary fencing. Details are set out and secured in the Outline LEMP (Document reference 7.5, DCO Volume 7).

Birds

8.9.52 Monitoring will be required for any habitat created or enhanced for SWBGS sites. Six surveys will be undertaken to cover the core wintering and passage period (spread from September – March inclusive). This will be undertaken for a minimum of three years following reinstatement and will be detailed in the management plan which will be produced for the SWBGS mitigation site.

Hazel dormouse

8.9.53 Monitoring of reinstated and newly created habitats will be undertaken for five years following reinstatement, to ensure new planting has become established successfully. Remedial measures will be provided as required if habitat is not establishing successfully. Details are set out and secured in the Outline LEMP (Document reference 7.5, DCO Volume 7).

8.9.54 Progress on habitat establishment required as part of hazel dormouse mitigation will be recorded in a Report of Action Taken Under Hazel Dormouse Licence form and provided to NE. This will be undertaken within the timeframes specified in the conditions of the licence.

8.9.55 Post-construction monitoring may be undertaken at two locations (to be confirmed), the purpose of which will be to confirm populations of hazel dormouse are still present following construction. Post construction nest box monitoring requirements will be subject to finalisation in the hazel dormouse draft licence application. If undertaken, monitoring locations will be selected to ensure representation across the Proposed Development, where positive results have been identified in field surveys and where there is suitable woodland habitat present to install nest boxes. Monitoring will be undertaken using 50 nest boxes at each location and will be carried out at least twice per year (May or June and September or October) for five years post-construction. This monitoring will be undertaken by the Named Ecologist or Accredited Agents.

Other notable fauna

8.9.56 Post-translocation reptile surveys will be undertaken at the receptor site to compare the reptile population class against the baseline survey to assess the success of the translocation. The duration of these surveys will be informed by standard guidance and details are set out and secured in the Outline LEMP (Document reference 7.5, DCO Volume 7).

Riparian mammals

8.9.57 If protected species licences for otter or water vole are secured as part of the Proposed Development, there may be requirements for monitoring. This will be to ensure any mitigation stipulated within a licence is achieving the objectives set. The results of the monitoring will inform any remedial work required or any further future monitoring requirements. Monitoring may be required before or during construction, during operation or any combination of these depending on the species or group concerned.

8.9.58 Monitoring of habitat planting is required as part of the Outline LEMP (Document reference 7.5, DCO Volume 7). This will include an aftercare regime which will incorporate the quick replacement of any failed planting and undertaking of any remedial work required.

Enhancement

8.9.59 Enhancement is defined as measures taken to achieve a net benefit, which are unrelated to an adverse impact, or which go beyond that required to mitigate or compensate for an impact. For example, restoration of a degraded habitat to leave it in a measurably better state than it was before the Proposed Development, or other interventions to leave a positive legacy for the environment and community.

8.9.60 Strategic opportunities to incorporate enhancements for biodiversity have been identified through the design development process to date. These EMEAs are described in Table 8-6. A total of 30 EMEAs have been identified across the Proposed Development. Potential enhancement proposals include habitat improvements adjacent to construction working areas. The Proposed Development is seeking consent to deliver these environmental enhancements, but these will only be implemented subject to securing agreements with landowners.

8.9.61 Further work would continue post-consent to refine environmental enhancement opportunities. This would include further multi-disciplinary working to define opportunities to deliver Biodiversity Net Gain and wider Environmental Net Gain.

8.9.62 Biodiversity Net Gain undertaken for the Proposed Development would result in a positive increase in biodiversity value through creation and management of suitable habitats. This would increase suitable habitats on-site which would also benefit badger, bats, birds, hazel dormouse, riparian mammals and other notable species.

8.9.63 Confirmation of these opportunities is subject to agreement with landowners and will be provided post consent.

8.10 Summary of residual effects

8.10.1 Table 8-19 provides a summary of the residual effects relating to the construction, operation and decommissioning of the Proposed Development with regard to terrestrial and freshwater ecology features.

