7 Biodiversity

Preface

This preface highlights the new and amended information that has been included within this chapter since the 2023 ES:

- **Section 7.4: Methodology** - 'Consultation' section has been updated to more clearly evidence compliance with the scoping opinion. A summary is provided of pre-application and post-application consultation. To shorten this chapter, the methodology of each detailed survey type has been removed – this is still provided within individual technical reports in the appendices.
- **Section 7.5: Baseline Conditions** – an updated desk study (July 2025) has been incorporated into the assessment and mapping updated to reflect new information. The updated assessment also takes into account surveys undertaken since the 2023 ES, including a habitat survey and condition assessments (July 2025), bat activity surveys (2024) and bat emergence surveys (2025), water vole reassessment (November 2024), lake ecology (2024 including sediments, water quality, macrophytes and macroinvertebrates) and further breeding and wintering bird surveys each year. Bird survey results between 2022-2025 have been consolidated to aid review. None of these update surveys have materially changed the baseline presented in the 2023 ES, rather they have worked to provide greater confidence. The value of buddleia to breeding birds has been downgraded to negligible following a desk-based review and onsite surveys in 2024 that showed no breeding behaviour associated with buddleia.
- **Section 7.7 Embedded Mitigation -** The assessment has been updated to include the revised Proposed Development drawings and plans, notably the significantly reduced extent of dredging and land reclamation as described in Chapter 4: Alternatives. Revised construction methods (Horizontal Directional Drilling (HDD)) for services connections to the Proposed Development means that impacts to a canal bridge and nearby tree with bat roosts will no longer occur.
- **Sections 7.8 - 7.9: Assessment of Effects -** Assessment of effects to ecological receptors has been amended to assume that all designated SSSI features are valued at the National level (despite evidence presented here that the majority of features are more accurately valued at the Borough level), so that consultees can be assured that no impacts or effects have been downplayed. Further amendments to the assessment approach for the construction stage only include presentation of the impacts and significant effects prior to embedded mitigation, as requested by Natural England.
- **Appendices:** All supporting appendices have been substantially revised (as set out in Table 7.1) as many of the previous supporting reports have been superseded. New reports have incorporated review of previous reports where relevant, to ensure continuity. Where possible documents have been shortened to aid review.

7.1 Introduction

7.1.1 This chapter of the ES was prepared by RPS-Tetratech and Harper Environmental Limited. It presents an assessment of the likely significant effects of the Proposed Development on the Site and surrounds within the Zone of Influence (ZoI). Mitigation measures are identified, where appropriate, to avoid, reduce or offset any significant adverse effects identified and / or enhance likely beneficial effects. The nature and significance of the likely residual effects are reported.

7.1.2 The chapter is supported by the following appendices, set out in Table 7.1.

Table 7.1 Appendices of this chapter

Appendix Number	Contents	Details
7.1	2023 Relevant Survey Reports	2023 Preliminary Ecological Appraisal: Establishes ecological baseline using desk study and detailed surveys undertaken from 2021 up until February 2023. Makes further survey recommendations and outlines suggested mitigation measures. Appendix A of this 2023 report includes all previous survey reports (detailed in Table 7.2 below). 2023 Invertebrate survey 2023 Ecology report (surveys completed after the PEA was written up until November 2023)
7.2	Figures	Habitat survey figures using UKHab classification
7.3	Wintering Birds	2022-2025 Wintering Bird Survey Summary - summary of breeding bird surveys. Detailed data within appendices to the report.
7.4	Breeding Birds	2022-2025 Breeding Bird Survey Summary - summary of four years of breeding bird surveys. Detailed data within appendices to the report. Technical note: value of buddleia to breeding birds.
7.5	Wildfowl Disturbance	Summary of disturbance surveys undertaken – wintering bird (2022-2023, and 2023-2024) and breeding bird (2024)
7.6	Freshwater Ecology Surveys	Bywater Ecology: Broadwater Lake Assessment 2024 Macrophyte Report Bywater Ecology: Broadwater Lake Assessment 2024 Macroinvertebrate Report

Appendix Number	Contents	Details
		University of Northampton: Preliminary investigations of the ecological status of Broadwater SSSI 2024 Harper Environmental: Underwater Lake Bed Survey 2024. Harper Environmental: 2024 Lake condition assessment technical note.
7.7	Bat Surveys	2024-2025 Bat Activity Report - update bat activity assessment at the Peninsula (2024-2025). 2025 Updated roost appraisal and emergence surveys of buildings. 2025 Bat Tree Assessment – ground level assessments and tree climbs plus emergence surveys.
7.8	2024 Water Vole Survey	Derek Gow Consultancy Ltd: Survey of Broadwater Lake to assess for potential to support water vole and to search for field signs.
7.9	Outline Mitigation, Enhancement and Management Plan (MEMP)	Revised Outline MEMP
7.10	Biodiversity Net Gain Assessment	Updated assessment (August 2025)
7.11	Biodiversity Air Quality Modelling Assessment	Following a review the previous assessment has not been revised. Justification is provided in the covering note.
7.12	Natural England Discretionary Advice Service Correspondence	Provides all advice and feedback issued by Natural England.

Table 7.2 Reports included within the 2023 PEA (forming Appendix A of that report)

Survey Report Title	Survey Type
August 2021 by CGO Ecology Ltd - Preliminary Ecological Appraisal	PEA (limited to the Peninsula and immediate zone of influence)

Survey Report Title	Survey Type
June 2022 by RSK Biocensus - eDNA Survey	Great Crested Newt presence / absence (waterbodies at the Peninsula)
August 2022 by Greengage - Breeding Bird Survey	Breeding birds - woodland (Peninsula) Breeding birds - lake (around Peninsula)
May 2022 by Ecology By Design - Scoping Report	Terrestrial Invertebrates – scoping (Peninsula)
September 2022 by Dr Ross Piper - Terrestrial Invertebrate Survey Report	Terrestrial Invertebrates – detailed survey and assessment (Peninsula)
November 2022 by Ecology By Design - Further Survey Report	Badger survey Bat Activity (at the Peninsula) Reptiles (presence / absence) Dormouse survey Water vole survey Otter survey
January 2023 by Five Rivers Environmental Contracting Ltd - Broadwater Aquatic Assessment Report	Fish (whole lake) Aquatic invertebrates (three sampling sites around lake)

7.1.3 The following Figures are included in the chapter:

- Figure 7.1: Protected sites within the Study Area;
- Figure 7.2: Units of Mid Colne Valley SSSI;
- Figure 7.3: SINCs within 2km;
- Figure 7.4: Protected sites within 2km identified as Important Ecological features (IEF) for the Proposed Development; and
- Figure 7.5: Location referencing within the Site including island numbering.

Competence

7.1.4 The work has been undertaken by RPS (a Tetra Tech company) and Harper Environmental Ltd.

7.1.5 This assessment has been drafted by a Director at Harper Environmental Ltd who has an undergraduate degree (BSc Hons) and a PhD in Environmental Sciences, a Natural England Level 1 Class Licence for bats and over 18 years' experience in ecological surveying and assessment.

7.1.6 The senior director within RPS (a Tetra Tech company) who undertook the review and impact assessment update has over 30 years' experience in nature conservation having worked on hundreds of terrestrial development projects. The senior director is head of the ornithology team, for which this site is particularly important being an SSSI predominantly for ornithological features.

7.2 Legislation, Planning Policy and Guidance

7.2.1 A summary of information relating to relevant legislation, policy and guidance with regards to Biodiversity, the Site and the Proposed Development is provided below.

Legislative Context

7.2.2 The following legislation is relevant to the Proposed Development:

- The Environment Act, 2021[1];
- The Conservation of Habitats and Species Regulations 2017 (as amended) ('Habitats Regulations')[2];
- The Wildlife and Countryside Act 1981 (as amended)[3];
- The Countryside and Rights of Way Act, 2000 (CRoW Act)[4];
- The Natural Environment and Rural Communities Act, 2006[5] ('NERC Act'); and
- The Eels (England and Wales) Regulations 2009).

7.2.3 The Applicant is a public body and under Section 28G of the Wildlife and Countryside Act 1981 (as amended), public bodies have a statutory duty to *'take reasonable steps, …to further the conservation and enhancement of the flora, fauna or geological features by reason of which the site is of special scientific interest'.* Public bodies also have duties relating to operations they carry out on or likely to affect SSSIs and operations they permit that may affect SSSIs.

7.2.4 The NERC Act places a public duty on public authorities to consider and conserve biodiversity when exercising their functions.

Planning Policy Context

7.2.5 The following national, regional, and local planning policy is relevant to the Proposed Development:

National

7.2.6 National Planning Policy Framework (NPPF)[6] (paragraph 193 (b) provides national policy protection for SSSIs and states that *'development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest.'*

7.2.7 NPPF paragraph 193 (d) states that *'d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.'*

Regional

7.2.8 Policies within the London Plan (March 2021)[7] of relevance to the Site and the Proposed Development include Policy G1 Green Infrastructure, Policy G5 Urban Greening, Policy G6 Biodiversity and access to nature and Policy G7 Trees and Woodland.

Local

- London Borough of Hillingdon Local Plan Part 1 – Strategic policies (Adopted November 2016); and
- London Borough of Hillingdon Local Plan Part 2 – Development Management Policies and Site Allocations and Designations (Adopted January 2020).

Guidance

7.2.9 The following guidance is relevant to the assessment of the Proposed Development:

- London Environment Strategy (2018)[8];
- UK Biodiversity Action Plan (BAP)[9] (superseded but still of relevance);
- London Biodiversity Action Plan (2007)[10];
- Chartered Institute of Ecological and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment in the UK and Ireland (September 2024)[11] ('CIEEM Guidelines'); and
- Bats and Artificial Lighting at Night (2023)[12].

7.2.10 Specific guidance on species and Biodiversity Net Gain (BNG) is detailed within the relevant appendices to this chapter.

7.3 Consultation

Pre-Application Consultation

Natural England

7.3.1 Consultation with Natural England was undertaken prior to submission of the Application in November 2023, with meetings, correspondence, and a meeting on-Site. A summary is provided below:

- **Meeting: 20 December 2022 (Virtual)** - Principles of the Proposed Development; Background / reason for the Proposed Development; Alternative sites considered and broad reasons why these were discounted; Environmental and ecological setting of the Site; Key considerations for the masterplan and how these have amended the masterplan for each iteration – presentation of the two latest iterations; and Options

for ecological mitigation and enhancement and the evolution of the masterplan as a result of survey findings.

- **Meeting: Site Walkover 24 March 2023 (On site**) – Review of the current Site habitats and their condition; Survey of completed buddleia clearance works; Discussion of the proposed mitigation and enhancement measures; request for information relating to the Mid Colne Valley SSSI designated features.
- **Meeting: 17 August 2023 (Virtual)** – Applicant presentation of updated masterplan.
- **Provision of information August 2023** - Breeding Bird Report and Alternative Sites Assessment were provided. Natural England provided comment on the submitted documents through the Discretionary Advice Service (DAS).
- **Meeting: 25 August 2023 (Virtual) with EA** – Applicant Presentation of Proposed Development design team to understand the nature of impacts to the water environment, and to input any concerns as a result of the discussions.
- **Meeting: 6 October 2023 (Virtual) -** Clarification on latest published SSSI Condition Assessment; EIA methodology used for assessing condition assessment; Use of Natural England analysed data on previous years bird assemblage numbers; and Discussion on loss of open water acceptability.

Other Bodies

- **EA –** The Applicant met with the EA to present the proposals in August 2023, and this meeting was attended by EA Ecology Officers.
- **HS2** - The Applicant engaged with representatives from HS2 prior to submission of the Application with two on-Site meetings and a virtual meeting. The meetings focused on understanding HS2 mitigation requirements within an area of water adjacent to the Peninsula, how this enhancement may be accommodated alongside the Proposed Development, and legal arrangements. Additional mitigation and surveys were also discussed.

EIA Scoping Opinion

7.3.2 A request for a Scoping Opinion was submitted to LBH in February 2023. An EIA Scoping Report (the 'Scoping Report') accompanied the request (Appendix 3.2: EIA Scoping Report (February 2023) and scoping correspondence). The LBH Scoping Opinion (dated 19 May 2023 (Appendix 3.3) included comments from statutory consultees. Table 7.3 summarises key comments raised by LBH in their EIA Scoping Opinion of relevance to this assessment and how the assessment has responded to them.

Table 7.3: EIA Scoping Opinion Response

Consultee and Comment	Response
LBH – EIA Scoping Opinion provided by Arup on their behalf) (May 2023)	
Confirmation should be sought as to whether Phase 2 (NVC) habitat surveys of Habitats of Principal Importance (deciduous woodland and wet woodland) on site have been considered and, if so, why deemed not to be necessary.	Woodland habitats have been reassessed in 2025 in accordance with Rodwell, J.S., 1991. British Plant Communities Volume 1 Woodlands and Scrub. Using the National Vegetation Classification (NVC), all woodland across the Site has been re-categorised as variants of wet woodland (W1 to W8) with dominant canopy species of willows, birch and alder, and characteristic understorey plants including water mint *Metha aquatica* and hemp agrimony *Eupatorium cannabinum*). The dominance of nettles across the Site, and buddleia in some locations, flags the artificial ground conditions. Condition assessments have been undertaken for the BNG calculation (provided in Appendix 7.10) and will be used to inform future management and monitoring (as set out in the Outline MEMP) to provide biodiversity enhancements for the Site. No loss of woodland is required for the Proposed Development. Although the Proposed Development requires the removal of trees, these are currently trees on hardstanding and are not classified as woodland.
No explicit mention of Impact Risk Zones around SSSIs and potential project interfaces with IRZs (leading to the potential for indirect effects to SSSIs). These should be included within the spatial scope of the study.	Consideration of SSSI IRZs is provided within this assessment in Section 7.5. The nature of the Proposed Development (recreational / sports with non-permanent seasonal residential use only) is not a land use identified within the IRZs of these SSSIs that would require consultation with NE.
Some confusion in the scoping report which needs clarification and / or alignment: ▪ description of status of bat roosts on-site; ▪ presence of dormouse and water vole; and	The ecological baseline for bats and water vole provided in Section 7.5 has been updated with further survey information collected in 2023, 2024 and 2025. Desk study information provided on bat roosts by HS2, and bat surveys of trees and buildings (2023 and 2025) have been incorporated to establish the ecological baseline with regard to bats. Further surveys undertaken in 2023-2024 with

Consultee and Comment	Response
	regard to water vole and otter provide greater confidence / clarity in the assessment. Absence of dormouse is clarified in Section 7.5.
▪ Otter holts ruled out despite large areas of the banks not accessed. Confirm why no boat / kayak-based survey completed. Requirement for further waterside survey referenced in PEA.	Boat-based survey completed in May and August 2023. No updates since as there have been no changes to the Site conditions which are unsuitable for creation of holts. Results have been incorporated into Section 7.5.
Wintering Bird results outstanding - assessment in progress (due for completion March 2023).	Surveys were completed in March 2023 and the initial assessment completed May 2023. Further surveys undertaken in 2023-2024 and 2024-2025. Results are provided in Appendix 7.3 and incorporated into Section 7.5.
PEA appendices note 'The Proposed Development would cause a net loss of deciduous woodland, and could impact breeding and wintering birds, damaging the integrity of the SSSI', so future BNG (BNG) and EIA assessment must address this clearly.	Since the PEA was drafted, the scheme evolved in response to the ecological surveys and findings. Sections 7.8 and 7.9 present the assessment of effects of the Proposed Development.
Assessment of future baseline should consider the potential value of any habitats that might be retained through positive management intervention, in line with current EcIA guidance, and not just the decline in current condition of habitats on site through neglect. Note that Defra metric version 4.0 may be available by the time of the assessment.	The future baseline assessment has been updated to include consideration of positive intervention as well as in the absence of management (Section 7.5). The BNG assessment has been undertaken using the Defra Statutory Biodiversity Metric (SBM) issued 23 July 2024 (Appendix 7.10).
Assessment of the impact of dredging on aquatic receptors (fish, European eel) will be expected within the EIA.	Section 7.8 provides an assessment of effects of the Proposed Development on aquatic receptors (fish and European eel).
Monitoring of species and adaptive management commitments to respond to findings (for example, any decline in wintering	A monitoring programme is specified within the Outline MEMP (Appendix 7.9), and a summary provided in Section 7.7.

Consultee and Comment	Response
bird numbers for which the SSSI is designated) should be made clear.	
The 30-year management plan should be produced in line with BNG requirements.	An Outline MEMP has been produced (Appendix 7.9) to set out what a detailed MEMP will include. The final MEMP will be produced in alignment with best practice and published guidance on BNG to cover an operational period of a minimum of 30-years. A BNG Assessment (Appendix 7.10) has been made.
The Ecological Mitigation Plan should be updated following the results of wintering bird and otter surveys.	An Outline MEMP has been produced (Appendix 7.9) to set out what a detailed MEMP will include. The final MEMP will be produced in alignment with best practice and published guidance on BNG to cover an operational period of a minimum of 30-years. A BNG Assessment (Appendix 7.10) has been made.
Consultation with Natural England will be expected, given the site's SSSI status. Consultation should include reference to any interfaces with Impact Risk Zones around SSSIs.	Consultation with Natural England has been undertaken as set out in Section 7.3 'Consultation'. Consideration of SSSI IRZs has already been undertaken but this has been made clearer within Section 7.8 and 7.9 under the assessment of protected sites.
Natural England (6 April 2023) - Comments on EIA Scoping Report	
Standing advice provided which details at length how to undertake a professional Ecological Impact Assessment. To incorporate assessment of environment data, SSSI Impact Risk Zones (IRZ), Biodiversity and Geodiversity, designated nature conservation sites, protected species, priority habitats and species, BNG, ancient woodland, veteran trees, resilience to climate change of existing and created habitats.	This assessment has been undertaken in accordance with the CIEEM Guidelines and incorporates consideration and assessment of all topics and sources listed by Natural England. See Assessment Methodology section for further details.

Consultee and Comment	Response
The ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts on air quality. Further information on air pollution impacts and the sensitivity of different habitats / designated sites can be found on the Air Pollution Information System (www.apis.ac.uk).	An Air Quality Assessment has been undertaken of the Proposed Development to inform this assessment and is provided as Appendix 7.11. The results have been considered and incorporated into this assessment in Section 7.8 and 7.9.
The ES should consider the contribution the proposed development could make to relevant local environmental initiatives and priorities to enhance the environmental quality of the proposed development and deliver wider environmental gains. This should include considering proposals set out in relevant local strategies or supplementary planning documents including landscape strategies, green infrastructure strategies, tree and woodland strategies, biodiversity strategies or biodiversity opportunity areas.	Review of relevant local strategy and policy has been undertaken and informed the Landscape Strategy and Draft MEMP (provided as Appendix 7.9). A BNG (BNG) Assessment has also been undertaken of the Proposed Development (Appendix 7.10).
HS2 (16 May 2023) – Comments on EIA Scoping Report and Note	
Source of information in paragraph 2.23 (of the EIA Scoping Report) – this paragraph, which discusses the HS2 Colne Valley viaduct, includes the text: *'There is also likely to be significant disturbance to waterfowl and breeding birds during construction, including to the Bird Refuge area on Broadwater Lake. In addition to this, there may be long term disturbance effects'*. Can you please confirm the source of this information, or is this your view / opinion? For awareness, Align have been carrying out monitoring surveys of the south west corner of Broadwater Lake to assess levels of disturbance of wildfowl in	This statement was based on professional opinion prior to receiving a) the final results of disturbance surveys undertaken to support this application, and b) the waterfowl disturbance report from HS2. The ecological impact assessment has been updated to incorporate results of HS2 construction disturbance monitoring and the final results from the winter surveys for this application. The construction of HS2 is now complete and will not overlap with construction for the Proposed Development.

Consultee and Comment	Response
this area and whether disturbance can be attributed to construction activities. A copy of Align's Broadwater Lake – Waterfowl Disturbance Survey Report (1MC05-ALJ-EV-REP-CS01_CL01-000174 C02) was shared with the agent (Quod) on 28 March 2023.	
Source of terminology in paragraph 2.24 (of the EIA Scoping Report) – this paragraph mentions 'HS2 have committed to areas of wetland and woodland creation including land reclamation'. Can you please confirm the source of the term 'land reclamation'?	The HS2 ecological enhancement measures have been clarified for this assessment, confirming that 'land reclamation' is not included.
No / little reference to review of HS2 ecological survey and monitoring data for bats or evidence of this being taken into account. Some data is available online and other data has been supplied directly by HS2 for this assessment in May 2023.	Ecological assessment has been updated, to incorporate relevant results from HS2's bat monitoring work within the evaluation of roosting and foraging bats in Section 7.5.
Bat activity levels based on HS2's monitoring of tagged bats is considered to be high, compared with the survey results for the Site which found moderate activity levels.	HS2 monitoring data taken into consideration in the ecological assessment. It should be noted that the activity of a single tagged bat will give a good idea of how bats are using the Site but does not give a measure of how many individual bats are present or using the Site. Both measures are an important part of characterising bat activity levels.
One of the biggest areas of land reclamation / island creation will partially clash with / adjoin HS2's proposed gravel islands / rafts. The implications of this from a health and safety perspective will need to be considered and addressed as appropriate in dialogue with HS2 Ltd.	Development proposals have been updated such that HS's planned mitigation may be installed without change to their plans.

Consultee and Comment	Response
The Proposed Development intersects land within HS2 Act limits which the appointed Contractor (Align) are progressing a habitat creation design for. The EIA Scoping Report does not include for the impacts of relocating HS2's mitigation site within Broadwater Lake and how the emerging Proposed Development within HS2's land would enable HS2 to be compliant with its own environmental obligations.	
EA (30 March 2023) - Comments on EIA Scoping Report	
Construction and operational impacts to the SSSI will need to be carefully considered within the Mitigation Enhancement and Management Plan and should be agreed with both Natural England and Herts and Middlesex Wildlife Trust (HMWT).	Consultation with Natural England undertaken since December 2022. Consultation with HMWT was undertaken on 21 June 2023 but no comments were forthcoming following the consultation. Comments from Natural England have been addressed or incorporated into this assessment and the Outline MEMP (Appendix 7.9) and further discussions are ongoing.
If significant harm resulting from a development cannot be avoided, adequately mitigated, or as a last resort compensated for, planning permission should be refused.	Embedded mitigation measures are described in Section 7.7 in line with the mitigation hierarchy.
A water vole survey was undertaken in November 2022. This is not the optimal survey season for this species and further surveys will be required to support the EIA.	Scoping surveys for suitability for water vole may be undertaken at any time of year; surveys in winter when vegetation cover is reduced allow lake / riverbanks to be seen and the suitability of the ground conditions for construction of burrows to be assessed. Burrows will also be more visible. Habitat suitable for water vole will also still be evident during winter such as areas of marginal and emergent plants. Further land and boat-based surveys have been undertaken at the Site in May and August 2023 (see Appendix 7.1). These surveys included survey effort for water vole per best practice guidance. A further suitability survey was undertaken by Derek Gow Consultancy in December 2024 using boat-based

Consultee and Comment	Response
	access. Results are provided within Appendix 7.8 and incorporated into this assessment.
Consideration should be given to the potential impacts of construction and recreation to the spread of Invasive Non-Native Species (INNS).	INNS have been appropriately considered as part of the assessment (survey results set out in Appendix 7.1). Impacts and their effects are fully characterised and assessed in Section 7.8 and 7.9.
Recreational pressures should include increased noise, physical disturbance both on the lake, the riparian area and woodland to breeding birds and other sensitive species e.g., Eurasian Otter and Water Vole. Consideration of how these will impact on the breeding bird assemblages at the site with regard to how any displacement would affect populations across the landscape of the Colne Valley- additional pressures at other sites within the valley (increased competition for food or mating, predation pressures etc.).	These aspects are fully assessed in Section 7.9.

7.3.3 Scoping comments raised by other consultation bodies including the Canal and Rivers Trust, Colne Valley Regional Park and Hertfordshire and Middlesex Wildlife Trust have been addressed in the ES chapter.

Post Application Consultation

7.3.4 Consultation with LBH, Natural England and the EA was undertaken following submission of the Application, including meetings, correspondence and a meeting on-Site, to discuss the revised proposals and how matters raised in consultation responses to the 2023 Scheme would be addressed. A summary is provided below:

- **LBH:** A meeting was held with Arup, as LBH's advisor to discuss Initial Review Response (IRR) in December 2023 comments on Chapter 7: Biodiversity of the 2023 ES and how they would be responded to. Various meetings were also held with Planning officers to discuss the revised proposals and 2023 ES and how the Applicant was responding to comments from statutory bodies.
- **Technical Note issued to Natural England: 28 August 2024 –** A Consultation Response Note was submitted to provide a direct response to Natural England's consultation response letter (dated 6 December 2023). The Applicant appointed a new architect in April 2023 to re-examine the proposals and directly address the matters raised by Natural England. The Note was accompanied by drawings and other supporting material which explain the proposed revisions to the Submitted Scheme.
- **Natural England Meeting: 29 August 2024 -** Provided a direct response to Natural England's consultation response letter (dated 6 December 2023) and an introduction to the revised proposals. Discussion on future governance of the site as part of the management of the SSSI.
- **Natural England Meeting: 14 October 2024** - Review of updated development proposals; Review of 2024 survey data and overview of 3 years of survey results for breeding and wintering birds; Discussion of technical points regarding the impact assessment (evaluation of the SSSI and its designated features etc); Discussion of NE's objection letter points to the 2023 Scheme; Explanation of how the mitigation hierarchy was applied; Discussion on whether HRA would be required for impacts to the West London Special Protection Area (SPA) (designated for wintering birds), given that the proposals do not impact wintering birds. Natural England confirmed a HRA would not be required as they did not expect for significant effects to be discernible.
- **Natural England Meeting: 16 January 2025 (virtual) –** Applicant update on the revised proposals and to discuss Natural England's objections to the 2023 Scheme; Discussion on 'acceptable' levels of disturbance and additional mitigation; Clarification of significantly reduced user numbers assumptions and levels of activity from that relied on in the 2023 ES; Presentation of the extent of hardstanding (buildings are only developed upon existing hardstanding); Discussion on loss of potential habitat was discussed and 'do nothing' scenario.
- **Natural England Meeting: 30 July 2025 (On-Site) –** The Applicant and Project Ecologists met with Natural England on-site to discuss the revised proposals and objectives of the Proposed Development.

Assessment Scope

7.3.5 The scope of the assessment is as outlined within the EIA Scoping Report (Appendix 3.2), and as agreed with LBH via the EIA Scoping Opinion (Appendix 3.3). The scope also responds to comments made by consultation bodies as evidenced in Table 7.3 and has been informed by comments made in relation to the 2023 ES.

7.4 Baseline Methodology

Study Area

7.4.1 The extent of the desk study for baseline characterisation was:

- 10km for internationally designated sites (e.g. SPAs, Special Area of Conservation (SACs) and Ramsar sites);
- 10km for national designated sites (e.g. SSSI or LNR) where the designations are for bats and birds (highly mobile species);
- 2km for all other national designated sites;
- 2km surrounding the Site for regional / borough / local designated sites; and
- 2km for records of protected and priority species.

7.4.2 In respect of air quality, namely from traffic (both from construction and the completed Proposed Development), potential sensitive receptors (e.g., SSSIs, Local Wildlife Sites (LWS) and ancient woodland) within 200 m of roads are considered within 10km of the Site.

