Teddington Direct River Abstraction

Preliminary Environmental Information Report
Chapter 7 – Terrestrial Ecology

Volume: 1

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Table of Contents

List of Tables

7. Terrestrial Ecology

7.1 Introduction

7.1.1 This chapter of the Preliminary Environmental Information (PEI) Report provides preliminary environmental information relating to terrestrial ecology, to allow stakeholders and local communities to understand and develop an informed view of the likely significant environmental effects of the Teddington Direct River Abstraction (TDRA) Project (hereafter referred to as 'the Project') at this stage of the programme. This should be read in conjunction with the description of the Project as presented in Chapter 2: Project Description. The chapter sets out the methodology for the assessment of any likely significant effects of the Project on terrestrial ecology in accordance with relevant recognised guidance in the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM guidelines) (CIEEM, 2024).

7.1.2 Terrestrial ecology focuses on the diversity of land-based organisms and their interactions with each other and their environment. Preserving terrestrial ecosystems is crucial for sustaining populations of both fauna and flora, as well as the communities they form. Terrestrial ecology in the UK is governed by a range of laws and policies. Impacts on ecological receptors may not only contravene legislation but may also be material considerations in the planning process.

7.1.3 This assessment comprises the following terrestrial ecology matters:

a. Designated sites – sites designated at all levels for nature conservation reasons, including Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar sites, Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs), Local Nature Reserves (LNRs) and Local Wildlife Sites (LWSs)

b. Notable habitats – habitats of conservation importance such as priority habitats, ancient woodland and ancient/veteran trees

c. Protected and/or notable species – these include animal and plant species protected by legislation, and species of conservation importance such as priority species or species of principal importance (SoPI)

7.1.4 The key impacts to be considered are listed below:

a. Permanent and temporary habitat loss within the draft Order limits

b. Direct mortality or harm to protected or ecologically significant species within the draft Order limits

c. Deterioration or fragmentation of surrounding (i.e. connected) habitats

d. Anthropogenic disturbance of protected or ecologically significant species within surrounding (i.e. connected) habitats

7.1.5 This chapter is supported by the following Volume 2 PEI Report Figures:

a. Figure 7.1: Terrestrial Ecology Designated Sites

b. Figure 7.2: Terrestrial Ecology Priority Habitats

c. Figure 7.3: Terrestrial Ecology Preliminary Protected Species Survey Results

7.1.6 This chapter is supported by the following Volume 3 PEI Report Appendices:

a. Appendix 7.1: Habitats Regulations Assessment Stage 1 Screening Report

b. Appendix 7.2: Approach to Achieve Biodiversity Net Gain

7.2 Legislation, policy and guidance

7.2.1 This section details the key legislation and policy relevant to the terrestrial ecology assessment for the Project.

Legislation

7.2.2 The Conservation of Habitats and Species Regulations 2017 (as amended) protects biodiversity by designating and safeguarding SACs and SPAs. It mandates rigorous assessments for any plans or projects that might impact these sites, ensuring no adverse effects on their integrity. The regulations also provide strict protection for certain European Protected Species (EPS).and designate public bodies as competent authorities to enforce compliance.

7.2.3 The Ramsar Convention on Wetlands of International Importance 1971 is an international treaty dedicated to the conservation and sustainable use of wetlands. It requires member countries to designate wetlands of international importance, known as Ramsar sites, and ensure their effective management. The convention promotes the '*wise use*' of all wetlands, recognising their critical ecological, economic, cultural and scientific value.

7.2.4 The Wildlife and Countryside Act 1981 is a key piece of UK legislation aimed at protecting wildlife and habitats. It provides comprehensive protection for wild birds, animals, and plants, and regulates the introduction of non-native species. The act also designates SSSIs to conserve important habitats and species. Additionally, it includes provisions for public rights of way and access to the countryside, ensuring that nature conservation is balanced with public enjoyment.

7.2.5 The Natural Environment and Rural Communities (NERC) Act 2006 is a UK law that places a duty on public bodies and statutory undertakers to have due regard for biodiversity and includes a list of habitats and species which are a priority for conservation.

7.2.6 The Countryside and Rights of Way Act 2000 provides additional protection on SSSIs by strengthening legal safeguards, allowing conservation agencies to impose restrictions, increasing penalties for damage, and placing duties on public bodies to consider their impact on SSSIs.

7.2.7 The Hedgerows Regulations 1997 places a responsibility on local authorities to protect hedgerows that meet certain criteria, by controlling their removal through a system of notification.

7.2.8 The Protection of Badgers Act 1992 contains a list of actions which constitute offences, if done to badgers or their setts.

National policy

National Policy Statement for Water Resources Infrastructure

7.2.9 The Project must also have regard for the National Policy Statement (NPS) for Water Resources Infrastructure (Department for Environment, Food and Rural Affairs (Defra), 2023). This sets out the government's policies for the development of Nationally Significant Infrastructure Projects (NSIPs) on water resources infrastructure in England. The Secretary of State uses the NPS as the primary basis for making decisions on Development Consent Order (DCO) applications.

7.2.10 The requirements of the NPS for water resources infrastructure in relation to terrestrial ecology are provided below in Table 7.1.

Table 7.1 Key policy from the NPS for Water Resources Infrastructure

Paragraph(s)	Requirements for the Applicant	How the Project addressed this
3.3.1	The applicant is required to provide sufficient information in their Habitats Regulations Assessment (HRA) to enable the SoS to discharge their functions as the competent authority. The HRA undertaken at the water resources management plan options appraisal process stage could provide relevant information to inform any project specific HRA.	A Habitats Regulations Assessment (HRA) Stage 1 Screening Assessment has been completed for the Project and a Stage 2 Appropriate Assessment will be completed prior to submission of the DCO application. Likely significant effects on Richmond Park SAC are anticipated in the absence of mitigation as habitats within the draft Order limits constitute functionally linked land for stag beetle *Lucanus cervus* (the qualifying feature of the SAC). Appropriate mitigation will be designed to ensure stag beetle habitat is retained on-site where possible and additional habitat is created. The mitigation proposals will be discussed and agreed with Natural England to ensure no adverse effect on site integrity.
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 biodiversity net gain.	The Project has committed to achieving a minimum 10% BNG. This net gain in biodiversity is measured as a Project-wide minimum 10% increase in 'habitat units', as measured by Defra's Biodiversity Metric calculation tool version 1.0.3. To achieve this commitment, the objectives are for the Project's BNG to: • Provide year-round resources for species of local ecological value • Support Local Nature Recovery Strategies • Seek to be resilient to future climate risks • Benefit communities local to the Project The design will also aim to respect and enhance the local landscape and cultural heritage, with the aim for the Project to provide long-term environmental benefits while meeting the

Paragraph(s)	Requirements for the Applicant	How the Project addressed this
		broader sustainability goals set out in the Project's Design Principles.
4.3.1 and 4.3.2	The SoS should have regard to the aims and goals of the Environmental Improvement Plan and any relevant measures and targets, including statutory targets set under the Environment Act 2021 or elsewhere. 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 Project will have regard for the Environmental Improvement Plan (HM Government, 2023), for example through consideration of Local Nature Recovery Strategies in design of landscape planting and habitat creation. The EIA considers a future baseline, including climate change, and furthermore any mitigation and enhancement considered would have regard to current ecological networks and their health as well as ensuring future resilience. For example, the design of landscaping would seek to maximise connectivity of habitats within and beyond the Order limits, and the landscaping scheme would seek to include species which are tolerant to climate change.
4.3.4	A site-specific HRA … should identify likely significant effects and necessary mitigation measures.	As stated above, a Habitats Regulations Assessment (HRA) Stage 1 Screening Assessment has been completed for the Project and a Stage 2 Appropriate Assessment will be completed prior to submission of the DCO application. Likely significant effects on Richmond Park SAC are anticipated in the absence of mitigation as habitats within the draft Order limits constitute functionally linked land for stag beetle *Lucanus cervus* (the qualifying feature of the SAC). Appropriate mitigation will be designed to ensure stag beetle habitat is retained on-site where possible and additional habitat is created. The mitigation proposals will be discussed and agreed with Natural England to ensure no adverse effect on site integrity.
4.3.5	Where the project is subject to Environmental Impact Assessment the applicant should ensure that the Environmental Statement clearly sets out any likely significant effects on internationally,	Section 4.3 of Chapter 4 summarises the factors considered to determine the spatial scope of the EIA. The effects on internationally, nationally and locally designated sites, protected species, and habitats and other species identified as being of

Paragraph(s)	Requirements for the Applicant	How the Project addressed this
	nationally and locally designated sites of ecological or geological conservation importance (including those outside England) on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity. 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.	principal importance as a result of the Project will be fully addressed in the ES, with a preliminary assessment of the likely significant effects provided in Table 7.16 of this PEI Report. Chapter 10 sets out likely significant effects on designated geological sites, which are scoped out due to there not being any in the study area.
4.3.6	The applicant should show how the project has taken advantage of opportunities to conserve and enhance biodiversity and geological conservation interests.	As stated in Paragraph 7.4.1, the Applicant has sought to avoid or reduce impacts through embedded design (primary) mitigation, therefore conserving biodiversity. Section 7.10 outlines potential opportunities to incorporate enhancements within the Project. These will be developed following Statutory Consultation and finalised measures reported with the ES.
4.3.7	Applicants should include appropriate mitigation measures as an integral part of their proposed development, including identifying where and how these will be secured. In particular, the applicant should demonstrate that: during construction they will seek to ensure that activities will be confined to the minimum areas required for the works during construction and operation, best practice will be followed to ensure that the risk of disturbance or damage to species or habitats is minimised	Aspect-specific mitigations is/ will be set out within the relevant chapter of the PEI Report/ ES and in the Commitments Register (Appendix 4.2) and the draft Code of Construction Practice (CoCP) (Appendix 4.3: draft CoCP). This includes / will include measures to: • minimise working areas • minimise disturbance • restore habitats after construction, where practicable • provide green corridors and minimise fragmentation where possible and reasonable • enhance retained habitats and create new habitats where practicable

Paragraph(s)	Requirements for the Applicant	How the Project addressed this
	habitats will, where practicable, be restored after construction works have finished developments will be designed and landscaped to provide green corridors and minimise habitat fragmentation where possible and reasonable opportunities will be taken to enhance existing habitats, and where practicable, to create new habitats of value within the site landscaping proposals where habitat creation is required as mitigation, compensation or enhancement, the location and quality will be of key importance. In this regard, habitat creation should be focused on areas where the most ecological and ecosystem services benefits can be realised	Commitments also include mitigation specific to species and habitats as well as a commitment to achieving a minimum 10% Biodiversity Net Gain (BNG). The location of mitigation and enhancement measures will be considered through the outline design process in order to realise maximum benefit from these features where practicable.
4.3.20	[…] Biodiversity net gain should be applied in conjunction with the mitigation hierarchy and does not change or replace existing environmental obligations. It does not override protection for designated sites, protected or priority species and irreplaceable or priority habitats.	Appendix 7.2 Approach to BNG, provides supplementary information to this chapter with regards to how the Project intends to achieve BNG. The Appendix acknowledges that habitats created and/or enhanced for the Project's mitigation and/or compensation requirements will count towards the Project's BNG, up to a maximum of 'no net loss' of habitat units.
4.3.21	Development should contribute to and enhance the natural environment by providing net gains for biodiversity. Applicants should use the current version of the biodiversity metric and should use the same version to calculate their biodiversity baseline and inform their biodiversity net gain outcomes. Applicants should take into account the requirements of any biodiversity gain statement published in respect of nationally	The project has committed to achieving a minimum 10% BNG. This net gain in biodiversity is measured as a Project-wide minimum 10% increase in 'habitat units', as measured by Defra's Biodiversity Metric calculation tool version 1.0.3. To achieve this commitment, the objectives are for the Project's BNG to:

Paragraph(s)	Requirements for the Applicant	How the Project addressed this
	significant infrastructure projects. Opportunities should be explored to deliver biodiversity net gain within the development footprint in the first instance. Applications for development consent should set out how opportunities for on-site delivery of biodiversity net gain have been considered and, where they are proposed, how they have been incorporated in the project design.	• Provide year-round resources for species of local ecological value • Support Local Nature Recovery Strategies • Seek to be resilient to future climate risks • Benefit communities local to the Project The design will also aim to respect and enhance the local landscape and cultural heritage, with the aim for the Project to provide long-term environmental benefits while meeting the broader sustainability goals set out in the Project's Design Principles. Appendix 7.2, Approach to BNG, provides supplementary information to this chapter with regards to how the Project intends to achieve BNG including for assessment of post-development habitats.
4.2.22	Biodiversity net gain can also be delivered wholly or partially off-site. Any off-site delivery of biodiversity net gain should also be set out within the application for development consent. When delivering biodiversity net gain off-site, developments should do this in a manner that best contributes to the achievement of relevant wider strategic outcomes, for example by increasing habitat connectivity or enhancing other ecosystem service outcomes. Reference should be made to relevant national or local plans and strategies, such as green infrastructure strategies or Nature Recovery Networks, to inform off-site biodiversity net gain delivery. Applicants are encouraged to refer to industry good practice principles and guidance for development before preparing their application. Where biodiversity net	The Project has committed to achieving a minimum 10% BNG. This net gain in biodiversity is measured as a Project-wide minimum 10% increase in 'habitat units', as measured by Defra's Biodiversity Metric calculation tool version 1.0.3. If 10% BNG cannot be achieved on site, local off-site habitat enhancement and creation for BNG will be sought where appropriate and practicable to do so. Appendix 7.2 Approach to BNG, provides supplementary information to this chapter with regards to how the Project intends to achieve BNG.

Paragraph(s)	Requirements for the Applicant	How the Project addressed this
	gain considerations have featured as part of the water resources management plan strategic options appraisal process to select a project, then applicants could reference that information to supplement the site specific details.	
4.3.23	Development proposals potentially provide many opportunities for building in beneficial biodiversity or geological features as part of good design. When considering proposals, the Secretary of State should consider whether the applicant has maximised such opportunities in and around developments. The Secretary of State may use requirements or planning obligations where appropriate in order to ensure that such benefits are delivered.	Section 7.10 outlines potential opportunities to incorporate enhancements within the Project. These will be developed following Statutory Consultation and finalised measures reported with the ES.

National Planning Policy Framework

7.2.11 The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2024) requires planning policies and decisions to contribute to and enhance the natural and local environment. This includes protecting and enhancing designated biodiversity sites. It emphasises minimising impacts on biodiversity and providing net gains, such as establishing coherent ecological networks that are resilient to current and future pressures. The NPPF also highlights the importance of recognising the intrinsic character and beauty of the countryside and the wider benefits from natural capital and ecosystem services.

Regional policy

7.2.12 The London Plan (Greater London Authority, 2021) embeds ecological protection and enhancement within the capital's spatial development strategy. It promotes the safeguarding and expansion of green infrastructure, recognising its role in supporting biodiversity and ecological connectivity across urban landscapes. Key policies, such as Policy G6, require developments such as the Project to protect and enhance SINCs, avoid net loss of biodiversity, and deliver measurable net gains where possible. The Plan also encourages boroughs to identify ecologically valuable habitats and integrate nature into urban planning, thereby reinforcing the resilience of terrestrial ecosystems in the face of urbanisation and climate change.

7.2.13 The Greater London Authority is preparing the LNRS for London as required under the Environment Act 2021. This strategy will provide guidance on where nature recovery should be prioritised with the aim of restoring, creating, and connecting habitats. This strategy will support the delivery of BNG while helping to deliver the national environmental targets. Once published, the maps can inform decisions on where to site off-site BNG delivery and potential enhancements for the Project, which will contribute to delivering the LNRS.

