Homes England

The Housing and Regeneration Agency

West of Ifield, Crawley
Phase 1 Ecological Mitigation Strategy

10051123-ARC-XXX-ZZ-TR-EC-00004
Version 1 - Planning submission

July 2025

ECOLOGICAL MITIGATION STRATEGY

West of Ifield – Phase 1 Infrastructure

Author	HC/ NG
Checker	HC
Approver	MG/ SW
Date	SEPTEMBER 2024

VERSION CONTROL

Version	Date	Author	Changes
001	13th March 2024	HC	First Draft Issued for Client Comments
002	17th April 2024	HC	Addressing of comments
003	10 September 2024	SW	[redacted]
004	05 June 2025	PT	Addressing of comments received from HE

CONTENTS

1 Introduction

1.1 Overview

Arcadis Consulting (UK) Limited has been commissioned to provide consultancy services in support of the Hybrid Planning Application for the West of Ifield Proposed Development, specifically in relation to the production of an Ecological Mitigation Strategy. This Ecological Mitigation Strategy document identifies the key habitats and protected species present within the footprint of the Phase 1 Site enabling highways infrastructure, the in full element of the application. This strategy does not consider the wider proposed Development which is the subject of the outline element of the application that will be delivered in phases over several years. The outline element of the application will be dealt with by the respective EMS.

Homes England intends to redevelop approximately 172 hectares (ha) of West of Ifield (hereafter referred to as 'the site') within the administrative area of Horsham District Council (HDC) and in West Sussex for a mixed-use development. The Proposed Development was part of the UK government's nationwide initiative to deliver new housing stock across the country as announced by the Department of Communities and Local Government (DCLG) in 2016 (now known as the Ministry of Housing, Communities and Local Government (MHCLG).

This document provides the details of the required mitigation for each of the Important Ecological Features (IEFs) which have been identified within the project's Environmental Statement (ES). This document sets out the mitigation requirements as well as any long-term maintenance and management requirements (where appropriate). This document has been produced to support the Hybrid planning application and the subsequent detailed design of the Phase 1 infrastructure.

This report provides details of the proposed mitigation for notable faunal receptors present within the site, namely Habitats and Invertebrate fauna, Great Crested Newt (*Triturus cristatus*), Reptiles, Dormouse *(Muscardinus avellanarius),* Bats, Nesting Birds, Otter (*Lutra lutra*), and Badger (*Meles meles*). This document presents temporary construction phase mitigation requirements as well as post-construction longer-term mitigation needs. Construction of the Phase 1 highways infrastructure is anticipated to take between 2 and 3 years. The highways infrastructure will be subject to a five-year defects and aftercare period with the completed development stage being permanent and present for more than 10 years.

A separate Biodiversity Net Gain (BNG) assessment has been carried out for the Phase 1 highways infrastructure and presented in a separate report. This document should be read in conjunction with the Landscape Ecology Management Plan (LEMP) and the Outline Construction Environmental Management Plan (OCEMP) (both produced by Arcadis Consulting in 2024 for the Highways Construction works of Phase 1) as well as the ES and associated technical appendix reports (produced by Ramboll in 2023).

1.2 Site location and setting

The Site of the proposed Development covers approximately 172 ha and is located to the west of Ifield near Crawley in West Sussex (see Figure 1). The West of Ifield site ('the Site') falls entirely within the administrative area of Horsham District Council (HDC) although it immediately abuts the Crawley Borough Council (CBC) boundary. The Site is bounded by Charlwood Road in the north, beyond which lies Gatwick Airport. The Site comprises predominantly agricultural land in the northern and central areas (dominated by arable and grazed pasture fields) and Ifield Golf Course in the south. A range of habitats are present throughout the site including grassland, woodland, scrub, a network of hedgerows and lines of trees, individual trees, ditches (including land drains) and ponds. The River Mole flows west to east through the northern half of the Site, and Ifield Brook runs flows south to north along the eastern site boundary (forming the boundary between the site and the adjacent Ifield Meadows LWS).