Zone of Influence

7.4.3 The ZoI is defined as the area surrounding a direct impact location where indirect impacts may be assumed to occur. Given the different habitats and ecological receptors at the Site, there are different ZoI considered as part of the assessment. These ZoI are all made using professional judgement based on education and experience:

- For noise and visual impacts to breeding and overwintering waterbirds using the lake, the ZoI is considered to be the open water area surrounding the source of the impact, extending out to the closest adjacent visual or physical barrier (i.e., lake edge or islands) but not beyond. This is based on disturbance surveys of waterbirds; when disturbances arise from sailing events, birds generally seek refuge on the opposite (lee) side of islands away from the disturbance.
- Where birds may be displaced from the lake through visual or noise disturbance, the ZoI will include the likely receiving waterbodies;
- For disturbance to the lakebed or water column arising from in-lake / underwater activities such as dredging of sediments, formation of islands etc, the ZoI is considered to be the surrounding open water area extending to the nearest land mass (lake edge or closest islands) up to 300m distance;
- 100m for dust, noise and vibration impacts to terrestrial habitats; and
- 20m for all other impacts on land to terrestrial habitats and species (including those listed in S41 of the NERC Act.

Establishing Baseline Conditions

7.4.4 This section briefly sets out the surveys completed to establish the baseline conditions. A summary table (Table 7.4) is provided which shows the timeline of the extensive on-site surveys and monitoring that has occurred to date. To limit the amount of repetition between documents, the methods undertaken for each survey are not repeated within this chapter but within the appropriate appendix as indicated in Table 7.4. A summary of baseline conditions is presented in Section 7.5.

Table 7.4: Baseline field surveys undertaken

Survey	Year					Appendix with full methods and results
	2021	*2022*	*2023*	*2024*	*2025*	
Preliminary Ecological Appraisal visits	✓	✓	✓			Appendix 7.1.
Priority habitat surveys	✓	✓	✓		✓	Appendix 7.1 (to 2023) Section 7.5 (2025)
Onsite habitat surveys	✓	✓	✓		✓	Section 7.5 (2025)
Bird surveys (breeding and wintering birds)		✓	✓	✓	✓	Appendix 7.3 and 7.4
Invertebrate surveys		✓	✓			Appendix 7.1
Badger surveys			✓		✓	Appendix 7.1 (2023)
Otter surveys			✓			Appendix 7.1
Water vole surveys	✓	✓	✓	✓		Appendix 7.1 and 7.8
Bat surveys		✓	✓	✓	✓	Appendix 7.7
Great Crested Newt (GCN) surveys		✓				Appendix 7.1
Reptile surveys	✓	✓				Appendix 7.1
Dormouse surveys	✓	✓				Appendix 7.1
Fish surveys		✓				Appendix 7.1
Aquatic invertebrate surveys		✓		✓		Appendix 7.6
Invasive non-native species			✓	✓		Appendix 7.6
Aquatic macrophytes			✓	✓		Appendix 7.6

7.4.5 Desk-based review has been undertaken at several points during the course of the project, initially for PEAs in 2021 and 2023 PEA (Appendix 7.1). An update desk study has been undertaken in 2025 to ensure the latest data has been incorporated into this assessment. The Defra Multi-Agency Geographic Information for the Countryside (MAGIC) website was reviewed, and biological records were purchased from:

- Greenspace Information for Greater London (GiGL);
- Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC); and
- Hertfordshire Environmental Record Centre (HERC).

Assumptions and Limitations

7.4.6 For the purposes of the impact assessment, it should be noted that the direct impacts arising from the Proposed Development will be geographically localised within the Site. This will limit direct impacts to those species present in that specific location (and ZoI) at the time the impact occurs. Not all species will be affected by each individual impact. The assumptions as to which species will be present when impacts occur have been clearly set out within the impact assessment.

7.4.7 Only where an impact has the potential to create a significant effect on the designated features of the SSSI (thus affecting the favourable conservation status of the SSSI) would a significant effect at the National level be identified by the impact assessment.

7.4.8 Surveys in 2021 and 2022 were limited to the Peninsula and parallel section of the Access Road as at the time impacts for the whole Site were not being considered. Surveys have been extended to the full Site boundary since late 2022.

7.4.9 Difficulties due to the presence of dense buddleia on the Peninsula constrained surveys during 2021, 2022 and into early 2023 by preventing access to certain areas and blocking visibility. However, further surveys carried out since buddleia clearance was undertaken in February 2023 have not had the same constraints, allowing the baseline to be fully established. All of the survey data is still considered to be valid in 2025 (when this application will be submitted) with any time sensitive surveys being updated in recent years if required.

7.4.10 Two experienced ornithologists were consulted in early 2023, prior to the breeding season, to try to determine if it was possible to assess disturbance impacts to breeding birds at the lake in the same way as for the wintering birds. It was concluded it would not be possible to survey for disturbance of breeding birds as they are very cryptic and will hide rather than be flushed when any disturbance occurs. If birds are flushed from within vegetation or from islands, it is often not possible to tell if they were flushed from a nest site. Too intrusive a search for nests amongst shoreline vegetation where nests may be hidden (to inform a baseline for a disturbance survey) may also cause nests to be abandoned. However, due to Natural England comments in response to the initial application a disturbance survey for breeding birds was attempted in 2024 utilising the same methodology as for the wintering bird disturbance study. No disturbance was observed for the reasons set out in this paragraph.

7.4.11 Bat activity surveys of the islands have not been possible due to potential disturbance to breeding birds present and the difficulties in gaining access / egress to safe vantage points for surveyors. However, the latest available radio tracking data from HS2, provided in May 2023, has allowed characterisation of the use of the full Site by bats including the islands to be established.

7.4.12 There are several limitations with the HS2 bat radio-tracking data (inherent to the technique and not to the HS2 survey effort) that should be borne in mind:

- Radio-tracking can only find roosts of bats that were tagged, and HS2 only had a licence to tag four species. Other species were not tagged and therefore their roosts are not represented, should they be present;
- The roost locations are considered to be approximate. Typically, radio-tracking has an accuracy of between 10 – 100m depending on the distance of triangulation, although if the night radio-tracking is followed up with daytime searches for day roosts, the exact tree or building can be determined. No survey results of daytime inspections or dusk emergence surveys of the identified roosts were provided by HS2, meaning that identification of the exact roost tree or feature was probably not part of the survey effort (this would be appropriate as the focus of HS2 survey efforts and data capture would not be on roosts located outside of the HS2 development boundary). Furthermore, although HS2 surveyors had full access to the Site, they would have been constrained from closely locating exact roost trees by the presence of dense buddleia (which was not cleared until February 2023). Therefore, the location of the roosts is assumed to be approximate with a 20m buffer at the Peninsula (where there was good access) and lower accuracy (larger buffer) further away from roads; and
- Accurate characterisation of the roosts was also not undertaken by HS2 (again this requires a dusk emergence survey of the roost to be done), so roost classification is assumed to have been made on a precautionary basis based on the sex and breeding status of the tagged bat. As such, a 'maternity roost' identified by HS2 data may only have been occupied by a single post-lactating female or by a juvenile bat with no signs of breeding late in the maternity season, and therefore large numbers of bats or a roost of high conservation value cannot be assumed to be present.

7.4.13 The assessment relies on the planning application drawings together with information presented in Chapter 5: Description of the Development and Chapter 6: Construction and accompanying Outline management plans including the Outline OMP (Appendix 5.1) and Outline CEMP (Appendix 6.1). This includes reasonable worst-case assumptions regarding the intensity and location of the future operational use of the Site.

7.5 Baseline Conditions

7.5.1 In accordance with an updated desk study (2025) and surveys undertaken between 2021-2025, the receptors presented within this section are limited to those recorded as present. Not all receptors which were recorded as present during the surveys have been identified as Important Environmental Features (IEFs). Only IEFs are assessed for the significance of effect.

Identification of IEFs

7.5.2 In accordance with the CIEEM Guidelines, IEFs are habitats, species or protected sites identified through the ecology desk study and field surveys that are of conservation interest or concern and that could be significantly affected by the Proposed Development.

7.5.3 Potential IEFs were identified through a comprehensive desk study and baseline field surveys, and include species populations, habitats, and protected sites within the Study Area and on which there could be potential effects as a result of the Proposed Development would be considered to be significant.

7.5.4 The determination of IEFs in this assessment is based on several criteria depending on the nature of the receptors.

7.5.5 Ecological features can be important for a variety of reasons and the rationale used to identify them is explained below. Importance may relate, for example, to protected status, the quality or extent of the site or habitats therein; habitat and / or species rarity; the extent to which such habitats and / or species are threatened throughout their range, or to their rate of decline.

7.5.6 Under the CIEEM Guidelines, the first step in the Ecological Impact Assessment (EcIA) process is determination of which ecological features or receptors (designated sites, habitats, species, ecosystems and their functions / processes) are important. To determine this, the baseline data were reviewed.

7.5.7 Important habitats are considered here to be:

- Habitats listed on Annex 1 of the Habitats Directive, as far as it applies to the UK and as transposed by The Conservation of Habitats and Species Regulations, 2017 (hereafter referred to as the 'Habitat Regulations')
- Habitats of principal importance under Section 41 of the NERC Act; and
- Irreplaceable habitats such as (but not limited to), ancient woodland and veteran trees. Habitats which comprise a significant habitat resource for an important species.

7.5.8 Important species are considered here to be:

- Of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive) as far as it applies to the UK and as transposed by the Habitats Regulations;
- Specially protected under the terms of the Wildlife and Countryside Act 1981;
- Species of principle importance under Section 41 of the NERC Act 2006;
- Those which are listed as a Nationally Rare or Nationally Scarce species (e.g. in one of the Species Status Project reviews) or listed as a nationally notable species where a more recent assessment of the taxonomic group has not yet been undertaken; and
- Endemic to a country or geographic location (it is appropriate to recognise endemic sub-species, phenotypes, or cultural behaviours of a population that are unique to a particular place).

7.5.9 The CIEEM Guidelines state that the importance of an ecological feature should be considered within a defined geographical context. Potential IEFs are assigned a value based on their biodiversity conservation value and the need to conserve representative areas of habitats and genetic diversity of species populations. Potential IEFs were given a value on a geographical scale as described in Table 7.5.

Table 7.5: Geographic categories of importance for potential ecological receptors

Importance	Examples (where possible of relevance to this assessment)
International or European (Very high)	An internationally designated site or candidate site, such as a SPA, SAC, Ramsar Site, Biosphere Reserve or an area Natural England has determined meets the published selection criteria for such a designation, irrespective of whether or not it has yet been notified. Species present in numbers greater than 1% of the international population.
National (High)	A nationally designated site, e.g., SSSI, NNR, Marine Nature Reserves or an area which Natural England has determined meets the published selection criteria for national designation (e.g., SSSI selection guidelines) irrespective of whether or not it has yet been notified. Bird species present onsite which represent >1% of the UK breeding or wintering population.
Regional (Medium to High)	Regionally important site or network of sites that encompass more than one London Borough or adjacent counties, irrespective of whether or not it has been designated e.g. Colne Valley Gravel Pits. Bird species present onsite which represent at least 0.5% but no more than 1% of the breeding or wintering population.
Borough (Medium)	Viable areas of habitat identified in a Borough BAP or designated as a Local Wildlife Site (LWS) or SINCs within London. A local significant population of a species identified as important on a county basis, such as a Borough BAP. Bat assemblages of moderate diversity as defined by the Bat Mitigation Guidelines (2023). Diverse and / or ecologically valuable habitats, including S41 Habitats of Principal Importance. Bird species present onsite which represent at least 0.1% but no more than 0.5% of the breeding or wintering population.
Local (Low)	Features of value to the immediate area only. Non-statutory protected sites with local status (London SINCs). Widespread protected species which occur in low numbers on the Site. Non-protected species in high numbers.
Zone of Influence (Negligible)	Commonplace feature of little or no habitat / historical significance. Loss of such a feature would not be seen as detrimental to the ecology of the area. Non-protected species in low to medium numbers.

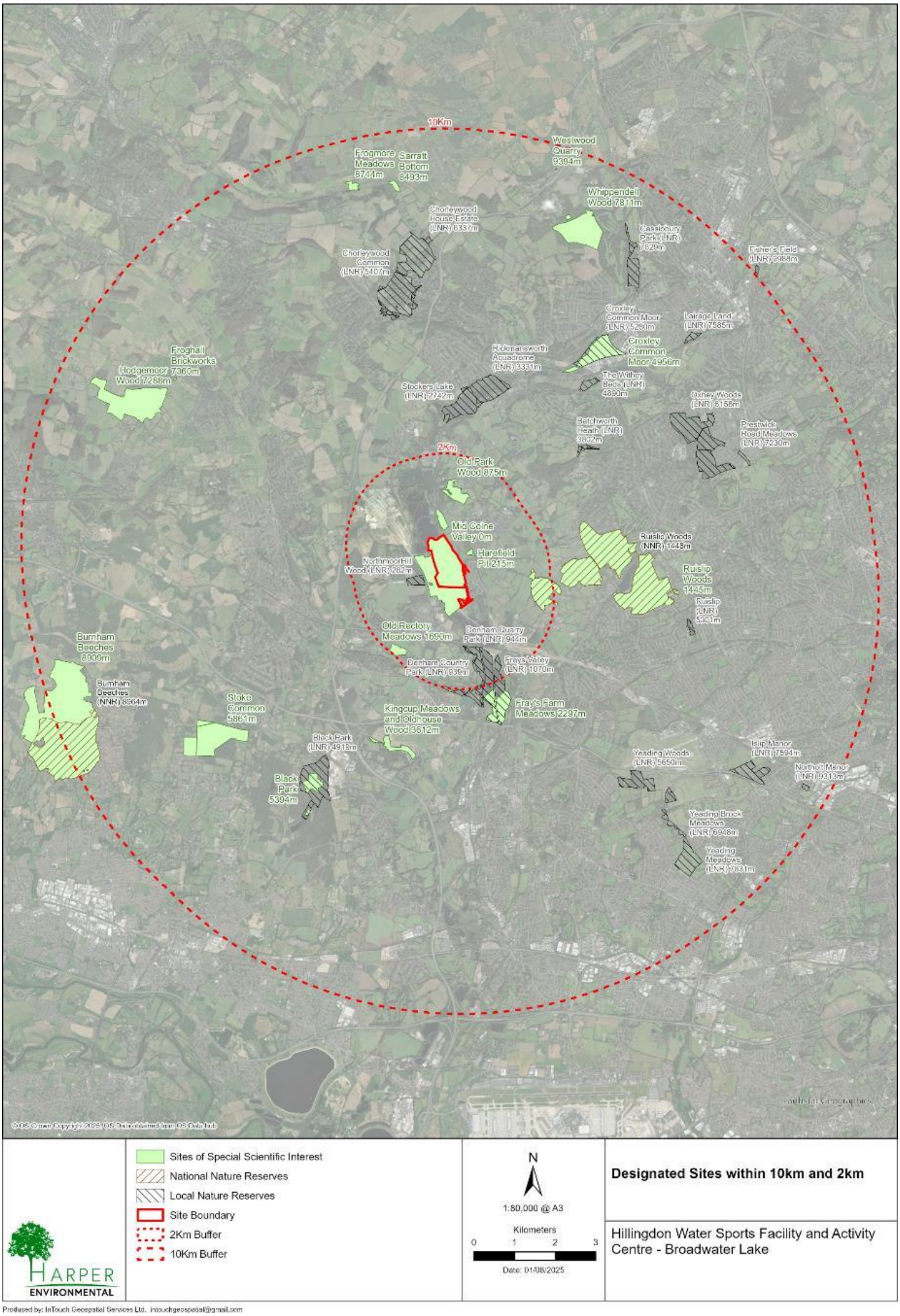
7.5.10 Under the CIEEM Guidelines, it is not considered necessary to carry out detailed assessment of features (habitats or species) that are sufficiently widespread and resilient

to project impacts such that there is no risk to the integrity or viability of the resource. For this project, this typically applies to IEF given an importance of 'Zone of Influence' or 'Negligible'. However, some species assessed as having importance within the Zone of Influence are protected by law (such as low populations of common breeding bird species) and therefore are still considered to be an IEF from a legal perspective.

Protected sites

7.5.11 Protected sites located within the Study Area are shown on Figure 7.1.

Figure 7.1: Protected Sites within the Study Area (2km and 10km buffer shown)



Protected sites within the boundary of the Site

Mid Colne Valley Site of Special Scientific Interest

7.5.12 The majority of the Site is within the boundary of the Mid Colne Valley SSSI. The Mid Colne Valley SSSI is comprised of four individual nature conservation sites (units). The total area of the SSSI is 147.73ha of which 72.03ha is outside of the Site boundary. The Site is located wholly within Unit 3 – Broadwater Lake.

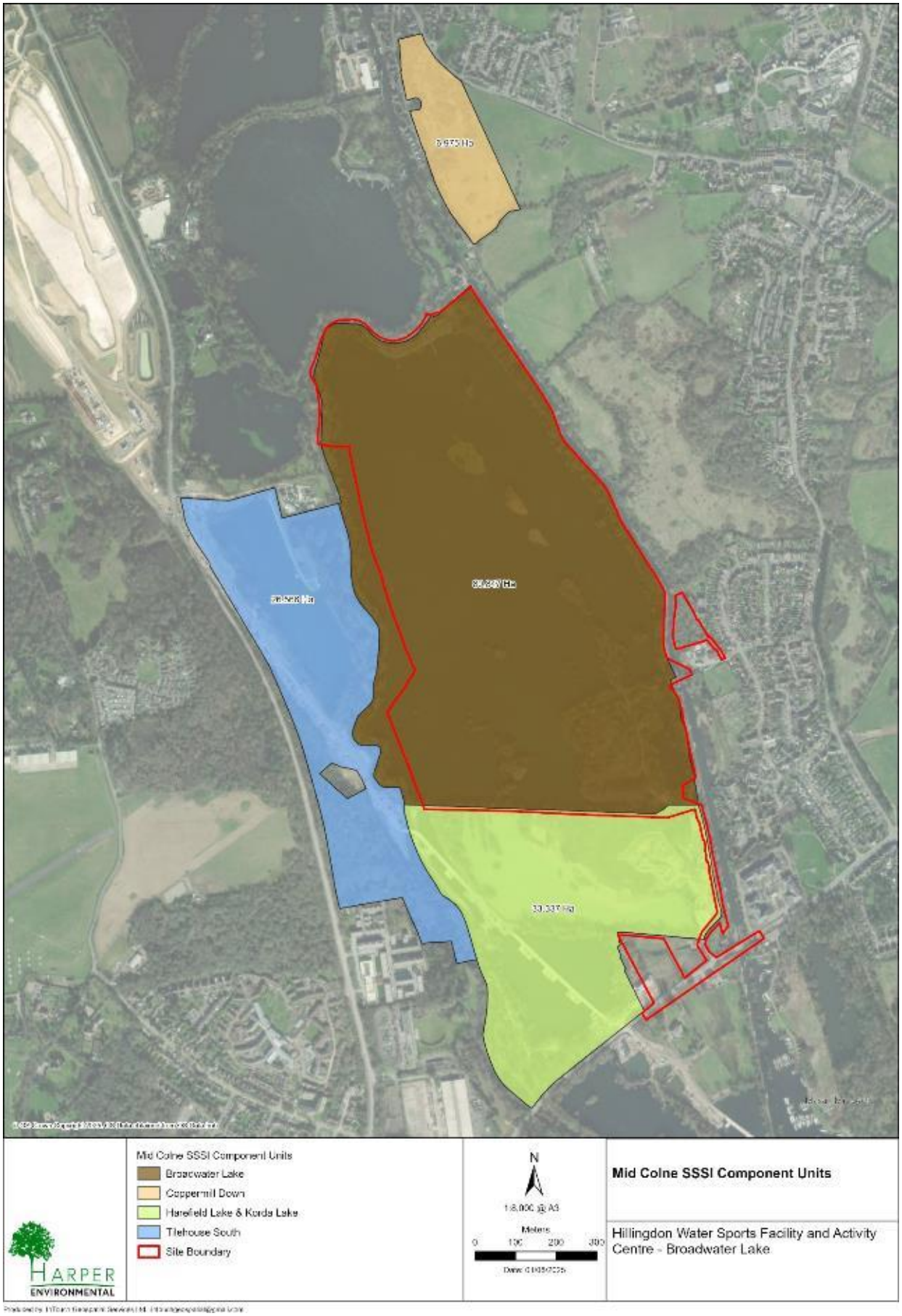
7.5.13 The designated units of the SSSI are set out in Table 7.6 and shown in Figure 7.2. Together, these units provide the requisite habitats that support the SSSI designated features set out in Table 7.7.

Table 7.6: Units of the Mid Colne Valley SSSI

Unit	Unit name	Area (ha)	Habitat Features	Location Relative to the Site	Condition
1	Coppermill Down	6.975	Lowland calcareous grassland	Off-site approximately 100m north of the Site	Unfavourable - declining
2	Tilehouse South	26.567	Standing open water and canals	Off-site immediately to the west of the Site	Unfavourable - no change
3	Broadwater Lake	80.847	Standing open water and canals	On-site	Unfavourable - no change
4	Harefield Lake and Korda Lake	33.338	Standing open water and canals	Off-site immediately south of the Site	Unfavourable - no change
Total area		147.726			

7.5.14 The most recent condition assessment was carried out in 2023. The SSSI as a whole is considered to be in an **unfavourable condition** due to the lowest condition assessment of any one feature (Table 7.7).

Figure 7.2: Units of the Mid Colne Valley SSSI showing the Site boundary



7.5.15 The designated features of the SSSI are set out in Table 7.7 along with their condition in 2023.

Table 7.7: Designated features of the SSSI and their condition

Designated feature	Condition in 2023	Present within the Site
Aggregations of non-breeding birds - variety of wintering species	Favourable	Yes
Aggregations of non-breeding birds - Tufted duck Aythya fuligula	Favourable	Yes
Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland	Favourable	Yes
Assemblages of breeding birds - Mixed: Scrub, Woodland	Unfavourable – no change	Yes
Assemblages of breeding birds - variety of species	Unfavourable – no change	Yes
Lowland calcareous grassland (CG3-5)	Unfavourable declining	No

7.5.16 Although these habitats and aggregations / assemblages of birds form part of the designation of the SSSI, the entirety of which has a **National importance**, the ecological value of the individual designated features have been assessed rather than simply applying a blanket National value. The value of each designated feature value is presented within Table 7.14.

7.5.17 Lowland calcareous grassland (CG3-5) - this feature does not occur within the boundary of the Proposed Development or within the zone of influence and is not considered further.

Mid Colne Valley Site of Importance for Nature Conservation (SINC) - Metropolitan

7.5.18 London's equivalent of LWSs, SINCs are recognised for the important habitats they support. This is a non-statutory designation, although SINCs are still afforded a high level of protection within the planning system.

7.5.19 In London, SINCs are designated as one of a hierarchy of types:

- Sites of Metropolitan Importance are selected on a London-wide basis;
- Sites of Borough Importance (Grade I and II, with Grade I being of higher importance) are selected from candidates within each borough, so ensuring that borough has some sites identified; and

- Sites of Local Importance are the lowest tier of sites, selected to redress any remaining local deficiencies.

7.5.20 The Site itself, as well as the adjacent lakes and active mineral works to the south of the Site, are covered by a section / parcel of the Mid Colne Valley SINC. This is a multi-site designation (as shown in Figure 7.1), formed of several parcels and which is of **Regional importance**. It covers an area of 324.74ha.

7.5.21 The SINC is summarised as *'A section of the Colne Valley with a remarkable range of high-quality wetland habitats, including three Sites of Special Scientific Interest'.*

7.5.22 There is also a specific mention of the birds using Broadwater Lake, which is in line with the SSSI designation.

London's Canals SINC – Metropolitan

7.5.23 The London Canals SINC overlaps the Site at the eastern edge and where utilities cables will be brought to the Proposed Development.

7.5.24 The SINC is summarised as '*London's canals provide a home for many fish and aquatic plants and are a great way to enjoy the natural world in some of the city's most built-up areas. The whole of the Grand Union Canal system in London, including the Regent's and Hertford Union Canals, is included in this single Metropolitan site*'.

7.5.25 In line with how geographic importance is defined this site is given **Regional importance**.

Protected sites outwith the boundary of the Site

Statutory protected sites outwith the boundary of the Site

7.5.26 Figure 7.3 shows the location of statutory protected sites relative to the Site comprising SSSIs, NNRs and LNRs.

7.5.27 The closest international statutory designated site, Burnham Beeches SAC and NNR, lies 8.9km away. The Site does not fall within the 5.6km zone of influence buffer zone around the SAC whereby impacts from development which could lead to recreational pressure are required to be considered. As such it is not an IEF for this assessment.

7.5.28 Within 10km there are four SSSIs with mention of birds within the descriptions for the sites. The SSSI Impact Risk Zone (IRZ) of these sites do not overlap the Site, however they have been considered to ensure all potential impacts are assessed for mobile species. These SSSI are:

- Sarratt Bottom SSSI (8.6km north) - alluvial meadow designated for damp species-rich neutral grassland. The description notes that it supports a variety of wetland birds and wide range of invertebrates;
- Hodgemoor Wood SSSI (7.3km north west) – designated for ancient and semi-natural broadleaf woodland. The description mentions supporting many woodland bird species;
- Whippendell Wood SSSI (7.8km north east) – designated for ancient woodland. There is mention of a diverse woodland bird community; and

- Black Park SSSI (5.4km south west) - variety of habitats and designated for lowland woodland and heathland. There is mention of a wide variety of breeding and wintering birds.

7.5.29 The above sites are not judged to be an IEF for this assessment, as their designations do not include important assemblages of wintering or breeding birds and would not be directly or indirectly affected by the Proposed Development.

7.5.30 Within 2km, there are four sites with SSSI statutory designation (of which one is also an NNR) with IRZ that overlap the Site. There are also four LNR, which are of **Borough importance**. Table 7.8 below gives the locations and descriptions of these sites.

Table 7.8: Statutory Designated Sites within Study Area (outwith the Site)

Site Name	Approximate Location	Description	Considered an IEF
Harefield Pit SSSI	214m north east	Designated for its geological interest only.	No – no ecological features
Old Park Wood SSSI	874m north	Designated for ancient woodland, 'some of the most floristically rich ancient woods in Greater London'.	No – no mobile features
Ruislip Woods SSSI and NNR	1.5km east	Designated for its ancient semi-natural woodland and invertebrates' assemblage	No – no mobile features
Old Rectory Meadows SSSI	1.7km south west	Grassland of botanical interest. 'Base-rich and poor marsh, wet alluvial meadows and water meadows with grazed wet and damp meadows, as well as alder carr woodland' on calcareous gley soils.	No – no mobile features
Northmoor Hill Wood LNR	282m west	Ancient woodland.	No – no mobile features
Denham Country Park LNR	1.5km south	River, wetland, meadow and woodland habitats. 'A scenic and relaxing location on the banks of the rivers Colne, Misbourne and Frays, the park is home to a mix of wildlife. You may catch a glimpse of herons and kingfishers while in summer damselflies and dragonflies dart over the wet meadows.' West of the Grand Union Canal	No – outwith potential ZoI
Denham Quarry Park LNR	1.5km south	Same as above – east of the Grand Union Canal	No – outwith

Site Name	Approximate Location	Description	Considered an IEF
			potential ZoI
Frays Valley LNR	1.8km south	Same as above – east of Denham Quarry Park LNR	No – outwith potential ZoI
Denham Lock Wood SSSI	2.9km south	Part of the Mid Colne Valley SINC designation: wet alder-willow woods supporting a rich fen flora. Invertebrates here include the nationally rare species Desmoulin's whorl snail (*Vertigo moulinsiana*) and the balsam carpet moth. Feature: Lowland wetland including basin fen, valley fen, floodplain fen, waterfringe fen, spring / flush fen and raised bog lagg – Favourable. Feature: Wet woodland – Favourable. Unit: Broadleaved, Mixed and Yew Woodland – Lowland – Favourable (floodplain and swamp)	No – the Site is out of SSSI IRZ
Frays Farm Meadow SSSI (forming part of Frays Valley LNR and the Mid Colne Valley SINC designation)	2.3km south	Feature: Floodplain fen (lowland) – Unfavourable declining Units: 001 Neutral grassland – Favourable 002 Neutral grassland – Unfavourable declining.	No – the Site is out of SSSI IRZ

Non-statutory protected sites outwith the boundary of the Site

7.5.31 There are multiple non-statutory designated sites adjacent to and within 2km of the Site. SINCs within 2km of the Site are detailed in Table 7.9 and shown in Figure 7.3. However, due to the ZoI, none of these sites are considered IEFs and no potential impact would occur.