Table 8-19 Summary of residual effects

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
Statutory designated sites (all)	Changes to water abstraction, release or storage during construction activities and changes in local drainage to facilitate works	Hydrological change Up to minor adverse (not significant)	N/A	Hydrological change Up to minor adverse (not significant)
	Potential introduction and or spread of INNS	INNS Up to minor adverse (not significant)	N/A	INNS Up to minor adverse (not significant)
	Presence of noise, visual stimuli (including lighting) and vibration	Disturbance to qualifying species (bats, birds and otter) Up to minor adverse (not significant)	Disturbance to qualifying species (bats, birds and otter) Up to minor adverse (not significant)	Disturbance to qualifying species (bats, birds and otter) Up to minor adverse (not significant)
	Waterborne pollution	Waterborne pollution Up to minor adverse (not significant)	N/A	Waterborne pollution Up to minor adverse (not significant)
Statutory designated sites (River Itchen SAC and SSSI)	Vegetation removal for installation of isolation, air and washout valves	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
	Presence of noise, visual stimuli (including lighting) and vibration from construction activities and	Habitat fragmentation (otter)	N/A	Habitat fragmentation (otter)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
	trenchless temporary construction compounds	Minor adverse (not significant)		Minor adverse (not significant)
		Disturbance (otter) Minor adverse (not significant)	N/A	Disturbance (otter) Minor adverse (not significant)
	Presence of construction plant and vehicles, increased number of vehicles, vehicle movements and changes in movement patterns and timings	Killing or injury (otter) Minor adverse (not significant)	Killing or injury (otter) Minor adverse (not significant)	Killing or injury (otter) Minor adverse (not significant)
	Dewatering of river channels, construction of temporary dams and diversion channels and any in-channel works during trenched open-cut watercourse crossings.	Killing or injury (fish species) Minor adverse (not significant)	N/A	Killing or injury (fish species) Minor adverse (not significant)
	Changes to groundwater dependent ecosystems	Hydrological change Minor adverse (not significant)	N/A	Hydrological change Minor adverse (not significant)
	Vehicle emissions during construction	Air quality change (qualifying species and habitats) Minor adverse (not significant)	N/A	Air quality change (qualifying species and habitats) Minor adverse (not significant)
	Construction dust and fine particulate matter emissions	Habitat degradation	N/A	Habitat degradation

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		Minor adverse (not significant)		Minor adverse (not significant)
	Reduced requirement for water abstraction	N/A	Water quality change Major beneficial (significant)	N/A
	Water quality change from the Eastney LSO discharge	N/A	Habitat loss or degradation and displacement or increased mortality of qualifying species (Atlantic Salmon) Minor adverse (not significant)	N/A
Statutory designated sites (River Meon Compensatory SAC)	Dewatering of river channels, construction of temporary dams and diversion channels and any in-channel works during trenched open-cut watercourse crossings.	Killing or injury (fish species) Minor adverse (not significant)	N/A	Killing or injury (fish species) Minor adverse (not significant)
	Changes to groundwater dependent ecosystems	Hydrological change Minor adverse (not significant)	N/A	Hydrological change Minor adverse (not significant)
	Vehicle emissions during construction	Air quality change (qualifying habitats) Minor adverse (not significant)	N/A	Air quality change (qualifying habitats) Minor adverse (not significant)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
	Construction dust and fine particulate matter emissions	Habitat degradation Minor adverse (not significant)	N/A	Habitat degradation Minor adverse (not significant)
	Water quality change from the Eastney LSO discharge	N/A	Habitat loss or degradation and displacement or increased mortality of qualifying species Minor adverse (not significant)	N/A
Statutory designated sites (Chichester and Langstone Harbour SPA and Ramsar and Langstone Harbour SSSI)	Vegetation removal for construction of the WRP site	Habitat loss or degradation of SWBGS site H08 Minor adverse (not significant)	N/A	N/A – SWBGS site H08 is permanently lost during construction
	Vegetation removal for construction of the SuDS outfall	Habitat loss or degradation of SWBGS site H130 Minor adverse (not significant)	N/A	Habitat loss or degradation of SWBG site H130 Minor adverse (not significant)
	Presence of noise, visual stimuli (including lighting) and vibration from construction activities	Disturbance (qualifying non-breeding bird species at SWBGS sites) Minor adverse (not significant)	N/A	Disturbance (qualifying non-breeding bird species at SWBGS sites) Minor adverse (not significant)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		Disturbance (qualifying breeding bird species) Minor adverse (not significant)	N/A	Disturbance (qualifying breeding bird species) Minor adverse (not significant)
	Piling activities at the WRP site during construction	Hydrological change Neutral (not significant)	N/A	Hydrological change Neutral (not significant)
		Disturbance (qualifying breeding and non-breeding bird species) Neutral (not significant)	N/A	Disturbance (qualifying breeding and non-breeding bird species) Neutral (not significant)
	Vehicle emissions during construction	Air quality change Minor adverse (not significant)	N/A	Air quality change Minor adverse (not significant)
	Construction dust and fine particulate matter emissions	Habitat degradation Minor adverse (not significant)	N/A	Habitat degradation Minor adverse (not significant)
	Water quality changes from discharge of treated surface runoff during operation from the WRP site SuDS outfall into the Hermitage Stream	N/A	Habitat loss or degradation and displacement or increased mortality of qualifying species	N/A