Local policy

London Borough of Richmond upon Thames (LBR)

7.2.14 The LBR Local Plan 2018 (LBR, 2018) includes several policies relevant to terrestrial ecology. Policy LP 12 aims to protect and enhance the borough's green infrastructure, including parks, open spaces, and green corridors, ensuring they contribute to biodiversity and ecological networks. Policy LP 15 focuses on protecting and enhancing biodiversity, requiring developments to conserve and enhance existing habitats and create new ones where possible, while emphasising the importance of ecological networks and the need for biodiversity net gain. Policy LP 16 seeks to protect and enhance trees, woodlands, and landscapes, recognising their importance for biodiversity, climate change mitigation, and the character of the borough. Lastly, Policy LP 18 focuses on protecting and enhancing the borough's river corridors, aiming to conserve and improve the biodiversity, landscape, and recreational value of

these areas, and requiring developments to consider the ecological importance of river corridors, ensuring that any impacts are mitigated and opportunities for enhancement are maximised.

7.2.15 The LBR Local Plan 2024 (emerging policy) (LBR, 2023) includes several additional policies relevant to terrestrial ecology. Policy G1 aims to integrate green and blue infrastructure into new developments, enhancing ecological networks and providing benefits for biodiversity, climate resilience and public well-being. Policy B1 requires all new developments to achieve a minimum of 10% biodiversity net gain, ensuring that habitats are enhanced and ecological networks are strengthened. Policy T1 focuses on the protection and enhancement of trees and woodlands, promoting the planting of new trees and the management of existing ones to support biodiversity and climate resilience. Lastly, Policy G2 aims to protect and enhance the ecological and landscape value of river corridors, requiring developments to consider the ecological importance of these areas, ensuring that any impacts are mitigated and opportunities for enhancement are maximised.

London Borough of Hounslow (LBH)

7.2.16 The LBH Local Plan 2015 (LBH, 2015) and the emerging Local Plan 2020 – 2041 (LBH, 2024) (programmed to be adopted in 2025 with no changes to policies) set out the planning framework for this borough. Policy GB1 sets out the approach to safeguarding the Green Belt and Metropolitan Open Land, in part for its ecological value. Policy GB4 highlights the importance of integrating green infrastructure into new developments and enhancing ecological networks. Policy GB7 underscores the need to protect and enhance biodiversity, requiring developments to achieve at least 10% biodiversity net gain, conserve existing habitats, and create new ones.

Royal Borough of Kingston upon Thames (RBK)

7.2.17 The RBK Core Strategy (2012) includes several policies relevant to terrestrial ecology. Policy CS3 aims to protect and improve Kingston's natural and green environment by protecting various designations such as Green Belt, Metropolitan Open Land and SINCs. Policy DM6 mandates that new developments protect and promote biodiversity through sustainable design, including tree planting, habitat enhancement and green roofs, and requires ecological assessments for major development proposals. Policy DM 7 requires that riverside developments avoid unacceptable biodiversity impacts and preserve and enhance connectivity.

7.2.18 In addition to the Core Strategy, the RBK emerging Local Plan (Regulation 18) (emerging policy) (RBK, 2022) also contains relevant policies. Developments must deliver 30% BNG, conserve priority species and habitats, and avoid harm to SINCs as outlined in Draft Policy KN3: Biodiversity. They should enhance green and blue infrastructure, incorporating urban greening measures, and manage these features over their lifetime, in line with Draft Policy KN1: Green and Blue Infrastructure. Developments must achieve Urban Greening Factor

targets, include green plantings and street trees, and manage these features for at least 30 years, with protected tree removal requiring justification and replacement planting, as specified in Draft Policy KN4: Urban Greening and Trees.

Guidance

7.2.19 The ecological impact assessment (EcIA) has been undertaken according to recognised guidance provided by the Institute of Environmental Management and Assessment (IEMA), Guidelines for Baseline Ecological Assessment (IEMA, 1995), Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, and Coastal (CIEEM, 2024) and the Guidelines for Preliminary Ecological Appraisal, Chartered Institute of Ecology and Environmental Management (CIEEM, 2017).

7.2.20 These guidelines provide a framework for evaluating impacts of development projects and ensure a rigorous and transparent assessment of impacts on terrestrial, freshwater and coastal environments. They promote good practice and help professionals communicate ecological findings effectively.

7.2.21 Thames Water Biodiversity and Invasive Non Native Species Policy (POL014), which requires the implementation of measures for preventing the spread of Invasive Non Native Species (INNS) via construction works, has also informed the assessment

7.3 Consultation, engagement and scoping

Scoping

7.3.1 Table 7.2 presents the section of the Scoping Opinion (Planning Inspectorate (PINS), 2024b) relating to terrestrial ecology, and the Applicant's response to those comments.

7.3.2 The Project consultation and engagement to date can be found in Section 4.5 of Chapter 4: Approach to Environmental Assessment.

Table 7.2 Key scoping opinion comments for terrestrial ecology (PINS, 2024b)

PINS ID reference	Comment	Response
3.4.1	'*Impacts from pollution and invasive non-native species (INNS) on species are not addressed in Scoping Report Table 9.6 without explanation. This is also not captured in the assessment on Aquatic Ecology. The ES should assess associated significant effects on species as well as habitats, where they are likely to occur.*'	Ongoing surveys are being carried out to capture the baseline terrestrial and aquatic receptors. This PEI Report includes an assessment of the likely significant effects on identified receptors (for both species and habitats) including from pollution and INNS in Section 7.9. The ES will include further assessment on this.
3.4.6	'*The Inspectorate does not agree to scope out impacts to water vole. The proposed study area for protected and notable species set out in Table 9.3 is 2km whereas the justification for scoping water vole out of further assessment is that no supporting habitat for water vole is identified around the Burnell Avenue site where above ground works are proposed. The extent of the Burnell Avenue site is not defined and impacts such as pollution and INNS have not been taken into consideration (please see ID 3.4.1 of this Opinion). The ES should define an appropriate study area based on the zone of influence to water vole and assess any significant effects where they are likely to occur. This should include potential impacts from INNS and pollution where relevant.*'	Likely significant effects from INNS and pollution on water vole *Arvicola amphibius* is scoped in and included in Section 7.9. The study area mentioned is for the collation of desk study records (including in respect of water voles), which is standard procedure for developments in environmental appraisals. The area subject to survey is usually much smaller and is based on the perceived area of potential impact. However, to bolster the current assessment for water vole (in response to stakeholder feedback) a longer stretch of the River Thames will be subject to survey in 2025. The survey area will cover the riverbank of the Thames between the Burnell Avenue site and the Ham Playing Fields site plus a 200m buffer upstream and downstream of these sites. The likely significant effects of INNS and pollution on water voles are scoped in and included in Section 7.9. The study area mentioned pertains to the collation of desk study records, including those related to water voles, which is a standard procedure for environmental appraisals in development projects. Typically, the area subject to survey is much smaller and is based on the perceived area of potential impact. However, to enhance

PINS ID reference	Comment	Response
		the current assessment for water voles, a longer stretch of the River Thames will be surveyed in 2025. This survey will cover the riverbank of the Thames between the Burnell Avenue site and the Ham Playing Fields site, along with a 200m buffer upstream and downstream of these sites.
3.4.7	'*Impacts from changes in flow regime are anticipated to be infrequent, with Scoping Report paragraph 2.2.1 stating that modelling scenarios indicate the Proposed Development would typically be in operation on average once in every two years, transferring 75 Ml/d at times of low flows (each for abstraction and importation of recycled water). The Scoping Report identifies that otters are highly adaptable and the Inspectorate agrees that on this basis, impacts from flow regime changes on otter may be scoped out. However, this matter should be scoped in for other riverine receptors such as water vole where significant effects are likely to occur.*'	Due to the infrequent and minimal impacts to flow regime as a result of the operation of the Project, no likely significant effects are likely to occur on water vole. The River Thames at the Burnell Avenue site supports no in-channel refuge, extremely minimal food sources, is significantly disturbed by recreational users and its banks at this location are largely artificial. More suitable habitat is present within the Duke of Northumberland's River, but this watercourse would not be impacted. The River Thames at the Burnell Avenue site is mostly unsuitable, and no evidence of water vole presence has been recorded. A wider survey area will be adopted in response to PINS comment 3.4.6 as per the row above, which will aim to capture any water vole evidence or suitable water vole habitat along the river between the Burnell Avenue site and the Ham Playing Fields site. Should evidence of water vole be identified during the additional surveys, additional assessment would be performed on potential impacts from construction and operation of the Project. An assessment of the likely significant effects on all other riverine receptors, such as designated sites, priority habitats and otter *Lutra lutra* are included in Table 7.16 of this chapter.

PINS ID reference	Comment	Response
3.4.9	'*The Scoping Report seeks to scope this matter* [impacts from temporary habitat loss on habitats and species at the Tudor Drive Thames Lee Tunnel connection shaft] *out as the site is urban, habitats present are for amenity purposes, and include non-native species of low biodiversity value, and the potential for protected species is low. The Inspectorate agrees that this matter can be scoped out on the basis presented but advises that the ES should confirm the assumptions with evidence from the updated preliminary ecological assessment as proposed in Scoping Report paragraph 9.4.4.*'	The ES will confirm assumptions regarding the Tudor Drive site with evidence from the updated Preliminary Ecological Appraisal (PEA).
3.4.10	'*Construction impacts identified in Scoping Report paragraph 9.5.7 include permanent habitat loss. In Table 9.8 habitat loss during construction for the Mogden* [Sewage Treatment Works (STW)] *Western Work Area is only identified as temporary but it is identified as permanent for the Mogden STW site Eastern Work Area. The ES should explain why habitat loss is only temporary for the Western area or assess habitat loss as a permanent effect.*'	It is anticipated that only a small area of habitat would be permanently lost in the Western Work Area where the shaft will be located for maintenance purposes. This is expected to be approximately 10 square metres. Permanent habitat loss would be unavoidable to the east of Mogden where construction of new infrastructure is required. The requirement for both temporary and permanent habitat loss at the Mogden STW site will be justified within the ES.
3.4.11	'*The Applicant should make effort to agree the location and extent of updated surveys for PEA with relevant consultation bodies. Coverage should include any offsite locations required e.g. for mitigation identified in the ES.*'	Further PEA surveys will be undertaken to bridge the gaps in the Project baseline information, for example where the draft Order limits have been updated. The programmed surveys have been outlined to key stakeholders including the Local Planning Authorities and Natural England. In addition, once the approach to BNG has been agreed, should off-site BNG be required, PEA surveys to include UK Habitat Classification and Conditions assessments

PINS ID reference	Comment	Response
		will be required. Engagement with relevant consultation bodies is on-going.
3.4.12	'*Public bodies have a responsibility to avoid releasing environmental information that could bring about harm to sensitive or vulnerable ecological features. Specific survey and assessment data relating to the presence and locations of species such as badgers, rare birds and plants that could be subject to disturbance, damage, persecution, or commercial exploitation resulting from publication of the information, should be provided in the ES as a confidential annex. All other assessment information should be included in an ES chapter, as normal, with a placeholder explaining that a confidential annex has been submitted to the Inspectorate and may be made available subject to request.*'	The location of sensitive environmental information will not be released to the public. The Applicant agrees with the approach to instead provide confidential annexes within the ES.
3.4.13	'*The Applicant's attention is drawn to the comments of London Borough of Richmond upon Thames (Appendix 2 of this Opinion) regarding additional protected species in the study area, including two lipped door snail. The ES should include an assessment of likely significant effects to this species or otherwise explain with reference to relevant guidance why these are not likely to occur.*'	An assessment of the likely significant effects to two-lipped door snail *Alinda biplicata* will be undertaken and presented within the ES. Initially, this will include the undertaking of a habitat suitability assessment with further surveys conducted as required prior to DCO submission. For this PEI Report, a precautionary approach has been taken and presence of two-lipped door snail has been assumed.

7.3.3 Other key feedback from stakeholders other than PINS is detailed below in Table 7.3.

Table 7.3 Other stakeholder key feedback from the Scoping Opinion

Stakeholder	Comment	Response
LBR	'*OMISSION – SCOPE IN* *Habitat Management and Monitoring Plans (HMMP) should be provided to demonstrate how the TDRA development will improve biodiversity in the long term.*'	An outline Habitat Management and Monitoring Plan for on-site BNG will be produced as part of the BNG package for DCO submission.
LBR	'*OMISSION – SCOPE IN* *The above ground sites could have an impact on river ecology given the proximity of some of the sites to the river e.g. Ham Street Car Park.*'	Impacts to most aquatic ecology receptors are within the remit of Chapter 6: Aquatic Ecology. Impacts to riparian mammals are scoped in and likely significant effects are assessed in Section 7.9.
LBR	'*OMISSION METHODOLOGY* *The sources of information are insufficient to provide a robust baseline for the biodiversity assessment and would only be partly compensated by field surveys which would need to be undertaken over many seasons … there seems to be too little time for survey work before planned submission of the EIA.*'	Terrestrial ecology field surveys have been undertaken for the Project since 2021 and a robust baseline has been developed. A Terrestrial Ecology Consolidated Baseline Report will be provided as an appendix to the ES. Where required, additional terrestrial ecology surveys will be conducted prior to DCO submission to ensure all data are up to date. Where surveys for a certain receptor have not yet been undertaken, e.g. dormice, these will be conducted in 2025 prior to DCO submission. Historical environmental records will be collated from a number of additional sources (where available) including Amphibian and Reptile Group (ARG) and local mammal groups
LBR	'*OMISSION* *Table 9.4 should include more information to justify the proposed cut off distances for exclusion.* *Two lipped door snail should be added to protected species – Scoped In.*'	The proposed survey buffers are based on standard good practice (tertiary) and professional judgement. These have been included and referenced in Table 7.12 of this chapter. Taking into account the relatively small area of habitat to be impacted by the Project and the

Stakeholder	Comment	Response
		lack of many protected and notable species present on-site, the survey buffers are considered sufficient. A habitat assessment for two-lipped door snail will be undertaken in 2025 in the vicinity of above ground sites.
LBR	'*CLARIFICATION* *The EIA is unclear regarding where BNG will be delivered, this Council encourages that BNG is delivered locally at the point of impact. BNG assessment must comply with BS 8683:12.*'	The Applicant will follow the British Standard BS 8683 (British Standards Institution, 2021) where practicable and applicable. Where feasible, BNG would be delivered on site and would seek to support delivery within areas formally identified within the LNRS of the three London boroughs. Where BNG cannot be delivered on-site, local off-site opportunities will be explored, and would aim to support the LNRS, where practicable.
LBR	'*The chapter does not reference protected trees at the side of Park Gate Woods nor the protected group of trees in Park Gate Woods (Burnell above ground area and North Weald above ground area) – these should be Scoped In and greater clarity provided.*'	Tree Preservation Order (TPO) trees are present within the Royal Park Gate Open Space Site of Importance for Nature Conservation (SINC) within the draft Order limits for the Project. Further design information is required before an assessment of TPO trees to be retained/lost can be made, and this would be reported within the ES. An arboricultural survey has been undertaken and any impacts to protected trees would be assessed. This is discussed further in paragraph 7.8.15 of this chapter.
LBR	'*CLARIFICATION* *Thames Water (TW)* [are requested to clarify] *how or where BNG improvements will be made. There is no reason given as to why TW have not considered aiming for more than the minimum BNG … it appears unlikely that the 20% figure will become adopted policy. TW are requested to provide more detail on this topic.*'	The Project has committed to achieving a minimum 10% BNG. This net gain in biodiversity is measured as a Project-wide minimum 10% increase in 'habitat units', as measured by Defra's Biodiversity Metric calculation tool version 1.0.3. To achieve this commitment, the objectives are for the Project's BNG to:

Stakeholder	Comment	Response
		• Provide year-round resources for species of local ecological value • Support Local Nature Recovery Strategies • Seek to be resilient to future climate risks • Benefit communities local to the Project If 10% BNG cannot be achieved on site, local off-site habitat enhancement and creation for BNG will be sought where appropriate and practicable to do so. Appendix 7.2, Approach to BNG, provides supplementary information to this chapter with regards to how the Project intends to achieve BNG. Further detail will be provided in the ES.
LBR	'*The assessment will need to include potential impacts of the proposal upon sites and features of nature conservation interest as well as opportunities for nature recovery through BNG. There might also be strategic approaches to take into account. We advise this should include the emerging LNRS which will be the key mechanism for planning and mapping local delivery of the Nature Recovery Network (NRN). The NRN refers to a single, growing national network of improved joined-up, wildlife rich places which will benefit people and wildlife.*'	The Applicant is liaising with the London boroughs with the aim to discuss their LNRS and identify how the Project's BNG can support delivery of the LNRS.
LBR	'*The ES should thoroughly assess the potential for the proposal to affect nationally and internationally designated sites of nature conservation importance, including marine sites where relevant … Should a likely significant effect on a European/Internationally designated site be identified (either alone or in-*	The ES will thoroughly assess the potential for the Project to impact nationally and internationally designated sites. In addition, a Shadow HRA Screening assessment is provided in Appendix 7.1 and an Appropriate Assessment will be submitted with the DCO application.