Figure 7.3. SINCs within 2km of the Site

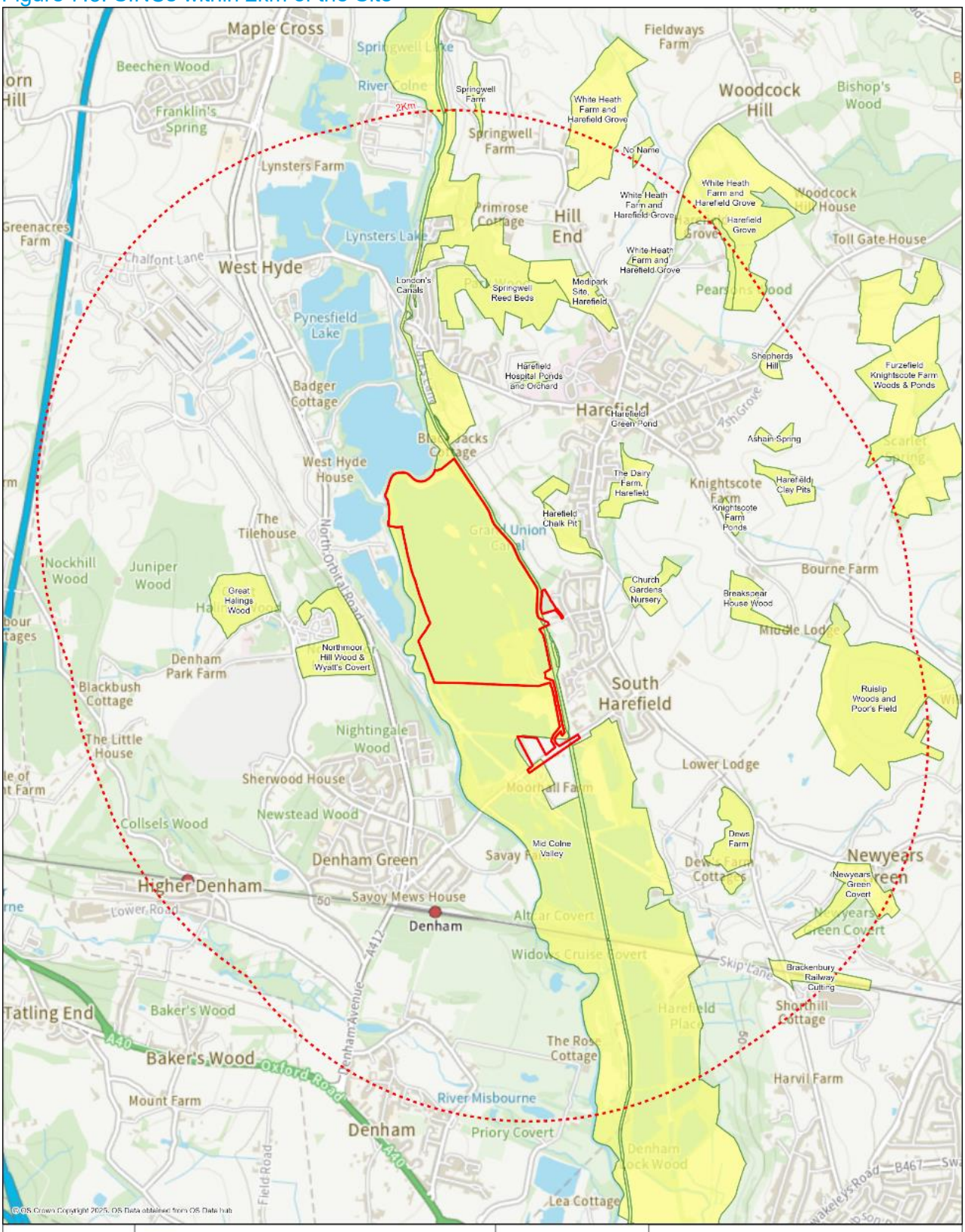


Table 7.9: Details of the SINCs within the Study Area

Site Name	Approximate Location from Site	Description	Considered an IEF
Coppermill Down SINC (Metropolitan)	107m north east	The only natural chalk grassland in north London, with an excellent range of wildflowers. (This also forms one of the units of the Mid Colne Valley SSSI).	No – outwith ZoI from works on Peninsula which could impact terrestrial sites
Harefield Chalk Pit SINC (Borough Grade I)	235m north east	Oak woodland which has developed in an old chalk pit.	No – outwith ZoI from works on Peninsula which could impact terrestrial sites
Northmoor Hill Wood and Hyatts' Covert LNR	215m west	Acid broad-leaved woodland and geological site.	No – outwith potential ZoI
Harefield Churchyard and Wood SINC (Borough Grade I)	500m east	A picturesque 14th century parish church and cemetery.	No – outwith potential ZoI
Harefield Hospital Ponds and the Old Orchard (Borough Grade II)	592m north east	Two ponds in the grounds of Harefield Hospital, and an old orchard within a tenanted	No – outwith potential ZoI
The Dairy Farm, Harefield (Borough Grade II)	630m north east	A small but interesting area of fields with no official public access.	No – outwith potential ZoI
Old Park Wood (Metropolitan; also, a SSSI)	690m north	A fine ancient wood, rich in woodland wildflowers.	No – outwith potential ZoI
Great Halings Wood	709m west	Species-rich ancient woodland with good links to other ancient woodlands	No – outwith potential ZoI
Breakspear House Wood (Borough Grade II)	961m east	A small ancient woodland with a footpath running through it.	No – outwith potential ZoI
Harefield Green Pond (Borough Grade II)	978m north east	A small pond on the edge of the historic village green of Harefield.	No – outwith potential ZoI

Site Name	Approximate Location from Site	Description	Considered an IEF
Knightscote Farm Ponds (Borough Grade II)	1.1km east / north east	Two ponds separated by an area of woodland, one used for fishing.	No – outwith potential ZoI
Dews Dell SINC (Borough Grade I)	1.2km south east	An old quarry with great wildlife potential.	No – outwith potential ZoI
Medipark Site (Borough Grade I)	1.2km north east	An interesting mosaic of habitats within the former grounds of a demolished hospital building. Adjoins the eastern edge of Old Park Wood	No – outwith potential ZoI
Ruislip Woods and Poor's Field (Metropolitan)	1.3km east	One of London's two National Nature Reserves, this site includes a large area of ancient woodlands, as well as heathland and grassland.	No – outwith potential ZoI
Shepherd's Hill Woods and Fields (Borough Grade I)	1.4km east	A large mosaic of fields and small woods with thick inter-connecting hedges, creating a distinctly rural feel.	No – outwith potential ZoI
Newyears Green (Borough Grade I)	1.4km south east	A woodland believed to have been planted in the late 19th century, surrounded by fields and hedges.	No – outwith potential ZoI
White Heath Farm and Harefield Grove (Borough Grade II)	1.5km north east	No details provided	No – outwith potential ZoI
Harefield Hall and the Lodge	1.6km south east	No details provided	No – outwith potential ZoI
Shepherds Hill House (Borough Grade II)	1.8km north east	No details provided	No – outwith potential ZoI
Denham Marsh Wood	1981m south	Semi-natural acidic high forest broad-leaved woodland. Mature stands of Silver Birch and Beech dominate. A few clumps of Heather and frequent Sessile Oak,	No – outwith potential ZoI

Site Name	Approximate Location from Site	Description	Considered an IEF
		indicating the presence of heathland.	
Springwell and Stocker's Lakes (Metropolitan)	1.9km north	Lakes forming part of the Mid Colne Valley Gravel Pits. Herts and Middlesex Wildlife Trust Nature Reserve. Important for wintering and breeding birds, with a heronry	No – outwith potential ZoI

Biodiversity Opportunity Areas (BOA)

7.5.32 The Colne Valley BOA lies outwith the Site; it stretches from the far bank of the River Colne at the north west corner of the Site and extends south for 11.6km to Junction 15 of the M25. The Central Chilterns Chalk Rivers BOA lies 1.36km south west at the closest point.

7.5.33 These BOA have not been identified as IEFs as the Site does not fall within their boundaries.

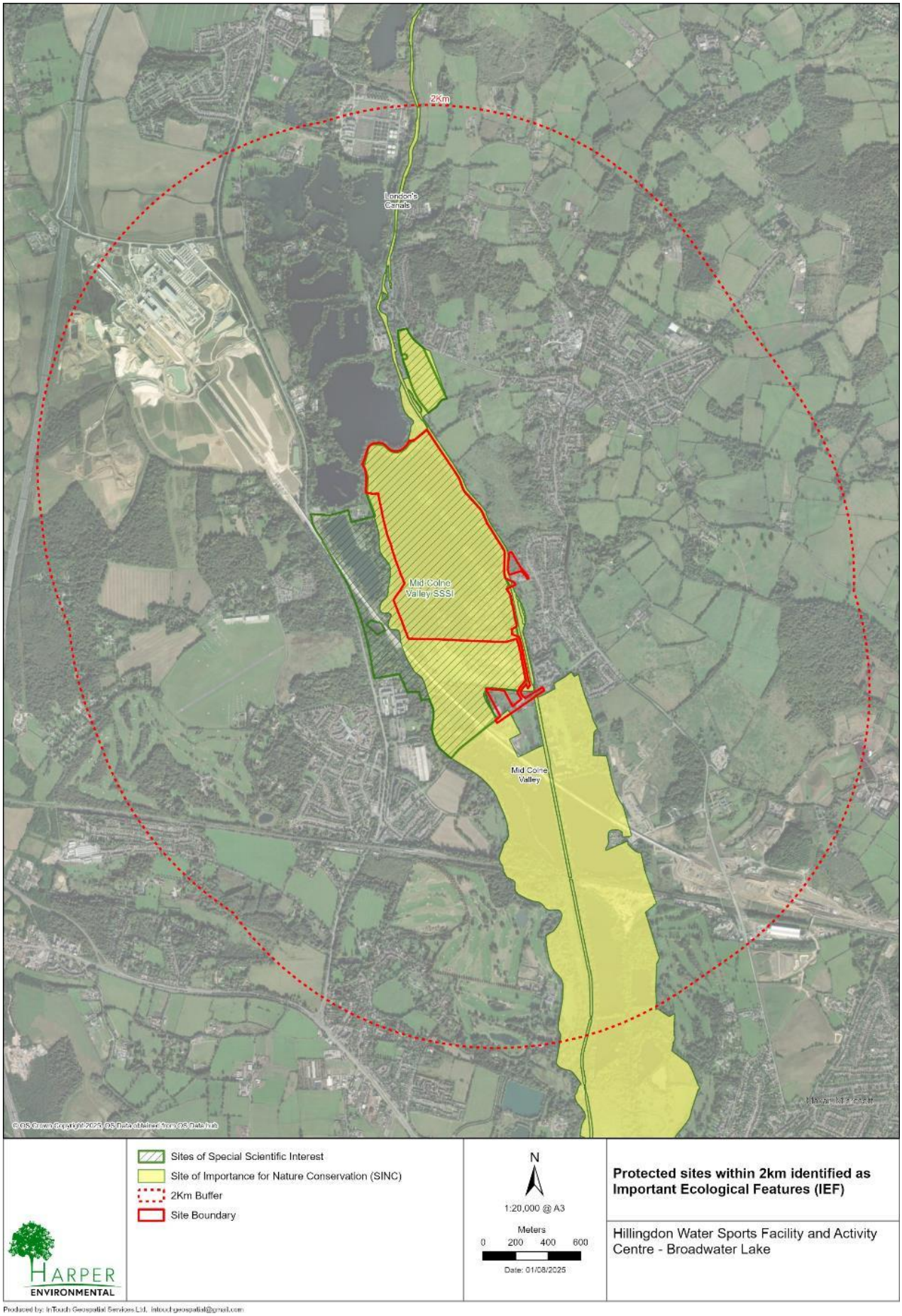
Biological Notification Sites (BNA)

7.5.34 There are four BNA within 2km of the Site. The closest is Tilehouse Gravel Pits, its boundary is formed by the far bank of the River Colne adjacent to the west side of the Site.

Protected Sites identified as IEFs

7.5.35 The final sites identified as IEFs for consideration within this assessment are shown in Figure 7.4

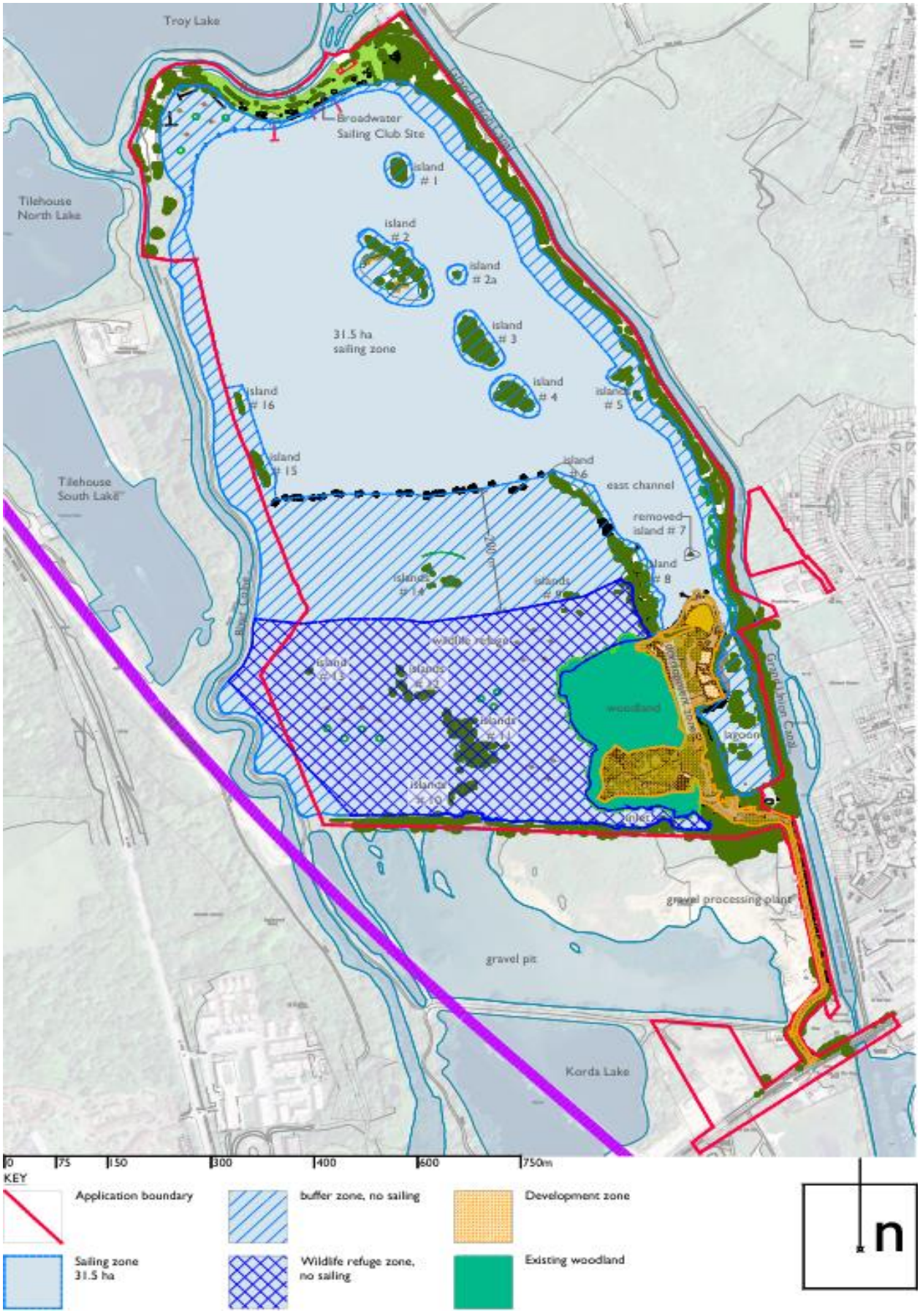
Figure 7.4. Protected sites within 2km identified as Important Ecological features (IEF) for the Proposed Development



Habitats and plants

7.5.36 To aid review of the following sections of this chapter, Figure 7.5 provides a key to the location references and island numbering.

Figure 7.5 Location referencing within the Site



Priority Habitats

7.5.37 The following priority habitats (as defined by Section 41 of the NERC Act) were identified at the Site and immediate surrounds:

- Ancient woodland and veteran trees;
- Woodland; and
- Standing water bodies: Pond, Lake.

7.5.38 The following UK BAP priority habitats were present at Site or in the immediate vicinity:

- Deciduous woodland (on Site and in immediate vicinity); and
- River Colne - a Chalk River.

7.5.39 The London BAP lists four priority habitats and 11 Habitat Action Plans (HAP). Those of relevance to the Site comprise:

- Parks and Urban Green Spaces HAP;
- Rivers and Streams HAP;
- Standing Water HAP (including canals); and
- Woodland HAP.

7.5.40 The habitats present at the Site are shown in Figures 1-5 in Appendix 7.2.

Ancient woodland and veteran trees

7.5.41 One parcel of ancient woodland lies 95m west from the south western corner of the Site beyond the River Colne. The woodland (Battlesford Wood or Ranston Covert) is under the possession of HS2 and lies directly adjacent to the new viaduct on the far side away from the Site. Beyond this, further parcels of ancient woodland lie 225m west and 315m west. Due to the location beyond the River Colne and the HS2 Colne Valley viaduct, and more than 500m from proposed construction works, this woodland does not lie within the ZoI of the Proposed Development.

7.5.42 No veteran trees have been identified within the ZoI of the Site. The closest notable tree identified by the Ancient Tree Inventory[13] is a 4.99m DBH hybrid black poplar 'robusta' located 205m east (beyond the Grand Union canal) at the margin of a recreation ground.

7.5.43 Due to the factors outlined above, neither receptor has been identified as an IEF for this assessment.

Wet woodland (w1d)

7.5.44 Wet woodland occurs across the Site, characterised by dominant willows (*Salix sp.*), alder (*Alnus glutinosa*) and silver birch (*Betula pendula*), although some locations have other broadleaf species more indicative of drier woodland types, these species, such as oak (*Quercus robur*) and hazel (*Corylus avellana*) were fairly localised and in rare cover abundance across the habitat unit areas. There was variability in species composition, depending on location across the site and former land uses. Much of the ground within the

woodland areas shows signs of nutrient enrichment due to the high presence of nettle (*Urtica dioica*).

7.5.45 Across the northern tip of the Peninsula is an area of wet woodland which borders the water's edge. Some areas have been used by fishermen which have compacted the ground, limiting presence of ground flora. The tree species comprised dominant alder, abundant white willow with occasional goat willow, grey willow and silver birch. Rare occurrences of sycamore were also present. The ground flora was dominated by nettle with occasional hemp agrimony, water mint, garlic mustard (*Alliaria petiolata*), creeping cinquefoil (*Potentilla reptans*), creeping buttercup, spreading hedge-parsley (*Torilis arvensis*), Yorkshire fog (*Holcus lanatus*) and London Invasive Species Initiative (LISI) species buddleia and goat's-rue (*Galega officinalis*).

7.5.46 At the Peninsula within an area which was formerly a silt lagoon, woodland was characterised by pools of water and extremely significant amounts of deadwood on the ground. Tree species recorded were dominant willows (*Salix sp.*) including white willow (*Salix alba*), crack willow (*S. fragilis*), goat willow (*S. caprea*), grey willow (*S. cinerea*), alder and abundant silver birch (*Betula pendula*) and rare sycamore (*Acer pseudoplatanus*). Species typical of damp and wet habitats recorded were occasional gypsywort (*Lycopus europaeus*), water mint (*Mentha aquatica*), hemp agrimony (*Eupatorium cannabinum*) and yellow flag iris (*Isis pseudacorus*). In drier areas, ground flora recorded comprised dominant nettle with frequent St John's wort (*Hypericum perforatum*), and occasional to rare herbs including forget-me-not (*Myosotis sylvatica*), self-heal (*Prunella vulgaris*), great burdock (*Arctium lappa*), cleavers (*Galium aparine*), spear thistle (*Circium vulgare*), woodland sedge (*Carex pendula*), ground ivy (*Glechoma hederacea*), cotoneaster (*Cotoneaster sp.*), stone parsley (*Sison amomum*).

7.5.47 The woodland surrounding the former silt lagoon to the north, east and south was also dominated by wet woodland species of alder and white willow and frequent grey willow. Other tree species include occasional silver birch, rare occurrences of ash (*Fraxinus excelsior*), oak, wild cherry (*Prunus avium*), hawthorn (*Crataegus monogyna*). Shrubs included frequent buddleia and occasional elder (*Sambucus nigra*). Ground flora was dominated by common nettle, abundant garlic mustard, occasional woodland sedge and rare instances of hemp agrimony, goat's-rue, St John's-wort, bramble, scarlet pimpernel (*Lysimachus arvensis*), scentless mayweed (*Tripleurospermum inodorum*), creeping thistle and fleabane (*Erigeron sp.*).

7.5.48 The woodland that borders the south of the Peninsula comprised predominantly wet woodland species of alder but also silver birch. Grey willow was occasional, with rare white willow, ash, sycamore horse chestnut (*Aesceulus hippocastanum*) and large leaved lime (*Tilia platphyllos*). Shrub species included rare holly (*Ilex aquifolium*) and buddleia. Ground flora was sparse in areas however was dominated by nettle with occasional tutsan (*Hypericum androsaemum*) and garlic mustard with rare goat's-rue, water mint, woodland sedge, glaucous sedge (*Carex flacca*), creeping bent (*Agrostis stolonifera*) and common fleabane (*Pulicaria dysenterica*). Wooded islands within the lake have also been classified as wet woodland - these are covered with willows. It has not been possible to examine the ground flora so as not to disturb breeding birds nesting at the islands, however from a distance the smaller islands were largely comprise of bare ground. Where the base of small islands has been seen closely, these were mainly covered with sections of fallen willow trunk from which new trees have arisen.

7.5.49 A small island just north of the Peninsula is comprised of wet woodland. The tree species are dominated by white willow, with abundant alder, silver birch, occasional sycamore and rare rowan (*Sorbus aucuparia*) and poplar species (*Populus sp.*). Shrub species comprised frequent elder, rare hawthorn, buddleia and holly. The ground flora was dominated by common nettle, ground-ivy, bramble, frequent common ivy (*Hedera helix*), woodland sedge, occasional water mint, garlic mustard, lesser burdock (*Arctium minus*), marsh woundwort (*Stachys palustris*) and rare goat's-rue, cow parsley (*Anthriscus sylvestris*) and hemp agrimony.

7.5.50 In the north of the Peninsula adjacent to the wet woodland is an area of willow scrub that lines the shoreline. It was dominated by semi-mature grey willow that were approximately 4m in height and rare alder. The area was also dominated by buddleia with abundant bramble. Along the southern edge of the willow scrub was abundant Yorkshire fog and creeping cinquefoil, occasional false oat-grass (*Arrhenatherum elatius*), St John's-wort and rare yarrow (*Achillea millefolium*).

7.5.51 Along the eastern shoreline was dominated by willow species and buddleia that had grown up through the concrete. Over years leaf litter has formed a thin soil layer for nutrient rich species to grow such as nettles, St John's-wort, goat's-rue and Yorkshire fog in areas. Due to the trees growing through concrete, it was best placed for this to be categorised as developed land, sealed surface with individual trees.

7.5.52 Woodland occurring on former mineral working areas across the Site surrounds the wet woodland; it occurs on very hard and organic-poor substrate. The habitat was species-poor and comprised mainly willow, birch and alder. Willows occurred on the shorelines. It had a very sparse and species-poor ground flora comprising of dominant nettle (*Urtica dioica*) with frequent St John's wort, and occasional bramble (*Rubus fruticosus agg.*), cleavers (*Galium aparine*) ivy (*Hedera helix*) and buttercup (*Ranunculus sp.*), being quite choked with buddleia in many places.

7.5.53 Along small areas of remaining natural ground at the Peninsula and along the southern boundary of the Site, this habitat was more species rich as natural soil was present. As well as willows, species included pedunculate oak (*Quercus robur*), alder, birch and hazel (*Corylus avellana*). This woodland had a diverse ground flora of ruderal / ephemeral where buddleia and bramble scrub had been kept from encroaching along a pathway running through this area.

7.5.54 Along the Access Road, at the sides of the lake and along the Grand Union Canal all the way to Broadwater Sailing Club (BSC) wet woodland occurs with a native woodland understorey of mixed scrub, herbs and grasses. Species included oaks (*Quercus spp.*), willows, black poplar (*Populus nigra*) with alder, birch and hazel, and understorey of bramble, nettles, ivy.

7.5.55 Adjacent to Site to the south (running parallel with the causeway across the south end of the lake) lies a small area of wet woodland that has developed on another silt lagoon. This had areas of sinking sand visible from the path and was unsafe to access. This area lies outside the ZoI of the Proposed Development.

7.5.56 This woodland habitat is assessed as being of **Borough importance**.

Lowland mixed deciduous woodland (w1f)

7.5.57 Within a small land parcel across the Canal to the east, this closed-canopy woodland had formed on / adjacent to a historic landfill. It was dominated by hawthorn with areas of dense hawthorn scrub, with occasional dog rose (***Rosa canina***), birch, alder, bramble and a rather impoverished understorey of tall ruderals including nettles. Rubbish was present throughout the woodland and there was a lack of structural diversity, trees also appeared somewhat stunted. It was assessed as being in poor condition.

7.5.58 This woodland habitat is assessed as being of **Borough importance**. It lies well away from the zone of influence of proposed works and will not be impacted by proposals (other than for enhancement purposes) and has therefore not been identified as an IEF.

Ponds

7.5.59 There are pools of standing water within wet woodland on-Site, these vary in extent according to the height of the water table and amount of recent rain. However, these are categorised within wet woodland (as a characteristic of that habitat) rather than discrete habitat in their own right, which is in accordance with the UKHab classification scheme mainly due to their small size.

Open standing water

7.5.60 Broadwater Lake, the inlet and lagoon, and standing pools of water in the wet woodland are present at the Site. Approximately 60ha of the lake's open water falls within the Site boundary of the Proposed Development.

7.5.61 Broadwater Lake has been assessed using EA criteria as a lake of medium alkalinity due to test results of 120mg/l of calcium carbonate ($CaCO_3$).

7.5.62 The Freshwater Biological Association 'Habitat Naturalness Assessment' may be used to assess the condition of lakes (this is used for the Defra Biodiversity Metric). Scores for four attributes (physical, hydrological, chemical, and biological naturalness) are averaged to generate an overall 'habitat naturalness assessment score' which can then be translated into a condition score.

7.5.63 In 2024 in-depth investigations were undertaken into lakebed and shoreline morphology (bathymetry), sediment composition, water quality, presence and diversity of aquatic plants and algae, diversity and distribution of macroinvertebrates, presence of invasive species. Appendix 7.6 provides a lake condition assessment technical note along with the reports that together inform the lake condition assessment. The surveys detected localised nutrient enrichment within the Eastern Channel which has been linked to leakages from the adjacent Grand Union Canal. Using the available data and professional judgement, the lake has been assessed as being in moderate condition.

7.5.64 As the habitat open standing water supports the designated features of the Mid Colne Valley SSSI, the habitat is valued at **National importance**. The open standing water habitat in itself is not of national importance, but the assemblage of breeding and wintering bird features require this habitat for the SSSI to function and therefore for precaution this habitat will be assessed as having National importance. Refer to Chapter 8: Water Resources and Flood Risk for further information on the lake as a waterbody and water quality.