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
			Minor adverse (not significant)	
	Water quality change from the Eastney LSO discharge	N/A	Habitat loss or degradation and displacement or increased mortality of qualifying species Minor adverse (not significant)	N/A
Statutory designated sites (Solent Maritime SAC)	Vehicle emissions during construction	Air quality change Minor adverse (not significant)	N/A	Air quality change Minor adverse (not significant)
	Construction dust and fine particulate matter emissions	Habitat degradation Minor adverse (not significant)	N/A	Habitat degradation Minor adverse (not significant)
	Water quality changes from discharge of treated surface runoff during operation from the WRP site SuDS outfall into the Hermitage Stream	N/A	Habitat loss or degradation and displacement or increased mortality of qualifying species Minor adverse (not significant)	N/A
Statutory designated sites (Portsmouth	Vegetation removal for installation of isolation, air and washout valves during construction	Habitat loss or degradation (SWBGS site W03G)	N/A	Habitat loss or degradation (SWBGS site W03G)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
harbour SPA, Ramsar and SSSI)		Neutral adverse (not significant)		Neutral adverse (not significant)
	Presence of noise, visual stimuli (including lighting) and vibration from construction activities	Disturbance (qualifying bird species) Minor adverse (not significant)	N/A	Disturbance (qualifying bird species) Minor adverse (not significant)
	Vegetation removal for construction	Habitat loss or degradation (SWBGS site W03G) Minor adverse (not significant)	N/A	Habitat loss or degradation (SWBGS site W03G) Minor adverse (not significant)
	Water quality change from the Eastney LSO discharge	N/A	Habitat loss or degradation and displacement or increased mortality of qualifying species Minor adverse (not significant)	N/A
Statutory designated sites (Singleton and Cocking Tunnels SAC)	Vegetation removal for construction	Habitat fragmentation (qualifying bat species) Minor adverse (not significant)	N/A	Habitat fragmentation (qualifying bat species) Minor adverse (not significant)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
	Presence of noise, visual stimuli (including lighting) and vibration from construction activities	Disturbance (qualifying bat species) Minor adverse (not significant)	N/A	Disturbance (qualifying bat species) Minor adverse (not significant)
Statutory designated sites (Solent and Dorset Coast SPA and Solent and Southampton Water SPA)	Water quality change from the Eastney LSO discharge	N/A	Habitat loss or degradation and displacement or increased mortality of qualifying species Minor adverse (not significant)	N/A
Statutory designated sites (Portsdown SSSI and St. Catherine's Hill SSSI)	Vehicle emissions during construction	Changes in air quality Minor adverse (not significant)	N/A	Changes in air quality Minor adverse (not significant)
All non-statutory designated sites	Potential introduction or spread of INNS	INNS Neutral (not significant)	N/A	INNS Neutral (not significant)
	Waterborne pollution	Waterborne pollution Neutral (not significant)	N/A	Waterborne pollution Neutral (not significant)
	Changes to water abstraction, release or storage during construction	Hydrological change	N/A	Hydrological change