Whilst the Site itself is within Flood Zone 1 the area to the east is within Flood Zone 2 which the Environment Agency has estimated to have a 1 in 1000 chance of flooding in any year. An area to the east of the Site is occupied by Ifield Meadow, which adjoins a wooded area and extends into an area of ancient woodland. Ifield Meadow is designated as a Site of Nature Conservation Importance (SNCI). Within the SNCI lies Ifield Mill Stream and Ifield Brook that flow from south to north across the eastern part of the site and to which smaller tributaries and drainage channels are connected. Small woodland blocks are located alongside sections of the River Mole and Ifield Brook. Further east lies the wider area of open space known as Ifield Park. Rusper Road passes through the southern half of the Site (passing north of the Golf Course), and Charlwood Road and Bonnett's Lane form the northern-most extent of the Site.

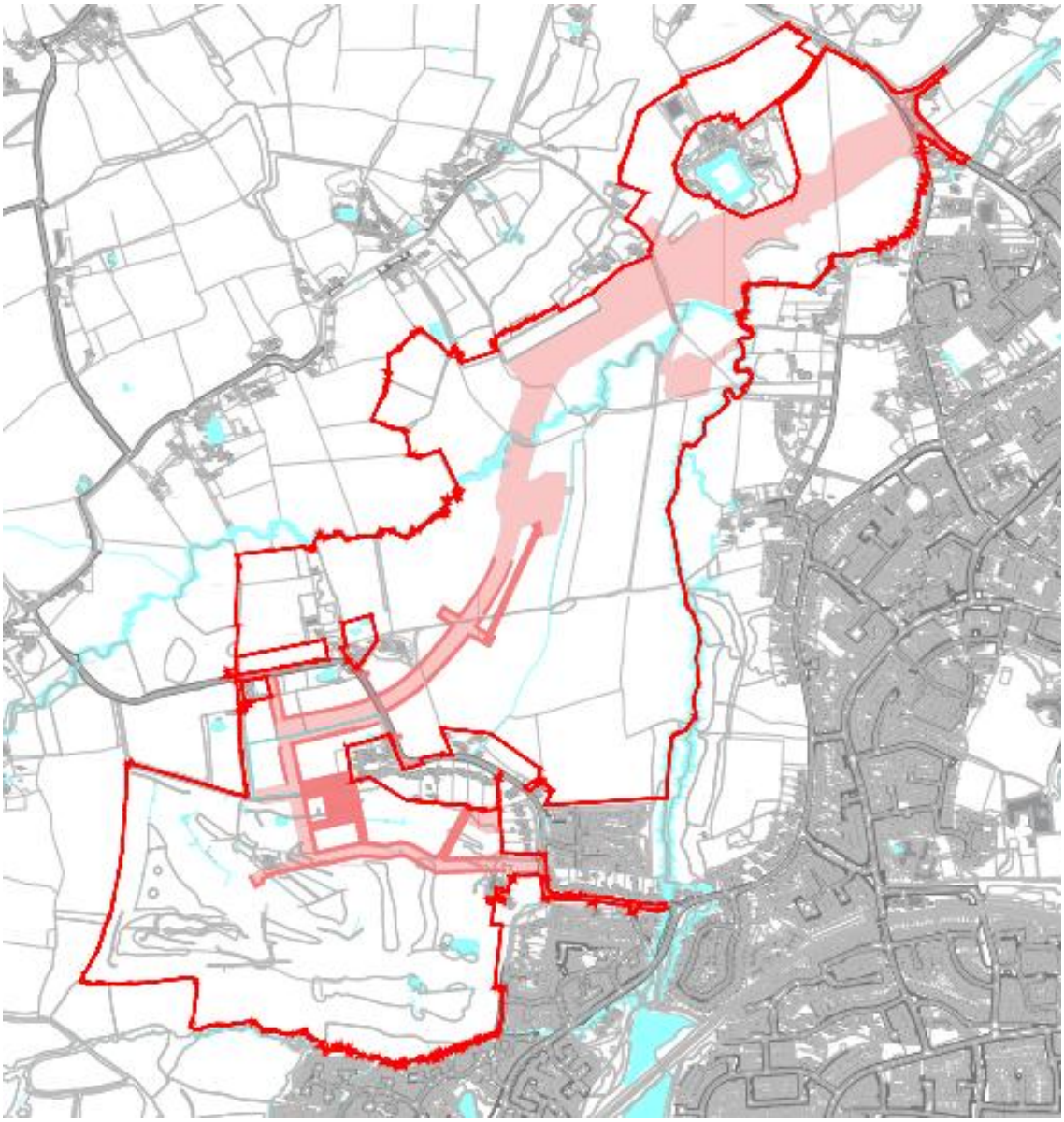


Figure 1 Proposed Development Redline Boundary (full site extent)

1.3 Proposed scheme

As noted above, whilst the Land West of Ifield proposed development spans an area of approximately 172 ha, this Ecological Mitigation Strategy covers the Phase 1 Site which covers approximately 25.9 ha of the Site. Figure 1 above, provides an indicative location for the works including the spine road which crosses the Site and ties into the southern extent of the site which comprises minor roads which will in the long-term service residential dwellings.

1.4 Structure of this report

This report outlines the key habitats and protected species that are of importance and relevant to Phase 1 of the proposed Development, namely:

- Habitats, including Veteran Trees and Terrestrial Invertebrates;
- Reptiles;
- Nesting Birds;

- Bats;
- Dormice;
- Otter;
- [redacted]

Whilst Great Crested Newts are present within the Proposed Development site boundary, district licensing is anticipated to be the proposed approach to be adopted and therefore Great Crested Newts are not considered further within this report and are envisaged to be addressed through District Level Licensing (DLL). DLL is an alternative to traditional mitigation licensing for planning applications. It does not require surveys for Great Crested Newts nor plans to carry out mitigation work to move newts to safety. It focuses on the development of habitats suitable for Great Crested Newts in the wider local area. Schemes need to include four elements:

1. Maps to show where GCN are likely to live and the important areas to conserve.
2. Target areas for new or restored ponds to compensate for habitat loss.
3. A strategy that includes an impact assessment of the effects of the development at a local authority or larger scale.
4. A developer contributions scheme to fund compensatory habitat.

Where DLL is suitable, Natural England will measure the impact of the development on Great Crested Newts, assess the cost of compensating the impact (creating/enhancing habitat) and then issue an impact assessment and conservation payment certificate (IACPA). Developers then submit this information with their planning application.

This strategy details:

- Where species and habitats are located.
- Any legislative requirements.
- Details of the site, summary of relevant survey information and cross-referenced appropriate documentation for existing survey information/details.
- Any specific ecological monitoring requirements (where applicable).
- Cross references to the LEMP (produced by Arcadis Consulting 2024) which will include monitoring and evaluation which will inform maintenance and management (where applicable) as well as the BNG Report.
- Identify any protected species licensing or cross discipline requirements.

At the time of writing, traditional mitigation approaches to great crested newts have been requested to be presented although consideration is being given the DLL. The traditional licensing approach to great crested newts has been presented below in Section 9.

1.5 Overview of on-site mitigation

In line with the mitigation hierarchy, the design of the proposed Development has been iterated throughout the design process to limit impacts to IEFs. The ES provides further details on the dedicated species, habitats and mitigation requirements which have been captured below and further developed.

Given the approach to phase the delivery of the proposed Development, this document only details the mitigation requirements specifically relevant to Phase 1 and does not capture all mitigation requirements for the entire West of Ifield proposed Development site. Mitigation for the wider Proposed Development will be covered by the respective EMS. Table 1 below sets out the mitigation requirements which are applicable to Phase 1. The mitigation requirements presented have been collated following a review of the ES chapter, authored by Ramboll, and a review of the survey information/ data held to date.