River Colne

7.5.65 The River Colne lies directly adjacent to the west and north of the Site boundary; it is a priority habitat and designated as UK BAP and London BAP habitat. It has **Regional importance** as its character influences the entire Colne Valley. It lies up-hydrological gradient from the Site (the direction of groundwater flow is to the south). A river condition assessment was undertaken by Greengage in 2024 in support of the Biodiversity Net Gain Assessment (Appendix 7.10).

Grand Union Canal

7.5.66 The Grand Union Canal lies within the boundary of the Site to the eastern edge. It is designated as London BAP habitat; forms part of the London's Canals SINC and is valued as a corridor for wildlife. As part of a SINC designated throughout Greater London, it is valued at **Regional importance**.

Open mosaic habitat

7.5.67 MAGIC indicatively shows some of the Site as Open Mosaic Habitat (due to its previously developed land usage) however this mapping is not based on detailed surveys.

7.5.68 Field survey data and use of satellite imagery and Google Earth was utilised to assess whether the Site contained any areas meeting the UK BAP criteria of open mosaic habitat on previously developed land. This assessment (detailed within the PEA in Appendix 7.1) found that the Site failed to meet three (criteria 1,4 and 5) of five relevant criteria for open mosaic habitat. Open mosaic habitat is therefore not present at the Site and is not an IEF.

Notable, rare or protected plants

7.5.69 There are relatively few notable, rare or protected plant species records within 2km. Ranston Covert 30m west on the far side of the River Colne has records dating from 1968 to 1995 of bluebell, coralroot bittercress (a rare plant whose distribution is restricted nationally), Scots pine and small teasel *Dipsacus pilosus*. Fringed waterlily was recorded within the Colne Valley lakes.

7.5.70 No specially protected plant species were recorded during habitat surveys in 2022-23 and update surveys in 2025.

7.5.71 A mature black poplar has been recorded at the Site along the canal next to the canal bridge. On a precautionary basis, it is assessed as having **Borough importance**. This is the only notable plant species receptor identified for the Site.

Other habitats and plants (non-priority)

Terrestrial habitats

7.5.72 The habitats present at the Site are shown in Figures 1 - 5 in Appendix 7.2.

7.5.73 The habitats at the Peninsula comprise:

- u1c – Artificial unsealed surface (gravel) with secondary codes designating small patches of habitat too small to map: 11 (scattered trees), 17 (ruderal / ephemeral), and 164 (moss lawn on concrete hardstanding);
- w1d – Wet woodland (described above under priority habitats);

- h3h – Mixed scrub with 1160 introduced shrub;
- u1b5 - Buildings; and
- u1b - Developed land; sealed surface (concrete).

7.5.74 The lake islands comprised ruderal / ephemeral (where managed for nesting birds) and wet woodland, with an area of introduced (non-native) scrub and another of dense scrub. Some individual mature trees were present, including willows, two oaks, a sycamore, a conifer species, and a silver birch.

7.5.75 Around the shoreline of the lake, emergent vegetation was present in small, isolated patches (too small to map) where shallows were present and not fully overshadowed by tree canopies. Species included common reed (Phragmites australis), rosebay willowherb (Chamaenerion angustifolium) and yellow flag-iris (Iris pseudacorus) as well as branched bur-reed (Sparganium erectum), water mint (Mentha aquatica) and purple loosestrife (Lythrum salicaria). Water level monitoring at the lake since 2023 has confirmed significant fluctuating levels through the year; these have caused vegetation to die in some years (such as in 2022) restricting its establishment and spread.

7.5.76 The section of Access Road from Moorhall Road to the entry to the Peninsula was constructed from concrete (u1b). The Access Road section from the gate at the Peninsula up to BSC was formed of gravel hardstanding (u1c). To each side of the Access Road was wet woodland.

7.5.77 The habitats at BSC comprised:

- g4 - Modified grassland;
- u1b – Developed land; sealed surface (concrete);
- u1b5 – Buildings;
- u1c – Artificial unvegetated unsealed surface; and
- w1d –wet woodland.

7.5.78 A field (former paddock) accessed from Moorhall Road in the south of the Site comprised modified grassland with 6sp per m^2 recorded during a June survey in 2023 and 4-6sp per m^2 during an update survey in August 2025. Habitat succession / lack of recent management has reduced the species diversity somewhat over time. The south-west corner had a greater proportion of tall ruderals and plants associated with damp habitats and for parts of the year this corner has had standing water, although it was dry at the time of survey in August 2025 (and mostly dry in June 2023). A small stand of willow scrub was present in the north of the field at the time of survey; the landowner undertakes infrequent ground clearance to maintain the field suitable for grazing by horses and so it is understood patches of scrub are scheduled for removal.

7.5.79 The woodland across the Canal to the east is accessible via a small area of u1b hardstanding.

7.5.80 All other habitats within the Site are considered to have **ZoI importance** only and are **not therefore identified as IEF** for the Proposed Development.

Aquatic macrophytes

7.5.81 Aquatic macrophyte surveys were undertaken in June 2024 by Bywater Ecology at five locations around the lake, using both boat- and land-based access points. The report is provided within Appendix 7.6. The location of the proposed new beach / sailing area at the north east of the Peninsula was not surveyed as it was unsuitable habitat for aquatic macrophytes (no marginal area for plants to establish, banks high and crumbling, water very deep).

7.5.82 The number of aquatic species found at each sector ranged from 11 to 20. This was considered to be poor in terms of number of species. Fennel pondweed *Stuckenia pectinatus* was the dominant species of the submerged macrophytes. The filamentous algae cover was not dominant in Broadwater Lake, indicating that the aquatic vegetation is not particularly represented by nutrient tolerant taxa (i.e. nutrients within the water are not elevated across the lake). Marginal stands of emergent macrophytes were limited to a few short lengths of open shore between the trees that dominated the shoreline, shading it and thus restricting aquatic plant growth. More frequently occurring emergent species included yellow flag iris, gypsywort, pendulous sedge, hemp agrimony, water mint, water forget-me-not, branched bur-reed. The macrophyte cover was therefore considered to be poor in terms of its surface area coverage as well as species diversity. As such, aquatic macrophytes are considered to have **ZoI importance** only and are **not considered to be an IEF** for the Site.

Faunal Species

Birds - Breeding

7.5.83 Legal protection and conservation status are material considerations when identifying and evaluating key species / ecological receptors. Table 7.10 below presents the key that has been applied to make this status clear for each bird species.

Table 7.10: Key to the legal and conservation status of bird species

Key	Definition	Abbreviations
Bold type	Schedule 1 of the Wildlife and Countryside Act 1981 (as amended)	WCA Schedule 1 species (Sch1)
	Conservation status - Red list of Birds of Conservation Concern (BoCC) in the UK, 5 (Stanbury, et al 2021[14])	Red list
	Conservation status - Amber list of Birds of Conservation Concern (BoCC) in the UK, 5 (Stanbury, et al 2021)	Amber list
*	Natural Environment and Rural Communities (NERC) Act, Section 41	NERC-S41 listed species (NERC S41 or just S41)
	Conservation status - Green list of Birds of Conservation Concern (BoCC) in the UK, 5 (Stanbury, et al 2021)	Green list

7.5.84 'Breeding birds' incorporates both non-waterbirds (passerines / near passerines) and waterbirds. There are numerous records of birds within 2km. The desk study revealed a total of 125 species recorded within 2km:

- 52 records of waterbirds (geese, ducks, waders, etc) of which 29 were Amber-Listed and 7 Red-Listed; and
- 73 records of passerines and near-passerines (24 Amber-Listed and 23 Red-Listed).

7.5.85 Breeding bird surveys were undertaken in 2022 at the Peninsula (Appendix 7.1 PEA (appendix A)). Subsequently, surveys were undertaken at the whole Site in 2023, 2024 and 2025. A report summarising the four years of survey results is provided in Appendix 7.2; the report also provides an overall evaluation of the importance of the Site for each breeding species individually.

7.5.86 The importance of the Site for each breeding species has been evaluated as follows. Firstly, an estimate of the number of breeding pairs or territories was made, based on the observations (e.g., birds sitting on nests or carrying nest material, calls of young, chicks or young seen in nests or on the water, presence of juveniles on the lake) and professional judgement. The maximum estimated number of breeding pairs / territories over the four years of monitoring was then compared with estimates of the total UK breeding population for each species as provided by the BTO.

7.5.87 A valuation of the Site to support the breeding status of each species in the UK was made in accordance with the criteria below. The lowest possible valuation of a breeding species that has special status or is a member of a habitat-specific SSSI designated assemblage has been set at Local importance.

Table 7.11: Importance criteria used to assess each bird species

Percentage of UK Breeding population	Importance
>1%	National
>0.5%	Regional
>0.1%	Borough (equivalent to County, Metropolitan etc)
>0.01%	Local
<0.01%[(s)]	Local
<0.01% [(g)]	Zone of influence (insignificant) i.e. important within the Site only

[(s)] Species with Special status (Sch 1, S41 or Amber or Red listed, or a member of a habitat-specific SSSI designated assemblage)
[(g)] birds of low / no conservation concern - Green list species or common species not assessed for conservation status

7.5.88 Table 7.12 lists all breeding (confirmed, probable) bird species at the Site over the four years of monitoring and details the assessment of importance. Where a species is a member of one or more habitat-specific SSSI designated assemblages, this has been indicated within the table.

7.5.89 All breeding species are included within the catch-all SSSI designation 'Assemblages of breeding birds - variety of species'.

Table 7.12: Summary of geographic importance of the Site for breeding (confirmed, probable) bird species.

Species with Legal and Conservation Status	Importance of the Site for breeding per species	Member of habitat-specific SSSI assemblage
Blackbird	Zone of Influence	-
Blackcap	Zone of Influence	-
Black-headed gull	Local	-
Blue tit	Zone of Influence	-
Canada goose	Zone of Influence / non-native	-
Carrion crow	Zone of Influence	-
Cetti's Warbler	Borough	Open water, Lowland fen
Chaffinch	Zone of Influence	-
Chiffchaff	Zone of Influence	-
Common Tern	Borough	Open water
Coot	Local	-
Cormorant	Borough	-
Cuckoo*	Local	Open water, Lowland damp grassland, Lowland fen Lowland woodland, Lowland scrub
Dunnock(*)	Local	-
Egyptian goose	Zone of Influence / non-native	-
Gadwall	Borough	Open water, Lowland damp grassland
Garden warbler	Local	Lowland woodland, Lowland scrub
Goldcrest	Local	Lowland woodland
Great Crested Grebe	Borough	Open water
Great Spotted Woodpecker	Local	Lowland woodland

Species with Legal and Conservation Status	Importance of the Site for breeding per species	Member of habitat-specific SSSI assemblage
Great tit	Zone of influence	
Green Woodpecker	Zone of influence	Lowland woodland
Grey Heron	Borough	Open water, Lowland damp grassland, Lowland fen Lowland woodland
Grey Wagtail	Local	Open water
Greylag Goose	Local	Open water
Jay	Local	Lowland woodland
Kingfisher	Local	Open water
Lesser Black-backed Gull	Local	-
Little Egret	Borough	Open water, Lowland damp grassland Lowland woodland
Long-tailed Tit	Local	Lowland woodland, Lowland scrub
Magpie	Zone of Influence	-
Mallard	Local	-
Moorhen	Local	-
Nuthatch	Local	Lowland woodland
Oystercatcher	Local	-
Pochard	Borough	Open water
Red Kite	Local	Lowland woodland
Reed Bunting*	Local	Open water, Lowland damp grassland, Lowland fen
Reed Warbler	Local	Open water, Lowland fen
Ring-necked parakeet	Zone of Influence / non-native	-
Robin	Zone of Influence	-

Species with Legal and Conservation Status	Importance of the Site for breeding per species	Member of habitat-specific SSSI assemblage
Sedge Warbler	Local	Open water, Lowland damp grassland, Lowland fen
Song thrush*	Local	-
Stock Dove	Local	Lowland woodland
Tawny Owl	Local	Lowland woodland
Treecreeper	Local	Lowland woodland
Tufted Duck	Local	Open water
Woodpigeon	Zone of Influence	-
Wren	Zone of Influence	-

7.5.90 49 species of bird bred at the Site over the four years of monitoring (including non-native species such as ring-necked parakeet) reducing to 46 species if non-natives are excluded. This is classed as a Local level of importance (after Fuller, 1980)[15].

7.5.91 Overall, the Site is evaluated as having **Borough importance** for its assemblage of breeding birds, due to the generally low species diversity found on-Site. It should be noted that the majority of the species are valued at Local importance or less (26 species classed as Locally important; 15 classed as Zone of Influence importance). Only eight species had Borough importance.

7.5.92 The assessment of impacts in Sections 7.8 and 7.9 has been made with reference to the designated features of the SSSI rather than just to breeding birds generally. This helps to break down the impacts by habitat type and helps the effects on the designated features and on the status of the SSSI to be better understood. The members of the breeding assemblages at Broadwater Lake are collated below for ease of reference:

- Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland – Cetti's warbler, common tern, cuckoo, gadwall, great crested grebe, grey heron, grey wagtail, greylag goose, kingfisher, little egret, pochard, reed bunting, reed warbler, sedge warbler, tufted duck.
- Assemblages of breeding birds - Mixed: Lowland woodland, Lowland scrub - Cuckoo, garden warbler, goldcrest, great spotted woodpecker, grey heron, jay, little egret, long-tailed tit, nuthatch, red kite, stock dove, tawny owl, treecreeper.

7.5.93 Given that the Mid Colne Valley SSSI is designated for its breeding assemblage of birds within a variety of habitats, the assessment of breeding assemblage will be of **National importance**. The SSSI feature uses the number of species but not the number of birds of each species as its metric hence the slight difference. No individual bird is recorded in numbers that are more than of **Borough importance**, but the total number of bird species are part of a SSSI feature and therefore are of **National importance**.

Birds - Wintering

7.5.94 The summary wintering bird survey report with full dataset and assessment is presented in Appendix 7.3. The key results for this assessment are summarised below.

7.5.95 Winter surveys were completed from November 2022 to March 2023, October 2023 to March 2024 and September 2024 to March 2025. The three winter survey periods confirmed the regular presence of 26 waterbird species and 47 non-waterbirds species. It should be noted that non-waterbirds were only recorded during 2023 / 2024 and 2024 / 2025 during the winter surveys.

7.5.96 Six species were considered to form a regular part of the wintering assemblage and were valued at the Borough level or above when considering the peak count during one winter period. The species are detailed below:

- Shoveler - The Site is **Nationally important** for shoveler (Amber-listed) with the peak count of 315 in winter 2022 / 23 equating to 1.66% of the estimated GB wintering population;
- Pochard - The Site supports **Nationally important** numbers of pochard (Red-listed) with a peak count of 302 in winter 2022 / 23 equating to 1.13% of the estimated GB wintering population;
- Tufted Duck - The population at the Site is evaluated as being of **Borough importance**, with a peak count of 467 recorded in winter 2023 / 24;
- Great Crested Grebe - The population of great crested grebe at the Site is evaluated as being of **Borough importance**, with a peak count of 47 recorded in winter 2024 / 25;
- Coot - The population at the Site is evaluated as being of **Borough importance**, with a peak count of 363 recorded in winter 2024 / 25; and
- Cormorant - The population at the Site is evaluated as being of **Borough importance**, with a peak count of 269 recorded in winter 2024 / 25.

7.5.97 All other waterbird and non-water species recorded are of Local or ZoI importance. However, wintering birds will be assessed as a single receptor of **National importance** in line with the most important constituent species.

Bats - Foraging

7.5.98 Appendix 7.7 provides updated bat survey results from 2024 and 2025; the reports present a full account of the desk study and site-specific surveys undertaken previously.

7.5.99 The local bat population comprises at least ten species of bat. The most commonly occurring species during surveys undertaken for the was soprano pipistrelle (*Pipistrellus pygmaeus*), along with common pipistrelle (*P. pipistrellus*), Nathusius's pipistrelle (*P. nathusii*), brown long-eared (*Plecotus auritus*), Daubenton's (*Myotis daubentonii*) and Natterer's (*M. nattereri*). Serotine (*Eptesicus serotinus*), noctule (*Nyctalus noctula*), Leisler's bat (*N. leisleri*) and barbastelle (*Barbastella barbastellus*) occur occasionally. The following additional species are recorded within 2km and may also be present (although not confirmed through survey): whiskered bat (*M. mystacinus*) and Brandt's bat (*M. brandtii*).

7.5.100 Brown long-eared, soprano pipistrelle, noctule and barbastelle are species of principal importance (S41 NERC Act). Barbastelle is a rare bat with limited distribution. Bats have a Species Action Plan under the London BAP.

7.5.101 This is a moderately diverse bat assemblage and given the occasional presence of barbastelle, the bat assemblage utilising the Site is valued at the Borough level in accordance with the Bat Mitigation Guidelines (2023)[16].

7.5.102 The woodland fringes around the shores of the Site, woodland edges on the Peninsula, islands on the lake, the Access Road along the eastern edge of the Site and the narrow access track corridors running through the Site, provide good commuting and foraging habitat for bats. The HS2 radio-tracking data recorded locational fixes in all these locations, confirming that the radio-tracked bats used the lake (including open water) and islands for foraging.

7.5.103 Bat activity surveys in 2022 and 2024-5 have shown that low to moderate bat activity levels are typical for the Site. The Site is considered to have **Borough importance** for foraging bats.

Bats - Roosting

7.5.104 A full account of the desk study and site-specific surveys undertaken has been provided for bats in Appendix 7.7: 2024-2025 Bat Activity and Emergence Surveys.

7.5.105 A desk study review of 2019-2022 HS2 radio-tracking survey data returned 14 roosts (assumed to be in trees) within the Site. The roosts were for four bat species (soprano pipistrelle, Nathusius's pipstrelle, Daubenton's and Natterer's. and included summer / day roosts, night roosts (locations where a bat rested for 20mins or so during the night) and four maternity roosts (limitations with the radio-tracking data mean that 'maternity roosts' may include features that would only support individual bats or low numbers of bats). One HS2 radio-tracked roost (HS2 roost M, a day roost for a Nathusius' pipistrelle) was indicated on Island 3 where the trees (regenerated scrub only 5m tall) are too young to support any roost features. It is considered likely the bat was night-roosting (i.e., perching on a bare branch) and will have moved to a more substantial PRF at or close to dawn (a commonly observed behaviour of bats).

7.5.106 Tree assessments in 2023 (ground level inspections and tree climbs) identified four moderate potential trees requiring further surveys. Emergence and endoscopic inspection surveys were completed in July, August and September 2023; no roosts were identified. In August 2025, in response to modified development proposals, update ground level assessments and tree climbs have been completed for all trees within the updated ZoI. Bat emergence surveys were completed for trees that were unable to be climbed. Two DJI Matrice 4 thermal drones were used to survey island 7 for potential emergences. No bat roosts have been identified as a result of these surveys.

7.5.107 Building surveys were undertaken in 2023 of four small breezeblock flat roof buildings at the edge of broadleaf woodland on the Peninsula, and of the BSC building at the north east of the lake. All buildings were assessed as having low bat roost potential except the pumphouse which had negligible potential for roosting bats. A single dusk emergence survey of low potential buildings was undertaken between May and July 2023. The surveys did not identify any bat roosts. An update assessment in August 2025 reconfirmed negligible

potential for the pumphouse and low potential for the remaining buildings. Emergence surveys of all buildings on 6 August reconfirmed that no bat roosts were present.

7.5.108 Therefore, the whole Site is considered to have up to Borough importance, based on data gathered for this Site and the HS2 work. However, due to the careful planning of the scheme and the small overall footprint, the area of the Site that could be impacted by the Proposed Development is considered to have no more than **Zone of Influence importance**.

Badgers

7.5.109 There are low numbers of badger records within 2km of the Site and no setts reported from the desk-based review. The lake margins, grassland and woodland adjacent to BSC, and northern part of the Peninsula are suitable to support foraging badger. There is a limited area of soft natural ground (i.e., soil containing organic matter) along the northern edge of the Peninsula, that may provide food items such as earthworms or be suitable for excavation for setts.

7.5.110 Badger signs infrequently recorded onsite between 2021-2025 have been indicative of very low levels of activity. See reports appended to the 2023 PEA (Appendix 7.1) A single latrine was recorded during surveys in 2022. In April 2023, an outlier sett, comprising one active and one disused entrance was discovered. Camera trap footage from 6 June to 20 June 2023 confirmed occasional use of one active entrance by a single badger, supporting the classification of the sett as an outlier sett. The second entrance was confirmed as disused. A badger survey at the Peninsula in July 2025 confirmed that the sett remains an outlier sett, with no further entrances created; no recent activity signs such as snuffle holes or mammal trails were located. Further camera trap monitoring in 2025 has not recorded any badger activity.

7.5.111 The remainder of the Peninsula is unsuitable to support badger setts, as substrates are comprised of concrete, hard substrate gravel and rocks, within which badgers cannot excavate setts. The former silt lagoon, supporting the wet woodland, is at a lower level and inundated most if not all of the year; wet ground conditions are unsuitable for badger setts.

7.5.112 The value of the Site for badger is therefore assessed as being of **Local importance**.

Otter

7.5.113 Otter has been recorded in the surrounding 2km area. The key habitats for otter are the lake itself, and the woodland, scrub and grassland areas immediately bordering the lake. Adjacent to Site, the River Colne and Grand Union Canal also provide suitable habitat. The Site forms part of an abundant network of suitable habitat within the wider Colne Valley.

7.5.114 Evidence of otter using the Peninsula and Site surrounds have been reported through surveys from 2021 through to 2025. Otter is using the Grand Union Canal and the Peninsula beaches to feed, with spraints left at both these locations. Nibbled shells of river mussels and signal crayfish shells have all been found occasionally; based on feeding remains, frequency of visits to the Peninsula beaches seems to be every 3-4 months. It is likely this is a single individual (likely a male with large territory). Camera trap surveys of the Peninsula shore in 2024 and 2025 have not detected otter activity.

7.5.115 Fish and macro-invertebrate surveys at the Site (see section below) have observed there is a relative lack of habitat for fish with very low populations; this will reduce the likelihood of otter being able to catch fish (its main food item) at the Site. Otters will eat amphibians, crustaceans and waterbirds (e.g. coot, moorhen) within the lake. On land, food for otters at the Site includes small birds, eggs, insects and small mammals.

7.5.116 Following clearance of buddleia in February 2023, a search for potential holts was undertaken at the Peninsula. Two locations were identified with suitable holes within concrete debris piles which were uncovered from beneath the buddleia although no signs of use by otter were observed. These were in fairly disturbed locations near the Access Road, with regular disturbance occurring from visitors and site users. Therefore, these locations are assessed as having negligible potential to be used as holts.

7.5.117 A detailed search for holts around the banks of the lake and shore of the Peninsula was undertaken by two ecologists from a boat in May 2023 and again in August 2023 (see Appendix 7.1: Ecology Report). One tree which had collapsed at the base had holes which were potentially suitable for otter holts, but these could only be viewed at distance from the boat. No signs of use by otter were found during either survey.

7.5.118 In summary, no active holts have been identified between 2021 and 2025, and the use of the Site by otter is considered to be infrequent and likely limited to a single individual. The Site is valued as being of **Local importance** for otter.

Water vole

7.5.119 Water vole (WCA Sch 5, NERC S41) has been recorded in the surrounding 2km area, mainly to the south and west. The closest historic record is approximately 680m south on the River Colne but the record dates from 1990; water vole populations have declined steeply since that date due to the presence of mink which has also been recorded within 2km. The River Misbourne lies approximately 1.7km south west and there are records of water vole there from 2012-2018. The River Misbourne connects to the River Colne at the Denham Country Park 3.07km south and so there is ecological connectivity to the Site via the River Colne. The River Colne and River Misbourne are designated as a 'Water Vole Key Area' with the buffer zone for the key area lying just outside the red line boundary of the Proposed Development at the south west corner.

7.5.120 At the Site, an assessment for water vole was first undertaken in 2021. Detailed water vole surveys have been undertaken in 2022 around the Peninsula, and in 2023 around the entire Site (using a boat); adjacent habitats were also surveyed (canal and adjacent bank of the River Colne where accessible). In response to concerns from the EA that water vole could be present, in September 2024 an update survey of the Peninsula shoreline (including lagoon) and banks of the Eastern Channel was undertaken. In December 2024 an independent survey was undertaken by Derek Gow Consultancy (DGC) of Broadwater Lake. The adjacent canal and River Colne were not surveyed at that time.

7.5.121 No signs of water vole have been recorded during any of the surveys undertaken at the Site over the last four years. The surveys have all found that where the banks were steep, these were mainly formed of a mix of earth and gravel, limiting suitability for water vole burrows although not completely unsuitable. The vast majority of the bankside is also covered / overshadowed with dense willow. Emergent and marginal vegetation is notably scarce around the lake margins, due both to very small areas of shallows (<100m^2 estimated

around the entire lake in very small discrete patches), and also due to overshadowing of the little suitable habitat by the tree canopy. As such, the supply of suitable food plants for water vole is extremely small and limited.

7.5.122 The Peninsula was considered unsuitable for water vole. Much of its shoreline is artificial (formed of concrete) and too hard to support water vole. More natural areas of shoreline (formed from the silt lagoon to the west, or from made ground along the north shore) lack suitable marginal habitats and vegetation as the shores are steeply inclined and there is a steep drop into the lake straight down to depths of 2m+. The bankside soils are gravelly and friable.

7.5.123 DGC reported that water vole were confirmed to be absent and that there were only very limited opportunities at the Site for water vole, mainly at the BSC shoreline, on Islands #2, #3 and #4 (with some management), and reed beds with some viable habitat along the west side of Broadwater Lake. However, it is considered that water voles would be vulnerable to predation by gulls if they were to colonise the Site's islands. This would likely exclude the species from the Site.

7.5.124 Another detrimental factor for water vole is that the water level of the lake has varied by 2m over the period 2022 to 2024; water levels were very high throughout 2024 reducing the limited area of marginal shallows at the lake still further. If water vole burrows were constructed below this level during drier periods or years, they would be flooded during years like 2024.

7.5.125 Due to the high suitability of the adjacent River Colne for water vole, there is potential for water vole to eventually make it to Broadwater Lake, either via natural expansion of range or if a reintroduction programme were to be carried out. Neither scenario could occur without American mink control on the River Colne, Grand Union Canal and on Broadwater Lake. With this potential in mind, habitat creation and enhancements at the BSC (north shore of Broadwater Lake) and long-term management have been targeted to improving conditions for water vole. A trial of mink tracking and trapping was undertaken at Broadwater Lake in February and March 2025 however the monitoring equipment and traps were immediately stolen; this shows that such a programme could not be successful without improved management and control of access to the Site (e.g. as a result of the Proposed Development).

7.5.126 Overall, four years of surveys have repeatedly concluded that **water vole is absent** from the Site. If it were present, it would be assessed as having Borough importance. There is a very low potential for this species to colonise small areas of the Site in the future, with two small areas of poor suitability habitat within the construction ZoI. Precautionary measures are therefore recommended during construction, and therefore this species has **been identified as an IEF** for the purposes of the impact assessment.

Reptiles

7.5.127 Within 2km of Site there is one record of slow worm (*Anguis fragilis*) in 2019 and one record of grass snake (*Natrix helvetica*) in 2013. The Site contains habitats that are suitable to support reptiles in the form of modified grassland and scrub, amongst others.

7.5.128 A reptile presence / absence survey was undertaken in 2022 by Ecology By Design at the Peninsula. No reptiles were seen or recorded during the survey. The report concluded that

a low population of grass snake could be present on Site, based on personal comment from a local landowner about grass snake being seen on Site previously. In 2024 an adult grass snake was seen alongside the Access Road by an ecologist in September, and a further sighting was reported at the bungalows just off-Site. Given the above, the Site is concluded to support a low population of grass snake.