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		Neutral (not significant)		Neutral (not significant)
	Vehicle emissions during construction	Air quality change Neutral (not significant)	N/A	Air quality change Neutral (not significant)
	Construction dust and fine particular matter emissions	Habitat degradation Neutral (not significant)	N/A	Habitat degradation Neutral (not significant)
Non-statutory designated sites (SINCS)	Presence of construction plant and vehicles, increased number of vehicles, vehicle movements and changes in movement patterns and timings	Changes to air quality resulting in habitat loss and degradation, Airborne pollution resulting in habitat loss or degradation Minor adverse neutral (not significant)	N/A	Changes to air quality resulting in habitat loss and degradation Minor adverse neutral (not significant)
		Killing or injury Neutral (not significant)	N/A	Killing or injury Neutral (not significant)
	Vegetation removal for construction, including isolation, air and washout valves	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
	Changes to hydrology such as changes to water flows, quality or	Hydrological change	N/A	Hydrological change

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
	quantities during construction due to the presence of groundwater dependent features.	Neutral (not significant)		Neutral (not significant)
Habitats; Other neutral grassland	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
Habitats; Scattered trees	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
Habitats; Ancient woodland	Changes to hydrology, geomorphology and water quantity, flows and quality during construction due to pipeline installation and other earthworks	Habitat degradation Neutral (not significant)	N/A	Habitat degradation Neutral (not significant)
	Changes to air quality associated with additional construction traffic	Habitat degradation Minor adverse (not significant)	N/A	Habitat degradation Minor adverse (not significant)
Habitats; Ancient or veteran tree	Vegetation removal for construction	No effect	N/A	N/A
Habitats; Cropland (including arable field margins)	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
	Vegetation removal for installation of isolation, air and washout valves	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
Habitats; OMH	Vegetation removal for construction	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
Habitats; Dense scrub	Vegetation removal for construction.	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
Habitats; Other broadleaved woodland	Vegetation removal for construction	Habitat loss or degradation Up to minor adverse (not significant)	N/A	Habitat loss or degradation Up to minor adverse (not significant)
Habitats; Other mixed woodland	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
Habitats; Other lowland acid grassland	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
				(not significant)
Habitats; Lowland calcareous grassland	Vegetation removal for construction	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
Habitats; Other calcareous grassland	Vegetation removal for construction	Habitat loss or degradation Neutral beneficial (not significant)	N/A	Habitat loss or degradation Neutral beneficial (not significant)
Habitats; Native hedgerows	Vegetation removal for construction	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
Habitats; Wet woodland	Vegetation removal for construction	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
	Changes to hydrology such as changes to water flows, quality or quantities during construction due to the presence of groundwater dependent features.	Habitat degradation Minor adverse (not significant)	N/A	Habitat degradation Minor adverse (not significant)
Habitats; Lowland mixed deciduous woodland	Vegetation removal for construction	Habitat loss or degradation Minor adverse	N/A	Habitat loss or degradation

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		(not significant)		Minor adverse (not significant)
Habitats; Other coniferous woodland	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
Habitats; Ecologically valuable line of trees	Vegetation removal for construction	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
Habitats; Other lines of trees	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
Habitats; Coastal and floodplain grazing marsh	Vegetation removal for construction	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
Habitats; Wood-pasture and parkland	Vegetation removal for construction	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
Habitats; Neutral grassland	Changes to hydrology, geomorphology and water	Habitat degradation	N/A	Habitat degradation