Stakeholder	Comment	Response
	combination) or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an appropriate assessment in addition to the consideration of impacts through the EIA process.'	
LBR	'*Consideration should also be given to the potential environmental value of brownfield sites, often found in urban areas and former industrial land. Sites can be checked against the (draft) national Open Mosaic Habitat (OMH) inventory published by Natural England and freely available to download.*'	Consideration will be given to the potential environmental value of brownfield sites. This inventory has been checked with no open mosaic habitat identified within the draft Order limits. It is present within Ham Lands LNR but has not been verified as priority habitat. This chapter does assess likely significant effects on Ham Lands LNR in Section 7.9 and any potential indirect effects on this habitat type will be explored further in the ES.
LBR	'*An appropriate level habitat survey should be carried out on the site, to identify any important habitats present. In addition, ornithological, botanical, and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present.*'	Taking into account the relatively small area of habitat to be impacted by the Project and types of habitats to be impacted, ornithological surveys are not considered necessary. As the site is considered functionally linked land for stag beetle, targeted habitat surveys for this species were conducted in 2023. The results of the UK Habitat Classification Assessment (UK Hab) and Statutory Biodiversity Metric Condition Assessment identified the location of all priority habitats within the draft Order limits. Targeted National Vegetation Classification surveys were conducted for a shaft location that has since been removed from the Project. No other areas of notable botanical species have been recorded on site and therefore no further survey work is required, unless further UK Hab surveys identify any areas with potential to support protected or priority plants.

Stakeholder	Comment	Response
LBR	Sensitive marsh area of Ham Lands is located next to the Ham Street Car Park.	Appropriate buffer zones and stand-off distances from sensitive ecological receptors, such as designated sites (Ham Lands LNR), will be implemented. An assessment of likely significant effects on designated sites, including Ham Lands, is included in this Chapter in Table 7.16.
Environment Agency	The updated PEA survey at the Mogden STW site should include the entirety of the LWS to consider mitigation and enhancements to the LWS for any losses in habitat.	The draft Order Limits have been expanded at the Mogden STW site and do now include the entirety of the LWS. Therefore the whole area will be subject to survey and mitigation and enhancements for the Project will be considered within the whole LWS.

Consultation and engagement

7.3.4 Non-statutory public consultation was undertaken from October 2023 to December 2023 to seek feedback about the site options for the Project from a variety of stakeholders such as landowners, residents, businesses, local authorities and other statutory bodies who might be affected by or interested in the Project. In relation to terrestrial ecology, the responses note concerns about impacts on biodiversity, wildlife and habitats, particularly within Ham Lands and Ham Lands LNR and along the lower River Thames.

7.3.5 Engagement with Natural England has been undertaken throughout Project development with discussions held on the updates to the Project design and a recommendation by Natural England to screen in Richmond Park SAC, due to the presence of functionally linked stag beetle habitat present within the draft Order Limits. The latest meeting in May 2025 served as an update on the current status of terrestrial ecology surveys and the approach to BNG.

7.3.6 Ongoing engagement with the local planning authorities (LPAs) has also been conducted throughout Project development, with representatives also present in the above meeting in May 2025. On 25 July 2024 a technical engagement session was carried out with representatives from LBH, LBR and RBK via video link where the Project team outlined the baseline environment in relation to terrestrial ecology and the proposed assessment methodology. The Project team also provided an outline of which terrestrial ecology receptors were proposed to be scoped in and which were proposed to be scoped out from further assessment. During the meeting, LBR referred to a population of badgers *Meles meles* living locally with individuals observed crossing the road into Ham Lands. It was suggested that the survey area buffer be increased to capture this. Assurance was given that this would be looked in to and that potential fragmentation effects on badgers outside the survey area would be considered. Since this engagement, the draft Order limits have changed and as such, full badger surveys of the area in question and additional areas will be undertaken in 2025.

7.3.7 Engagement with the LPAs and Natural England will continue through the DCO process and as assessment work is undertaken to prepare the ES. Engagement will also be undertaken with a wider set of consultees when appropriate, including the local Wildlife Trusts, National Appraisal Unit (Environment Agency) and conservation groups.

Scope of the assessment

7.3.8 A summary of the impacts to be scoped in or out of the ES terrestrial ecology assessment during construction is provided in Table 7.4. This is based on the outcome of the assessment in the Scoping Report (Thames Water, 2024a) as well as the Scoping Opinion and engagement with stakeholders. In line with the Scoping Opinion, Operational effects have been scoped out from the assessment as the majority of the Project is located underground. Further rationale for this is given in paragraphs 7.3.9-7.3.11 below.

7.3.9 Changes in flow regime could impact on the suitability of the River Thames for commuting otter. However, due to the infrequent and limited impacts to flow and the plasticity in the behaviour of otters, impacts due to flow change are considered not significant.

7.3.10 Maintenance of the infrastructure within Mogden STW Eastern Work Area would involve limited lighting and anthropogenic noise disturbance. However, this maintenance will be infrequent and this area has existing high levels of disturbance, so limited and infrequent marginal changes are not considered significant.

7.3.11 Similarly, maintenance along the tunnelled conveyance route will also be infrequent, and on an as-required basis. This will also represent very limited increases in lighting and anthropogenic disturbance, which is not considered significant.

Table 7.4 Scoping of potential effects to ecological features

Feature(s)	Description of potential effect during construction	Scoped in/out
Ancient woodland	N/A – no ancient woodland is located within 200m of the draft Order limits.	Out
Ancient/veteran trees	N/A – any potential effects would emanate from above ground sites and there are no ancient trees within 100m of these. There are five veteran trees within 100m but these are present where the draft Order limits have been expanded along the road network. All the veteran trees are over 100m from the construction works within the above ground sites, therefore they are scoped out.	Out
Priority habitats	Habitat loss, fragmentation or modification; hydrological changes to surface and groundwater; introduction and spread of INNS (resulting in habitat loss/modification); and exposure to pollution incidents, air and dust emissions.	In
Notable vascular plants	Habitat loss, fragmentation or modification; hydrological changes to surface and groundwater; introduction and spread of INNS (resulting in habitat loss and degradation).	In
European designated sites, SSSI and NNR	Loss of and fragmentation of habitat and direct mortality of qualifying feature with functionally linked habitat: stag beetle, Richmond Park SAC, NNR, SSSI.	In
LNR	Hydrological changes to surface and groundwater (resulting in mortality/injury of species and/or habitat loss/modification); air quality changes from nitrogen deposition and dust deposition; and introduction and spread of INNS (resulting in habitat loss/degradation).	In

Feature(s)	Description of potential effect during construction	Scoped in/out
LWS/SINC	Habitat loss (including the potential loss of TPO trees), fragmentation or modification; hydrological changes to surface and groundwater (resulting in mortality/injury of species and/or habitat loss/modification); air quality changes from nitrogen deposition and dust deposition; and introduction and spread of INNS (resulting in habitat loss/degradation).	In
Bats	Direct injury and mortality, loss of roost sites in trees; loss of and fragmentation of foraging and commuting habitat; and disturbance of roosts.	In
Badger	Loss of setts; loss of foraging habitat; and disturbance.	In
Birds	Loss of nesting habitat, loss of foraging habitat, disturbance to species listed on Schedule 1 of the Wildlife and Countryside Act 1981.	In
Common toad *Bufo bufo*	Loss of foraging and shelter habitat; and direct mortality or injury.	In
European hedgehog *Erinaceus europaeus*	Loss of habitat and direct mortality or injury.	In
Great crested newt (GCN) *Triturus cristatus*	N/A – Likely absent (see paragraph 7.8.23).	Out
Hazel dormouse *Muscardinus avellanarius*	Direct injury and mortality, loss of foraging habitat, loss of nesting habitat, habitat fragmentation and disturbance.	In
Otter	Severance of commuting routes.	In
Invertebrates listed as SoPI (e.g. stag beetle)	Loss of habitat and direct mortality, disturbance through artificial lighting.	In
Reptiles	Loss of habitat; and direct mortality or injury.	In
Water vole	Hydrological and water quality changes to surface water, introduction and spread of INNS.	In

7.4 Embedded design (primary) mitigation and standard good practice (tertiary)

Embedded design (primary) mitigation

7.4.1 The Applicant has worked through the design process to avoid or reduce environmental impacts through the use of embedded design (primary) mitigation. Chapter 3: Consideration of Alternatives details the design alternatives that have been considered, including the environmental factors which have influenced the decision making.

7.4.2 Mitigation will be designed and implemented in line with Chapter 4: Approach to Environmental Assessment. In addition to mitigation, the Project is also investigating opportunities to deliver enhancement measures. At the time of writing, mitigation design is in a preliminary phase. As such, this chapter sets out the mitigation principles for the terrestrial ecology aspect, which will be fully developed for the ES in consultation with stakeholders.

7.4.3 The Project has committed to achieving a minimum 10% BNG. This net gain in biodiversity is measured as a Project-wide minimum 10% increase in 'habitat units', as measured by Defra's Biodiversity Metric calculation tool version 1.0.3 (PCR 25). To achieve this commitment, the objectives are for the Project's BNG to:

a. Provide year-round resources for species of local ecological value

b. Support Local Nature Recovery Strategies

c. Seek to be resilient to future climate risks

d. Benefit communities local to the Project. Appendix 4.2: Project Commitments Register (PCR),(PCR 25)

7.4.4 Works will be undertaken within both the western and eastern sides of the Mogden STW site. However, permanent infrastructure works will be confined to the eastern part of the site and only temporary habitat clearance will be required within the western area. The only permanent impact in the Western Work Area will be a manhole cover over the Tunnel Boring Machine (TBM) shaft. Thus, reducing the amount of permanent habitat loss within the STW.

7.4.5 Above ground sites have been located in areas which minimise or avoid loss of notable and priority habitats. These sites also minimise loss of habitat for protected and notable species, including badgers and bats.

7.4.6 Construction of the conveyance tunnel using a TBM rather than by way of pipejacking has reduced the number of above ground sites and therefore reduced the extent of habitat loss and degradation resulting from the Project.

7.4.7 Embedded design (primary) mitigation relevant to the terrestrial ecology aspect includes:

a. Sheet pile wall if required for a cofferdam during construction of the intake and outfall will be installed using a method to reduce noise and vibration

such as press-in piling where this is reasonably practicable. (Appendix 4.2: PCR 8). The aim being to minimise noise and vibration impacts on protected and notable species such as breeding birds, badgers and bats.

b. Direction of outfall if bankside to be angled from the perpendicular of the riverbank to mitigate disturbance of river flow, (Appendix 4.2: Commitments Register PCR 9) which could impact notable species such as otter which may forage or commute within the area.

Standard good practice (tertiary)

7.4.8 Standard good practice (tertiary) will be applied to comply with legislative requirements or align with standard sector practices. The following good practice measures shall be implemented during construction where reasonably practicable:

7.4.9 Ecological features shall be retained where reasonably practicable, such as by siting temporary compounds, laydown areas and access in areas of least ecological sensitivity (for example, areas of hardstanding and, modified grassland). (Appendix 4.2: Commitments Register PCR 19a).

7.4.10 Clearance and / or disturbance of habitats within above ground sites shall be conducted under the supervision of a suitably qualified ecologist (Appendix 4.2: Commitments Register PCR 19a).

7.4.11 Where reasonably practicable works shall be timed to mitigate potential impacts on protected or ecologically significant species, for example: to avoid removal or disturbance of any nesting bird habitat during the bird breeding season (generally between 1 March and 31 August inclusive); avoiding removal of habitats that may support hibernating species during the hibernation season; (Appendix 4.2: Commitments Register PCR 19a)

7.4.12 The creation of features which could attract wildlife into works areas shall be avoided. For example, stockpiling of large earth piles in areas of known badger activity shall be managed to prevent the excavation of new setts (Appendix 4.2: Commitments Register PCR 19b)

7.4.13 Important commuting features such as mammal pathways and river channels shall be kept clear of obstruction so that habitat connectivity is maintained across the site and mobile species such as badgers are able to continue to forage within their normal range, outside of restricted works areas, and maintain healthy populations throughout the construction period (Appendix 4.2: Commitments Register PCR 19b).

7.4.14 Any trenches, trial pits and excavations shall be covered overnight or appropriately fenced off, where reasonably practicable, in order to prevent animals falling in and becoming trapped. Where excavations cannot reasonably be closed or backfilled on a nightly basis or securely fenced, a means of preventing animal entry or facilitating escape shall be provided (Appendix 4.2: Commitments Register PCR 19b).

7.4.15 Buffer zones and stand-off distances from sensitive ecological receptors such as designated sites, confirmed bat roosts, badger setts, suitable stag beetle habitat and birds' nests and watercourses shall be implemented as appropriate. These buffer zones will be demarcated using physical barriers such as Heras style fencing to prevent encroachment of works and where necessary signage will also be attached to barriers (Appendix 4.2: Commitments Register PCR 19c).

7.4.16 Sensitive lighting strategies shall be implemented where reasonably practicable which will avoid directly lighting ecological receptors where disturbance effects could arise and minimising light spill onto the receptors by use of shielding and directional lighting. Light intensity shall be reduced where reasonably practicable and where a higher light intensity is required these works shall be scheduled to daylight hours where reasonably practicable (Appendix 4.2: Commitments Register PCR 19d).

7.4.17 Licences may be provided by Natural England for works that would otherwise contravene current UK or European wildlife legislation. All construction works will be undertaken in accordance with the relevant mitigation strategies and conditions of those licences. Draft licence applications will be provided in support of the application for development consent to inform any 'Letter of No Impediment' that may provided by Natural England (Appendix 4.2: Commitments Register PCR 20).

7.4.18 Any unavoidable removal of fox dens or rabbit burrows shall be undertaken sensitively by hand. All excavation of dens and burrows will be supervised by a suitably qualified and experienced ecologist (Appendix 4.2: Commitments Register PCR 21).

7.4.19 Control of noise and vibration from construction and operation of the Project around sensitive features such as confirmed bat roosts, badger setts and watercourses would adhere to good practice measures as presented in Chapter 14: Noise and Vibration and in the draft CoCP (Appendix 4.3: draft CoCP).

7.4.20 Control of dust generation during construction by means of the standard good practice (tertiary) measures presented in Chapter 13: Air Quality and in the draft CoCP (Appendix 4.3: draft CoCP).