7.5.129 An update survey has not been undertaken due to no change in habitats onsite which may change the species composition or population size. The value of the Site for reptiles is assessed as being of **Local importance**.

Fish

7.5.130 Fish surveys were completed at the lake in October 2022 (see PEA in Appendix 7.1). Generally, the habitat in Broadwater Lake appeared to be lacking for juvenile fish, with limited areas of macrophytes. Most of the cover for small fish fry was provided by overhanging branches from large willow trees around the perimeter of the lake. The lack of cover present is likely to result in low juvenile survival rates as a result of predation.

7.5.131 A total of five fish species, all native, were recorded during the fish surveys across all methods; these were: pike (*Esox Lucius*), perch (*Perca fluviatilis*), tench (*Tinca tinca*), common carp (*Cyprinus carpio*) and three-spined stickleback (*Gasterostreus aculeatus*). The combined abundance of fish was 245 individuals with an estimated biomass of 10,228.56 grams. Perch were the most abundant species present, while pike had the highest biomass. Fish populations appeared to be low, and biodiversity was considered to be low with only five species present.

7.5.132 Anecdotal evidence from local anglers reported carp close to 20kg in the lake, and presence of common bream (*Abramis brama*) and European eel (*Anguilla anguilla*). However, neither of these species was caught in the surveys, indicating that if they were present then they would have been in low abundances.

7.5.133 European eel is a priority species under S41 of the NERC Act 2006, listed as critically endangered on the global IUCN Red List of threatened species, and protected in England under specific legislation (The Eels (England and Wales) Regulations 2009).

7.5.134 In 2024, the National Anguilla Club was contacted for information on eel populations at Broadwater Lake, and for recommendations for suitable mitigation and enhancement in view of proposals. The Club's spokesperson confirmed eels were present with specimens of 5 lbs plus indicating eels aged 60 years or more. No specific eel surveys were undertaken but presence is presumed and therefore mitigation to reduce impacts on this species are proposed as part of the assessment on 'Fish'.

7.5.135 Overall, given the confirmed presence of large eel specimens, the Site is assessed as having **Borough importance** for European eel.

Terrestrial invertebrates

7.5.136 Surveys for terrestrial invertebrates have been carried out in 2022 at the Peninsula (see PEA in Appendix 7.1), and in 2023 around the edges of the lake and Peninsula, and within suitable habitats on the Peninsula (see survey report in Appendix 7.1). Update surveys were not undertaken in 2024 or 2025 as the Site's invertebrates are considered to be adequately

characterised by the existing surveys, with no reason (such as changes to Site habitats) to suspect any significant changes. The findings of the detailed surveys are set out below.

7.5.137 In 2022 at the Peninsula 447 terrestrial invertebrate species were recorded, of which 10 have some level of national conservation status (a few however have become more widespread, and their status would be reviewed). There were 39 moth species are classed as 'Local'. In 2022, two species assemblages (of scrub edge and rich flower resource) were found to be in favourable condition.

7.5.138 In 2023, a total of 303 taxa were recorded at the Peninsula (including its lake edge, woodland and pools). Ten species have a conservation designation. The same two species assemblages (of scrub edge and rich flower resource) were in favourable condition.

7.5.139 In general, the Peninsula was found to be floristically species-poor, indicating poor habitat for terrestrial invertebrates. There was a lack of specimen trees within woodland, few open areas, hard ground and extensive buddleia scrub - these factors were considered to limit the diversity of the invertebrate populations. In 2022, the best areas for invertebrates were two open areas with ruderal / ephemeral plants providing flowers as a source of nectar for invertebrates (shown in PEA Appendix A Peninsula Surveys) (PEA provided in Appendix 7.1). This habitat was limited to small areas on the Peninsula at the edges of its central Access Road. The survey concluded that these areas have moderate value for terrestrial invertebrates; other areas have low value.

7.5.140 Stag beetle was not recorded by the surveys; ground at the Peninsula would be too hard for this species to occur. There is a low potential for this species to occur along the canal.

7.5.141 Around the remaining lake edge the 2023 surveys have recorded 245 taxa, with 11 species with conservation designations. The species assemblage for 'open water on disturbed mineral sediments' is in favourable condition with 9 species recorded (threshold is six species), although other species assemblages are in unfavourable condition (tree-associated: bark and sapwood decay; wetland: reed-fen and pools; open habitats: scrub edge; open habitats: rich flower resource; and wetland: northern lakes and lochs). No assemblages of high conservation concern were found by the surveys.

7.5.142 Away from the lake and Peninsula, areas across the rest of the Site did not typically have the mosaic of habitats that might support notable invertebrates or diverse assemblages. The woodland along the eastern edge of the lake and canal has an apparent lack of standing or fallen deadwood suitable for saproxylic invertebrates, and the available area is relatively small in extent. These areas have only low potential for stag beetle to occur.

7.5.143 The terrestrial invertebrate assemblages identified to be receptors for the Site are summarised in Table 7.13.

Table 7.13: Terrestrial invertebrate assemblages.

Assemblage	2022	2023	Valuation
Peninsula			
Open habitats: Scrub edge Open habitats: Flower rich resource	Favourable / 10 sp with conservation status	Favourable / 10 sp with conservation status	Local importance
Lake edge away from Peninsula			
Open water on disturbed mineral sediments	Not assessed	Favourable 9 sp recorded	Local importance

Aquatic macro-invertebrates

7.5.144 Aquatic macro-invertebrate surveys were completed (whole lake assessment) on 4 June 2024 by Julie Bywater, a specialist freshwater ecologist with 25+years' experience. The report is provided in Appendix 7.6. Five sampling locations were selected all around the lake, targeting the most optimal locations with shallow bed sections and emergent aquatic plants. Sample site 5 was in the Eastern Channel. Much of the habitat around the lake was poor for macroinvertebrate colonisation with steep banks, no marginal vegetation and dense shading from trees. The presence of a large amount of leaf and twig litter lends itself to colonization by grazers such as hog-lice and omnivores like invasive signal crayfish in large numbers. The results indicated 'fair' to 'good' biological quality, signalling good water quality as pollution-sensitive species were present (they would be absent if the water quality was lower). Most of the sites in Broadwater Lake were classified as having 'Moderate' conservation value, except for one site that was 'Fairly High', but no rare macroinvertebrates found at any of the sites. The report concluded that habitat quality appeared to be the limiting factor preventing the lake from supporting a much more diverse and conservation-rich community. The presence of alien signal crayfish and demon shrimp was reported and concluded to also have a negative impact on macroinvertebrate fauna. The report recommended that improving the bank profile and reducing the tree cover on the shore to allow more areas where various aquatic macrophytes can colonise and establish in the margins would create habitat for a diverse range of macroinvertebrates.

7.5.145 The 2024 monitoring confirmed the findings and conclusions of an October 2022 lake-wide survey by Five Rivers. Macro-invertebrate communities were sampled in three locations (two the same as the 2024 study, one slightly adjusted); these were found to be relatively diverse and were indicative of moderate water quality. No rare / protected species were found in the samples. Overall, the marginal / emergent vegetation was reported to be poor, and the littoral zone also appeared to be very homogenous. The Five Rivers report also concluded that poor habitat may potentially limit the diversity of the macro-invertebrate community.

7.5.146 Targeting only the Eastern Channel and north Peninsula shoreline, detailed surveys of macro-invertebrates (8 sampling locations) were undertaken by University of Northampton

on 17 and 22 June 2024 (report provided in Appendix 7.6). The survey locations are shown below. Samples were taken from the lakebed (benthic samples) and from shallow areas (littoral zones) wherever these were present. The sampling locations were of much less optimal habitat than the survey by Bywater Ecology, and more representative of the habitat within the zone of influence of proposed development works. The results found mainly 'poor' biological quality with only one 'moderate' quality sample location (12). The reduced quality at 9 and 8 may be due to previous sampling on 4 June in the same location. Demon shrimp were found in samples 3,5,9,11,13 and signal crayfish were found in samples 11 and 13. A Zebra mussel half-shell was found within sample 8 and considered to have been deposited there rather than indicative of the species' presence within the lake. The report considered the 'poor' score within the Eastern Channel may reflect the lack of littoral zones present, as well as indicating possible water quality issues. Associated water quality sampling in the Eastern Channel was suggestive of localised nutrient enhancement (reducing quality within the Eastern Channel rather than all around the lake), and a hot spot was identified suggesting a leak or input from the Grand Union canal adjacent to the east. Development of shore zones to enhance for macro-invertebrates was recommended.

7.5.147 Given the limited extent of suitable habitat and absence of notable / rare species, the macro-invertebrate assemblage is assessed as being of **Local importance** generally for Broadwater Lake.

7.5.148 However, within the Eastern Channel, biological quality scores were much lower than the wider lake, and suitable habitat almost non-existent; where habitat was present the fauna was dominated by signal crayfish and a few common species. Within the Eastern Channel the macro-invertebrate assemblage is assessed as being of **Zone of Influence importance**

Other BAP species - Hedgehog

7.5.149 Hedgehog has been recorded 743m south west in Denham Green in 2015. Terrestrial habitats at the Site away from the Peninsula (including woodland, ruderal / ephemeral, modified grassland, bankside habitats) are suitable for foraging and sheltering hedgehog. At the Peninsula, there is a restricted extent of soft ground / natural soil within which hedgehogs may forage, limiting its value and it is considered unlikely that hedgehog would use the Peninsula for foraging.

7.5.150 Areas of the Site away from the Peninsula are assessed to have **Local importance** to support hedgehog. The Peninsula has negligible importance for this species.

Invasive non-native species

Invasive Non-Native Species – Terrestrial

7.5.151 There are a low number of records of invasive non-native species (INNS) listed on Schedule 9 of the Wildlife and Countryside Act within 2km, including the terrestrial plants Japanese knotweed, rhododendron, few flowered garlic and Montbrecia.

7.5.152 Japanese knotweed and giant knotweed have been recorded onsite during surveys since 2021 and were still present as of August 2025. Japanese knotweed was present in a stunted form on the north west Peninsula shoreline; this form sometimes results from repeated treatment using glyphosate and will persist for decades without eradication. Giant knotweed was present as a stand on island 6, and within a private garden adjacent to the entrance to the Peninsula.

7.5.153 Buddleia, a species listed in Category 3 of the London Invasives Species Initiatives (LISI) Species of Concern, has been recorded across the Peninsula on hardstanding and within woodland since 2021. A significant proportion was cleared in February 2023, mainly on hardstanding, but was regenerating in the absence of management as of August 2025.

7.5.154 In 2024, three stands of Himalayan balsam were recorded on the west lake bank between the River Colne and the Site.

Invasive Non-Native Species - Aquatic

7.5.155 There are records of the aquatic invasive species floating pennywort *Hydrocotyle ranunculoides* on the River Colne adjacent to Site, most recently observed in 2024 during water vole surveys.

7.5.156 Limited presence of submerged non-native macrophytes (*Elodea canadensis*) were recorded within the lake in 2023. In 2024, the dominant species of macrophyte was found to be Nuttall's waterweed (*Elodea nuttallii*) which has taken over in the UK from Canadian waterweed.

7.5.157 Aquatic surveys in 2024 (University of Northampton, 2024 and Bywater Ecology, 2024 reports provided in Appendix 7.6) have reconfirmed presence of demon shrimp *Dikerogammarus haemobaphes* (a freshwater gammarid crustacean) and signal crayfish *Pacifasticus leniusculus*. These species impact native flora and fauna leading to decreased diversity in the invaded range by competing with or preying upon a broad range of invertebrates.

7.5.158 North American signal crayfish is a highly invasive species which has a detrimental effect on habitats, macrophytes, macro-invertebrate populations and fish. It outcompetes native species for food and shelter, and preys upon them too. Once signal crayfish become established in a waterbody, eradication is almost impossible, although management is possible.

7.5.159 The acute bladder snail *Physella acuta*, identified at the lake by Bywater Ecology, is considered to be an invasive species within the United Kingdom, although its effects on ecosystems are currently assessed as 'unknown'. It is a prolific species that has undergone naturalisation and has been observed in several great rivers, streams and tributaries within England, Wales, Scotland and Northern Ireland.

7.5.160 A zebra mussel (*Dreissena polymorpha*) shell was found within the Eastern Channel during sediment sampling in 2024 (University of Northampton, 2024). This was considered likely to have originated from the canal and to have been brought to the lake potentially by an otter to eat.

7.5.161 Therefore, there is confirmed presence of aquatic INNS at the Site.

Summary of Receptors and Sensitivity

7.5.162 Table 7.14 provides a summary of the ecological receptors identified at the Site and in the identified ZoI, their sensitivity, and whether or not they comprise IEF for the impact assessment. All receptors identified as IEFs will be assessed for significance within sections 7.8 and 7.9. Protected sites identified as IEFs are shown in Figure 7.4 above.

Table 7.14: Summary of Receptor Sensitivity

Receptor group	Receptor	Sensitivity (Value)	IEF
Onsite Protected Sites	Mid Colne Valley SSSI	National importance	Yes
Offsite Protected Sites	Mid Colne Valley SINC	Regional importance	Yes
	London's Canals SINC	Regional importance	Yes
	All other offsite protected sites	Up to National importance (SSSIs)	No
Priority Habitats	Ancient woodland and veteran trees	Negligible (not present at Site or within ZoI)	No
	Wet woodland	Borough importance	Yes
	Lowland mixed deciduous woodland across the Canal to the east	Borough importance	No
	Ponds	Borough importance	No, included in wet woodland
	Open standing water (Broadwater Lake)	National importance	Yes
	River Colne	Regional importance	Yes
	Grand Union Canal	Regional importance	Yes
	Open mosaic habitat	Negligible (not present at Site or within ZoI)	No
Notable rare or protected plants	Terrestrial plant species – specifically black poplar	Borough importance	Yes
Other habitats and plants (non-priority)	Islands: ruderal / ephemeral, individual trees, dense scrub	ZoI importance	No
	BSC and field on Moorhall Road: Modified grassland	ZoI importance	No

Receptor group	Receptor	Sensitivity (Value)	IEF
	Peninsula: Moss lawns on concrete hardstanding	ZoI importance	No
	Peninsula: Individual mature trees on hardstanding	ZoI importance	No
	Peninsula: Mixed scrub with introduced shrub	ZoI importance	No
	Urban habitats: buildings, concrete, gravel hardstanding, introduced shrub	N/A – not a receptor	No
	Aquatic macrophytes	ZoI importance	No
Species	Birds – Breeding	Up to Borough importance	Yes
	Birds – Wintering	Up to National importance	Yes
	Bats - Foraging	Borough importance	Yes
	Bats – Roosting	Local importance	Yes
	Badgers	Local importance	Yes
	Otter	Local importance	Yes
	Water vole	Absent – low potential	Yes
	Reptiles (grass snake)	Local importance	Yes
	Fish – specifically European eel	Borough importance	Yes
	Terrestrial invertebrates	Local importance	Yes
	Aquatic invertebrates ▪ wider lake ▪ Eastern Channel	 Local importance ZoI importance	 Yes No
	Other BAP species - hedgehog	Local importance	Yes
Invasive Non-Native Species	Terrestrial: Sch 9 species: Japanese knotweed, giant knotweed, Himalayan balsam.	Present	Yes

Receptor group	Receptor	Sensitivity (Value)	IEF
	LISI Category 3: buddleia.		
	Aquatic: Sch 9 species: Elodea sp., signal crayfish, demon shrimp, zebra mussel.	Present	Yes

Future Baseline of the Site

7.5.163 The current baseline of the Site will be changed by the Proposed Development and operation of HS2, with the Colne Valley Viaduct located to the west. Construction of the viaduct was completed in 2024. HS2 however is not expected to be fully operational until the 2030s at the earliest and no trains are currently running along the viaduct.

7.5.164 Disturbance surveys in 2022 for HS2 (provided by HS2) and in winter 2022 / 23 for this assessment for the Proposed Development, found no significant disturbance to the Site or its receptors from HS2 construction activities. Before the railway becomes fully operational, HS2 will undergo pre-operational testing with a limited number of trains, and from the 2030s, the railway will be fully operational with an assumption of 14 trains per day running from approximately 6:00am till 11:30pm at night. The operational lifespan of the railway is assumed to be at least 100 years. The viaduct structure has noise and visual barriers designed to minimise environmental impacts. Noise is less disturbing to birds than visual impacts, therefore as long as movement from the viaduct cannot be seen from the lake, it is considered that waterbirds using the Site will habituate to any intermittent noise from both pre-operational testing and full operation, and therefore populations are assumed to remain unaffected.

7.5.165 Five floating bird nesting rafts are proposed within the south west area of Broadwater Lake adjacent to the Peninsula to compensate for habitat loss because of HS2. These would be maintained and managed for a period of 30 years.

Current Site Management and Condition

7.5.166 Tarmac are the current owners of the majority of the Site and are responsible for management of Broadwater Lake. Other parties have current responsibilities for the management of parts of the Site including the Canal and Rivers Trust (section of the canal) and BSC.

7.5.167 In line with Section 28J of the Wildlife and Countryside Act, the landowner is required to manage land within the *SSSI 'effectively and appropriately to conserve the special features of the site'* The Mid Colne Valley SSSI is not subject to a formal management plan.

7.5.168 Current operations and associated ongoing management would be assumed to continue. The BSC would remain where it is and continue to operate all through the year (as described in Chapter 2: Site and Setting), with membership assumed to remain relatively constant and current disturbance levels to the lake from sailing to also remain relatively constant. Fishing activities and their extent would also continue as they are (as described in Chapter 2: Site and Setting).

7.5.169 The woodland along the Access Road and habitat around the lake edges would continue to be managed for fishermen and for access to BSC. The islands on the lake may continue to be managed by BSC with scrub clearance to maintain nest / roost sites for breeding and wintering birds. Once this section of HS2 is fully complete and operational the western edge of the lake may go back under the control of the Hertfordshire and Middlesex Wildlife Trust or other wildlife group, however this is unknown.

7.5.170 Unauthorised site uses (as described in Chapter 2: Site and Setting) which pose a risk to wildlife would continue and may increase. Pressures from an increased population are considered to be likely in the future, with potential increased incidences (in proportion to the increased population) of trespassing, poaching, camping, fly tipping and other current non-authorised uses of the Site.

7.5.171 The influence of climate change over the future baseline has been considered. A scenario of warming in London of 2-3 degrees (annual mean temperature) above the 1980-2000 baseline over the next 50 years has been considered (with summer temperatures being 3-4 degrees warmer by 2080-2099) (UKCP18 project[17]).

7.5.172 Under this scenario, the baseline conditions within the Site are expected to remain relatively constant over a 10–20-year period with up to 2^{o}C warming in summer above the baseline, and the weather likely to be drier in summer as a result. The most obvious change to the baseline would be that water levels in the lake are likely to be lower in summer with drops of greater than the 1m reduction that is the current fluctuation. Weather events may become more extreme, possibly with flash flooding of the River Colne (which if the river overflowed to Broadwater Lake, would likely introduce invasive plants such as floating pennywort and Himalayan balsam).

7.5.173 Beyond this time period from 20 - 50 years, the impacts of climate change will start to be more perceptible with up to 4^{o}C warming in summer above the baseline. Shallow areas of the lake may become completely dry for periods during summer if water levels drop more than 1.5m. Lake water quality may suffer as lower water levels and warmer water may reduce dissolved oxygen levels and there may be algal blooms during summer months. Fish kills may occur; birds and mammals may also be adversely impacted. Sailing may become limited to smaller areas of the lake in summer, or long-term sailing may become impossible during the summer months and be limited to winter only.

7.5.174 It is difficult to predict the impact of lower lake water levels on fauna. If water levels remain lower in winter, there would potentially be a reduction in wintering bird numbers, but changes in migration patterns will also occur as a result of a warmer climate and species may choose to spend their winters elsewhere (in other countries). Breeding bird numbers may increase as shallower areas of the lake become islands (offering more breeding habitat) during the drier months with more trees establishing and perhaps with slow establishment and spread of emergent and riparian vegetation. Predation of birds may however increase as water levels drop, and islands become easier to access by foxes and other predators.

7.5.175 The habitats occurring on made ground within the Peninsula will continue to slowly succeed, with wet woodland drying, and plant species composition would change to reflect the warmer dryer conditions. There would be loss of areas of vulnerable habitat to drought such as trees and pioneer habitats growing on hardstanding. The lagoon will likely dry, silt up and become a woodland. Succession of habitats typically results in a slow increase in

biodiversity over time; the more extreme weather conditions arising from climate change however may counteract this tendency.

7.5.176 Taking the above into account, two future management scenarios and their overall effect on biodiversity are considered below – no change to current management, and the effects of additional sympathetic management.

No change to current management

7.5.177 It is assumed that current management includes basic housekeeping measures such as removal of litter and fly-tipped wastes, control of Japanese knotweed, maintenance of barriers to limit unauthorised access as best possible; plus, management of trees along Access Roads for health and safety purposes (i.e., removal of fallen branches and trees, removal of unsafe overhanging limbs).

7.5.178 The Peninsula area would be subject to the most detrimental effects as this area receives minimal management currently. Uncontrolled regrowth and encroachment of buddleia would result in a reduction in biodiversity through further suppression of woodland ground flora and choking of young trees. If woodland habitats were adversely affected by climate such as drying, there would not be any positive management to introduce varieties of tree or plant species that were more suited to the new conditions. Natural introduction of new species would occur but over a much longer period and in the interim, there may be a loss of biodiversity.

7.5.179 The effects of climate change (as set out above) on the lake would be largely unmitigated with no measures put in place to counter loss of biodiversity, impacts to water quality, loss of water depth etc. Floating pennywort if introduced to the lake would likely be managed / eradicated as best possible; Himalayan balsam would likely take hold and be extremely difficult to eradicate.

7.5.180 Although the direction of biodiversity change cannot be predicted with certainty, the Site would not remain in its current condition; over 50 years it is considered that a loss of biodiversity is the most likely scenario.

With additional sympathetic management (positive intervention)

7.5.181 Cost-effective additional sympathetic management would comprise ongoing control of buddleia from encroaching into woodland to prevent loss of biodiversity and retaining some open areas along the Peninsula and Access Road to encourage the Proposed Development of wildflower rich areas for invertebrates. Control of areas of invasive planting (once identified) will also take place. There may be more concerted and better funded efforts to eradicate new invasives such as floating pennywort and Himalayan balsam in the lake and on its banks.

7.5.182 If additional funds were made available for management, further tree species may be introduced as woodland habitat at the Peninsula dries to replace species lost and increase biodiversity. Black poplar grows well in wet ditches and also has an adaptive mechanism for drought; it may therefore be a good opportunity to plant black poplar trees at the Peninsula.

7.5.183 In the future, newly dry areas of the lake would probably still be nutrient poor and lack a suitable substrate for plants to grow in. If funding were available, a suitable growing medium

may be imported and reedbeds and riparian planting introduced to vegetate these areas; extreme fluctuations of the lake water levels between summer and winter may still kill such planting, but floating systems would allow habitats to rise and fall with water levels.

7.5.184 In response to lower water levels and potential eutrophication, significant additional funds may be made available for remedial measures, although a viable source of such funding is uncertain. Bubbler systems and water circulation systems may be required in the lake and lagoon to maintain water quality by preventing depleted dissolved oxygen levels, to support fish populations and prevent toxic algal blooms. If algal blooms were to occur, deaths of fish, birds and mammals would certainly occur.

7.5.185 Over 50 years with the above interventions, it is considered that biodiversity at the lake may remain at a similar level; a loss of biodiversity is also a likely scenario as climate change is likely to have an initial negative impact before habitats and species recover longer-term.

7.5.186 The predicted changes to the Site's baseline from the two scenarios outlined above are summarised in Table 7.14.

Table 7.14: Predicted changes to the Site's baseline with the same or additional management

Future Baseline Receptor	Changes predicted over 50 years	
	Same management	Additional management
Priority habitat onsite: woodland	Loss of biodiversity	Biodiversity changed but at similar level
Priority habitat onsite: standing water (pond / lake)	Reduction of area and quality	Reduction of area but to a lesser extent, and water quality maintained
Badger	Lower water levels may provide greater opportunities for badger	Lower water levels may provide greater opportunities for badger
Bats – foraging	No changes predicted	No changes predicted
Bats – roosting	No changes predicted	No changes predicted
Woodland breeding birds	Possible minor negative impact	Neutral impact
Breeding birds (lake)	Increased areas for breeding in summer but more predation; potential impacts from reduction in water quality. Likely negative impact	Efforts would be aimed at maintaining biodiversity – neutral impact
Wintering birds (lake)	Dependent on migration patterns and winter water levels – likely loss of biodiversity / negative impact	Dependent on migration patterns and winter water levels – intervention may manage to maintain biodiversity – neutral impact
Reptiles	Likely increase in value of the Site for this species	Likely increase in value of the Site for this species
Otter	Reduction of water area and water quality – possible minor negative impact	Reduction of water area but no water quality impacts – neutral impact
Fish	Reduction of water area and water quality – minor to major negative impact	Reduction of water area but no water quality impacts – neutral or minor negative impact
Aquatic invertebrates	Likely negative impact	Neutral impact
Rare / notable terrestrial invertebrates	Neutral impact	Neutral impact

Future Baseline Receptor	Changes predicted over 50 years	
	Same management	Additional management
Black poplar	No change predicted	Possible minor positive impact
Hedgehog (UK BAP)	Neutral impact	Neutral impact
Terrestrial Invasive / Non-native species	Likely minor negative impact	Likely minor negative impact
Aquatic Invasive / Non-native species	Likely negative impact	Likely negative impact

7.5.187 The assessment (in Section 7.69) has been undertaken against the 'same management' scenario.

7.6 Impact Assessment Methodology

Assessment Scope

7.6.1 As outlined within the EIA Scoping Report (Appendix 3.2), and as agreed with LBH and Natural England via the EIA Scoping Opinion (Appendix 3.3), the scope of the ecological assessment within this chapter is limited to the following assessment of effects:

Construction Phase

7.6.2 The assessment of construction phase effects includes consideration of the flora and fauna to be directly and / or indirectly affected by the Proposed Development. The construction phase of the Proposed Development is taken to include enabling / preparatory works, including demolition, habitat clearance and modifications to the lake including localised dredging, land reclamation and habitat creation. Construction of the Proposed Development will involve works to the lake and its habitats as well as terrestrial areas on the Peninsula.

7.6.3 The majority of effects during the construction phase are likely to be largely confined to the Site and its immediate vicinity including the Mid Colne Valley SSSI and SINC, although indirect effects from potential displacement of wide-ranging bird species to likely receptor sites in the wider surrounds will also be considered. The assessment considers the following seven potential effects during the construction phase:

- Habitat loss and degradation;
- Effect of air quality emissions from Construction-generated traffic on designated sites and ancient woodland;
- Direct impacts on faunal populations on and in the vicinity of the Site such as loss of breeding and resting sites as a result of the Proposed Development;
- Indirect impacts to habitats and faunal populations within the ZoI of construction activities from dust, lighting, noise, emissions from construction traffic, etc.;
- Fragmentation of 'dispersal corridors' utilised by faunal populations;
- Indirect disturbance of bird populations on adjacent designated / protected sites or habitats caused by displacement of bird species from the Site; and

- Hydrological and water quality effects on sensitive habitats and species.

Completed Development

7.6.4 The assessment considers the following potential six operational effects:

- Degradation of retained and created habitats from activities associated with the completed, operational Development;
- Effect of air quality emissions from Development-generated traffic on designated sites and ancient woodland;
- Disturbance to faunal species / populations from unintentional mismanagement and timing of management works;
- Disturbance to habitats and fauna species due to an increase in recreational pressure;
- Indirect disturbance to faunal populations from lighting and noise associated with the completed Development; and
- Effects associated with invasive species and biosecurity threats from the creation of new habitats as part of the proposed mitigation and enhancement strategy.