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
	quantity, flows and quality during construction due to pipeline installation and other earthworks	Neutral (not significant)		Neutral (not significant)
Habitats; Purple moor grass and rush pasture	Changes to hydrology such as changes to water flows, quality or quantities during construction due to the presence of groundwater dependent features.	Habitat degradation Minor adverse (not significant)	N/A	Habitat degradation Minor adverse (not significant)
Habitats; Other wetlands	Changes to hydrology, geomorphology and water quantity, flows and quality during construction due to pipeline installation and other earthworks	Habitat degradation Neutral (not significant)	N/A	Habitat degradation Neutral (not significant)
Badger	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
	Vegetation removal for construction	Habitat fragmentation Neutral (not significant)	N/A	Habitat fragmentation Neutral (not significant)
	Presence of noise, visual stimuli (including lighting) and vibration	Disturbance Neutral (not significant)	Disturbance Neutral (not significant)	Disturbance Neutral (not significant)
	Stored material, including spoil, used for badger sett creation	Killing of injury Neutral (not significant)	N/A	Killing of injury Neutral (not significant)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
	Presence of construction plant and vehicles, increased number of vehicles, vehicle movements and changes in movement patterns and timings	Killing or injury Neutral (not significant)	Killing or injury Neutral (not significant)	Killing or injury Neutral (not significant)
	Entrapment in open excavations	Killing or injury Neutral (not significant)	N/A	Killing or injury Neutral (not significant)
	Trenchless techniques causing vibration and destabilisation of soil	Killing or injury Neutral (not significant)	N/A	Killing or injury Neutral (not significant)
	Potential introduction or spread of INNS and disease	INNS and disease Neutral (not significant)	N/A	INNS and disease Neutral (not significant)
Bats	Vegetation removal for construction	Habitat loss or degradation (all species) Neutral (not significant)	N/A	Habitat loss or degradation (all species) Neutral (not significant)
		Killing or injury (all species) Minor adverse (not significant)	N/A	Killing or injury (all species) Minor adverse (not significant)
		Habitat fragmentation	N/A	Habitat fragmentation

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		(all species) Neutral (not significant)		(all species) Neutral (not significant)
	Demolition of structures	Habitat loss or degradation All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse (not significant)	N/A	Habitat loss or degradation All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse (not significant)
		Killing or injury (all species) Minor adverse (not significant)	N/A	Killing or injury (all species) Minor adverse (not significant)
	Vegetation removal for installation of isolation, air and washout valves	Habitat loss or degradation (all species) Neutral (not significant)	N/A	Habitat loss or degradation (all species) Neutral (not significant)
	Soil compaction during construction	Habitat loss or degradation (all species)	N/A	Habitat loss or degradation (all species)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		Neutral (not significant)		Neutral (not significant)
	Changes to air quality	Habitat loss or degradation (all species) Neutral (not significant)	N/A	Habitat loss or degradation (all species) Neutral (not significant)
	Potential introduction or spread of INNS	Habitat loss or degradation All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse (not significant)	N/A	Habitat loss or degradation All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse (not significant)
	Use of lighting	Habitat fragmentation All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse	Habitat fragmentation All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse	Habitat fragmentation All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		(not significant)	(not significant)	(not significant)
		Disturbance All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse (not significant)	Disturbance (all species) Up to minor adverse (not significant)	Disturbance All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse (not significant)
	Loss or modification of waterbodies and watercourses	Habitat fragmentation All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse (not significant)	N/A	Habitat fragmentation All species except Annex II species: Neutral (not significant) Annex II species: Minor adverse (not significant)
	Presence of noise and vibration	Disturbance (all species) Neutral (not significant)	Disturbance (all species) Neutral (not significant)	Disturbance (all species) Neutral (not significant)
Wild birds and bird assemblages	Potential introduction or spread of INNS	Habitat loss or degradation Minor adverse	N/A	Habitat loss or degradation

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		(not significant)		Minor adverse (not significant)
	Pollution from run off leading to the introduction of toxic pollutants or sediments into receiving watercourses	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
	Presence of noise, visual stimuli (including lighting) and vibration	Disturbance Neutral (not significant)	Disturbance Minor adverse (not significant)	Disturbance Neutral (not significant)
	Vegetation removal for construction	Habitat loss or degradation Minor adverse (not significant)	N/A	Habitat loss or degradation Minor adverse (not significant)
		Habitat fragmentation Minor adverse (not significant)	N/A	Habitat fragmentation Minor adverse (not significant)
	Presence of construction plant and vehicles, increased number of vehicles, vehicle movements and changes in movement patterns and timings	Killing or injury Minor adverse (not significant)	N/A	Killing or injury Minor adverse (not significant)
Hazel dormouse	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Neutral (not significant)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		Habitat fragmentation Neutral (not significant)	N/A	Neutral (not significant)
		Killing or injury Neutral (not significant)	N/A	Killy or injury Neutral (not significant)
	Air quality change	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
	Presence of noise, visual stimuli (including lighting) and vibration	Disturbance Neutral (not significant)	N/A	Disturbance Neutral (not significant)
	Potential introduction or spread of INNS	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
	Presence of construction plant and vehicles, increased number of vehicles, vehicle movements and changes in movement patterns and timings	Killing or injury Neutral (not significant)	N/A	Killing or injury Neutral (not significant)
	Entrapment in open excavations	Killing or injury	N/A	Killing or injury