The wider site mitigation requirements will be provided in a separate document. This will be authored as the later phases of the proposed Development are to be progressed. Table 1 below presents the mitigation measures applicable to Phase 1.

Receptor	Site Status	Avoidance and Retention Measures	Buffering	Habitat Creation	Monitoring
Habitats and Terrestrial Invertebrates	Lowland mixed deciduous woodland/ ancient woodland (Local – National) Veteran trees (National) Other woodland; broadleaved & other neutral grassland (Local) Line of trees (Site) Modified grassland (Site) Mixed scrub (Site) Bramble scrub (Site) Blackthorn scrub (Site) Sparsely vegetated land (Site) Hedgerows priority habitat (Local) Other hedgerows (Site) Bracken; Developed land; sealed surface; Buildings (Negligible) Artificial, unvegetated, unsealed surface (Negligible) Cereal crops (Site) Urban (Negligible) Individual trees (site – national) Eutrophic standing waters; ponds priority habitat (Local) Eutrophic standing waters; artificial pond (Negligible) Standing open waters and canals; ditch (Site) River Mole; other rivers and streams (Local) Unnamed ditch/watercourse; other rivers and streams (Local) Ifield Brook; other rivers and streams (Local) Hyde Hill Brook; other rivers and streams (Local) Invertebrates (Regional)	• Avoidance of veteran trees and woodland habitats • Avoidance of watercourses • Retention of veteran trees (of up to National Level importance and considered to be irreplaceable) except where removal is unavoidable to facilitate construction of the Crawley Western Link where one veteran tree (T368 as presented in the Arboriculture Report 230265-PD-11b) will be lost. • Retained habitats to be protected during construction. • Avoidance, where possible of key areas including the River Mole, the southern woodland edges of the Golf Course, two existing ponds within the Golf Course and the off-site Ifield Brook Wood and Meadows LWS	Buffers provisioned during construction phase for: • veteran trees, • woodland habitat, • watercourses, and • southern woodland edges of the Golf Course, two existing ponds within the Golf Course and the off-Site Ifield Brook Wood and Meadows LWS	• Landscape design to be like for like or provide betterment with long-term management included within the LEMP. • Designated pedestrian routes to ensure non-motorised users do not trample or damage retained or newly created habitats. • The retention of large woody material from felled trees into log piles and consideration of retaining standing dead wood and ‘planting’ dead tree stumps as dead wood features. • Incorporation of sparsely-vegetated, south-facing banks and slopes (i.e. bee banks) to provide invertebrate nesting, hunting and basking opportunities. • Creation of areas of bare, sandy ground within landscape planting. • Landscape design to include planting mixes which include the provision of sources of nectar. • Invertebrate boxes or ‘bee hotels’ and bee bricks are proposed. • Specific mitigation measures for Brown Hairstreak butterfly.	• Implementation of the OCEMP which includes pollution control measures, management of invasive plant species as well as monitoring and management recommendations.