Scoped out impacts

7.6.5 All other ecological effects were scoped out of further assessment within this ES, as detailed within the Scoping Report (Appendix 3.2).

7.6.6 The baseline assessment has shown that significant effects on the following receptors are not likely and as such, they would not be considered further in the assessment (detail on why they are not considered further can be found within Appendix 7.1 – 7.11):

- SPAs, SACs, and Ramsar sites on account of their spatial separation and removal from the Site;
- Hazel dormouse and harvest mouse due to a considered lack of presence; and
- Amphibians due to lack of GCN presence and common status of other amphibian species likely to be present of little conservation concern.

7.6.7 Since the Scoping Report was prepared, further ecological surveys have been completed. As reported in Appendix 7.1 and 7.7, water vole has repeatedly been found to be likely absent with no signs identified and a lack of suitable habitat. A survey in November 2024 has found no signs of water vole; the survey confirmed that habitat and physical conditions at the site remain unchanged and remain largely unsuitable for water vole, with no potential that conditions may become more suitable for this species. Therefore, water vole are not assessed.

Significance Criteria

7.6.8 The significance of an effect is determined based on the sensitivity of a receptor and the magnitude of an impact. This section describes the criteria applied in this chapter to characterise the sensitivity of receptors and magnitude of potential impacts.

Receptor Sensitivity / Value

7.6.9 Several factors have been taken into consideration when assessing the value of an ecological feature and whether it is considered important and therefore requires assessment.

7.6.10 In assessing the value of habitats or species populations, a subjective assessment has been made, based on a range of factors that influence overall ecological value. Amongst other factors, a series of criteria have been considered for habitats and populations of species including fragility, rarity, extent, diversity, position in the landscape, naturalness, and recorded history.

7.6.11 These factors have been presented within Table 7.5 when defining the geographic importance of each receptor.

Magnitude of Impact

7.6.12 Impacts may be described in terms of changes to the structure or function of an ecological resource and are characterised according to a number of parameters where these are relevant. These parameters include:

- Positive or negative – impacts may be either, depending on the nature of the impact;
- Extent - the geographical range over which the impact occurs;

  Magnitude – the size of the impact in terms of amount of a feature affected;
- Duration and timing – when the impact would occur and how long it would last;
- Frequency – whether the impact would be a single event or multiple events; and
- Reversibility – the impact may be permanent, or may naturally reverse without mitigation, or may be reversible with appropriate mitigation.

7.6.13 Table 7.15 indicates how the magnitude of impacts has been described within this assessment.

Table 7.15: Impact Magnitude Criteria

Magnitude of Impact	Definition
High	Loss of resource and / or quality and integrity of resource; severe damage to key characteristics, features or elements (Negative).
	Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Positive).
Medium	Loss of resource but not adversely affecting the integrity; partial loss of / damage to key characteristics, features or elements (Negative).
	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Positive).

Magnitude of Impact	Definition
Low	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Negative).
	Minor benefit to, or addition of, one (maybe more) key characteristic, feature or element; some beneficial impact on attribute or a reduced risk of negative impact occurring (Positive).
Negligible	Very minor loss or detrimental alteration to one or more characteristics, features or elements (Negative).
	Very minor benefit to or positive addition of one or more characteristics, features or elements (Positive).
No Change	No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Significance of Effect

7.6.14 The significance of an effect has been determined by taking into account the sensitivity of the receptor and the magnitude of the impact. The method employed for this assessment is presented in Table 7.16. Where a range of significance levels are presented, the final assessment for each effect is based upon professional judgement.

7.6.15 In all cases, the evaluation of receptor sensitivity, impact magnitude and significance of effect has been informed by professional judgement and is underpinned by narrative to explain the conclusions reached.

7.6.16 For the purpose of this assessment, any effects with a significance level of minor or less are not considered to be significant in terms of the EIA Regulations.

Table 7.16: Assessment Matrix

Sensitivity	Magnitude of Impact				
	No Change	*Negligible*	*Low*	*Medium*	*High*
Negligible	No change	Negligible	Negligible or Minor	Negligible or Minor	Minor
Low	No change	Negligible or Minor	Negligible or Minor	Minor	Minor or Moderate
Medium	No change	Negligible or Minor	Minor	Moderate	Moderate or Major

Sensitivity	Magnitude of Impact				
	No Change	*Negligible*	*Low*	*Medium*	*High*
High	No change	Minor	Minor or Moderate	Moderate or Major	Major or Substantial
Very High	No change	Minor	Moderate or Major	Major or Substantial	Substantial

7.6.17 A description of the significance levels is as follows.

- Substantial: Only negative effects are normally assigned this level of significance. These effects are generally, but not exclusively, associated with sites or features of international importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of national importance may also enter this category.
- Major: These positive or negative effects are generally, but not exclusively, associated with sites or features of international or national importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of regional importance may also enter this category.
- Moderate: These may be positive or negative effects, arising from a high level of impact on a less sensitive site or a lower magnitude of impact on a more sensitive site. The cumulative effects of such factors may lead to an increase in the overall effect on a particular resource or receptor.
- Minor: These positive or negative effects are often localised but may be important in enhancing the subsequent design of the Proposed Development.
- Negligible: No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Cumulative Effects

7.6.18 Cumulative likely significant effects have been assessed using professional judgement and best practice guidance (the CIEEM Guidelines and in accordance with BS42020 2013: Biodiversity).

7.6.19 Cumulative effects have been considered with regard to the schemes identified in Chapter 3: EIA Methodology. Only impacts from the operation of HS2 on the adjacent Colne Valley Viaduct are considered likely to have the potential to give rise to cumulative effects in cumulation with the Development due to its proximity (c.100m from the Site). The construction of the Colne Valley Viaduct is complete and there would therefore be no overlap in construction activity. Other cumulative schemes lie greater than 1.8km from Site, thereby lacking ecological connectivity with the Site.

7.6.20 This assessment has been informed by a review of available information for the HS2 Scheme. Planning information was reviewed, namely the Environmental Statement and published baseline ecology survey data. HS2 has also undertaken construction phase monitoring which has encompassed some or all of the Site and which has not been published publicly, however HS2 provided the Applicant with the reports for review (for birds and bats) to inform the Proposed Development and assessment. An assessment of the

reports and data has been made and incorporated into the relevant protected species reports as appropriate (Appendix 7.3 Wintering Birds and Disturbance Survey, and Appendix 7.7 Bat Survey Report). Data for other species were not relevant to the assessment as other species are not as mobile as bats and birds and therefore the ZoI for each species did not encompass the Site (meaning that there was no likelihood of significant cumulative effects).

BNG Assessment

7.6.21 As part of the project design process, as per best practice in EcIA, opportunities for ecological enhancements and net gain of biodiversity were identified as early as possible. However, given the status of the Site as a SSSI, the design of the Site was developed first and foremost around avoiding and reducing impacts to the designated features (particularly assemblages of wintering and breeding birds). Potential enhancements for biodiversity were then identified, however only those that would not cause further disturbing impacts / likely significant effects to the designated features were selected for the final design.

7.6.22 A BNG Assessment was undertaken to calculate the ecological value of the pre- and post-development site. The Defra statutory biodiversity metric ('the metric') was utilised, following good practice guidance from Natural England[18,19,] and joint guidance from CIEEM, IEMA and CIRIA[20]. The BNG Assessment is provided as Appendix 7.10.

7.6.23 The metric solely utilises habitat data (area and condition) and does not incorporate measures of value (existing or enhanced) for protected species.

7.6.24 It should be noted that features with no or negligible ecological value are included within the Defra Biodiversity Metric calculation as the metric accounts for every part of the Site regardless of existing value.

7.7 Embedded Mitigation (Scheme Design and Management)

General Approach

7.7.1 The Proposed Development, as described in Chapter 5: Description of Development, was designed in an iterative way to embed avoidance and mitigation for impacts to ecological receptors into the design. Since submission of the 2023 Scheme, the Applicant and design team engaged further with key stakeholders and made a series of positive revisions to the scheme. Further details of the revisions to the 2023 Scheme that are inherent in the Proposed Development are set out in Chapter 4: Alternatives, however in summary these include:

- Substantially reduced land reclamation, lake dredging and in-lake works;
- Significantly reduced user level activity assumptions from those presented in the 2023 ES;
- Restriction of water-based activities to the Eastern Channel (excluding sailing / windsurfing); and
- Reduced scale of buildings and overall built footprint.

7.7.2 Construction works will be undertaken in accordance with a detailed CEMP(s) which will be required to be prepared in accordance with the Outline CEMP (Appendix 6.1)). The CEMP

will be produced prior to the commencement of construction. Measures detailed in the CEMP will include best practice measures to protect retained vegetation, control noise, light, vibration, and airborne and waterborne pollutants. The Outline CEMP includes measures to both avoid and mitigate effects.

7.7.3 The Outline MEMP provides the designed-in (and therefore embedded) mitigation measures considered necessary to avoid significant effects and has therefore been relied upon for assessment purposes.

7.7.4 An Outline OMP (Appendix 5.3) provides a framework for controlling the operational activities of HWSFAC and its users – particularly surrounding the reduction of disturbance impacts on the biodiversity of the Site.

7.7.5 Detailed versions of the CEMP(s), MEMP and OMP will be prepared in accordance with and will be based on the outline documents appended to the ES referred to above and principles described below. The detailed documents will be secured by planning condition, approved by LBH and relevant stakeholders prior to works or activities commencing as deemed appropriate.

7.7.6 Embedded mitigation measures are set out in this section in line with the three components of the mitigation hierarchy: avoid, mitigate (can be called restore / compensate also) and enhancement.

Avoidance Measures

7.7.7 Avoidance measures are defined as primary (inherent design) mitigation, and these allow impacts to be avoided entirely.

7.7.8 One of the main principles driving the design of the Site was the requirement for no net loss of existing woodland habitat, a requirement requested by Natural England in early consultation. This has been achieved by placing all buildings on the existing concrete hardstanding left from the previous usage.

7.7.9 Principles for the timing of the construction works have been developed to avoid the most sensitive period for the nationally important birds associated with the open water of Broadwater Lake and part of the Mid Colne Valley SSSI (as set out in Table 7.17). Works within the lake will occur during September only, this month is after the breeding season of birds and before the main concentrations of wintering birds arrive, thus avoiding potential significant impacts.

Table 7.17: Timings of main construction works

Main construction works	Timing	Avoidance
Works within the main lake including islands (outside the Eastern Channel) – dredging, reprofiling of islands	September	Avoids both the main breeding and wintering period for birds
Vegetation clearance in the Eastern Channel	Outside the breeding bird season only (September to end February)	Avoids the breeding period of birds

Main construction works	Timing	Avoidance
East channel – dredging	September.	Avoids both the main breeding and wintering period for birds
East channel – initial land reclamation (works in and out of the water)	September – October. Water temperature to be above 10°C to ensure eels active and can swim away from disturbance.	Avoids both the main breeding period for birds and takes account of eel seasonality
All other works in the Eastern Channel (on existing and reclaimed land)	No timing restraints	N/A
Vegetation clearance on the Peninsula	Outside the breeding bird season (September to end February)	Avoids both the main breeding period for birds
Works on land	All year-round, no timing restraints, with Ecological Clerk of Works (ECoW) present	N/A

7.7.10 The construction of HWSFAC requires a small amount of land reclamation to act as a slipway and boat storage location. The north east corner of the Peninsula has been chosen as the most appropriate location as this area avoids / is not visible to the highest concentration of birds within the south west corner of Broadwater Lake (the Bird Refuge). The north east corner of the Peninsula is fully screened from this area by dense woodland, vegetation and islands.

7.7.11 Whenever practicable, to avoid impacts on breeding birds, clearance of vegetation of potential value to nesting birds will be completed outside of the bird-breeding season as detailed in Table 7.17 (considered to be between end-February and August inclusive). However, should it not be possible to avoid this season, vegetation will be inspected/surveyed by an appropriately experienced ecologist immediately before clearance (i.e. the morning of clearance works, or late in the day prior to clearance works) in order to confirm the absence of active nests. Should an active nest be located in the vegetation to be cleared or close by (depending on the species of bird) measure will be set in place as advised by the ECoW to prevent damage or disturbance to the nest until it can be confirmed by the ecologist that the nest has been abandoned or any young have fully fledged and left the nest. Protective measures will include the establishment of a works-free buffer zone around the nest.

7.7.12 The key measure to avoid operational impacts is that HWSFAC will only operate between 1 April and 31 September each year. Therefore, during the winter period (key for the SSSI bird features) there will be no net increase of people on the water, with BSC operations currently permitted year-round. This avoidance measure is secured by the Outline OMP and should be read alongside the mitigation measure which increases the scale of the Bird Refugee area in the south west of Broadwater Lake to increase the undisturbed area.

Mitigation Measures

7.7.13 During construction, the detailed CEMP must be adhered to by Contractors since it will form part of Employers Requirements. The Outline CEMP includes measures which are deemed 'mitigation' to reduce the level of impact that is unavoidable, some of the key measures include:

- Industry good-practice pollution prevention methods and emergency spill response measures;
- Control of working hours 07:00 – 18:00 hours weekdays, 07:00 – 13:00 hours Saturday and no working on Sundays or Bank Holidays. Construction work which gives rise to noise that is audible at the construction area boundary will be restricted to 08:00 – 18:00 hours weekdays and 08:00 – 13:00 hours Saturday;
- Restriction of lighting to dusk and dawn in late autumn – winter (see months where works are avoided in Table 7.17Table 7.17). The use of temporary lighting will be minimised wherever practical and as required for health and safety, security or other reasons. Light fittings will be directional so as to minimise light spill on to retained habitat of value to biodiversity (i.e. Site boundary hedgerows, woodland and individual mature trees);
- Works (including surveys and monitoring visits) will be undertaken in accordance with a biosecurity risk assessment and safe system of work. The risk assessment and safe system of work will take into account species-specific guidelines for management and control of INNS produced by the Non-Native Species Secretariat (NNSS) and Natural England;
- Use of best practicable means to control noise, vibration and dust;
- Fencing, which acts as physical and acoustic barriers will be installed at the start of enabling works at the boundary of wet woodland on the Peninsula to protect the habitat from accidental damage and minimise noise disturbance during construction;
- Where works in close proximity to retained trees will be undertaken in accordance with current best practice, defined in British Standard (BS) 5837: 2012 Trees in relation to design, demolition and construction – Recommendations (Ref 10) and National Joint Utilities Group (NJUG) Guidelines for the Planning, Installation and Maintenance of Utility Apparatus in Proximity to Trees. All necessary protective fencing will be installed prior to the commencement of any site clearance or construction works; and
- Protected species checks prior to commencement of works and mitigation measures and licensing to ensure compliance with legislation as appropriate.

7.7.14 As part of the construction and operation of the Proposed Development, the potential for visual stimuli on Broadwater Lake (from existing and proposed uses) has been considered and appropriately mitigated to reduce the potential impacts as far as possible. This includes the following mitigation measures included in the Outline MEMP:

- Floating reedbeds and new willow tree planting in submerged planters carefully placed across Broadwater Lake to reduce visual stimuli;
- Increasing amount of standing open water due to remodelling of Islands #2 and #6 and removal of Island #7;
- Creating a 'Bird Refuge Area' in the southern part of the lake, by removing the certain disturbance from the south banks from fishers and decreasing the area over which

sailing is allowed. Overall, there will be an increased disturbance-free area from 3.4ha to 14.7ha in the Bird Refuge;

- Installation of a green wall and fencing around the camping area in the south of the Peninsula. This will also stop egress into the woodland area by humans but allow movement of animals (mammal access points will be installed); and
- Increase area of woodland on Peninsula by removing the trackway to the north of the Peninsula and planting of native broadleaf and fruiting trees.

7.7.15 As previously stated, the Outline MEMP will be finalised in consultation with interested parties to provide the best possible outcome for nature in the long-term.

7.7.16 The Outline OMP includes a range of management controls for the future use of the facility to ensure disturbance levels remain as low as practicable during operational activities. The Outline OMP will control where and when land and water-based activities will be undertaken. The OMP will also include pollution prevention measures and emergency spill responses as relevant to the existing and proposed operational activities.

7.7.17 A lighting scheme for Proposed Development has been designed to avoid impacts to foraging bats by reducing lux levels falling from external lighting onto vegetation to a maximum of 0.4 lux which is lower than best practice guidance. In the majority of locations onsite light levels falling onto adjacent vegetation are reduced to zero by bespoke mitigation comprising 4m wide panels behind the lighting columns. The panels provide a further vertical enhancement opportunity for providing climbing plants, bird boxes and invertebrate enhancements. A Lighting Impact Assessment and External Lighting Design accompanies the planning application, and it is expected that details would be secured by planning condition.

7.7.18 Internal lighting spill from buildings with windows facing onto natural habitats will be controlled by design and also through management measures included in the Outline OMP. Measures include layout of internal lighting and choice of luminaires, to prevent lights pointing directly out of windows. The OMP includes suitable window treatments that must be closed at night, and electronic controls on lighting to ensure lights are not switched on at night if windows are unshielded.

Enhancement Measures

7.7.19 Within the Outline MEMP, the enhancement measures proposed to provide a net benefit for biodiversity of the Site are presented. In summary, the enhancements have been proposed result in a net benefit to the Site without mitigating for any specific potential impact. A brief summary is presented within this section.

7.7.20 The enhancement measures are geographically spread throughout the Proposed Development. On the northern shore of the lake is the existing BSC club house and associated facilities. This will be removed since BSC will operate from the Peninsula and area will be restored for nature. Breeding ground nesting ‘seabirds’ such as gulls and terns will benefit from the vegetation clearance on Islands #3 and #4, alongside new tern rafts and floating jetties (disused from BSC) to increase the number of breeding pairs. Small numbers use the already in-situ jetties, but these are at capacity.

7.7.21 Appropriate management measures will be in place for woodland on the Peninsula (and other areas within the red line boundary) which is currently unmanaged to increase the biodiversity of the Site as a whole.

7.7.22 Other enhancements proposed include shallow submerged gravel beaches in the Eastern Channel for invertebrates, a bird hide to increase the public's understanding of this nationally important area, bird boxes throughout woodland, duck nesting tunnels / tubes, increased habitat within the water with macrophyte planting, additional wet features within the camping area (pond dipping etc.) and planting of native fruit trees which are currently absent. Overall, there will be an increase in the biodiversity of the Site as a whole with the multiple enhancements proposed.

7.7.23 As previously stated, the Outline MEMP will be finalised in consultation with interested parties to provide the best possible outcome for nature within this Proposed Development.

7.8 Assessment of Effects – Construction Phase

7.8.1 Taking into account the avoidance measures and designed-in mitigation measures (outlined in Section 7.7), the assessed impacts and effects of the construction phase are set out in the sections below.

Protected Sites

Mid Colne Valley SSSI

7.8.2 The following sections provide an assessment of the effects of construction of the Proposed Development on the five designated features of the Mid Colne Valley SSSI which are present within the Broadwater Lake unit of the SSSI. The assessment is presented per designated feature.

Aggregations of non-breeding birds - variety of wintering species

7.8.3 The construction of the Proposed Development and associated mitigation and enhancement measures have the potential to result in an effect on the aggregations of non-breeding birds during the winter period. This aggregation is for all species (terrestrial and waterbirds) and is no longer used by Natural England when designating a SSSI due to its wide scope and ambiguity.

7.8.4 Without consideration of embedded mitigation (i.e. location and timing of works outlined in Section 7.7), works within the lake during the winter months (works on islands and dredging in the Eastern Channel) would cause visual and noise disturbance to wintering species on the open water. Works would not take very long and would be very localised, and so the duration would be short-term. Depending on the location of works, the magnitude of construction would be considered to be low, on a receptor of National importance, which would result in a temporary Minor or Moderate negative effect for the duration of the works. Also, without consideration of embedded mitigation, works on land and visible to birds on the open water during winter would cause visual and noise disturbance affecting birds within 100m. In the absence of embedded mitigation, the magnitude of construction would be considered to be low, on a receptor of National importance, which would result in a temporary Minor negative (not significant) effect for the duration of the works.

7.8.5 For waterbirds, one of the key avoidance measures is around timing of construction works, with all works occurring in open water restricted to September (Table 7.17 as secured by the Outline CEMP). This timing restriction avoids the key wintering period.

7.8.6 Works (generating noise, vibration and visual disturbance) are proposed to be undertaken on land and on reclaimed land in the Eastern Channel throughout the year, however this work will be visually screened by existing large trees and dense vegetation – as such works will not be visible from the Bird Refuge within the south west of Broadwater Lake. Only those birds within 100m of works on open water within the Eastern Channel would be affected. Therefore, the magnitude of impact would be negligible for waterbirds.

7.8.7 As part of the mitigation and enhancement of the Proposed Development (outlined in Section 7.7), which includes extensive habitat management and an increase in open water habitat, will occur in the construction phase. This is predominately achieved by the removal of Island #7 and reprofiling of Islands #2 and #6. Overall, these works will lead to a net gain of c. 716m^2 of open water habitat during the construction phase. The provision of additional open water habitat for waterbirds would result in a low magnitude benefit to wintering waterbirds.

7.8.8 Combined with the establishment of the Bird Refuge, which will increase the undisturbed area within Broadwater Lake three-fold, a medium magnitude positive benefit will occur. This combined effect is fully assessed in the Completed Development section of this chapter.

7.8.9 For terrestrial species which make up the aggregation (all species present), construction of the HWSFAC facility could occur during the winter period, however it would last up to 16 months construction. This means one or two winter periods may be impacted when construction occurs during this period. Wintering species are highly mobile and move to where food resources are plentiful or where weather patterns are preferential. Throughout the construction activities there will be parcels of the Site which are undisturbed. No species would only occur on the Peninsula, and birds would move away from any noise into adjacent woodland, trees or hedges.

7.8.10 It is highly unlikely that airborne dust will result in any impacts during the construction works on the Peninsula due to adherence to industry good practice measures as secured through the Outline CEMP.

7.8.11 Overall, during the winter period the construction impacts would result in a negligible to low magnitude impact to a National important receptor, which results in a temporary, Minor or Moderate negative effect. However, assuming adherence to the embedded mitigation measures, a Minor negative (not significant) effect is considered likely to occur.

Aggregations of non-breeding birds - Tufted duck Aythya fuligula

7.8.12 The assessment presented for *Aggregations of non-breeding birds - variety of wintering species* is also of relevance for tufted duck, which is part of the aggregation of wintering birds. Therefore, to avoid repetition the assessment is not presented twice and the conclusions presented for aggregations of wintering birds will be the same.

Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland

7.8.13 The members of this assemblage at Broadwater Lake are: – Cetti's warbler, common tern, cuckoo, gadwall, great crested grebe, grey heron, grey wagtail, greylag goose, kingfisher, little egret, pochard, reed bunting, reed warbler, sedge warbler, tufted duck.

7.8.14 None of these species were recorded using the main construction zone (concrete hardstanding areas) on the Peninsula or woodland adjacent.

7.8.15 Within the Eastern Channel and around islands #2, #6 and #7, breeding behaviour recorded in 2024 and 2025 included one Cetti's warbler singing in the Eastern Channel, 1-2 pairs of greylag geese near island #2 (although nesting has only been confirmed in the SW corner), a pair of gadwall using the entire lake as territory, great crested grebe nests in the Eastern Channel (4 in 2024 and 2 in 2025), sedge warbler was singing on islands #2 #3 and #4 (2024-5), and three pairs of tufted duck in the Eastern Channel with broods on the final 2025 visit (however the only confirmed nest sites were around islands #11 #12). No pochard nests were recorded within the ZoI (confirmed nest by island #12) but a pair were using the Eastern Channel, and a female with a single duckling was seen on visit 5 (2025). All these species were recorded in much greater numbers away from the ZoI.

7.8.16 The other assemblage member species were only recorded displaying breeding behaviours away from any possible impacts from works. Common tern only bred on rafts outside the ZoI, cuckoo was recorded within Peninsula wet woodland and island #11 well away from the ZoI, grey heron breeds annually within the heronry on islands #11 and #12. Grey wagtail was recorded at the BSC in 2024, kingfisher breeds annually in the Peninsula wet woodland away from the ZoI, little egret has bred on islands #11 #12 and #14, pochard bred on island #12 in 2024, reed bunting breeds on the west lake edge or possibly along the River Colne, and reed warbler was recorded on the south, west and north west edges of the lake.

7.8.17 Species not forming part of the designated assemblage and recorded breeding within the Eastern Channel and lagoon were coot (5 pairs), moorhen (1-2 pairs) and mute swan (1 pair bred in the lagoon). Black-headed gull breeds predominantly on island #2. Mallard young were seen in the Eastern Channel in 2025 as well as by island #4 and #2. It was suspected a pair of little grebes bred in the lagoon in 2025, but this could not be confirmed.

7.8.18 Without consideration of embedded mitigation (i.e. location and timing of works outlined in Section 7.7), if construction works were undertaken within and adjacent to Broadwater Lake during the breeding season, these activities would cause disturbance to those species breeding within the ZoI of works i.e. within the Eastern Channel and lagoon, and on islands #2, #6 and #7. A small number of nests (for great crested grebe, little grebe, mallard, tufted duck, mute swan, coot and moorhen) and up to 15 nests for black-headed gull may be abandoned, damaged or destroyed, and breeding would be reduced in these locations for up to one breeding season. However, the majority of breeding activity occurs away from proposed works in the south west of the lake (particularly for more disturbance-sensitive species such as ducks) and around the margins of the lake. Particularly for black-headed gull, breeding on island #2 is currently significantly reduced by at least 50% from the 2021-2022 baseline due to lack of vegetation clearance for the last 3 years. Overall, in the absence of mitigation and applying a National value to this receptor (although it has been valued at Borough level), there could be a low to medium magnitude impact to a receptor of National value, which would result in a moderate to major negative effect.

7.8.19 As mentioned, embedded mitigation is described in Section 7.7. Construction activities occurring within Broadwater Lake will occur in September, after the breeding season of species making up the assemblage (Drewitt,*et al*, 2023). Additionally, all vegetation clearance throughout the Site will occur between September and February to avoid the breeding season (Table 7.17) and if unavoidable there will be an ECoW present to make sure no direct impacts on breeding sites.

7.8.20 Within this assemblage of species, none of the species were recorded using hardstanding areas of the Peninsula. None were recorded on the Peninsula exclusively (e.g. rarer species for the Site, such as kingfisher were recorded at the west of Peninsula, along the east shoreline of the lake and around the BSC area). The Peninsula is the only location where works can occur in the breeding season (under the supervision of a qualified ECoW), therefore limited visual and noise disturbance may occur within the footprint of the hardstanding where the buildings are to be built. Additional mitigation will be put in place with visual and acoustic fencing installed to dampen any disturbance effect.

7.8.21 It should be noted that the vast majority of the species within this assemblage (open water, fen and damp grassland) will be located on the islands of Broadwater Lake which will not be impacted during the summer months during construction.

7.8.22 Overall, the magnitude of impact would be low, on a National important receptor, which results in Minor or Moderate negative effect. As the construction will be temporary, there will be no long-term impact on this feature and therefore a conclusion of Minor negative (not significant) effect can be made.

Assemblages of breeding birds - Mixed: Scrub, Woodland

7.8.23 Members of this assemblage at Broadwater Lake are cuckoo, garden warbler, goldcrest, great spotted woodpecker, grey heron, jay, little egret, long-tailed tit, nuthatch, red kite, stock dove, tawny owl, treecreeper.

7.8.24 The species which contribute to this assemblage (Drewitt,*et al*, 2023) are located throughout the Site and the construction works have no potential to reduce this assemblage due to the distribution. Noise and visual disturbance would result in a potential exclusion zone of 20-50m from the works, but the woodland extends much further beyond this ZoI. This exclusion would only occur if the establishment of nests coincides with the commencement of work, however it's likely that the work will have commenced and therefore birds will be choosing to nest within close proximity to the construction, as is often evidenced by the kind of species which make up woodland assemblages which have high levels of habituation to humans (e.g. stock dove, goldcrest, long-tailed tit, great spotted woodpecker).