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		Neutral (not significant)		Neutral (not significant)
Riparian mammals	Vegetation removal for construction	Habitat loss or degradation (otter) Neutral (not significant)	N/A	Habitat loss or degradation (otter) Neutral (not significant)
		Habitat fragmentation (otter) Neutral (not significant)	N/A	Habitat fragmentation (otter) Neutral (not significant)
		Disturbance (otter) Neutral (not significant)	N/A	Disturbance (otter) Neutral (not significant)
		Killing or injury (otter) Minor adverse (not significant)	N/A	Killing or injury (otter) Minor adverse (not significant)
		Killing or injury (water vole) Neutral (not significant)	N/A	Killing or injury (water vole) Neutral (not significant)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
	Waterborne pollution	Habitat loss or degradation (otter) Neutral (not significant)	N/A	Habitat loss or degradation (otter) Neutral (not significant)
	Potential introduction or spread of INNS	Habitat loss or degradation (otter) Neutral (not significant)	N/A	Habitat loss or degradation (otter) Neutral (not significant)
	Entrapment in excavations and pipework	Killing or injury (otter) Neutral (not significant)	N/A	Killing or injury (otter) Neutral (not significant)
	Presence of noise, visual stimuli (including lighting) and vibration	Disturbance (otter) Neutral (not significant)	Disturbance (otter) Neutral (not significant)	Disturbance (otter) Neutral (not significant)
	Presence of construction plant and vehicles, increased number of vehicles, vehicle movements and changes in movement patterns and timings	Killing or injury (otter) Neutral (not significant)	Killing or injury (otter) Neutral (not significant)	Killing or injury (otter) Neutral (not significant)
	Reduction in the volume of water abstraction required during drought conditions.	N/A	Increased riparian habitat biodiversity	N/A

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
			Minor beneficial (not significant)	
	Water quality change	N/A	Habitat loss or degradation Neutral (not significant)	N/A
	Operation of the WRP site SuDS outfall into the Hermitage Stream	N/A	Habitat loss or degradation Neutral (not significant)	N/A
Other notable fauna	Vegetation removal for construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
		Habitat fragmentation Neutral (not significant)	N/A	Habitat fragmentation Neutral (not significant)
		Killing or injury Neutral (not significant)	N/A	Killing or injury Neutral (not significant)
	Air quality change	Habitat loss or degradation Neutral	N/A	Habitat loss or degradation Neutral

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
		(not significant)		(not significant)
	Soil compaction during construction	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
	Presence of noise, visual stimuli (including lighting) and vibration	Disturbance Neutral (not significant)	Disturbance Neutral (not significant)	Disturbance Neutral (not significant)
	Entrapment in excavations	Killing or injury Neutral (not significant)	N/A	Killing or injury Neutral (not significant)
	Increased number of vehicles, vehicle movements and changes in movement patterns and timings	Killing or injury Neutral (not significant)	Killing or injury Neutral (not significant)	Killing or injury Neutral (not significant)
	Changes to hydrology such as water flows, quality, qualities and drainage pathways	Hydrological change Neutral (not significant)	N/A	Hydrological change Neutral (not significant)
	Potential introduction or spread of INNS and disease	INNS and disease Neutral (not significant)	N/A	INNS and disease Neutral (not significant)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
Aquatic and riparian habitats (excluding Annex I vegetation)	In-channel works and associated impacts at trenched open-cut watercourse crossings, including accidental pollution events.	Habitat loss or degradation Up to minor adverse (not significant)	N/A	Habitat loss or degradation Up to minor adverse (not significant)
		Habitat fragmentation Up to minor adverse (not significant)	N/A	Habitat fragmentation Up to minor adverse (not significant)
	Water quality changes in Havant Thicket Reservoir	N/A	Water quality change Neutral (not significant)	N/A
	Downstream water quality changes from Havant Thicket Reservoir (Riders Lane Stream and Hermitage Stream)	N/A	Water quality change Up to minor beneficial (not significant)	N/A
	Potential spread or introduction of freshwater INNS	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
Annex I *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation	Potential spread or introduction of freshwater INNS	N/A	N/A	N/A