7.4.21 Water pollution would be avoided through standard good practice (tertiary) measures presented in Chapter 5: Water Resources and Flood Risk and adherence to current good practice pollution prevention control measures within the draft CoCP (Appendix 4.3: draft CoCP).

7.4.22 A landscape and ecology management plan (LEMP) shall be implemented, detailing how landscape and ecology mitigation and management will be delivered (Appendix 4.2: Commitments Register PCR 104).

7.4.23 Newly enhanced or created habitats for BNG will be managed and monitored in line with a landscape and ecology management plan (LEMP) and/or a habitat

management and monitoring plan (HMMP) (Appendix 4.2: Commitments Register PCR 104).

7.4.24 Care will be taken to control and prevent the spread of invasive non native species. For example, works exclusion zones around stands of invasive plant species will be installed and specialist contractors will be brought in to remove and legally dispose of the cut waste materials (Appendix 4.2: Commitments Register PCR 23)

7.4.25 Pre-construction surveys shall be undertaken for bats, badgers, and stag beetles to confirm status within above ground sites (and appropriate buffers areas). Such surveys may also include hazel dormouse, otter, water vole and two-lipped door snail depending on further survey results, to be confirmed in the ES. (Appendix 4.2: Commitments Register PCR 22).

7.5 Assessment methodology

General approach

7.5.1 The ecological assessment has been undertaken according to recognised guidance provided in the Institute of Environmental Management and Assessment (IEMA) (IEMA, 1995) and CIEEM guidelines (CIEEM, 2024). The assessment methodology itself is semi-quantitative, based on empirical data and professional judgement.

7.5.2 The aims and objectives of the assessment are to:

a. Determine the value/importance of ecological features (or receptors) to be affected by the Project

b. Characterise (e.g. extent, magnitude, duration, reversibility, timing and frequency) the effects within the Project draft Order limits and surrounding terrestrial ecological features (i.e. study area)

c. Assess the significance of the effects

d. Identify cumulative effects

e. Identify likely significant effects on terrestrial ecology

f. Identify embedded design (primary) mitigation measures and standard good practice (tertiary) to avoid, minimise and/or reduce the likely significant effects and identify additional (secondary) mitigation and enhancement measures

g. Establish residual likely significant effects after additional (secondary) mitigation has been implemented

7.5.3 Specific terrestrial species guidance used during field surveys can be found in Table 7.12.

Assessing the significance of effects

Determining the value/importance of ecological features

7.5.4 The importance of ecological features has been assessed according to the criteria set out in Table 7.5, which has been created following CIEEM guidelines (CIEEM, 2024). Consideration has also been given to biodiversity value in addition to legal or policy status.

Table 7.5 Criteria for determining the value/importance of ecological features

Value	Criteria
International and European	An internationally designated site or candidate site, i.e. an SPA, provisional SPA, SAC, candidate SAC, Ramsar site, or area which would meet the published selection criteria for designation. A viable area of a habitat type listed in Annex I of the Habitats Directive, or smaller areas of such habitat that is essential to maintain the viability of a larger whole. Sites supporting populations of internationally or European important species.
National (England)	A nationally designated site, i.e. SSSI, NNR, or discrete area which would meet the published selection criteria for national designation (e.g. SSSI selection guidelines). A viable area of a priority habitat identified in the UK Biodiversity Action Plan (BAP), or smaller areas of such habitat essential to maintain wider viability. Viable populations of nationally important species that are of threatened or rare conservation status, including those identified as priority species in the UK BAP.
Regional (South East)	Sites that exceed the Metropolitan-level designation but fall short of SSSI selection criteria. Smaller areas of key habitat identified in the UK BAP that are essential to maintain wider viability. Viable populations of nationally scarce species identified in Regional or Metropolitan BAP and/or regularly occurring populations of a regionally important species.
Metropolitan/ County (Greater London)	Sites recognised by local authorities, e.g. Sites of Metropolitan Importance, SINCs or considered to meet published ecological selection criteria for such designation. A viable area of key habitat identified in the London BAP. A LNR designated as one of the best for habitats and/or species assemblages in the Metropolitan area. Viable populations of regionally scarce species identified in Regional or Metropolitan BAP and/or regularly occurring populations of a species important at the metropolitan scale.
Borough/ District (LBH, LBR, RBK)	Sites recognised by local authorities, e.g. Sites of Borough Importance or considered to meet published ecological selection criteria for such designation. A viable area of habitat identified in the District BAP.

Value	Criteria
	A LNR designated as one of the best for habitats and/or species assemblages in the Borough area. Viable populations of species identified in the Metropolitan BAP and/or regularly occurring populations of species important at the Borough scale.
Local (e.g. within 1km of the draft Order limits)	Areas of habitat or populations/assemblages of species that appreciably enrich the local habitat resource (e.g. ponds). Sites that retain other elements of semi-natural aquatic vegetation due to their size, quality or the wide distribution within the local area. Viable populations of species identified in the Borough BAP and/or regularly occurring populations of species important at the Local scale.
Within the draft Order limits only	Sites that retain habitats and/or species of limited ecological importance due to their size, species composition or other factors.

7.5.5 The ecological features potentially impacted by the Project were then compiled and their importance assessed using the above criteria. As per the guidance, any sites, habitats and/or species that are considered to be of at least Local biodiversity value and/or are protected by law have been included in this assessment.

Characterising impacts and effects

7.5.6 Once importance has been assigned to the ecological features and those of sufficient importance for inclusion have been identified, an assessment of the impacts likely to affect the features was undertaken. As detailed within Chapter 4, the assessment of magnitude takes into consideration all primary (embedded) and tertiary (standard) mitigation measures as described in Section 7.4.

7.5.7 The identification of impacts refers to ecological structure and function, and the impacts were assessed in the context of the future baseline conditions during the lifetime of the Project, as described in Section 7.8. An ‘impact’ is defined by CIEEM as actions resulting in changes to an ecological feature and an ‘effect’ is defined as the outcome to an ecological feature from an impact. When describing ecological impacts and effects, reference has been to the following characteristics as required:

a. Positive or negative impact, according to whether the change is in accordance with nature conservation objectives and policy

b. Magnitude – refers to the size, amount, intensity and volume of an impact, in quantitative terms where possible (e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population)

c. Extent – the spatial or geographical area over which an impact/effect may occur

d. Duration – the time period for which an impact is expected to last. Impacts and effects may be described as short, medium or long term, and

permanent or temporary impact. These periods are defined in Chapter 4: Approach to Environmental Assessment.

e. Reversibility – a permanent impact is one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

f. Timing and frequency – the number of times an activity occurs will influence the resulting effect. This should consider whether impacts are constantly ongoing, separated but recurrent or single events and whether they occur during critical seasons or life-stages of habitats or fauna.

Determining ecologically significant effects

7.5.8 The ecological significance of an effect is defined by CIEEM as an effect (positive or negative) on the 'integrity' of a defined site or ecosystem and/or on the conservation status of habitats and species within a given geographical area (CIEEM, 2024). The value of the feature that will be significantly affected and type of impact will be used to inform the geographical scale at which the effect is significant. A definition of 'integrity' is provided in the government circular: Biodiversity and Geological Conservation: '*The integrity of a site is the coherence of its ecological structure and function, across its whole area that enables it to sustain the habitat, complex of habitats and/or levels of populations of the species for which it was classified*' (Ministry of Housing, Communities and Local Government, 2005).

7.5.9 The significance of any identified effect has been determined through application of CIEEM guidance (CIEEM, 2024) alongside professional judgement. The process involved identifying and evaluating the potential impacts on ecological features, including species, habitats, and ecosystems. The significance of an effect was determined by considering the magnitude of the impact and the sensitivity of the ecological feature affected. This involved a detailed assessment of the extent, duration, frequency, and reversibility of the impact, as well as the conservation status and legal protection of the affected features.

7.5.10 As part of the design and assessment process, measures to deliver ecological mitigation, enhancement and compensation will be reviewed, with reference to embedded design (primary) and standard good practice (tertiary) mitigation measures, and with any subsequent implementation to be secured through a Code of Construction Practice (CoCP). Where additional (secondary) mitigation is recommended within the PEI Report and ES, an assessment of residual impacts would be undertaken.

Determining the likely significant residual effects

7.5.11 Residual impacts are defined as ecological impacts that remain with the implementation of all types of mitigation measures, including additional measures. A preliminary assessment of residual effects has been presented in section 7.11. In the ES an assessment of residual effects would be undertaken to determine the likely significance of the effect on ecological features.

7.6 Approach to Biodiversity Net Gain

7.6.1 Appendix 7.2, Approach to BNG, provides supplementary information to this chapter with regards to how the Project intends to achieve BNG. Stakeholders including LPAs (in order to align the BNG approach with LNRS) and local wildlife groups, will be consulted as part of the development process and on the proposed BNG design.

7.7 Study area

7.7.1 The study area has been informed by CIEEM guidelines (CIEEM, 2024) and the Zone of Influence (Zol). It comprises the draft Order limits and areas outside in which important ecological features (including habitats and species) have the potential to be affected by biophysical changes as a result of the Project.

7.7.2 The study area buffers around the draft Order limits, used for different ecological features, vary depending on their sensitivity to environmental change, and are detailed in Table 7.6 and illustrated on Figures 7.1 and 7.2. These study area buffers were discussed in a presentation given to the LPAs on 25 July 2024 and no feedback or comments were provided and no changes were requested at the time. Desk-based environmental records have been obtained for the study areas identified.

Table 7.6 Study area buffers used for ecological features in the desk study

Feature	Study area
Internationally designated statutory sites with bats as a qualifying feature (SAC)	10km
Internationally and nationally designated statutory sites (SAC without bats as a qualifying feature, SPA, Ramsar, SSSI, NNR)	2km
Locally designated statutory and non-statutory sites (LNR and SINC)	2km
Priority habitat	200m
Ancient woodland	200m
Ancient/veteran trees	100m
Protected and notable species	2km
Invasive and non-native species	2km
Water bodies suitable for GCN	500m

7.8 Baseline conditions

Sources

7.8.1 The collection of baseline information has focused on those features that are considered to be of ‘importance’ and where the Project could feasibly create an impact pathway from which the feature could experience a potential likely significant effect.

7.8.2 The baseline has been established by using the following sources of information.

a. Greenspace Information for Greater London (GiGL) provided records in 2024 of protected and notable species, invasive and non-native species and non-statutory designated sites (GiGL, 2024). Records were also requested in 2020 but have not been included in this report due to being superseded

b. Multi-Agency Geographic Information for the Countryside (MAGIC) was used to identify international and national statutory designated sites and granted European Protected Species Mitigation Licences (Natural England, 2024a)

c. Statutory designated site information was obtained from the Joint Nature Conservation Committee (JNCC) (JNCC, 2024)

d. The Ancient Woodland Inventory was reviewed to identify ancient woodlands (Natural England, 2024b)

e. The Woodland Trusts' Ancient Tree Inventory was used to locate ancient and veteran trees (Woodland Trust, 2024)

f. Priority habitats were identified on Priority Habitats Inventory (England) (Natural England, 2024c)

g. Priority River Habitat – Rivers (England) was used to identify priority rivers (Natural England, 2024d)

h. Publicly available Ordnance Survey maps and aerial imagery were reviewed to locate water bodies

7.8.3 All data used in the baseline assessment are publicly available, excluding GiGL data which were purchased. Prior to the ES, additional data sources will be purchased where necessary.

7.8.4 In addition to the sources listed above, this review of baseline conditions includes data collected during field-based surveys (species and habitat surveys), some of which are ongoing through 2025 and 2026. The details of surveys conducted to date and of further surveys scheduled are provided in Table 7.12.

Desk-based

Statutory designated sites

7.8.5 There are no SACs within 10km of the draft Order limits for which bats are a qualifying feature.

7.8.6 One internationally designated site is located within the study area, Richmond Park SAC. The site is located 1.1km from the draft Order limits. Richmond Park SAC is also designated as a NNR, SSSI and a SINC with varying boundaries.

7.8.7 HRA Stage 1 Screening has been completed for the Project and is proceeding to Stage 2 Appropriate Assessment for potentially significant effects on Richmond Park SAC qualifying feature – stag beetle. This is discussed in more detail in Appendix 7.1.

7.8.8 Five nationally and locally designated statutory sites were identified within the study area: a further two SSSIs and three LNRs. These are a minimum of 340 metres away with the exception of Ham Lands LNR, which is located directly adjacent to the draft Order limits.

7.8.9 The statutory designated sites identified within the study area are detailed below in Table 7.7 and shown on Figure 7.1.

7.8.10 It should be noted that designated sites with multiple designations have varying boundaries, and the area provided is for the most significant designation as detailed in Table 7.7 below.

Table 7.7 Statutory designated sites within the study area

Designated site name	Label on Figure 7.1	Designation	Importance	Grid reference	Area (ha)	Distance from nearest above ground site (m)	Reason for designation
Richmond Park	1	SAC, NNR, SSSI, SINC	International	TQ199728	846.68	887	Richmond Park is of importance for its diverse deadwood beetle fauna associated with the ancient trees found throughout the parkland. Many of these beetles are indicative of ancient forest areas where there has been a long continuous presence of over-mature timber. The site is at the heart of the south London centre of distribution for stag beetle.
Bushy Park and Home Park	2	SSSI, SINC	National	TQ159692	541.03	1250	Bushy Park and Home Park SSSI is of special interest for its nationally important saproxylic invertebrate assemblage, population of veteran trees and acid grassland communities.
Syon Park	3	SSSI, SINC	National	TQ176766	21.50	1380	Syon Park is the only known area of tall grass washland along the Thames in Greater London; it contains several invertebrate species with a restricted distribution, both locally and nationally.
Ham Lands	4	LNR, SINC	Borough	TQ165720	60.01	Directly adjacent	Ham Lands is an area of infilled gravel pits, some old water meadows and a narrow belt of woodland. The site is of considerable value for informal

Designated site name	Label on Figure 7.1	Designation	Importance	Grid reference	Area (ha)	Distance from nearest above ground site (m)	Reason for designation
							recreation and is well used by local people.
Isleworth Ait	5	LNR	Borough	TQ167757	3.48	882	The Ait provides an undisturbed sanctuary for a variety of birds and supports several rare mollusc populations including the two-lipped door snail.
Ham Common	6	LNR	Borough	TQ184718	40.27	236	Ham Common supports many species and habitats, many of which have been identified in the BAP process. Additionally, the site is used extensively by the public for the informal enjoyment of nature.

Non-statutory designated sites

7.8.11 Within the study area there are 66 SINCs, including the designated sites that have more important designations. One SINC, Mogden Sewage Treatment Works, is also a self-designated Thames Water Site of Biodiversity Interest (SBI). Four further non-statutory designated sites fall partially within the draft Order Limits and Petersham Lodge Wood and Ham House Meadows SINC are directly adjacent. These seven SINCs are detailed in Table 7.8 and shown on Figure 7.1.

Table 7.8 Non-statutory designated sites within the draft Order limits

Designated site name	Label on Figure 7.1	Importance	Area (ha)	Reason for designation
Duke of Northumberland's River at Woodlands	15	Borough	1.50	Narrow section of the river with good quality water and diverse aquatic vegetation. The river supports fennel pondweed *Potamogeton pectinatus* and water-crowfoot *Ranunculus sp*, which are scarce in London.
Ham Lands	4	Metropolitan	72.27	An attractive area of scrub and grassland beside the River Thames, well known for its diverse plant life.
Mogden Sewage Works	31	Borough	60.29	A large sewage treatment works, providing a good range of habitats for birds.
Petersham Lodge Wood and Ham House Meadows	37	Borough	8.67	A small wood and two grassy fields beside the River Thames, which flood on high spring tides, introducing an interesting wetland element to the plants at this site.
River Thames and Tidal Tributaries (Richmond)	43	Metropolitan	2312.73	The Thames, London's most famous natural feature, is home to many fish, bird and other species, creating a wildlife corridor running right across the capital.
Royal Park Gate Open Space	47	Local	1.55	A public park next to the River Thames with scrub, trees and a significant area of semi-improved neutral grassland, where patches of rough grassland are interspersed with frequently mown grass paths.
Walnut Tree Allotments	68	Local	1.4	Allotments with a rich biodiversity and historical agricultural use. Includes grasslands, hedgerows, and areas with deadwood, which are crucial for species like stag beetles, various bird species, and small mammals.