7.8.25 There will be no direct physical impact on the woodland species with all clearance of scrub and vegetation occurring outside of bird nesting season (Table 7.17). As stated above, works on the Peninsula can occur all year round which will result in limited visual and noise disturbance to species making up this assemblage. Additional mitigation will be put in place with visual and acoustic fencing installed to dampen any disturbance effect.

7.8.26 Overall, the magnitude of impact would be low, on a National important receptor, which results in Minor or moderate negative effect. As the construction will be temporary, there

will be no long-term impact on this feature and therefore a conclusion of Minor negative (not significant) effect can be made.

Assemblages of breeding birds - variety of species

7.8.27 The assessment presented above for *Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland and Assemblages of breeding birds - Mixed: Scrub, Woodland* is also of relevance for *Assemblages of breeding birds - variety of species*, which incorporates both of above and includes all other species present. The assessment presented and conclusions drawn for these other two features should be read in absence of a specific assessment against this feature.

7.8.28 Overall, the magnitude of impact would be low, on a National important receptor, which results in Minor or Moderate negative effect. As the construction will be temporary, there will be no long-term impact on this feature and therefore a conclusion of Minor negative (not significant) effect can be made.

Summary of impact on the Mid Colne Valley SSSI

7.8.29 None of the five features of the Mid Colne Valley SSSI are predicted to result in significant effects during the construction period and therefore this can be concluded for the Site as a whole.

7.8.30 It was also concluded that all air quality effects will be non-significant and would not result in an effect on the Mid Colne Valley SSSI features, as set out in Section 7.9.

Mid Colne Valley SINC

7.8.31 The assessment presented above for the Mid Colne Valley SSSI is presented in proxy of a specific assessment of the Mid Colne Valley SINC. The habitats and species present within the Broadwater Lake are features of both the SSSI and SINC, therefore, to avoid repetition the assessment is not presented twice and the conclusions presented for the Mid Colne Valley SSSI will be the same for the Mid Colne Valley SINC.

London's Canals SINC

7.8.32 London Canals SINC is the only SINC within the boundary of the Proposed Development. The utility connection is proposed to be constructed by HDD under the Grand Union Canal, but this would result in no impact due to the depth at which is travels. Therefore, there is no direct impact on this protected site, the only potential impact is through reduction of air quality associated with the construction.

7.8.33 It is highly unlikely that airborne dust or other air quality issues will result in any impacts during the construction works on the Peninsula due to adherence to industry good practice measures as secured through the Outline CEMP. See Section 7.9 for a specific air quality assessment on all receptors.

Priority Habitats and Protected Plants

Woodland

7.8.34 Woodland is present at the Peninsula adjacent to planned construction works. No loss of woodland will occur. During mobilisation, site clearance and construction, damage to woodland habitat may arise from dust, runoff and pollutant spills. Impacts may comprise smothering of vegetation with dust until next rainfall; dust and runoff impacts to soils potentially may alter surface substrate chemistry and alter plant species assemblage over the medium-term. Pollutant spills may cause localised death of vegetation. The effects of these impacts would be highly localised due to the attenuating effects of vegetation preventing pollutants spreading.

7.8.35 Accidental loss of or damage to individual trees or branches may occur during site clearance and construction. This would likely only affect individual trees at the edges of woodland, due to the dense tree cover and lumpy concrete hardstanding on the ground around the trees, and long overhanging branches which are low to the ground in some places, preventing vehicle movement from going far beneath the trees.

7.8.36 In the absence of mitigation there would be a low magnitude impact on a receptor of Borough importance which results in a Minor negative effect (not significant).

7.8.37 A range of embedded mitigation measures are included within the Outline CEMP (Appendix 6.1) including site compounds to be set back from woodland areas; chemicals stored in bunds, spill kit made available, protective barriers around woodland and therefore no measurable effect is predicted and negligible magnitude concluded.

7.8.38 Overall, the magnitude of impact would be negligible, on a receptor of Borough importance, which results in negligible effect. As the construction will be temporary, there will be no long-term effect on this feature and therefore a conclusion of Minor negative (not significant) effect can be made.

Open standing water – Broadwater Lake

7.8.39 The proposals will affect the open standing water in the following ways: dredging in the Eastern Channel to remove obstructions for sailing and ensure a minimum 2m depth across the watersports area (with 2m to each side left undisturbed); land reclamation works at the north east of the Peninsula to create a beach, removal of soils from islands #2 and #6 and removal of island #7 to create new open water areas with shallows and gently shelving areas, creation of new shallows at the east edge of the Peninsula, placement of underwater planters (caissons) for new willow trees, placement of floating habitats, tern rafts and relocation of existing pontoons.

7.8.40 Temporary impacts to water quality are predicted from disturbance of soils and sediments as a result of dredging within the Eastern Channel and land reclamation, and soil excavation on islands. These impacts are fully assessed within Chapter 8: Water Environment and the assessment is not repeated here.

7.8.41 No direct impacts are predicted as a result of placement of ecological enhancement features within the lake (underwater planters, floating habitats, pontoons, tern rafts). Works would be very short-term and result in minimal to no disturbance to the water environment.

7.8.42 There will be a permanent increase in area of open water due the design of the Proposed Development and remodelling islands. The net gain is approximately 716m^2 of open water.

7.8.43 Embedded enhancement measures to improve the condition of the standing open water are designed into the Proposed Development. During the construction phase, the edges of islands will be removed to create gently shelving areas, a characteristic of greater naturalness in lakes. Another measure of lake condition is water quality: the lake water quality is currently reduced due to an excess of nutrients in the water. Surveys in 2024 found nutrient rich inputs coming from the adjacent Grand Union canal which is likely leaking into the lake. Floating reedbeds and habitats will be placed along the edge of the Eastern Channel and at the periphery of the south west Bird Refuge area. These large areas of plants will begin to act immediately to improve water quality by removing nutrients from the water column, although the benefits will increase and accumulate over time as the plants grow in successive growing seasons.

7.8.44 Overall, the magnitude of impact would be of positive low, on a receptor of National importance, which results in Minor or Moderate effect. Due to the scale of the increase in area (716 m^2 or 0.08% increase) which is small it's considered to be of Minor significance. As the construction will result in a permanent increase in the area of the open standing water, there will be a long-term effect on this feature and therefore a conclusion of Minor positive (not significant) effect can be made.

River Colne

7.8.45 The only works which could impact the River Colne would be the demolition of the clubhouse at the BSC and habitat restoration works. The scale of demolition works would be small, with only 1-2 demolition vehicles and trucks likely to be needed, and storage of chemicals or fuels would be very Minor (if any). No works are proposed within 8m of the watercourse and standard measures would be in place to minimise disturbance, although some noise, dust and vibration may arise for 1-2 days. The land slopes towards the lake and away from the river, minimising the likelihood of any pollutant spills or runoff entering the river.

7.8.46 In the absence of embedded mitigation, as a result of possible dust or contaminant spills, there could be a temporary short-term low magnitude impact on a receptor of Regional importance which would result in a Minor negative (not significant) effect.

7.8.47 Protection of the fence and footpath are secured through the Outline CEMP and will ensure the banks of the river are not encroached upon; the Outline CEMP also secures measures to prevent contaminant spills and polluted runoff, and dust suppression measures if identified to be required.

7.8.48 When embedded mitigation is taken into account, the magnitude of impact would be negligible, on a receptor of Regional importance, which results in negligible effect. As the construction will be temporary, there will be no long-term effect on this feature and therefore a conclusion of negligible effect can be made.

Grand Union Canal

7.8.49 During the construction of the Proposed Development, the only works occurring within the potential ZoI for the canal are the HDD for utilities connections. The works would be set far

back from the canal, both entry and exit pits are not close to the canal itself, and no above ground works would occur within 20m.

7.8.50 The HDD will be undertaken in accordance with the Outline CEMP and will occur at a depth which will have no impact on the Grand Union Canal.

7.8.51 Overall, the magnitude of impact would be negligible, on a receptor of Regional importance, which results in negligible effect.

Notable rare or protected terrestrial plants – Black Poplar

7.8.52 There is no potential for impacts to the black poplar tree located to the east of the site close to the canal bridge, as there is no work proposed in this area during construction. As a result of revisions to the proposed construction method, the utilities connection will be underground via HDD (with dig / tunnel sites set well back from the canal and any ecological receptors within the Site) and therefore there is no potential for any effects.

Species

Birds

7.8.53 Birds are fully assessed as part of the Mid Colne Valley SSSI aggregations and assemblage features and therefore no further assessment is required.

Bats – foraging

7.8.54 Night-time lighting of works areas and compounds, and security lighting may prevent light-sensitive bat species from using lit areas for foraging. Small areas would be impacted by construction only, with no severance of connectivity due to the large area and alternative flightlines around any lit areas. In the absence of embedded mitigation, impacts would be negligible to this receptor of Borough importance resulting in a negligible (not significant) effect.

7.8.55 Embedded mitigation measures are included in the Outline CEMP which include no lighting of construction works at night, and no night-time construction works to occur - should any artificial lighting be required this should follow the Bat Conservation Trust and Institute of Lighting Professionals guidelines[1]. No security lighting will be installed as the Site may be secured through its existing gates and through presence of security personnel. Lighting of site compounds, although temporary, will be designed in accordance with best practice guidance and would be bespoke, low level, shielded and directional with LED and warm colour temperatures. Site compounds will be enclosed by visual screening. As a result of these measures, no effects are predicted.

Bats – roosting

7.8.56 No bat roosts have been identified within buildings or trees at the Peninsula within the ZoI of construction works. There are a small number of trees with potential roost features within 10 - 20m of construction works but these lie within areas that will be retained with no works

[1] ILP & BCT, (2018); Bats and Artificial Lighting Guidance Note. ILP & BCT.

planned or required and which will be protected with barriers during construction (to protect retained habitats). No effect predicted.

Badgers

7.8.57 An outlier sett lies within an area of retained habitat within the Site >30m (but within 50m) from proposed construction.

7.8.58 In the absence of mitigation, disturbance or inadvertent destruction of the outlier sett with possible injury or death to one animal may occur through adjacent construction activities such as materials storage, movement of plant etc. The sett is only infrequently occupied and disturbance of the wider area from construction is liable to reduce the occupancy rate below current levels. This would be a low to medium magnitude impact to a Local important receptor, resulting in a Minor or Moderate negative effect.

7.8.59 It is not considered necessary to close the sett due to the intervening distance that will protect the sett from collapse from excavations / ground works. The sett will be preserved onsite; its location will be recorded within the CEMP along with measures to prevent inadvertent damage, such as Heras fencing, toolbox talks, signage and frequent checks by an EcOW as part of onsite supervision and monitoring of construction works.

7.8.60 Occasional foraging badger may utilise the Site during construction. Gaps to allow free passage to badger (also deer and foxes which also occur at the Site) should be allowed within construction barriers at the Site. Trenches and excavations should be constructed with inbuilt ramps, to allow any animals that fall in to escape.

7.8.61 Overall, taking embedded mitigation into consideration, no effects are predicted.

Otter

7.8.62 No impacts to otter are predicted because of the construction phase of the Proposed Development on land. Although otter may use the Peninsula occasionally (at intervals of several months) for feeding, no holts have been identified at the Site. The presence of construction compounds and plant will be disturbing and deter otter from using these areas. Measures to protect badger and small mammals during construction such as ramps within excavations will also protect otter in the unlikely event one ventures onto the construction site. Other areas will remain quiet and undisturbed (such as the concrete beach at the south west corner of the Peninsula) and will still be available throughout the construction phase (and operational phase) for feeding otters.

7.8.63 No impacts to otter are predicted because of construction phase activities within the lake. Localised short-term visual, noise and vibration disturbance from construction activities within the Eastern Channel (dredging, land reclamation) and landscaping works to islands will only occur within the day and will only affect small areas of the lake. Otter are mainly active at night and so will not be present during disturbing works. There are significant alternative resources accessible within the locality for otter (River Colne, Grand Union canal, further lakes within the Colne Valley). No impacts or effects are predicted.

Water Vole

7.8.64 The species is absent from the Site and only two very small poor suitability areas of habitat were identified within the construction ZoI within the Eastern channel. The Site has a small

number of very localised opportunities for water vole to occur and in the absence of appropriate targeted management there is a very low or negligible potential this species may colonise the Site in the future. In the absence of mitigation, no impacts to water vole are predicted because of the construction phase of the Proposed Development on land. Despite this, on a highly precautionary basis, prior to habitat clearance along lake banks, a check of the clearance area should be undertaken by a suitably experienced ecologist (as part of protected species checks prescribed in Section 7.7). No impacts or significant effects are predicted following mitigation.

Reptiles

7.8.65 There is a low risk of injury or killing of individual grass snakes through removal of rubble piles (refugia) at the Peninsula, and clearance of habitat at the BSC site and at the Peninsula. In the absence of mitigation, there would be a low magnitude impact on a receptor of Local importance which results in a Minor negative (not significant) effect.

7.8.66 A watching brief by an EcoW will be undertaken during Site clearance works in suitable reptile habitat, with methodical clearance of habitat towards areas of retained vegetation. Rubble mounds will be inspected by an ecologist to ensure no reptiles are present, and surface materials carefully lifted up individually and removed until the EcOW indicates the remaining materials may be removed y machine. These measures will be set out within a CEMP. No effects are predicted following embedded mitigation.

Fish – specifically European eel

7.8.67 Noise and vibration disturbance and disturbance of sediments from dredging works may cause the temporary displacement of fish and European eel from affected areas to undisturbed areas of the lake. The area affected (Eastern Channel) is a very small sub-section of the wider lake, with the vast majority of aquatic habitat located away from this area. Fish are highly mobile and easily able to get away from disturbing works even when conditions are very cold, unless trapped.

7.8.68 In the absence of embedded mitigation and under a likely worst-case scenario whereby dredging within the Eastern Channel was undertaken in winter, moving of large concrete blocks and other obstructions identified in 3-4 locations on the lakebed may crush individual eels sheltering in accumulated soft sediments or possible small cavities beneath these objects. The population within the lake would remain unaffected as the majority of individuals would be present elsewhere away from works. In the absence of mitigation, killing of a small number of individual eels would be considered a low magnitude impact on a receptor of Borough importance which results in a Minor negative (not significant) effect.

7.8.69 Embedded mitigation, secured through the Outline CEMP, ensures that these works are programmed to be undertaken in September, outside of the sensitive spawning season for fish and at water temperatures of 10°C or above (water temperatures in Broadwater Lake have been monitored for several years and do not typically drop below 10°C until late October / early November). Fish and eels would be fully active and would easily move away from disturbing works at the initial stages. This temporary displacement of eels from a small area of the available habitat would comprise a temporary short-term negligible magnitude impact on a receptor of Borough importance which results in a Minor negative (not significant) effect.

Other BAP species - Hedgehog

7.8.70 Impacts to hedgehogs during construction may include disruption to connectivity of habitat, and injury or killing of individual hedgehogs if they fall into open excavations or pipes. Without mitigation, this would constitute a low magnitude impact on a receptor of Local importance which results in a Minor negative (not significant) effect. Embedded mitigation measures are secured in the Outline CEMP to include ramps placed within open excavations during construction and open pipework to be capped off overnight. The potential for impacts would be reduced to negligible with no significant effects predicted.

Terrestrial Invertebrates

7.8.71 Mobilisation, site clearance, vegetation clearance and construction activities may cause disturbance or destruction of areas of habitat at the Peninsula supporting moderately diverse invertebrate populations: open habitats scrub edge and flower rich resource. Without mitigation, this would constitute a low magnitude impact on a receptor of Local importance which results in a Minor negative (not significant) effect.

7.8.72 Prior to the commencement of works, the main area identified to be important for invertebrates will be protected with Heras fencing; the Proposed Development has been designed to retain this small existing area of open flower-rich resource and protect it from disturbance. No effects predicted following embedded mitigation.

Aquatic Invertebrates

7.8.73 A number of different construction activities have the potential to cause temporary localised suspended sediment in the water column, which when the sediment settles may impact small areas of aquatic invertebrate habitat in the vicinity / zone of influence through smothering, causing a reduction in biodiversity; the effects may last for at least one season. Within the lake, this includes short-term works for the removal of island #7, and removal of areas of soils from islands #2 and #6 to below the summer water level as well as the initial stages of land reclamation at the Peninsula in the Eastern Channel. On land, increased suspended sediment may be caused by dust and runoff or pollutant spills from construction works. Without mitigation, this would constitute a low magnitude impact on a receptor of Local importance which results in a Minor negative (not significant) effect.

7.8.74 Impacts would be managed through measures within a CEMP. No effects predicted following embedded mitigation. Enhancements for aquatic invertebrates include creation of new areas of shallows in the Eastern Channel, lagoon and on island #2 and #6. As the construction will result in a permanent increase in the area of suitable habitat, there will be a long-term effect on this feature and therefore a conclusion of Minor positive (not significant) effect can be made.

INNS - Terrestrial and Aquatic

7.8.75 Spread of existing INNS or introduction of new INNS may occur through movement of boats, plant, machinery from external contaminated sites to Broadwater Lake without decontamination measures being implemented, or through use of contaminated PPE such as wellington boots. In the absence of embedded mitigation, this would potentially constitute a medium magnitude impact on a receptor of Regional importance which results in a moderate negative (significant) effect.

7.8.76 An updated INNS survey would be completed prior to commencement of construction. If INNS were to be identified to be present, an eradication programme would be undertaken by a specialist contractor. These measures are included in the Outline CEMP which will be developed further in consultation with stakeholders.

7.8.77 Control of potential impacts would be managed through biosecurity measures in the detailed CEMP(s) secured through planning condition. No effects are predicted with adherence to the embedded mitigation.

Air Quality Effects on All Receptors

7.8.78 An air quality assessment was undertaken for the Proposed Development for construction (and operational traffic) both alone and in-combination with the HS2 Scheme (Appendix 7.12), utilising industry standard guidance.

7.8.79 The air quality assessment (Appendix 7.11) sets out the changes to air quality at relevant designated nature conservation sites associated with the Proposed Development. The assessment consider are emissions from road traffic generated during the construction and operation of the Proposed Development. The increase to traffic associated with the Development will be greater than the Decision-Making Threshold defined by JNCC, meaning that a quantitative assessment was required. The assessment was based on pre-COVID 19 pandemic activity and emissions forecasts, to ensure a worst-case assessment that does not take into account temporary reductions in pollutant concentrations as a result of reduced activity levels during the Covid-19 pandemic.

7.8.80 The Proposed Development is predicted to increase concentrations of NO_x and ammonia, and nitrogen and acid deposition fluxes within the Mid Colne Valley SSSI. These increases, when considering the changes brought about by the Proposed Development in-isolation, are considered to be insignificant through the application of commonly accepted screening criteria. However, there is a small area of the designated site where these increases, in-combination with other projects and plans, cannot readily be discounted as insignificant through application of the same criteria. Information available from Natural England and APIS does not identify these areas as containing the features for which the SSSI has been designated. Examination of aerial photographs suggests that these areas, over which significant in-combination effects cannot immediately be discounted, are a thin woodland strip next to a road and a thin strip of a HS2 construction compound.

7.8.81 A further ecological assessment was then made assessing the potential impact of the assessed air quality changes as a result of construction of the Proposed Development to the Mid Colne Valley SSSI. This further assessment has also been provided in full in Appendix 7.11 and key points are provided below.

7.8.82 The Proposed Development will lead to changes in traffic flows on roads that pass within 200m of two SSSI, namely the Mid Colne Valley SSSI and Harefield Pit SSSI. The Harefield Pit SSSI citation covers geological features of interest only so will not be affected and has not been considered further. The traffic flows passing the Mid Colne Valley SSSI could result in the exceedance (or an increase in current exceedance) of the critical levels (Cles) and critical loads (Clos) for NOx and ammonia concentration and deposition fluxes within habitats supporting the designated features of the SSSI through the production of emissions from vehicle exhaust. This could result in direct effects on individual plants due to toxicity,

or changes in the make-up of floral communities through changes in nutrient availability and / or acidification.

7.8.83 The increases in traffic will occur on three roads that are within 200m of the Mid Colne Valley SSSI, namely the A412, Moorfield Road and Moorhall Road. These roads abound unit 2 (A412) and unit 4 (Moorfield Road and Moorhall Road) of the SSSI. Both units are monitored with respect to their bird populations and are in the broad habitat category of standing open water and canal. However, the habitats closest to the roadside include modified grassland, wet woodland, scrub and lines of trees. These habitats will support a wide variety of the breeding birds described in the SSSI citation and therefore degradation could impact upon the ornithological feature of this designated site. The unimproved lowland calcareous grassland present in unit 1 (Coppermill Down) is not within 200m of any road where additional traffic numbers are predicted and can be discounted.

7.8.84 To determine whether degradation of the roadside habitats within the affected zones could occur, the detailed species lists, and habitat classifications were considered. The habitats present and the species that they are made up of are typical of the area and do not support a range of features that would be considered to be particularly susceptible to marginal increases in nitrogen deposition. Modified grassland and wet woodland dominated by willow are habitats commonly growing across soils supporting high nutrient levels (naturally or artificially), as does scrub (also supporting willow species of various kinds) especially that with a ground flora including indicators of high nutrient status such as common nettle. None of these habitats would be considered to be particularly sensitive to small levels of additional nutrient input, indeed they have developed since the creation of Broadwater Lake (in the 1980's) in an environment where deposition rates were highly likely to have been greater than today's baseline.

7.8.85 The Proposed Development is not predicted to give rise to adverse effects (i.e., deterioration) on the Mid Colne Valley SSSI due to air quality changes associated with increases of traffic during the peak construction phase. This is because the changes are small and the habitats within 200m of the roads are relatively insensitive to additional nitrogen inputs.

7.8.86 No effects are therefore predicted.

Additional Mitigation, Monitoring and Residual Effects

7.8.87 No additional mitigation has been identified to be required in addition to that presented in Section 7.7.

7.8.88 Monitoring has been formulated to cover both the construction and operational phases of the Proposed Development and presented in the Outline MEMP. The finalised MEMP and overarching monitoring strategy (and how it is regulated) will be developed further in consultation with stakeholders.

7.8.89 A summary of the receptors, their sensitivity, the magnitude of impact and concluding significance of residual effect for the construction phase of the Proposed Development is presented in Table 7.18.

Table 7.18: Summary of Residual Effects – Construction Phase

Receptor group	Receptor	Sensitivity (Value)	Magnitude of impact	Significance of effect
Protected sites	Mid Colne Valley SSSI	National importance	Low	Minor negative
	Mid Colne Valley SINC	Regional importance	Low	Minor negative
	London's Canals SINC	Regional importance	Low	Negligible
Habitats	Wet woodland	Borough importance	Negligible	Negligible
	Open standing water	National importance	Low	Minor positive
	River Colne	Regional importance	Negligible	Negligible
	Grand Union Canal	Regional importance	Negligible	Negligible
Species	Aquatic invertebrates	Local importance	No change	No change
	Badgers	Local importance	Low	Negligible or minor negative
	Bats - Foraging	Borough importance	No change	No change
	Bats – Roosting	ZoI importance	No change	No change
	Birds – Breeding	Up to National importance (assemblage)	Low	Minor negative
	Birds - Wintering	Up to National importance (aggregation)	Low	Minor negative
	Fish – specifically European eel	Borough importance	No change	No change
	Other BAP species – hedgehog	Local importance	No change	No change
	Otter	Local importance	Low	Negligible or minor negative
	Water Vole	Absent	No change	No change
	Reptiles (grass snake)	Local importance	No change	No change
	Terrestrial invertebrates	Local importance	No change	No change

Receptor group	Receptor	Sensitivity (Value)	Magnitude of impact	Significance of effect
	Terrestrial plant species – specifically black poplar	Borough importance	No change	No change
INNS	Terrestrial Invasive / Non-native species	ZoI	No change	No change
	Aquatic Invasive / Non-native species	ZoI	No change	No change

7.9 Assessment of Effects – Operational Phase

7.9.1 The embedded avoidance and mitigation measures set out in Section 7.7 ensure that all foreseeable operational impacts have been mitigated for as far as possible. Visual and acoustic screens will be provided to prevent disturbance to sensitive habitats (woodland, lagoon, Bird Refuge area, from daytime land-based activities such as movement of pedestrians and vehicles, noises from vehicles, engines and children playing). Thick vegetation will prevent access to unscreened areas. Lighting would be designed to avoid disturbance effects in accordance with best practice.

7.9.2 Taking into account the avoidance measures and embedded mitigation measures set out in Section 7.7, the assessed impacts and effects of the operational phase are discussed further below.

Protected sites

Mid Colne Valley SSSI

7.9.3 The following sections provide an assessment of the effects of operation of the Proposed Development on the five designated features of the Mid Colne Valley SSSI which are present within the Broadwater Lake unit of the SSSI. The assessment is presented per designated feature.

Aggregations of non-breeding birds - variety of wintering species

7.9.4 During the operation of the HWSFAC there will be no net increase in water-based activities as the centre will not operate between 1 October and 31 March each year. The existing sailing from BSC will continue as usual, albeit from an operational base on the Peninsula rather than the northern lake shore.

7.9.5 As set out in the Outline MEMP and Section 7.7, there will be an increase in the undisturbed area for waterbirds (Bird Refuge in the south west of Broadwater Lake). There would be a slight reduction in the area which members of BSC can sail, therefore there is a net benefit to the wintering species of the Mid Colne Valley SSSI with increased undisturbed area.

7.9.6 There will be a net increase in open standing water of c.716m^2 which will result in a net benefit to waterbirds through an increase in habitat. The reprofiling of the islands is likely to

lead to better 'edge' habitat designed to encourage new species of wader to the Site, thus increasing the 'variety of wintering species'.

7.9.7 Overall, the operational impacts during the winter would result in low magnitude positive impact to a national important receptor, which results in a Minor or Moderate significant impact. Due to the embedded mitigation measures in place a Minor (not significant) positive effect is considered more likely to occur due to the wider UK trends for wintering birds.

Aggregations of non-breeding birds - Tufted duck Aythya fuligula

7.9.8 The assessment presented for *Aggregations of non-breeding birds - variety of wintering species* is also of relevance for tufted duck, which is part of the aggregation of wintering birds.

7.9.9 Therefore, in line with the above assessment, the magnitude of operational effects is considered to be low positive magnitude, the receptor is of national importance. The effect is therefore assessed as permanent Minor (not significant) positive effect.

Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland

7.9.10 As previously stated, the vast majority of the breeding birds which make up this assemblage occur on the islands within Broadwater Lake. These islands will become less disturbed within the Bird Refuge due to an increased buffer from the sailing area (now over 200m). Birds using the islands within the sailing area (Islands #1, #2, #3 and #4) would likely to be very slightly more disturbed than currently due to the increase in recreational activities (6 extra dinghies present on the lake each day). However, the islands currently have no vegetation management and therefore are not currently supporting the variety of birds that they could which make up this assemblage. The only 'new' activities which breeding birds are not already habituated to will occur in the Eastern Channel, which is visually screened from the main area for breeding. On a precautionary basis, the Eastern Channel is used for breeding by great crested grebe (up to 4 nests) and tufted duck (3 nests) and pochard (1 nest) for nesting, along with several pairs of coot and moorhen. Coot and moorhen are highly tolerant of disturbance and will be assumed to continue nesting in the Eastern Channel however great crested grebe and tufted duck are likely to move to the west side of island #8 or into the south west Bird Refuge for nesting.

7.9.11 As part of the OMP, no landing on the islands will be strictly implemented and therefore birds could use these islands to breed due to improved vegetation management.