Receptor	Site Status	Avoidance and Retention Measures	Buffering	Habitat Creation	Monitoring
Reptiles	County level importance at the Golf Course and Local level importance for the rest of the site	• Plan showing areas for reptile mitigation and locations where habitats will be retained.	• The provision of buffers, planting and features including hibernacula to provide areas of shelter and protection where higher risks of disturbance may occur – wider site mitigation strategy.	Habitat enhancement and creation strategy, including creation of habitat features such as: • hibernaculum and basking banks; • new areas of rough grassland in the north of the site; • suitable habitat features around sustainable drainage features; • features to prevent fragmentation as a result of the proposed Crawley Western Multi-Modal Corridor, such as clear-span bridge over the River Mole; and • features such as dense vegetation to reduce the likelihood of pet predation in the southern areas of the site.	Implementation of a LEMP (to be secured via a Planning Condition). The LEMP would include monitoring and maintenance requirements.
Bats	Common pipistrelle (up to Regional) Soprano pipistrelle (Local) Brown long-eared (County) Grey long-eared (Regional) Noctule (County) Leisler's (Local) Serotine (Local) Myotis excl. Bechstein's (County) Bechstein's (County) Barbastelle (Regional)	• Key ecological corridors through the site will be retained and enhanced for wildlife connectivity, e.g., commuting routes for bats. Designed with North-South and East-West corridors to connect adjacent valuable habitats (e.g. LWS and ancient woodlands) • As much of the mature hedgerow and scrub/woodland and associated grassy margins are retained as possible. • Plans showing the location of roosts, areas of highest risk of disturbance. • Sensitive lighting design following guidance and principles provided in the BCT and Institution of Lighting Professionals (ILP) Guidance Note 08/18 'Bats and artificial lighting in the UK' (or as updated), with an assumption against lighting of areas of important retained and new habitats and minimising light	Buffers of between 25 m to 30 m (width) around areas of sensitive habitat, such as: • river corridors, • woodlands, • hedgerows, • water bodies, • Ifield Brook Wood and Meadows LWS, • ancient woodland and veteran trees (in the south), and • ancient woodland (in the east), with a 35 m buffer at Hyde Hill Wood LWS Buffers would be incorporated into the various designs as appropriate for the different phases of development.	Enhancement and creation strategy: • creation of areas of habitat within natural and semi-natural green space • green corridors retain connectivity through the site (including road narrowing in residential areas and bat hop-overs), tailored towards bat species requirements (particularly mimicking existing habitats found at the Golf Course, such as grassland and scrub mosaics) – applicable for Phase 1, in relation to hop-overs where green corridors interface with highways infrastructure. • plans showing locations of temporary flightline routes (if required), and areas of compensation / enhancement – applicable for Phase 1 but only in relation to flightlines/ hop-overs. • provision of clear span bridge structure at the River	LEMP includes monitoring plans for retained and new roost features, foraging areas and commuting features over a time period and at a frequency in accordance with current guidelines LEMP, tailored towards species known to use the site most frequently (such as common pipistrelles) and also rare species with notable records in the local areas (such as Bechstein's); and monitoring plans for retained / new roost features, foraging areas and commuting features, over a time period and at a frequency in accordance with current bat mitigation guidelines – hop-over and verge planting relevant in relation to Phase 1a and 1b, to be covered in the wider site mitigation strategy Habitat degradation arising due to air / water quality effects will be predominantly

Receptor	Site Status	Avoidance and Retention Measures	Buffering	Habitat Creation	Monitoring
		spill from lit areas. – applicable to Phase 1		Mole will minimise fragmentation effects of severing the Link Road. Planting bat hop-overs at key locations (applicable to Phase 1) • opportunities for, and benefits of installation of overpasses, flyovers etc. throughout the site would be considered to reduce the likelihood of road traffic accidents and to retain or enhance permeability • the LEMP and landscape design will incorporate replacement planting and ensure that vegetation is appropriately positioned throughout the scheme design to maximise connectivity and retain green corridors. Sustainable Drainage Systems (SuDS) are to be incorporated into the verge designs for the Phase 1 infrastructure	addressed by measures within the OCEMP.
Nesting Birds	Local	• If construction of the Crawley Western Multi-Modal Corridor lies within nesting season (March-August), checks for kingfisher nests should take place and if identified, restriction of the works footprint, programme or type of machinery used should occur and an artificial kingfisher nesting wall should be constructed and left until chicks have fledged.		• The Landscape Ecology Management Plan (LEMP) and landscape design details the planting mixes. • Given the proximity of Gatwick Airport, the encouragement of birds on the site is not appropriate due to the increased collision risk with aircraft. Further information and details have been provided in the Bird Hazard Mapping Report and Management Plan.	The LEMP and landscape design details the planting mixes and maintenance and management requirements.
Dormouse (*Muscardinus avellanerius*)	There is suitable habitat for dormouse within the wider landscape around the site (namely woodland and hedgerows). No evidence of dormice was recorded in the surveys that informed the ES.. An update assessment for the presence of dormouse in the north of the site should be undertaken prior to work commencing in this area. If following this, presence is confirmed, an appropriate mitigation strategy should be implemented, and works may need to proceed under licence to Natural England.				