7.8.12 Information relating to the remaining 59 SINCs is provided in Table 7.9, including the distance from the nearest above ground site. These are also shown on Figure 7.1.

Table 7.9 Non-statutory designated sites outside the draft Order Limits within the study area

Designated site name	Label on Figure 7.1	Importance	Area (ha)	Distance from nearest above ground site (m)
Cassel Hospital	11	Borough	3.4	11
Duke of Northumberland's River north of Kneller Road	16	Borough	0.8	16
Lensbury Riverside	28	Metropolitan	0.6	34
Orleans Gardens	36	Local	1.5	98
Trowlock Avenue riverside land, Teddington	62	Borough	1.7	113
Marble Hill Park and Orleans House Gardens	29	Local	29.9	120
The Copse, Holly Hedge Field and Ham Avenues	57	Borough	11.9	158
Ham Common west	19	Borough	8.5	218
St Andrews Churchyard	49	Metropolitan	0.9	248
Kneller Hall	26	Local	6.7	256
The Copse, Holly Hedge Field and Ham Avenues - part of Grey Court School grounds & sports field	58	Borough	0.3	305
St Mary The Virgin, Church Street, Twickenham	51	Borough	0.3	378
Hounslow Loop Railsides	21	Local	30.3	401
The River Crane at St. Margaret's	59	Borough	4.6	419
Broom Road Recreation Ground	10	Borough	2.2	438
Inwood Park	23	Local	5.8	463

Designated site name	Label on Figure 7.1	Importance	Area (ha)	Distance from nearest above ground site (m)
River Thames and Tidal Tributaries (Hounslow)	64	Metropolitan	65.2	472
Churchyard of St Mary with St Alban, Teddington	14	Metropolitan	0.5	490
Orford House (former St Michaels Convent)	35	Local	0.9	517
The Copse at Hampton Wick and Normansfield Hospital	56	Borough	13.1	564
Langdon Park	27	Local	3.9	569
Oak Lane Cemetery	33	Local	0.6	575
Duke of Northumberland's River south of Kneller Road	17	Borough	0.6	580
Cavendish House Allotments	12	Borough	0.9	663
Duke of Northumberlands River at Isleworth	18	Local	1.8	695
River Crane at St Margarets	42	Borough	1.2	699
Udney Park	67	Borough	5.2	752
Moormead Recreation Ground	32	Borough	5	753
Brook Road Allotments	9	Local	0.1	755
St Margarets Residential Grounds	50	Local	5.3	871
Twickenham Junction Rough	65	Borough	4.7	902
Challenge Court open space	13	Borough	0.9	908
The Wilderness	61	Local	0.5	940
Petersham Meadows	38	Local	14.4	950

Designated site name	Label on Figure 7.1	Importance	Area (ha)	Distance from nearest above ground site (m)
Royal Mid-Surrey Golf Course	45	Borough	82.2	1037
Piccadilly Line Railsides in Hounslow	39	Borough	16.6	1130
School House Lane Orchard	48	Borough	0.1	1143
Marsh Farm Allotments	30	Local	0.4	1157
Heath Gardens Allotments	20	Local	0.5	1197
Twickenham Bridge Allotments	63	Local	0.3	1289
Syon Park Tide Meadow	53	Metropolitan	22.5	1386
Terrace Field and Terrace Garden	55	Borough	6.6	1389
Twickenham Road Meadow	66	Local	2.8	1398
Strawberry Hill Golf Course	52	Metropolitan	20.4	1409
Briar Road Allotments	8	Borough	1.9	1411
Whitton Railsides	69	Local	0.9	1413
Royal Paddocks Allotments	46	Borough	6	1488
Old Palace Lane Allotments	34	Local	0.4	1501
Hounslow, Feltham and Whitton junctions	22	Borough	4.7	1592
Teddington Cemetery	54	Local	5.5	1607
Lampton Park	70	Local	19.9	1656
American University	7	Borough	0.8	1718

Designated site name	Label on Figure 7.1	Importance	Area (ha)	Distance from nearest above ground site (m)
Jersey Gardens	24	Borough	2.2	1733
Jubilee Meadow (Heathfield Nature Park)	25	Local	2.2	1739
Twickenham Cemetery	64	Borough	7.8	1747
Royal Botanic Gardens, Kew	44	Local	123.2	1865

Ancient woodland, ancient trees and veteran trees

7.8.13 A search of the Ancient Woodland Inventory identified no ancient woodland within 200m of the draft Order limits (Natural England, 2024b).

7.8.14 A search of the Ancient Tree Inventory identified no ancient trees within 100m of the draft Order limits, although five veteran trees were identified within this area (Woodland Trust, 2024).

7.8.15 Arboricultural surveys have been undertaken and recorded no ancient or veteran trees within the draft Order limits. More detail is provided in Chapter 9: Townscape and Visual.

Priority habitats

7.8.16 The desk study identified priority habitats present within the study area, including within the draft Order limits, as shown on Figure 7.2.

7.8.17 Multiple areas of deciduous woodland priority habitat, lowland meadow priority habitat and an area of traditional orchard priority habitat were identified within 200m of the draft Order limits (Natural England, 2024c).

7.8.18 A priority habitat river – the River Crane – was also identified within 200m of the draft Order limits (Natural England, 2024d). The river intersects the draft Order limits but is over 800m from any above ground sites.

7.8.19 Information relating to the distance of priority habitat from the nearest above ground site is provided in Table 7.10.

7.8.20 The only priority habitat within the draft Order limits is deciduous woodland, within the Mogden STW site and the Burnell Avenue site. Lowland meadow lies adjacent to the draft Order limits, located east of the Ham Playing Fields site. The nearest area of traditional orchard is located 122m south-west of the Ham Playing Fields site.

Table 7.10 Distance of priority habitat from the nearest above ground site

Priority habitat	Distance/bearing from nearest above ground site (m)	Nearest above ground site
Deciduous woodland	Within	Mogden STW site and Burnell Avenue site
Lowland meadow	Adjacent	Ham Playing Fields site
Traditional orchard	122m south-west	Ham Playing Fields site

Protected and notable species

7.8.21 Data from GiGL provided recent (i.e. within the last ten years) records of protected, priority and notable species within 2km of the draft Order limits (GiGL, 2024). These included:

a. Amphibians: common toad, common frog *Rana temporaria* and GCN

b. Bats: serotine *Eptesicus serotinus*; Daubenton's bat *Myotis daubentonii*; whiskered / Brandt's bat *Myotis mystacinus / brandtii*; Natterer's bat *Myotis nattereri*; noctule *Nyctalus noctula*; Nathusius' pipistrelle *Pipistrellus nathusii*; common pipistrelle *Pipistrellus pipistrellus*; soprano pipistrelle *Pipistrellus pygmaeus*; lesser noctule *Nyctalus leisleri*; and brown long-eared bat *Plecotus auritus*

c. Birds: records for over 60 species of bird were returned. These include several Schedule 1 species (birds with additional levels of protection under the Wildlife and Countryside Act 1981) including kingfisher *Alcedo atthis*; Cetti's warbler *Cettia cetti*; nightjar *Caprimulgus europaeus*; red kite *Milvus milvus*; peregrine falcon *Falco peregrinus*; and barn owl *Tyto alba*.

d. Fungi and higher plants: protected and notable plant species including oak polypore *Piptoporus quercinus*; cornflower *Centaurea cyanus*; large-leaved lime *Tilia platyphyllos*; and clustered clover *Trifolium glomeratum*

e. Invertebrates: over 70 species were returned including stag beetle; Roman snail *Helix pomatia*; white-letter hairstreak *Satyrium w-album*; and brown hairstreak *Thecla betulae*

f. Mammals (excluding bats): hazel dormouse; water vole; European hedgehog; otter; and badger

g. Reptiles: grass snake *Natrix Helvetica*; slow worm *Anguis fragilis*; common lizard *Zootoca vivipara*; and adder *Vipera berus*

7.8.22 No records of two-lipped door snail were returned during the data search, but they are mentioned in the citation for Isleworth Ait LNR and were also mentioned in comments from PINS (reference 3.4.13 in Table 7.2).

7.8.23 As part of the desk study, a search for water bodies suitable for GCN was undertaken using Ordnance Survey maps and aerial imagery. Although records of GCN were returned within the 2km desk study search area, no suitable water bodies were identified within 500m of the draft Order limits. This significantly decreases the likelihood that GCN are present within the terrestrial habitat within the draft Order limits. They are therefore assessed as being likely absent from the draft Order limits. Should the draft Order limits change, an updated search for water bodies would be conducted.

Invasive and non-native species

7.8.24 Data received from GiGL identified a number of recent records of invasive and non-native plant species located within 2km of the draft Order limits including buddleia *Buddleja davidii,* Japanese knotweed *Reynoutria japonica* and Himalayan balsam *Impatiens glandulifera*, as well as records of the invasive non-native mammal American mink *Neovison vison* (GiGL, 2024). The Environment Agency also noted the presence of floating pennywort *Hydrocotyle ranunculoides* within the Duke of Northumberland's River which runs through the Mogden STW site (PINS, 2024b).

Assumptions and limitations

Assumptions

7.8.25 For the purposes of this PEI Report, it is assumed that all habitats within the boundaries of the above ground sites will be impacted. This assumption is due to the ongoing development of Project designs, making it currently unfeasible to precisely determine which habitats will be affected. Consequently, the impacts are considered to be a worst-case scenario, appearing more significant than they are likely to be because the actual area of habitat directly impacted by the Project will be smaller than the total area within each above ground site. This approach allows the retention and protection, where practicable, of important ecological features within each site, a practice already being implemented for features such as TPO trees and habitats supporting protected species.

7.8.26 An assessment of the likely significant effects on two-lipped door snail will be undertaken and surveys conducted as required (in response to PINS (3.4.13)). Surveys are likely to be restricted to the above ground sites with an appropriate buffer. The surveys will require a habitat assessment and potentially a fingertip search to record the locations of individuals.

7.8.27 Records will be requested from other sources such as local badger and bat groups, the British Trust for Ornithology and Amphibian and Reptile Groups of UK (ARG UK) to inform the assessment that will be presented in the ES, prior to DCO submission.

7.8.28 Additional surveys may be required to include areas needed for mitigation purposes (in response to PINS (3.4.11)) and further terrestrial ecology surveys will be conducted prior to DCO submission to ensure all data are valid (in response to PINS (3.4.6)).

Limitations

7.8.29 Specific limitations for each survey, such as land access constraints, will be detailed in a Terrestrial Ecology Baseline Report as an appendix to the ES. The survey-specific constraints are unlikely to represent a limitation that would compromise the Ecological Impact Assessment (EcIA), especially when considering the Project's embedded design (primary) mitigation and standard mitigation measures.

7.8.30 The assessment presented in this PEI Report is based on the data available at the time of writing. Some field work is incomplete at this stage, most notably:

a. Hazel dormouse surveys (Ham Lands LNR)

b. Water vole and otter surveys (River Thames, Ham Lands LNR)

c. Reptile habitat assessment of the western side of the Mogden STW site

d. Stag beetle habitat assessment (within above ground sites)

e. UK Hab and Statutory Biodiversity Metric Condition Assessments for BNG provision, as well as areas required for updated draft Order limits or haulage routes for example

f. Dusk summer bat surveys for a low number of moderate trees (to align with new bat guidance (Collins, 2023))

g. Summer tree-climbing surveys of a low number of moderate trees (to align with new bat guidance (Collins, 2023))

h. Habitat suitability assessment for two-lipped door snail

7.8.31 As designs have progressed there have been amendments to both the draft Order limits and the above ground site boundaries. As stated above, some of these areas have not been subject to survey. The absence of the above data is not considered a significant constraint to the assessments undertaken in this chapter because the majority of the area within the draft Order limits has been surveyed extensively and the significance of ecological features within it is well understood. All outstanding surveys will be conducted in 2025 or 2026, and prior to DCO submission (in response to comments received from LBR in Table 7.3).

Field survey

7.8.32 In addition to the desk-based records referenced above, the baseline environment will be informed through targeted field surveys, further details of which are provided below. Field surveys have been ongoing since 2021 and are continuing through 2025 and 2026 to ensure there are no gaps in the baseline data; where surveys are ongoing, this is stated below for the relevant receptor.

7.8.33 A Terrestrial Ecology Baseline Report will be provided as an appendix to the ES, which will provide the field survey results for the Project.

Habitats

7.8.34 As part of the PEA, a UK Hab and Statutory Biodiversity Metric Condition Assessment were undertaken within all above ground site boundaries between March 2024 and May 2024. A summary of the habitats present and their condition at each above ground site is provided in Table 7.11. Updates to the PEA surveys will be undertaken to support the EIA where necessary.

7.8.35 It should be noted that the draft Order limits, including above ground sites, will be further developed to become the Order limits and the limits of deviation in the DCO application. Table 7.11 may alter in light of additional survey data proposed to be undertaken as part of the EIA.

7.8.36 As stated in paragraph 7.8.30, some areas within all above ground sites are still subject to survey. Therefore, additional habitats may be present to those listed in Table 7.11.

Table 7.11 UK Habitat Classification results summary

Above ground site	Habitat type	Habitat code	Condition
Mogden STW site Western Work Area	Other lowland mixed deciduous woodland	w1f7	Poor
	Other neutral grassland	g3c	Good
	Mixed scrub	h3h	Moderate
	Developed land, sealed surface	u1b	N/A
Mogden STW site Eastern Work Area	Other lowland mixed deciduous woodland	w1f7	Poor
	Modified grassland	g4	Moderate
	Mixed scrub	h3h	Poor
	Bramble scrub	h3d	N/A
	Individual trees	200	Moderate
	Developed land, sealed surface	u1b	N/A
	Buildings	u1b5	N/A
	Built linear features	u1e	N/A
Ham Playing Fields site and Support Work Area	Modified grassland	g4	Poor and Good
	Individual trees	200	Moderate and Good
	Built linear features	u1e	N/A
	Other lowland mixed deciduous woodland	w1f7	Good
	Developed land, sealed surface	u1b	N/A
	Built linear features	u1e	N/A
Burnell Avenue site	Other lowland mixed deciduous woodland	w1f7	TBC
	Other broadleaved woodland	w1g	Poor and Good
	Other neutral grassland	g3c	Moderate
	Modified grassland	g4	Poor
	Other rivers and streams	r2b	Fairly Poor
	Individual trees	200	Moderate and Good
	Developed land, sealed surface	u1b	N/A
	Built linear features	u1e	N/A

Above ground site	Habitat type	Habitat code	Condition
Tudor Drive site	Mixed scrub	h3h	Poor
	Other neutral grassland	g3c	Good
	Modified grassland	g4	Poor
	Individual trees	200	Moderate
	Developed land, sealed surface	u1b	N/A
	Built linear features	u1e	N/A

7.8.37 Other lowland mixed deciduous woodland priority habitat was present at the Mogden STW site and Ham Playing Fields site, which qualifies as deciduous woodland priority habitat under the NERC Act 2006.

Protected and notable species

7.8.38 The preliminary results of targeted field surveys conducted for protected and notable species are summarised in the following sections. The results are also shown in Figure 7.3 Sheet 1 to 5 Field surveys were undertaken following CIEEM guidance (CIEEM 2024 and 2017), good practice guidelines and professional judgement.