7.9.12 Within the Bird Refuge area, repurposed BSC area and adjacent wet woodland on the Peninsula, bird boxes and duck nesting tunnels will be placed to increase the range of habitats available to encourage more species to breed which make up this assemblage. Similarly, additional rafts and repurposed jetties will be floated into the Bird Refuge area to increase available habitat for breeding birds. New floating islands with reed and emergent vegetation habitat will have small nest platforms incorporated into them (12 nest sites) to replace lost nest sites within the Eastern Channel due to increased disturbance. This will be suitable for ducks such as tufted and pochard. Great crested grebes require overhanging vegetation to create their own floating nests; this species will use the less disturbed fringes of the south west area and west Peninsula more as a result of decreased disturbance from fishing; future growth of willows in the lake within planters will also provide new nest sites in the future.

7.9.13 Overall, the magnitude of impact would be low (with both positive and negative results), on a national important receptor, which results in Minor or Moderate effect. As the scale in which these benefits / negatives will occur are over a small spatial scale (Broadwater Lake unit and not the whole SSSI), a conclusion of Minor (not significant) effect (both positive and negative depending on location) can be made.

Assemblages of breeding birds - Mixed: Scrub, Woodland

7.9.14 Operational activities near to terrestrial habitats used by these breeding bird assemblages of woodland, comprise activities such as camping, land-based activities, traffic and pedestrian movement at the Peninsula. These activities will be very localised. Noise and visual disturbance to woodland and scrub may occur within the zone of influence, 20-50m in the absence of mitigation.

7.9.15 Embedded mitigation comprises a fence around the retained wet woodland on the Peninsula to prevent children and pedestrians accessing into this breeding bird habitat and reduce impacts from noise and visual disturbance. Dense vegetation within the woodland will also help attenuate noise and visual disturbance. As such, the effects of adjacent activities are likely to be very minimal. The birds of this assemblage are spread across the Site with many using the habitats both within and outwith the boundary of the Site including lake edges, river corridor, canal, Access Road, woodland adjacent to the south. Any disturbance will only affect a small part of the habitat being utilised.

7.9.16 Woodland and scrubland birds already present on the Site have high levels of habituation. The BCS currently use the Site alongside the noise from the bagging plant to the south of Broadwater Lake which is close and audial from the largest area of woodland on the Peninsula, which will continue with or without HWSFAC.

7.9.17 Overall, the magnitude of impact would be low, on a national important receptor, which results in Minor or Moderate negative effect. As the ZoI of these impacts occur over a small spatial scale (the Site and not the whole SSSI) therefore a conclusion of Minor negative (not significant) effect.

Assemblages of breeding birds - variety of species

7.9.18 The assessment presented for *Assemblages of breeding birds - Mixed: Lowland open waters and their margins, Lowland fen and Lowland damp grassland* and *Assemblages of breeding birds - Mixed: Scrub, Woodland* is also of relevance for *Assemblages of breeding birds - variety of species*, which incorporates both of above and includes all other species present. The assessment presented for these other two features should be read as proxy.

7.9.19 Overall, the magnitude of impact would be low, on a national important receptor, which results in Minor or Moderate negative (or positive) effect. As the ZoI of these impacts occur over a small spatial scale (the Site and not the whole SSSI) therefore a Minor negative or positive (not significant) effect can be concluded. The variation between positive and negative is due to the different areas of the lake experiencing differing levels of impact.

Mid Colne Valley SINC

7.9.20 The assessment presented above for the Mid Colne Valley SSSI is presented in proxy of a specific assessment of the Mid Colne Valley SINC. The habitats and species present within the Broadwater Lake are features of both the SSSI and SINC, therefore, to avoid repetition

the assessment is not presented twice and the conclusions presented for the Mid Colne Valley SSSI should be used in proxy.

London's Canals SINC

7.9.21 The operational activities associated Proposed Development will not give rise to any impacts on the London's Canals SINC due to its distance, therefore there would be no effect.

Habitats

7.9.22 Impacts to priority habitats present onsite (i.e., woodland, standing open water) are assessed under the relevant SSSI designated features and wildlife sites set out above. All other priority habitats have been scoped out as IEF as being outside the ZoI of construction works.

Woodland

7.9.23 No loss of woodland will occur during the operational phase. The expanded woodland (with the additional proposed planting) will be protected from damage through recreational pressure by a fence around the retained central wet woodland which will prevent access.

7.9.24 The Outline MEMP includes provision for woodland management measures to improve its condition and enhance its biodiversity value.

7.9.25 Overall, the magnitude of impact would be low positive magnitude, on a receptor of Borough importance, which results in a permanent Minor positive (not significant).

Open Standing Water

7.9.26 There will be a permanent increase in area of open water due the design of the Proposed Development and remodelling of islands. This will lead to a net gain of open water of approximately 700m^2.

7.9.27 Planted and floating reedbeds will help remove nutrients from the water which will help improve water quality. Planting areas will be managed and may be increased in the future in response to ongoing monitoring findings.

7.9.28 Lake functionality will not be affected by the introduction of new features such as the small area of land reclamation as it will be contiguous with the Peninsula in the Eastern Channel.

7.9.29 Overall, the magnitude of impact would be of low magnitude, on a receptor of National importance, which results in Minor or Moderate positive effect. Due to the scale of the increase in area (716 m^2 or 0.08% increase) which is small it's considered to be of Minor significance. The permanent, long term effect will be Minor positive (not significant).

River Colne

7.9.30 The operational activities associated Proposed Development will not give rise to any direct impacts on the River Colne. Pollution prevention measures and emergency response plans would also be in place through the Outline OMP which would protect the river habitat. There would therefore be no effect.

Grand Union Canal

7.9.31 The operational activities associated Proposed Development will not give rise to any impacts on the Grand Union Canal due to their distance, therefore there would be no effect.

Terrestrial Plants – Black Poplar

7.9.32 The identified black poplar lies away from the areas of the Site that will be active during the operational phase of the Proposed Development. Therefore, no effect is predicted.

7.9.33 Black poplar will be included in planting mixes for new trees around the Site for landscaping and ongoing management to provide biodiversity benefit.

Species

Birds

7.9.34 Birds are fully covered as part of the Mid Colne Valley SSSI aggregations and assemblage features assessments above.

Bats – foraging

7.9.35 Embedded mitigation comprising a lighting scheme designed in accordance with best practice guidance, with no lighting directed onto woodland or open water habitats and dark corridors (0 lux) along woodland edges. The Outline OMP also secures other lighting controls. This would ensure no negative effects to foraging bats as a result of the operation of the Proposed Development.

7.9.36 The Proposed Development will introduce additional habitats to benefit invertebrates on the Peninsula and elsewhere – this will enhance the area for bats by increasing their food resource. Clearings and rides within woodland designed to enhance the habitat condition will also create good foraging areas for bats.

7.9.37 Overall, during the completed development would result in a low magnitude impact to a Borough important receptor, which results in a permanent, negligible or Minor positive (not significant) effect.

Bats – roosting

7.9.38 Bat roosts and indicative locations of such roosts identified through survey work carried out for HS2 lie away from the operationally active areas of the Site. Operational controls including gates and fences will ensure no disturbance occurs to confirmed and suspected roosts.

7.9.39 Details of bat roosts will be provided within the MEMP, ensuring that site workers, landscaping contractors and maintenance operative are aware of areas with potential for roosting bats. The requirement for a Permit to Work on-site will ensure all checks have been made prior to works commencing.

7.9.40 Enhancements for roosting bats will include artificial bat boxes provided on mature trees along the Access Road and around the Peninsula. Bat boxes will include some suitable for maternity and hibernation roosts which would be of high conservation value depending on the species using them. Many potential roosting features at the Site were identified to be

low potential and high potential features were notable uncommon, likely due to the young age of woodland and trees at the Site. These bat boxes may supplement the range of PRFs provided by the Site and improve resources for roosting bats.

7.9.41 A low magnitude impact on a receptor of ZoI importance is predicted, which results in a negligible or Minor positive (not significant) effect.

Badgers

7.9.42 No operational impacts are predicted to the outlier sett as this will lie within an area of the Site >30m away from operational activities.

7.9.43 Habitat enhancements set out within the Outline MEMP to be implemented at the operational phase may increase the food provision for badger by introducing new planting areas with imported soils across the Peninsula. Further enhancements at the BSC will also benefit this species, with enhancement of grassland and provision of scrubby mounds, both of which may be exploited by badgers for foraging and potentially for new sett excavation. Hedgehog highways will be provided, and discrete larger gaps may be created through any permanent fences for badger, fox and deer.

7.9.44 As the badger set is an outlier and not regularly used the magnitude of impact is negligible, on a receptor of Borough importance and therefore no effect is predicted.

Otter

7.9.45 The increased use of the hardstanding areas of the Peninsula for the activities of HOAC during April to September, and the lower-level activities of the BSC year-round at the Peninsula, will not prevent otter from using the Site and even the edges of the Peninsula during the night and quiet times of the day.

7.9.46 Increased use of the lake for watersports in the day between April and September will not have a negative impact on otter as it is a highly mobile species and can swim at speed and dive to get away; it also prefers to avoid disturbed areas. Otters have large ranges with significant suitable habitat close to the Site along the Grand Union canal, River Colne and the other connected lakes of the Colne Valley; they will use alternative habitat in the day and may also use Broadwater Lake at night.

7.9.47 Enhancements at the lake for birds such as floating reedbeds may be exploited by otter as couches or feeding platforms. Creation of wildflower meadow with scrubby mounds at the BSC site will create sheltered terrestrial areas for couches and feeding. Enhancements that benefit the resident fish population will potentially increase the food resource for otter, although there is already significant food resource for otter in the form of the invasive signal crayfish.

7.9.48 Overall, during the completed development would result in a low magnitude impact to a Local important receptor, which results in a permanent, negligible or Minor negative (not significant) effect.

Water Vole

7.9.49 Enhancements for water vole will be made at the former BSC site to create and improve marginal vegetation and create suitable bankside inclines or mounds for burrows.

Interventions for marginal plants and aquatic macroinvertebrates around the edges of the lake and on the islands may also benefit this species should it occur at the Site. However no significant positive effects are predicted, due to the absence of the species from the area.

7.9.50 In the future, American mink control may be possible once the Site is made secure; at which point water vole may eventually recolonise via the Rover Colne corridor, or it may then be viable to undertake a reintroduction project. If a small, localised population of water vole were to become established, this would be a low magnitude impact to a Local important receptor, which results in a minor positive (not significant) effect.

Reptiles

7.9.51 No impacts are predicted to reptiles at the operational phase of the Proposed Development. The low grass snake population will likely avoid active areas at the Peninsula, however there will still be plenty of undisturbed woodland margin with scrub for hunting and bare ground basking sites for this species, particularly around the lagoon. Woodland management to improve its condition such as coppicing will improve conditions for grass snake by bringing light into the ground flora, and pruning of areas of overhanging willow branches to bring light to the lake margins in patches for aquatic macrophytes will also benefit grass snake, increasing basking and hunting areas.

7.9.52 To enhance the Site for reptiles, the former BSC site will be enhanced with wildflower-rich grassland, scrubby mounds, hibernacula, log piles and a small pond. Compost heaps will also be created. These habitats will encourage breeding and egg laying at this south-facing part of the Site.

7.9.53 Overall, during the completed development would result in a low magnitude impact to a Local important receptor, which results in a permanent, negligible, or Minor positive (not significant) effect.

Fish – specifically European eel

7.9.54 The Proposed Development will increase sailing use and introduce other watersports activities of open water at Broadwater Lake during 1 April to 31 September only. The types of watersports are not motorised. Instructors will use small, electric boats; these will be limited to 1-2 boats on the lake at any time, and as they are supervising students sailing, the boats will only rarely need to move at speed to rescue any students in difficulty. This is the only potentially disturbing activity identified for fish at the operational phase of the Proposed Development. Fish are highly mobile and if disturbed will simply move to less disturbed areas of the lake – these areas will be present around the majority of the lake edge and cover 40% of the lake.

7.9.55 Floating reedbeds and willow planters deployed across the lake will provide underwater rootzones within which fish may hide; aquatic planting also provides concealing vegetation. An artificial reef to improve breeding and survival of small fish will be provided within the lagoon in the south east corner of the Site.

7.9.56 Overall, during the completed development would result in a low magnitude impact to a Borough important receptor, which results in a permanent, negligible or Minor positive (not significant) effect.

Terrestrial Invertebrates

7.9.57 At the operational phase, no loss of habitat will occur. Disturbance may arise from outdoor activities, and movements of pedestrians through semi-natural and natural habitat areas. A small area important for the open flower-rich resource assemblage of terrestrial invertebrates will be protected from human disturbance within an area made inaccessible by barriers at the edge of the active area of the Site. Other terrestrial invertebrate assemblages present within woodland and open water habitats are more widely dispersed around the Site and less susceptible to disturbance. Embedded mitigation measures such as fences, and thorny shrub planting have been designed in to ensure these retained habitats will not be encroached into during operation of the Proposed Development.

7.9.58 Enhancements for terrestrial invertebrates have been designed for the Peninsula and BSC site as these species provide a valuable food resource for a range of other species. There will be creation of mosaic habitat with rocks / bare ground, friable substrates, flower-rich grassland, deadwood including log mounds and piles, hibernacula, scrub and water sources, and wildlife ponds. Flower-rich swales will be exploited by invertebrates. At the Peninsula, the log piles and soft soils away from gravel and concrete hardstanding areas may encourage stag beetle to utilise the area.

7.9.59 Overall, during the completed development would result in a low magnitude impact to a Local important receptor, which results in a permanent, negligible or Minor positive (not significant) effect.

Aquatic Invertebrates

7.9.60 The lakebed and vast majority of lake shore will not be disturbed by operational activities; only the shoreline of the new reclaimed land at the Peninsula will be subject to disturbance arising from launching and landing of boats and other watercraft. Existing disturbance at the northern shore associated with BSC will cease. The boats will stay on the open water and the bed of the lake, and landing on lake shores or islands will not be allowed (as secured by the Outline OMP). Aquatic invertebrates utilising bed sediments and aquatic and emergent vegetation in other areas of the lake will be unaffected.

7.9.61 General biodiversity enhancements within the lake such as areas of aquatic and emergent planting will provide benefits by improving water quality and increasing the area of suitable habitat for these species. New shallows created on islands #2 and #6 and gravel shallows within the lagoon will provide new areas of suitable habitat which is the major constraint for this species group at the Site. Overall, a permanent negligible or Minor positive (not significant) effect is predicted.

Other BAP Species - Hedgehog

7.9.62 Hedgehog highways will be implemented by creating gaps into any fences and hedgerows to maintain connectivity for the species. There would be very limited benefit to hedgehogs at the Peninsula at the operational phase from landscaping, although enhancements proposed at the BSC may provide some small benefit. Overall, no effects are predicted.

Terrestrial and Aquatic INNS

7.9.63 Standard operating protocols include biosecurity measures for the operation of the BSC and for HOAC and these measures will be implemented for the Proposed Development to

prevent introduction or spread of INNS. The control measures are secured through the Outline OMP.

7.9.64 At the operational phase, the Site will benefit from improved operational controls and security. This will significantly reduce or prevent unauthorised Site uses and reduce the risk of INNS being introduced in the future. The ongoing management and monitoring will ensure that future threats and stressors arising to the Site will be identified quickly and addressed promptly and positively. However, how as the current level of introduction and relevance of INNS is unknown, no change or effect is predicted.

Air Quality Effects on All Receptors

7.9.65 The air quality impact on all receptors presented within the construction section also cover the completed development. A conclusion of no effect is predicted during the construction and completed development phases.

Additional Mitigation, Monitoring and Residual Effects

7.9.66 No additional mitigation has been identified to be required in addition to that presented in Section 7.7.

7.9.67 A summary of the receptors, their sensitivity, the magnitude of impact and concluding significance of residual effect for the completed Proposed Development is presented in Table 7.19.

Table 7.19: Summary of Residual Effects – Completed Development

Receptor group	Receptor	Sensitivity (Value)	Magnitude of impact	Significance of effect
Protected sites	Mid Colne Valley SSSI	National importance	Low	Minor (positive and negative)
	Mid Colne Valley SINC	Regional importance	Low	Minor (positive and negative)
	London's Canals SINC	Regional importance	No change	No change
Habitats	Wet woodland	Borough importance	Low	Minor positive
	Open standing water	National importance	Low	Minor positive
	River Colne	Regional importance	No change	No change
	Grand Union Canal	Regional importance	No change	No change
Species	Aquatic invertebrates	Local importance	Low	Negligible or minor positive
	Badgers	Local importance	Low	Negligible or minor positive

Receptor group	Receptor	Sensitivity (Value)	Magnitude of impact	Significance of effect
	Bats - Foraging	Borough importance	Low	Negligible or minor positive
	Bats – Roosting	ZoI	Low	Negligible
	Birds – Breeding	Up to National importance (assemblage)	Low	Minor (positive and negative)
	Birds – Wintering	Up to National importance (aggregation)	Low	Minor positive
	Fish – specifically European eel	Borough importance	Low	Negligible or minor positive
	Other BAP species - hedgehog	Local importance	No change	No change
	Otter	Local importance	Low	Negligible or minor negative
	Water Vole	Absent	No change	No change
	Reptiles (grass snake)	Local importance	Low	Negligible or minor positive
	Terrestrial invertebrates	Local importance	Low	Negligible or minor positive
	Terrestrial plant species – specifically black poplar	Borough importance	No change	No change
INNS	Terrestrial Invasive / Non-native species	ZoI	No change	No change
	Aquatic Invasive / Non-native species	ZoI	No change	No change

7.9.68 The Applicant has made a commitment to a programme of monitoring as part of the Outline MEMP, covering 30 years to start with. This forms a key part of an adaptive mitigation approach / management strategy. Details will be confirmed in due course and will be developed in consultation with relevant stakeholders.

7.9.69 Monitoring during the operational phase will be undertaken for evidence of progress against the goals of the enhancement features, to detect negative or positive effects arising from the mitigation and enhancement measures prescribed as part of the Proposed

Development, and to inform management prescriptions for each of the designated features of the SSSI. An indicative monitoring programme is set out within Table 7.20 although details would be agreed as part of the detailed MEMP.

Table 7.20: Indicative Monitoring Programme

Receptor(s)	Monitoring Goal	Method	Timing
Standing open water	Establish detailed water quality baseline. Detection of trends long-term. To inform detailed interventions.	Common Standards Monitoring Guidance for Freshwater Lakes, JNCC (2015)	Monthly: DO, temperature, turbidity, depth, total P Annual: Macrophyte & filamentous algae survey, sampling for zooplankton & phytoplankton.
Lake condition assessment	Confirm baseline and monitor progress towards improvement goals. Detection of trends long-term.	Freshwater Biological Association 'Habitat Naturalness Assessment'.	Annual reassessment; using data provided by detailed monitoring above
Woodland	Confirm baseline and monitor progress towards improvement goals.	DEFRA Metric condition assessment	Annual in June or July
Wintering birds	Record assemblage and numbers - no change, or improvement relative to the 2023 baseline.	Wintering bird survey non BSC sailing days	Monthly October to March During construction and operation - annually until 2029 and then bi-annually.
	Disturbance effects on species, detection of reduction relative to 2023 baseline.	Wintering bird survey on BSC sailing days	Monthly October to March During construction and operation - annually until 2029 and then bi-annually.
Breeding birds	Record assemblage and numbers - no change, or improvement relative to the 2023 baseline.	Breeding bird survey	Monthly March - July During construction and operation - annually until 2029 and then bi-annually.
	Provide a measure of intrinsic biodiversity relative to the recorded	SSSI condition assessment - calculation of site	Annually until 2029 and then biannually using

Receptor(s)	Monitoring Goal	Method	Timing
	baseline - to detect any improvement resulting from the enhancement measures.	threshold values for each designated assemblage	survey data as detailed above.
Other faunal species (otter, water vole, reptiles, GCN, invertebrates, badger, hedgehog)	To detect any improvement resulting from the enhancement measures	Presence / absence surveys in accordance with best-practice guidance (to include camera traps, boat-based surveys etc)	Bi-annually

7.10 Cumulative Effects

7.10.1 The only potential cumulative impacts identified are with the HS2 scheme, however the construction has now completed and therefore only operational phase cumulative effects are considered. Given that HS2 is situated outwith the Site, the only possible impacts would be visual and noise disturbance to birds on the open water of Broadwater Lake. No other receptors are considered cumulatively.

7.10.2 There are no other schemes that have the potential to result in cumulative effects with the Proposed Development due to their distance from the Site.

Completed Development & Operational HS2

7.10.3 In the HS2 ES, a potential disturbance impact of visual and noise impacts from the operation of the Colne Valley Viaduct was identified, from the passage of trains along the viaduct. This impact is identified to affect the Site in the south west corner of the lake. The HS2 assessment stated that the lake offered a much larger area of habitat away from the impacted area that may be used by any disturbed birds, and that birds would habituate to the train noise, reducing the impacts to where they are not significant. However, surveys for the Proposed Development and a review of published literature have shown this affected area is used by waterbirds as a refuge from human on-lake activities (from BSC) as well as for feeding, roosting, moulting and breeding.

7.10.4 To mitigate for the predicted operational disturbance impact, HS2 designed visual and acoustic barriers into the viaduct and a landscaping scheme to shield the viaduct so that train movements are not visible from the level of the water within the lake (where the birds will be). HS2 also proposed five tern rafts within the south west corner of the lake, however close to the Peninsula as far from HS2 as possible (See Chapter 2: Site and Setting). It is considered that the operation of the HS2 railway is likely to fully commence by the 2030s.

7.10.5 Although trains will not be seen to move from the lake as a result of the HS2 design measures, it is assumed there will still be low noise disturbance arising from passage of the trains at regular intervals. Birds easily habituate to regularly experienced noises – the birds at Broadwater are habituated to a 100+dB klaxon that sounds before sailing events, with no

disturbance observed at all to any birds on the lake, even those in close proximity to the klaxon (e.g., on and around islands #1 and #2).

7.10.6 A disturbed zone / buffer of 100m from the Colne Valley Viaduct has been allowed for (100m being the accepted zone within which disturbances arising on land to birds on the water may occur) - this area has been removed from the calculated 'undisturbed area' of the proposed Bird Refuge in the south west of Broadwater Lake. Even so, the Bird Refuge will be increased in size from 3.4ha to 14.7ha by embedded mitigation for the Proposed Development.

7.10.7 As a result of the embedded mitigation, no cumulative effects are predicted.

Additional Mitigation, Monitoring and Residual Effects

7.10.8 Monitoring will be required to assess for disturbance impacts once HS2 commences pre-operational testing, likely in the early 2030s. Disturbance surveys (as part of the proposed monitoringTable 7.20) should take place during the breeding and winter seasons to determine effects to the different receptors. HS2 will undertake this monitoring; they undertake a consultation process with stakeholders (Colne Valley Regional Park group) to ensure that consultee considerations are taken into consideration.

7.10.9 Additional mitigation is considered to be unnecessary although the requirement for this would be informed by the monitoring. If remediation is required, this would lie with HS2 but the requirement for this is considered highly unlikely.

7.11 Summary of Assessment

7.11.1 Table 7.21 presents a summary of the assessment. For all receptors assessed, no significant effects were identified.

Table 7.21: Summary of Effects

Receptor	Operational phase	Temporal Scale	Sensitivity of Receptor and Significance of Effect	Additional Mitigation and Monitoring	Significance of Residual Effect
Mid Colne Valley SSSI	Construction	Temporary, short term, intermittent	National (Minor negative)	None	Minor negative
	Operation	Permanent	National (Minor negative and minor positive)	See Table 7.20	Minor negative and minor positive
Mid Colne Valley SINC	Construction	Temporary, short term, intermittent	Regional (Minor negative)	None	Minor negative
	Operation	Permanent	Regional (Minor negative and minor positive)	See Table 7.20	Minor negative and minor positive
London's Canals SINC	Construction	Temporary, short term, intermittent	Regional (Minor negative)	None	Negligible
	Operation	Permanent	Regional (No change)	See Table 7.20	No change
Wet woodland	Construction	Temporary, short term, intermittent	Borough (Negligible)	None	Negligible
	Operation	Permanent	Borough (Minor positive)	See Table 7.20	Minor positive
Open standing water	Construction	Temporary, short term, intermittent	Borough (Minor positive)	None	Minor positive
	Operation	Permanent	Borough (Minor positive)	See Table 7.20	Minor positive
River Colne	Construction	Temporary, short term, intermittent	Regional (Negligible)	None	Negligible
	Operation	Permanent	Regional (No change)	See Table 7.20	No change

Receptor	Operational phase	Temporal Scale	Sensitivity of Receptor and Significance of Effect	Additional Mitigation and Monitoring	Significance of Residual Effect
Grand Union Canal	Construction	Temporary, short term, intermittent	Regional (Negligible)	None	Negligible
	Operation	Permanent	Regional (No change)	See Table 7.20	No change
Aquatic invertebrates	Construction	Temporary, short term, intermittent	Local (No change)	None	No change
	Operation	Permanent	Local (Negligible or minor positive)	See Table 7.20	Negligible or minor positive
Badgers	Construction	Temporary, short term, intermittent	Local (Negligible or minor positive)	None	Negligible or minor negative
	Operation	Permanent	Local (Negligible or minor negative)	See Table 7.20	Negligible or minor negative
Bats - Foraging	Construction	Temporary, short term, intermittent	Borough (No change)	None	No change
	Operation	Permanent	Borough (Negligible)	See Table 7.20	Negligible or minor positive
Bats – Roosting	Construction	Temporary, short term, intermittent	ZoI (No change)	None	No change
	Operation	Permanent	ZoI (Negligible)	See Table 7.20	Negligible
Birds – Breeding	Construction	Temporary, short term, intermittent	National (Minor negative)	None	Minor negative

Receptor	Operational phase	Temporal Scale	Sensitivity of Receptor and Significance of Effect	Additional Mitigation and Monitoring	Significance of Residual Effect
	Operation	Permanent	National (Minor positive and minor negative)	See Table 7.20	Minor positive and minor negative
Birds - Wintering	Construction	Temporary, short term, intermittent	National (Minor negative)	None	Minor negative
	Operation	Permanent	National (Minor positive)	See Table 7.20	Minor positive
Fish – specifically European eel	Construction	Temporary, short term, intermittent	Borough (No change)	None	No change
	Operation	Permanent	Borough (Negligible or minor positive)	See Table 7.20	Negligible or minor positive
Other BAP species - hedgehog	Construction	Temporary, short term, intermittent	Local (No change)	None	No change
	Operation	Permanent	Local (No change)	See Table 7.20	No change
Otter	Construction	Temporary, short term, intermittent	Local (Negligible or minor negative)	None	Negligible or minor negative
	Operation	Permanent	Local (Negligible or minor negative)	See Table 7.20	Negligible or minor negative
Water Vole	Construction	None	Absent (no change)	None	No change
	Operation	Permanent	Absent (no change)	See Table 7.20	No change
Reptiles (grass snake)	Construction	Temporary, short term, intermittent	Local (No change)	None	No change

Receptor	Operational phase	Temporal Scale	Sensitivity of Receptor and Significance of Effect	Additional Mitigation and Monitoring	Significance of Residual Effect
	Operation	Permanent	Local (Negligible or minor positive)	See Table 7.20	Negligible or minor positive
Terrestrial invertebrates	Construction	Temporary, short term, intermittent	Local (No change)	None	No change
	Operation	Permanent	Local (Negligible or minor positive)	See Table 7.20	Negligible or minor positive
Terrestrial Invasive / Non-native species	Construction	Temporary, short term, intermittent	ZoI (No change)	None	No change
	Operation	Permanent	ZoI (No change)	See Table 7.20	No change
Aquatic Invasive / Non-native species	Construction	Temporary, short term, intermittent	ZoI (No change)	None	No change
	Operation	Permanent	ZoI (No change)	See Table 7.20	No change

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