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
Common macrophyte and phytobenthic assemblages	Potential spread or introduction of freshwater INNS	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
	In-channel works and associated impacts at trenched open-cut watercourse crossings, including accidental pollution events, noise, vibration and lighting.	Habitat loss or degradation Up to minor adverse (not significant)	N/A	Habitat loss or degradation Up to minor adverse (not significant)
	Water quality changes in Havant Thicket Reservoir, Riders Lane Stream and Hermitage Stream	N/A	Water quality change Neutral (not significant)	N/A
	Downstream water quality changes from Havant Thicket Reservoir (Riders Lane Stream and Hermitage Stream)	N/A	Water quality change Up to minor beneficial (not significant)	N/A
Common fish assemblages, S41 fish species that are not Annex II species (European eel, brown/sea trout) and Annex II bullhead. Common freshwater and riparian invertebrate assemblage	Potential spread or introduction of freshwater INNS (and pathogens)	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
	In-channel works and associated impacts at trenched open-cut watercourse crossings, including accidental pollution events, noise, vibration and lighting.	Habitat loss or degradation Up to minor adverse (not significant)	N/A	Habitat loss or degradation Up to minor adverse (not significant)

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
including nationally notable and red listed macroinvertebrate species		Habitat fragmentation Up to minor adverse (not significant)	N/A	Habitat fragmentation Up to minor adverse (not significant)
		Disturbance Up to minor adverse (not significant)	N/A	Disturbance Up to minor adverse (not significant)
		Killing or injury Neutral (not significant)	N/A	Killing or injury Neutral (not significant)
	Noise and vibration during trenchless construction under watercourses	Disturbance Up to minor adverse (not significant)	N/A	Disturbance Up to minor adverse (not significant)
	Water quality changes in Havant Thicket Reservoir, Riders Lane Stream and Hermitage Stream	N/A	Habitat loss or degradation Neutral (not significant)	N/A
	Downstream water quality changes from Havant Thicket Reservoir, (Riders Lane Stream and Hermitage Stream)	N/A	Water quality change Up to minor beneficial (not significant)	N/A
Annex II fish species (lamprey and Atlantic salmon)	Potential spread or introduction of freshwater INNS (and pathogens) during operation	N/A	N/A	N/A

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
and Annex II invertebrate species (southern damselfly and white-clawed crayfish)	In-channel works and associated impacts at trenched open-cut watercourse crossings, including accidental pollution events, noise, vibration and lighting.	Habitat loss or degradation Up to minor adverse (not significant)	N/A	Habitat loss or degradation Up to minor adverse (not significant)
		Habitat fragmentation Up to minor adverse (not significant)	N/A	Habitat fragmentation Up to minor adverse (not significant)
		Disturbance Up to minor adverse (not significant)	N/A	Disturbance Up to minor adverse (not significant)
		Killing or injury Minor adverse (not significant)	N/A	Killing or injury Minor adverse (not significant)
	Noise and vibration during trenchless construction under watercourses	Disturbance Up to minor adverse (not significant)	N/A	Disturbance Up to minor adverse (not significant)
S41 invertebrate species (southern iron blue mayfly)	Potential spread or introduction of freshwater INNS during operation	Habitat loss or degradation Neutral (not significant)	N/A	Habitat loss or degradation Neutral (not significant)
	In-channel works and associated impacts at trenched open-cut	Habitat loss or degradation	N/A	Habitat loss or degradation

Feature	Impact	Residual effects		
		Construction	Operation	Decommissioning
	watercourse crossings, including accidental pollution events, noise, vibration and lighting.	Up to minor adverse (not significant)		Up to minor adverse (not significant)
		Habitat fragmentation Up to minor adverse (not significant)	N/A	Habitat fragmentation Up to minor adverse (not significant)
		Disturbance Up to minor adverse (not significant)	N/A	Disturbance Up to minor adverse (not significant)
		Killing or injury Neutral (not significant)	N/A	Killing or injury Neutral (not significant)
	Noise and vibration during trenchless construction under watercourses	Disturbance Up to minor adverse (not significant)	N/A	Disturbance Up to minor adverse (not significant)

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