7.8.39 The survey area buffers that were used to define the maximum survey area for each species are provided in Table 7.12. Survey area buffers were informed by the species relative sensitivity and the legislation or planning policy that protects them. These buffers have also been developed by engagement with stakeholders including Natural England and the LPAs. The buffers are from the above ground site boundaries, except for the Mogden STW site where they are buffered from the work area.

Table 7.12 Guidance and survey area buffers for each species

Species	Survey type and guidance followed	Survey area buffer	Most recent survey date
Badgers	Badger survey (Natural England, 2011)	Up to 30m	March 2024 – May 2024 Further surveys scheduled of additional areas in 2025 and updates for winter 2026
Bats	Preliminary roost assessments, ground level tree assessments, aerial inspection survey and dusk emergence surveys	Up to 20m	March 2024 – September 2024

Species	Survey type and guidance followed	Survey area buffer	Most recent survey date
	(Collins, 2023)		Further surveys scheduled between May 2026 and September 2026
Breeding birds	Habitat assessment during PEA (CIEEM, 2017)	Within above ground site/ work area	March 2024 – May 2024
Reptiles	Habitat assessment during PEA (CIEEM, 2017)	Within above ground site/ work area	March 2024 – May 2024, and April 2025
Schedule 1 birds	Habitat assessment during PEA (CIEEM, 2017)	Up to 50m	March 2024 – May 2024
GCN	N/A – likely absent	N/A	N/A
Hazel dormouse	Nest tube surveys (Bright *et al.*, 2006; Chanin and Woods, 2003)	Up to 200m	N/A – survey scheduled between March 2025 and November 2025
Riparian mammals	Water vole and otter survey (Chanin, 2003; Dean *et al.*, 2016)	Up to 250m	March 2024 – May 2024 (updated habitat assessment within 50m of above ground site boundary) A longer stretch of the River Thames will be subject to survey between May 2025 and August 2025
Terrestrial invertebrates (including stag beetle)	Stag beetle habitat assessment	Within above ground site/ work area	Habitat assessment conducted in 2023 Further surveys scheduled for 2025

Badger

7.8.40 Badger walkover surveys have been undertaken throughout the survey area and the presence of badger has been confirmed. Evidence recorded includes

multiple setts (four active setts), foraging signs and latrines. Due to the sensitive nature of the data, sett locations are not provided in this chapter and detailed location descriptions are not included. This information will be included within a confidential technical report and shared with key stakeholders.

7.8.41 The wider landscape at the Mogden STW site, Ham Playing Fields site and Burnell Avenue site (which includes Ham Lands LNR and Mogden SINC) also offer commuting and foraging opportunities for badger.

Bats

7.8.42 Bat surveys have been undertaken throughout the survey area and have included Preliminary Roost Assessments of buildings, Ground Level Tree Assessments, Potential Roost Feature (PRF) aerial inspection surveys and dusk emergence surveys.

7.8.43 These surveys have been conducted at all above ground sites except for Tudor Drive, which is a small amenity garden in a densely urban area, with no features likely to support roosting bats.

7.8.44 In total, 33 trees with bat roost suitability were recorded within the survey area. Trees with a roost suitability of ‘Moderate’ or ‘High’ were subject to further survey (see Table 7.13). No suitable buildings were found within the survey area.

Table 7.13 Bat survey results

Above ground site	**Roost suitability of trees**			**Total**	**Type of survey conducted**		**Roosts**
	Low	**Moderate**	**High**		**Aerial inspection**	**Dusk emergence**	
Mogden STW site Western Work Area	0	0	0	0	N/A		0
Mogden STW site Eastern Work Area	7	6	0	13	3	3	1
Ham Playing Fields site and Support Work Area	6	4	2	12	2	4	0
Burnell Avenue site	0	6	2	8	6	2	0
Tudor Drive site	0	0	0	0	N/A		0

7.8.45 The survey work confirmed the presence of one bat roost within the study area. The roost is associated with a dead wild cherry *Prunus avium* tree within the Mogden STW site, adjacent to the Eastern Work Area, and was recorded during an emergence survey. Whilst only one bat was recorded emerging from the roost during surveys, the roost has precautionarily been classified as a day roost for low numbers of common pipistrelle bats. The roost feature is not considered suitable to support a maternity or hibernation roost and is therefore considered to be of low conservation value.

7.8.46 Dusk summer surveys and tree-climbing surveys will be conducted in 2025 for a low number of moderate trees to align with new bat guidance (Collins, 2023).

Birds

7.8.47 Suitable foraging and breeding habitat for a range of common bird species in the form of woodland, scrub and individual trees, has been identified at all above ground sites and within the wider survey area.

7.8.48 Large, mature trees are present within the Mogden STW site, the Ham Playing Fields site and the Burnell Avenue site and may provide suitable habitat for a red kite to nest. No evidence of red kite was recorded during the field surveys; however, the species receives additional protection from disturbance whilst nesting under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended). Field surveys identified no suitable breeding habitat for other Schedule 1 bird species within 50m of above ground sites.

7.8.49 A small area of the River Thames is located within the draft Order limits at the Burnell Avenue site. No surveys for wintering birds have been conducted due to the small extent of the area and it being exposed and subject to disturbance from local people and boats, but species have been observed here which could use this stretch of river during the winter in very small numbers including ducks, gulls and grebes.

Hazel dormouse

7.8.50 The desk study identified the presence of dormice within 2km of the draft Order limits (GiGL, 2024). A review of field data from other survey types and aerial photography has identified all habitats that are considered to be suitable for dormice, based on the type and structure of the habitat, the proximity to identified dormouse records, and the presence of inter-connecting habitat.

7.8.51 Field surveys for dormice have not been undertaken as records for the species were only provided by GiGL during the 2024 desk study update. However, field surveys are programmed for 2025 and will be undertaken following current good practice guidelines. The surveys will encompass suitable habitat for dormice within the draft Order limits and a survey area buffer of up to 100m.

Otter

7.8.52 The habitat appraisal undertaken for otter found that the riverbanks within the survey area for this species along the River Thames at the Burnell Avenue site

were largely reinforced and heavily disturbed by human activity and dogs. It was therefore considered to be unsuitable habitat for the creation of otter holts.

7.8.53 The surveys concluded that no otter holts were likely to be present within the survey area, but that there was the potential for otter to use the River Thames for commuting and foraging purposes.

7.8.54 A longer stretch of the River Thames will be subject to survey for otter in 2025. The survey area will cover the riverbank of the Thames between the Burnell Avenue site and the Ham Playing Fields site, plus a 200m buffer upstream and downstream.

Reptiles

7.8.55 Suitable reptile habitat is present within all above ground sites except for Tudor Drive (due to surrounding urban environment). Of particular interest are the Western Work Area within the Mogden STW site, the grasslands bordering the Ham Playing Fields site and the unmanaged grassland within the Burnell Avenue site, which all offer foraging and basking opportunities for reptiles. Surveys to appraise the quality of habitats for reptiles at the Mogden STW site (western boundary) were also scheduled and undertaken in April 2025, with results also confirming suitable reptile habitat at this location.

7.8.56 Given only a small amount of suitable reptile habitat is to be temporarily impacted by the works and there is suitable surrounding habitat for reptiles to migrate into when works are ongoing, targeted surveys are not proposed. Common reptiles will instead be assumed to be present, commensurate to the suitability and the extent of habitat within the draft Order limits, and its connectivity to suitable habitat in the local wider area.

Terrestrial invertebrates

7.8.57 A stag beetle habitat assessment was conducted in May 2023 at two locations: Ham Lands LNR and Burnell Avenue (Jacobs, 2023). A stag beetle habitat assessment was also conducted at the Mogden STW site during the PEA of the site in 2024. Suitable habitat for stag beetle was found at all surveyed locations, specifically broadleaved woodland which includes a variety of dead or decaying wood with moist soils which provide optimal breeding habitat for stag beetle. Wood chippings, dead mature trees and loose soil around old tree stumps was also recorded, which also provides egg laying habitat for female stag beetles.

7.8.58 An updated stag beetle habitat assessment will be undertaken of all above ground sites in 2025 to inform the Stage 2 HRA Appropriate Assessment for Richmond Park SAC on the basis that the above ground sites provide functionally linked habitat for this qualifying feature.

Water vole

7.8.59 The River Thames at the Burnell Avenue site is characterised as a wide, slow flowing lowland river, with water levels controlled by Teddington Weir operated by the Environment Agency. An assessment of the habitat along the River

Thames was conducted to determine its suitability to support water vole. The river is largely artificially reinforced, is lacking in-channel vegetation and is subject to human disturbance making it unsuitable habitat to support a water vole population.

7.8.60 In response to the PINS comment (3.4.6) on the EIA Scoping Report, a longer stretch of the River Thames will be subject to survey for water vole in 2025. The survey area will cover the riverbank of the Thames between the Burnell Avenue site and the Ham Playing Fields site, plus a 200m buffer upstream and downstream. This survey will help to assess what impacts the Project will have on the species, should they be present.

Importance of receptors

7.8.61 All receptors within the baseline have been assigned an importance based on CIEEM guidance and using professional judgement. Table 7.14 summarises the value of receptors identified within the study area, based on suitability assessments and survey work undertaken to date. Where surveys have not yet been conducted (e.g. two-lipped door snail), the importance of those receptors has been assessed on a precautionary basis.

Table 7.14 Importance of receptors within the study area

Importance	Receptors within the study area
Designated sites	
International and European	• Richmond Park SAC
National (England)	• Syon Park SSSI • Bushy Park and Home Park SSSI
Regional (South East)	No features present within the study area at this level of importance.
Metropolitan/ County (Greater London)	Within the draft Order limits: • Ham Lands SINC • River Thames and Tidal Tributaries (Richmond) SINC
	• Lensbury Riverside SINC • Syon Park Tide Meadow SINC • Richmond Park and associated areas SINC • River Thames and Tidal Tributaries (Hounslow) SINC • Bushy Park and Home Park SINC • Royal Botanic Gardens, Kew SINC
Borough/ District (LBH, LBR, RBK)	Within the draft Order limits: • Mogden Sewage Works SINC/SBI • Duke of Northumberland's River at Woodlands SINC • Petersham Lodge Wood and Ham House Meadows SINC

Importance	Receptors within the study area
	• Ham Lands LNR • Ham Common LNR • Isleworth Ait LNR • 28 SINC
Local (e.g. within 1km of the draft Order limits)	Within the draft Order limits: • Royal Park Gate Open Space SINC • Walnut Tree Allotments SINC
	• 25 SINC
Within the draft Order limits only	No features present within the study area at this level of importance.
Habitats	
International and European	No features present within the study area at this level of importance.
National (England)	No features present within the study area at this level of importance.
Regional (South East)	No features present within the study area at this level of importance.
Metropolitan/ County (Greater London)	No features present within the study area at this level of importance.
Borough/ District (LBH, LBR, RBK)	Deciduous woodland Lowland meadow Traditional orchard Rivers
Local (e.g. within 1km of the draft Order limits)	Non-priority woodland Hedgerows Neutral grassland Individual trees (mature)
Within the draft Order limits only	Modified grassland Scrub Individual trees (not mature)
Species	
International and European	No features present within the study area at this level of importance.
National (England)	No features present within the study area at this level of importance.
Regional (South East)	No features present within the study area at this level of importance.

Importance	Receptors within the study area
Metropolitan/ County (Greater London)	Stag beetle Two-lipped door snail Bat assemblage: foraging/commuting Hazel dormouse
Borough/ District (LBH, LBR, RBK)	No features present within the study area at this level of importance.
Local (e.g. within 1km of the draft Order limits)	Badger Breeding bird assemblage Otter Reptiles SoPI; common toad, hedgehog Water vole
Within the draft Order limits only	Bat assemblage: roosts Wintering bird assemblage Terrestrial invertebrate assemblage Notable plants

7.8.62 In accordance with the 'Determining the value/importance of ecological features' section herein (paragraph 7.5.4 onwards), only those receptors considered to be of at least Local biodiversity value will be included in the assessment of likely significant effects; the exception being protected/notable species which are assessed regardless of level of importance in recognition of their legal/conservation status. To provide a fuller assessment regarding birds, wintering birds have also been taken forward for preliminary assessment, although they may be scoped out within the EcIA based on their level of importance being within the order limits only.

Future baseline

7.8.63 In general, climate change is expected to lead to an increase in temperatures, with a greater frequency of hotter, drier summers and warmer, wetter winters. Climate change is also expected to lead to sea level rise which will affect tide levels and associated flood risk within the tidal section of the River Thames as far west as Teddington Weir. Projected future changes in climate (e.g. increase in temperatures) have the potential to interact with effects identified within some environmental aspects and exacerbate or diminish their impact. Such combined impacts are termed In-Combination Climate Impacts (ICCI). Consideration of the potential ICCI associated with terrestrial ecology is provided in paragraph 7.9.2 of this chapter

7.9 Preliminary assessment of likely significant effects

7.9.1 The preliminary assessment of likely significant effects on terrestrial ecology during the construction phase of the Project is detailed below. The impacts and

effects have been identified with reference to the CIEEM guidelines (CIEEM, 2024) for EcIA and in consideration of the sensitivity of the baseline biological communities and the proposed construction and operational activities. Any effect assessed as being above minor is considered to be a significant effect, as outlined in Chapter 4.

Construction phase

7.9.2 This section sets out the likely significant effects on terrestrial ecology during the construction phase of the works. The assessment assumes that embedded design (primary) mitigation and standard construction good practice are in place, and the results of the assessment would then inform the need for any additional (secondary) mitigation requirements. The effects are summarised by ecological receptor in Table 7.16.

Table 7.15 Preliminary assessment of likely significant effects (LSE) with embedded and standard mitigation

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
Designated sites						
Richmond Park SAC	International/ High	Mogden STW site Burnell Avenue site	Direct mortality, loss of habitat and disturbance by light of the designated site's qualifying feature: stag beetle	Due to the distance between the SAC and the Project draft Order limits, no direct impacts on the qualifying features within this designated site are anticipated. However, the draft Order limits do support suitable habitat for the qualifying feature of the SAC, stag beetle. These suitable habitats have been assessed as being functionally linked with the SAC and therefore the construction activities could result in likely significant effects.	Pending HRA Stage 2 Appropriate Assessment	
Ham Lands LNR, Petersham Lodge Wood and Ham House Meadows SINC	Between Metropolitan and Borough/ Low	Ham Playing Fields site	Potential exposure to pollution incidents	Construction adjacent to Ham Lands LNR and Petersham Lodge Wood and Ham House Meadows SINC could lead to impacts through pollution incidents causing habitat degradation and injury/mortality to species.	Small	Neutral (Not significant)
Ham Lands LNR, Petersham Lodge Wood and Ham	Between Metropolitan and Borough/ Low	Ham Playing Fields site	Air and dust emissions	Due to construction within and adjacent to these designated sites, they could be impacted through changes in air quality from emissions, dust, sediment and hydrocarbons. The	Small	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
House Meadows SINC				habitats could be degraded through the deposition of toxic pollutants which makes it harder for plants to grow.		
Ham Lands LNR, Petersham Lodge Wood and Ham House Meadows SINC	Between Metropolitan and Borough/ Low	Ham Playing Fields site	Hydrological changes to surface and groundwater	Although the draft Order limits are adjacent to the LNR and SINC, construction activities are separated from them by at least 20m. Chapter 5 assesses likely significant effects on sensitive surface and groundwater receptors and does not identify these receptors as being sensitive to surface water changes. It does however recommend a hydrological impact assessment to assess groundwater impacts, but none of these receptors are likely to be significantly affected by groundwater changes.	Negligible	Neutral (Not significant)
Ham Lands LNR, Petersham Lodge Wood and Ham House Meadows SINC	Between Metropolitan and Borough/ Low	Ham Playing Fields site	Introduction or spread of INNS	The potential introduction of INNS during construction and their subsequent dominance could affect the habitats present by reducing habitat quality and species composition.	Small	Neutral (Not significant)
Mogden Sewage Works SINC and SBI	Borough/ District/ Low	Mogden STW site	Permanent habitat loss	Construction of permanent infrastructure within the Eastern Work Area could result in a worst-case-scenario permanent loss of 0.4ha of	Medium	Minor (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
				lowland mixed deciduous woodland priority habitat.		
Mogden Sewage Works SINC and SBI	Borough/ District/ Low	Mogden STW site	Temporary habitat loss	Temporary land take would be required in the Western Work Area for activities associated with launching the TBM, as well as substrate and construction material storage, resulting in the loss of approximately 1.4ha of neutral grassland, 0.4ha woodland and 0.6ha of scrub. There may also be a requirement for temporary habitat loss in the Eastern Work Area, to facilitate installation of the permanent infrastructure. All temporarily lost habitats will be reinstated on completion of the construction works, except for the manhole covers at the shaft locations.	Small	Neutral (Not significant)
Mogden Sewage Works SINC and SBI	Borough/ District/ Low	Mogden STW site	Potential exposure to pollution incidents	There is potential for pollution incidents causing habitat degradation and injury/mortality to species to occur at and adjacent to the Eastern and Western Work Areas.	Small	Neutral (Not significant)
Mogden Sewage Works SINC and SBI	Borough/ District/ Low	Mogden STW site	Air and dust emissions	Construction activities could lead to impacts to the woodland within the SINC/SBI through changes in air quality from emissions, dust and sediment.	Small	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
Mogden Sewage Works SINC and SBI	Borough/ District/ Low	Mogden STW site	Introduction or spread of INNS	The introduction of INNS during construction and their subsequent dominance could affect the habitats present by reducing habitat quality and species composition.	Small	Neutral (Not significant)
Royal Park Gate Open Space SINC, River Thames and Tidal Tributaries (Richmond) SINC and Ham Lands SINC	Between Metropolitan and Local/ Low	Ham Playing Fields site Burnell Avenue site	Temporary habitat loss	Construction activities would result in temporary land take within these three SINCs in the form of parking, site cabins, laydown areas and construction of the intake and outfall, resulting in worst-case scenario temporary loss of 3.2ha of Ham Lands SINC, 2.2ha of River Thames and Tidal Tributaries (Richmond) SINC and 1.5ha of Royal Park Gate Open Space.	Small	Minor (Not significant)
	Between Metropolitan and Local/ Low	Ham Playing Fields site Burnell Avenue site	Potential exposure to pollution incidents	There is potential for pollution incidents to cause habitat degradation and injury/mortality to species.	Small	Neutral (Not significant)
	Between Metropolitan and Local/ Low	Ham Playing Fields site Burnell Avenue site	Air and dust emissions	Construction activities could lead to deterioration of habitats including woodland degradation within the SINCs through changes in air quality from emissions, dust and sediment.	Small	Neutral (Not significant)
	Between Metropolitan	Ham Playing Fields site	Hydrological changes to	Temporary changes to surfacing within these SINCs could alter surface water movement and availability, which could	Small	Minor (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
	and Local/ Low	Burnell Avenue site	surface and groundwater	result in mortality of plants leading to changes in habitat composition. Additionally, construction on the bankside of the River Thames could impact the SINCs. Aquatic impacts are discussed in Chapter 6: Aquatic Ecology.		
	Between Metropolitan and Local/ Low	Ham Playing Fields site Burnell Avenue site	Introduction or spread of INNS	The introduction of INNS during construction and their subsequent dominance could affect the habitats present by reducing habitat quality and species composition.	Small	Neutral (Not significant)
Six SINCs between 16m and 250m from the draft Order limits (as illustrated in Figure 7.1)	Between Metropolitan and Local/ Low	All above ground sites	Air and dust emissions	Construction activities within 250m of these six SINCs could lead to impacts through changes in air quality and dust emissions.	Small	Neutral (Not significant)
Habitats						
Priority habitat; deciduous woodland	Borough/ Low	Mogden STW site Burnell Avenue site	Loss of habitat	0.4ha of this habitat will be permanently lost within the draft Order limits to site the permanent infrastructure. An additional 1.2ha would require temporary losses but due to the time it takes for the habitat to recover, this is also classed as a permanent loss, totalling 1.6ha. The Project will aim to meet 10% BNG in	Small	Minor (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
				ways that support delivery of LNRS. However, this may not be in the immediate or local area from where the habitat is lost and therefore an adverse effect is assumed on a precautionary basis.		
Priority habitat; deciduous woodland	Borough/ Low	Mogden STW site Burnell Avenue site	Potential exposure to pollution incidents	There is potential for pollution incidents to cause habitat degradation.	Small	Neutral (Not significant)
Priority habitat; deciduous woodland	Borough/ Low	Mogden STW site Burnell Avenue site	Air and dust emissions	Construction could result in air quality impacts, including dust, that could impact the woodland habitat adjacent to the Mogden STW site Eastern Work Area. This could lead to degradation or modification of the habitat.	Small	Neutral (Not significant)
Priority habitat; deciduous woodland	Borough/ Low	Mogden STW site Burnell Avenue site	Introduction or spread of INNS	The introduction of INNS during construction and their subsequent dominance could affect the habitats present by reducing habitat quality and species composition.	Small	Neutral (Not significant)
Priority habitat; rivers	Borough/ Medium	Burnell Avenue site	Hydrological and water quality changes to surface and groundwater	As per Section 6.7 in Chapter 6: Aquatic Ecology, no construction works are planned which would be in hydrological connectivity to the River Crane or Whitton Brook.	No change	No change
			Introduction and spread of INNS	The introduction of INNS during construction and their subsequent	Small	Minor (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
				dominance could affect the habitats present by reducing habitat quality and species composition.		
Priority habitat; lowland meadow	Borough/ Medium	Ham Playing Fields site	Air and dust emissions	Lowland meadow is located adjacent to above ground works, on the opposite side of Ham Street. Construction activities including air pollution, dust emissions and increased vehicle movement could result in air quality impacts to lowland meadow. This could result in habitat degradation including altering the species composition.	Small	Minor (Not significant)
Priority habitat; lowland meadow	Borough/ Medium	Ham Playing Fields site	Introduction or spread of INNS	Due to its close proximity to increased vehicle movement, construction works could lead to the introduction of INNS, which could affect the habitats present if the INNS became dominant, by reducing habitat quality and species composition.	Small	Minor (Not significant)
Protected and notable species						
Bat assemblage	Roosting (Site/ Low)	Mogden STW site Ham Playing Fields site	Direct mortality	A roost of low conservation value has been identified at the Mogden STW site. In addition, bats may begin to use other potential roost features within the	Small	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
		Burnell Avenue site		ZoI in the period up to construction of the Project. Should the Project require the loss of any trees supporting PRFs, there is potential to result in injury/mortality to bats.		
Bat assemblage	Roosting (Site/ Low)	Mogden STW site Ham Playing Fields site Burnell Avenue site	Loss of roosts	A roost of low conservation value has been identified at the Mogden STW site, which may be able to be retained. However, disturbance may cause the known roost (low conservation value) to be abandoned. Groundworks are proposed nearby so more assessment is required in order to assess what impact this may have on the tree's root system.	Small	Neutral (Not significant)
Bat assemblage	Commuting/ foraging (County/ Medium)	Mogden STW site Ham Playing Fields site Burnell Avenue site	Loss of and fragmentation of supporting habitat	Construction would result in the loss of habitats which bats use as foraging areas, as well as potentially impacting invertebrate species which bats prey on. There would be a small permanent loss of foraging habitat within the draft Order limits as well as temporary losses during the construction period, which may also fragment the habitat depending on flight paths. However, on the basis that local bat populations would not be solely reliant on habitats within the draft Order limits as a foraging resource, and the majority of habitat losses are temporary, only	Negligible	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
				negligible adverse effects are anticipated.		
Bat assemblage	Commuting/ foraging (County/ Medium)	Mogden STW site Ham Playing Fields site Burnell Avenue site	Disturbance (from changes in noise, vibration, visual and light stimuli)	Construction works within the Eastern Works Area of the Mogden STW site have the potential to disturb bats within a confirmed roost. Construction activities could also disturb commuting and foraging bats and potentially lead to fragmentation effects through disturbance via light spillage, noise and vibration. However, where permanent habitat loss does not disconnect linear features flight paths are expected to be retained, and in any event, bats would use various flight paths, such that disruption to commuting/foraging bats is expected to be negligible.	Negligible	Neutral (Not significant)
Badger	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Direct mortality	Badgers could be harmed during the potential destruction of two outlier setts. Increased badger mortality could potentially be caused by collisions with construction traffic. Badgers may also be killed within their setts should works encroach too close to retained active setts leading to tunnel collapse for example.	Medium	Minor (Not significant)
Badger	Local/ Low	Mogden STW site	Loss of setts	Construction of the Project could potentially result in damage to or	Medium	Minor (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
		Ham Playing Fields site Burnell Avenue site		destruction of two outlier setts. Outlier setts are generally smaller than other setts and subject to sporadic use, such that they are of lower value to the local badger social group. In addition, on the basis that small setts are relatively quick to create, and extensive areas of equivalent habitat will be retained and undisturbed from the proposed works, it is expected badgers will readily use other setts in their territory or create new outlier setts within available habitat, such that the effect arising from the loss of the setts is negligible.		
Badger	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Disturbance (from changes in noise and / or vibration)	The Project could impact badgers through disturbance from nearby noise and vibration from construction activity which may discourage foraging or accessing setts. This includes potential fragmentation effects where construction is located between setts and foraging habitat. Additionally, there are two active setts within 30m of construction activities which could be disturbed by the works. One main sett is within the draft Order Limits and works within this area have taken into account avoiding direct impacts to this sett; however, disturbance is possible.	Small	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
Badger	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Loss of and fragmentation of supporting habitat	A small 0.4ha area of foraging habitat would be permanently lost, and 6.3ha area of foraging habitat would be temporarily lost during the construction period. The local badger population would not be solely reliant on the habitats within the draft Order limits as a foraging resource, and the reinstatement of habitats post-development ensures any reduction in suitable foraging habitat is minimised. In addition, provision will be made in site layout designs to ensure movement of badgers throughout the landscape is not negatively affected.	Small	Neutral (Not significant)
Otter	Local/ Low	Ham Playing Fields site Burnell Avenue site	Disturbance (from changes in noise, vibration, visual and light stimuli)	Construction could impact otters through disturbance from lighting, noise and vibration which could cause fragmentation effects on the River Thames, potentially severing a commuting and foraging route. However, no holts/couches were recorded within 200m of the areas of works, and given the diurnal/nocturnal nature of otters, construction works are unlikely to be undertaken at typical times of otter activity along the River Thames. Accordingly, disturbance of otters within a resting place or whilst	Negligible	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
				commuting/foraging is unlikely to occur.		
Otter	Local/ Low	Ham Playing Fields site Burnell Avenue site	Hydrological and water quality changes to surface water	Changes in water quality affecting prey abundance could potentially impact otter. This would include sediment run off and pollution incidents. This is discussed in more detail in Chapter 6: Aquatic Ecology.	Small	Neutral (Not significant)
Water vole	Local/ Low	Burnell Avenue site	Hydrological and water quality changes to surface water	Water vole could be impacted through changes to water quality affecting foraging resources.	Small	Neutral (Not significant)
Water vole	Local/ Low	Burnell Avenue site	Introduction and spread of INNS	Water vole are particularly sensitive to the introduction or spread of mink. If the Project inadvertently caused the introduction or spread of mink, then local populations could be severely impacted. However, there are no pathways to this occurring.	No change	No change
Common toad, hedgehog	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Direct mortality	Movement of construction traffic could lead to increased mortality to SoPI. Animals seeking shelter in vegetation and leaf litter may be particularly sensitive to activities which clear vegetation or break ground as well as the movement of construction vehicles through their habitats.	Small	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
Common toad, hedgehog	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Loss of habitat	The Project will involve the temporary loss of 4.39ha of suitable habitat for these SoPI and a permanent loss of 0.4ha. Local populations of these species would not be solely reliant on the habitats within the draft Order limits for sheltering/foraging.	Small	Neutral (Not significant)
Common toad, hedgehog	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Disturbance (from changes in noise, vibration and light stimuli)	Construction activities could impact on common toad and hedgehog through disturbance from lighting, noise and vibration which could discourage commuting, resting and/or accessing foraging habitat. The amount of suitable habitat impacted is minimal.	Small	Neutral (Not significant)
Stag beetle	Metropolitan/ Medium	Mogden STW site Burnell Avenue site	Direct mortality	Construction activities including vehicle movement, vegetation clearance, clearance of deadwood habitat and breaking ground could result in direct mortality of stag beetle. The local population of stag beetle would not be solely reliant on the habitats within the draft Order limits, and the loss of suitable habitat is small at 2.1ha of woodland. Whilst other habitats are affected where stag beetle can be found (e.g. scrub), the limitation to the extent of deadwood typically associated with this habitat reduces	Small	Minor (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
				the likelihood of encountering stag beetle.		
Stag beetle	Metropolitan/ Medium	Mogden STW site Burnell Avenue site	Loss of habitat	Loss of suitable habitat is limited to 2.1ha. This includes all woodland impacted and some of this contains much less standing and fallen deadwood than others.	Small	Minor (Not significant)
Stag beetle	Metropolitan/ Medium	Mogden STW site Burnell Avenue site	Disturbance (from changes light stimuli)	Construction lighting has the potential to impact stag beetle, as this species is attracted to artificial lighting. Some night lighting may be required within the Western Work Area in the Mogden STW site. However, this is a very active area with high amounts of ambient lighting, so the lighting required here would only represent a small change.	Negligible	Neutral (Not significant)
Breeding bird assemblage (including Schedule 1 species)	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Direct mortality	Construction activities, particularly removal of vegetation, has potential for direct mortality where nests are in use.	Small	Neutral (Not significant)
Breeding bird assemblage (including Schedule 1 species)	Local/ Low	Mogden STW site Ham Playing Fields site	Loss of habitat	Suitable nesting and foraging habitat will be lost during construction, although the majority will be reinstated, with permanent loss being limited to 0.4ha of woodland.	Small	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
		Burnell Avenue site				
Breeding bird assemblage (including Schedule 1 species)	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Disturbance (from changes in noise, vibration and light stimuli)	Construction activities may cause disturbance to nesting birds through noise, vibration and lighting, that could result in nests being abandoned and disruption to foraging. Red kite is a Schedule 1 species and therefore in receipt of greater protection from disturbance which can occur at a distance up to 300m for breeding individuals. They have not however been recorded during surveys to date despite the presence of suitable habitat. Given the urbanised location of the works areas and therefore relatively high levels of disturbance already arising from operational use of the Mogden STW site, use of vehicles, and the public in open areas, the temporary increase in disturbance is expected to be limited to birds in the vicinity of the works and is considered to represent a small magnitude of change, although would be anticipated to have a negligible effect.	Small	Neutral (Not significant)
Wintering bird assemblage	Less than Local/ Very Low	Burnell Avenue site	Temporary loss of habitat	In-channel construction activities would represent a loss of habitat suitable for wintering birds in the Thames. However, the extent of	Negligible	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
				temporary impact is small (limited to 0.5km of bank) and temporary, such that any wintering birds would be displaced to equivalent nearby habitats, resulting in a negligible effect.		
Wintering bird assemblage	Less than Local/ Very Low	Burnell Avenue site	Disturbance	There could potentially be a temporary increase in disturbance to foraging and resting wintering birds due to construction activities and traffic. Any wintering birds present within range of disturbance would already be highly accustomed to relatively high levels of base disturbance (including noise and visual) given the urban context of the local area, use of green open spaces adjacent to the River Thames by the public, and use of the River Thames itself by vessels. Any increase in disturbance is therefore considered to represent a negligible magnitude of change.	Negligible	Neutral (Not significant)
Common reptiles	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Direct mortality	There is potential for mortality or injury to reptiles during removal of vegetation, site clearance, groundworks and movement of construction traffic.	Small	Neutral (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
Common reptiles	Local/ Low	Mogden STW site Ham Playing Fields site Burnell Avenue site	Temporary loss of habitat	Suitable foraging and sheltering habitat for reptiles will be lost during construction, although permanent loss is limited to 0.4ha of sheltering habitat.	Small	Neutral (Not significant)
Two-lipped door snail	Metropolitan / Medium	Ham Playing Fields site Burnell Avenue site	Direct mortality	No populations of this species are known to reside within the draft Order limits; the nearest population being associated with Isleworth Ait LNR 3.3km downstream from the outfall location. Nonetheless, surveys are proposed to confirm the presence/likely absence of this species. If present, the outfall and intake works have potential to result in direct harm to individuals of this species.	Small	Minor (Not significant)
Two-lipped door snail	Metropolitan / Medium	Ham Playing Fields site Burnell Avenue site	Loss of habitats	No assessment of habitat suitability has been undertaken for this species. However, damp, shaded habitat on the riverbank is scarce within the draft Order limits, so it is likely that no significant population is supported. In the absence of survey data, loss of habitats for this species could potentially occur at the Burnell Avenue site. Preliminary assessment of likely	Small	Minor (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
				effects has therefore been precautionary, pending further survey.		
Two-lipped door snail	Metropolitan / Medium	Ham Playing Fields site Burnell Avenue site	Hydrological and water quality changes to surface water	Temporary changes in surfacing during construction could lead to habitats within and adjacent to the draft Order limits becoming unsuitable for the two-lipped door snail, either by becoming too wet or too dry. Additionally, changes in water quality caused by dust, sediment and pollution could negatively affect habitats that support this species. Precaution has been applied to the assessment of hydrological impacts, pending further survey.	Small	Neutral (Not significant)
Hazel dormouse	Metropolitan/ Medium	Ham Playing Fields site Burnell Avenue site	Direct mortality and injury	There is no evidence that dormice are present on site. If they are present, then any vegetation clearance within the woodland at the Ham Playing Fields site and the Burnell Avenue site could result in direct mortality or injury. The vegetation clearance required is minimal and is predominantly in areas disconnected from the main blocks of woodland.	Small	Minor (Not significant)
Hazel dormouse	Metropolitan/ Medium	Ham Playing Fields site Burnell Avenue site	Loss of and fragmentation of habitat	Construction activities will require the removal of habitats considered suitable for supporting dormice (1.4ha). All of the habitat to be lost or	Small	Minor (Not significant)

Receptor	Importance/ sensitivity	Relevant above ground sites	Impact	Characterisation of impact from construction	Magnitude of change	Preliminary assessment of LSE
				fragmented would be reinstated or allowed to reestablish over time. Any dormouse population present on-site would not be solely reliant on the habitats within the draft Order limits as a foraging and nesting resource.		
Hazel dormouse	Metropolitan/ Medium	Ham Playing Fields site Burnell Avenue site	Disturbance (from changes in noise, vibration and light stimuli)	The increased noise, vibration and light from construction could result in the disturbance of dormice if they are present within the suitable habitat at the Ham Playing Fields site and the Burnell Avenue site. No night works are proposed within or adjacent to suitable dormouse habitat.	Small	Minor (Not significant)

Operation phase

7.9.3 Likely significant effects from operation of the Project on terrestrial ecology have been scoped out.

Cumulative effects

7.9.4 A preliminary assessment of intra-project and inter-project cumulative effects (excluding climate change) for terrestrial ecology is contained in Chapter 19: Cumulative Effects.

In-combination effects with climate change

7.9.5 Any effect from climate change would be unlikely to significantly alter the land use and, therefore, the habitats prior to the construction of the Project. Long-term impacts from climate change (including increased rainfall and occurrences of flooding during the winter months and drier summers with increased temperatures) could impact priority and notable habitats and designated sites as well as protected species in and around the draft Order limits and, thus, the types and diversity of fauna and flora. However, it is unlikely that the combined impact of the Project and climate change would be different to the impact of the Project without climate change because the changes to terrestrial habitats as a result of climate change are not anticipated to be significant within the assessment timeframe (construction phase) and furthermore, any habitat creation will seek to be resilient to climate change (refer to Appendix 7.2). The full ICCI assessment is provided in Appendix 18.1.

7.10 Additional (secondary) mitigation and enhancement measures

Additional (secondary) mitigation

Richmond Park SAC

7.10.1 Likely significant effects have been identified on Richmond Park SAC for stag beetle, which will be carried through to HRA Stage 2 Appropriate Assessment. Specifically, Ham Lands LNR is considered functionally linked habitat for the stag beetle population present within Richmond Park SAC and lies adjacent to the draft Order limits at the Mogden STW site and Burnell Avenue site.

7.10.2 The requirements for mitigating impacts to the SAC will be identified during the appropriate assessment, although the following approach may be undertaken:

a. In the first instance, mature trees that will become future veterans, as well as dead wood habitats, including tree stumps, would be left in situ and protected through the establishment of an exclusion zone. This exclusion zone will be as defined in the HRA. If habitat and deadwood suitable for stag beetle must be moved it would be reinstated on a like-for-like basis or translocated to adjacent retained habitat.

b. Where practicable, felled vegetation and dead timber would be retained and made into habitat piles (log and brash piles) within retained vegetation and proposed landscaping and mitigation areas under direction of a suitably

experienced ecologist. Where log piles are created, these would be partially buried so they do not dry out. The exact number and location of habitat piles would be identified ahead of the DCO submission and included within the draft CoCP.

c. Where practicable, mitigation areas, as well as broader landscaping, would be designed with benefits to invertebrates, including stag beetle, in mind. Designs may include the creation of new wildflower and grassland areas seeded from a species-rich seed mix, new ponds and ditches, trees and woodland, species-rich hedgerows and scrub comprising native tree, shrub and herbaceous species of local provenance.

Bats

7.10.3 Thirty-three trees with suitability to support roosting bats have been identified to date within the draft Order limits; one of the trees has a confirmed common pipistrelle bat roost (Mogden STW site). The tree with the known roost is proposed for retention, although other trees with roosting features may also be confirmed to support roosts during ongoing survey work. Accordingly, the Project could result in the damage, destruction, or disturbance of a bat roost present within the draft Order limits, which would require a development mitigation licence from Natural England. A Natural England draft licence would be sought as part of the DCO application.

7.10.4 The roost recorded within the draft Order limits to date is a day roost for a small number of a common and widespread species, deemed to be of low conservation value; appropriate mitigation for the loss of this roost, should it be necessary, would be the provision of alternative roosting opportunities in the form of a bat box to be erected within proximity of the current roost location. However, appropriate mitigation for roost loss is dependent on the species it supports and status (e.g. day roost, maternity roost, etc.), and the loss of other roosts if shown to be present may require additional measures such as dedicated roosting spaces of specific size and design, and timing restrictions for loss of the roost itself. Detailed mitigation proposals would be set out within the Natural England licence application.

Badger

7.10.5 As detailed in Section 7.9, two outlier badger setts are present within the draft Order limits and two subsidiary setts are present within 30m of it. Should these setts remain active, a Natural England licence would be required where damage/destruction to the sett or disturbance to badgers in occupation would occur. A Natural England draft licence would be sought as part of the DCO application for setts which have been categorised as partially active or very active. Any setts requiring closure (whether permanent or temporary) would be subject to monitoring to confirm their status (i.e. active or disused), and all licensable activities would be undertaken between July to November inclusive.

7.10.6 Prior to sett closure, each sett would be monitored by a suitably qualified ecologist at least once every three days during the exclusion period. Exclusion would take place over a minimum period of 21 days after the last date when

badgers were recorded leaving the sett. Monitoring would use field cameras focusing on set entrances, and the placement of small sticks within tunnels and in front of the one-way gates to check for signs of badger presence. At the time of monitoring, the gates would be checked to ensure they are working as expected and the condition of the wire-mesh used to secure the sett would be assessed to ensure it remains sufficient to prevent badgers regaining access.

7.10.7 The Project does not require the destruction or disturbance of any active, main badger setts and therefore mitigation in the form of the provision of an artificial sett will not be required.

7.10.8 Typically, exclusion zones of 30m would be implemented around any retained active setts within the draft Order limits to avoid disturbance. The exact distance of exclusion zones may be altered based on assessment by an Ecological Clerk of Works (ECoW), who would look at the type and condition of the sett(s) present and the works planned for the area; exclusion zones may be reduced or increased based on these assessments.

7.10.9 Usage of setts can be highly changeable, and badgers are able to quickly colonise new areas. Pre-construction surveys would be undertaken to confirm the status of all setts and also identify any new setts prior to start of works, so that appropriate measures can be implemented to safeguard badger.

Common reptiles

7.10.10 Clearance of areas considered suitable for reptiles would be overseen by a suitably qualified ecologist. Mitigation measures for this work would include habitat manipulation (i.e. strimming vegetation to a lower height to encourage animals to disperse), fingertip searching and safe removal of animals to suitable terrestrial habitat outside of the working area, as appropriate.

7.10.11 Refuges for reptiles such as log, rubble and brash piles, would be retained wherever possible. Should any reptiles require moving during the works, this would first be checked by a suitably experienced ecologist before being placed in suitable terrestrial habitat outside of the working area.

7.10.12 Where practicable, habitats with the potential to support hibernating species would not be removed during the hibernation season (mid-October to April). If removal becomes necessary, it will be undertaken under the supervision of a suitably experienced ecologist or after appropriate mitigation has been completed.

7.10.13 Habitat piles (e.g. hibernacula and log piles) would be created from some felled vegetation and dead timber and placed in retained habitat and ecological mitigation areas to provide replacement sheltering opportunities.

Stag beetle

7.10.14 Measures to mitigate impacts to stag beetle are set out under paragraphs 7.10.1 and 7.10.2.

Hazel dormouse, water vole, otter and two-lipped door snail

7.10.15 Surveys for hazel dormouse, water vole, otter and two-lipped door snail are either yet to take place in 2025 or are ongoing through 2025. If present within the ZoI, bespoke mitigation may be required to minimise any adverse effects. Mitigation will be detailed within the EcIA and any mitigation licence requirements from Natural England confirmed.

Enhancement measures

7.10.16 The Project design, mitigation and compensation strategy, and approach to BNG aims to support delivery of the LNRS once published by the London boroughs. This will aim to integrate environmental sustainability, climate resilience and biodiversity enhancement across the Project. This could involve contributing habitat units to areas designated for ecological restoration or habitat creation such as green spaces, rivers and wildlife corridors. Additional aspects for the Project to consider include the following:

a. Habitat restoration and creation can provide essential habitats for wildlife. The Project can also aim to restore degraded areas by reintroducing native species and improving water and soil quality.

b. Discussions are being held with the LPAs and Regulators around potentially planting up the banks of the River Thames at the Burnell Avenue site with riparian tree species including native black poplar *Populus nigra*, silver birch *Betula pendula*, alder *Alnus glutinosa* and willows *Salix spp.*

c. Features to enhance biodiversity such as wildlife boxes, species-rich habitats and the provision of wildlife corridors

d. Involve local communities in nature restoration efforts by offering educational programs, science initiatives and volunteer opportunities to maintain and monitor the success of nature recovery projects

e. Look for opportunities to collaborate with local wildlife and conservation groups and government agencies for the Project to support broader environmental goals and make a measurable impact on local nature recovery

7.10.17 Habitat enhancement opportunities will also be considered as part of the BNG assessment for the Project. As described above, the approach to achieve BNG includes the aim to support delivery of the relevant LNRS for the restoration and improvement of habitats locally. Where feasible, habitat enhancement will be undertaken on-site for the Project however off-site opportunities will be considered where necessary. Opportunities to achieve BNG could include:

a. Enhancement of species-poor other neutral and modified grassland habitats to species-rich other neutral grassland habitats

b. Enhancement of existing woodland habitats to improve the condition through thinning, planting or seeding with native tree and shrub species and removal of invasive non-native species

7.10.18 Highly mobile protected species including badgers and bats have been recorded within the draft Order limits for the Project. By creating or restoring

habitat connectivity across the site, through the provision of hedgerows and tree lines for example, habitat fragmentation can be improved/reversed providing opportunities for animals to expand their range, forage and commute successfully.

7.10.19 Bat roosting and bird nesting boxes, suitable for a variety of species (over and above the numbers required for mitigating roost/habitat losses), could be installed within retained vegetation (such as tall trees), or to new or existing buildings or structures, or installed on free-standing posts as appropriate.

7.10.20 Enhancements will be discussed with relevant environmental stakeholders.

7.11 Summary of likely significant residual effects

7.11.1 A summary of likely significant residual effects for terrestrial ecology is provided in Table 7.16. The table only includes effects where there is any pathway to residual effects.

Table 7.16 Summary of likely significant residual effects for terrestrial ecology

Receptor	Description of effect	Preliminary likely significance of effect (taking account of embedded and standard good practice mitigation)	Additional (secondary) mitigation and enhancement measures	Preliminary residual effects
Richmond Park SAC	Loss of and fragmentation of habitat and direct mortality of qualifying feature within functionally linked habitat: stag beetle	Potentially significant effects identified during Stage 1 Screening	The requirement for mitigation will be assessed during HRA Stage 2 Appropriate Assessment and agreed with Natural England	No likely significant residual effects following the implementation of mitigation agreed with Natural England as part of the HRA.
Badger	Direct mortality	Minor Adverse (Not significant)	Natural England mitigation licence will be sought to exclude badgers prior to sett destruction	Negligible/ Neutral
	Disturbance (from changes in noise and/or vibration)	Minor Adverse (Not significant)	Exclusion zone will be established around retained setts, with disturbance covered by the Natural England mitigation licence	Negligible/ Neutral
Bat assemblage	Direct mortality, loss of roosts, loss of foraging habitat, habitat degradation and fragmentation, disturbance	Surveys for these species are ongoing. Due to the already applied embedded mitigation, localised and relative small size and scale, with works being mainly temporary also comprising underground elements, it is unlikely that effects to these species will be significant. With respect to bats, a single bat roost has been found to date. In the unlikely event that significant effects were identified following the		

Receptor	Description of effect	Preliminary likely significance of effect (taking account of embedded and standard good practice mitigation)	Additional (secondary) mitigation and enhancement measures	Preliminary residual effects
Hazel dormouse	Direct mortality and injury. Habitat degradation and fragmentation, disturbance	surveys, it is very likely that suitable mitigation could be devised in order to reduce the significance of effects to Not significant.		
Water vole	Hydrological and water quality changes to surface water			
Two-lipped door snail	Direct mortality, loss of supporting habitat, habitat degradation and fragmentation			

7.12 Next steps

7.12.1 Although sufficient data sets have been gathered to provide a robust assessment of the likely significant effects at this preliminary stage, further surveys are required to fill in gaps in some areas where the draft Order limits have been subject to change post the EIA Scoping phase. In addition, design details such as the precise locations of temporary structures, are still under refinement. The next steps will be to fill in the data gaps and continue the assessment as the Project design process progresses. This will improve the Applicant's understanding of the likely significant effects of the Project and allow the mitigation proposals to be developed accordingly, alongside discussion with stakeholders.

7.13 References

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