Receptor	Site Status	Avoidance and Retention Measures	Buffering	Habitat Creation	Monitoring
Otter	Negligible	Construction phase mitigation has been omitted from the ES as Otter has been scoped out. Long-term mitigation is considered due to the potential for Otter to increase their range within the local area.	Effects on Otter are limited to disturbance around the Ifield Brook on the east of the site and the River Mole in the centre of the site, although with sufficient buffers around these features, effects would be minimal.	River crossings would be clear span with no culverts or piers allowing safe passage beneath, and mammal tunnels would allow additional passage.	
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Survey reports for all relevant species have been appended to the ES. The reports of relevance for Phase 1 are as follows:

- Confidential Badger Survey Report – October 2019 – WOI-AUK-XX-WS-RP-EC-008-01- Badger Survey Report (Arcadis).
- Land West of Ifield Environmental Statement Bat Survey Report – November 2019 – WOI-AUK-XX-WS-RP-EC-0013-01-Bat Survey Report (Arcadis).
- Breeding Bird Survey Report including Barn Owl Assessment – November 2019 – WOI-AUK-XX-WS-RP-EC-0011-01- Breeding Bird Survey Report (Arcadis).
- Dormouse Survey Report – October 2019 – 10020728- ARC-XX-XX-RP-YE-11 (Arcadis).
- Invertebrate Survey Report – October 2019 (Arcadis)
- Otter and Water Vole Survey Report – October 2019 – WOI-AUK-XX-WS-RP-EC-007-01-Otter and Water Vole Survey Report (Arcadis).
- Hedgerow Survey Report – October 2019 – WOI-AUK-XX-WS-RP-EC-0009-01- Hedgerow Survey Report (Arcadis)
- Extended Phase 1 Habitat Survey Report- October 2019 – WOI-AUK-XX-WS-RP-EC-0010-01-Extended Phase 1 Habitat Survey Report (Arcadis).
- Reptile Survey Report – October 2019 – WOI-AUK-XX-WS-RP-EC-006-01- Reptile Survey Report (Arcadis).
- Reptile Survey Report – 2020 – R-1620007949_1-Reptile Survey (Ramboll).
- Advanced Bat Survey Report – November 2021 – 20-030-ABS-v2 (Ramboll).
- Invertebrate Survey Report – September 2023 – CPA-23211 (Ramboll).
- Barn Owl Report – August 2023 – R-1620007949_1-BarnOwls (Ramboll).
- Bat Survey Report – February 2023 – R1620007949_1_Field_Bat Report. (Ramboll).
- Early Breeding Bird Survey – July 2020 – R-1620007949_1-Breeding Birds (Ramboll).
- Bat Activity Survey Report (Transect 5) – March 2023 – R1620007949_1-Ifield_Bat Activity Report (Ramboll)
- Badger Survey Report- November 2022 – R162007949_1-Badger Survey Report (Ramboll)
- Reptile Survey Report – November 2022 - R1620007949_1-Reptile Report (Ramboll).
- Land West of Ifield – Bat Activity Survey Report (Transect 5) April 2023 (Ramboll).
- Bat Trapping and Radio-tracking Baseline Report and Evaluation for Land West of Ifield, Crawley for Ramboll 26 September 2022.

2 Habitat & Invertebrate Mitigation

2.1 Site conditions/ survey results summary

2.1.1 Habitats

Two non-statutory designated sites have been identified within the boundary of the overall proposed development and need to be considered as part of the Phase 1 works.

- Ifield Brook Wood and Meadows LWS is located along the eastern extent of the Proposed Development red line boundary. The LWS should not be directly affected by the onsite Phase 1 activities, but mitigation measures are required for potential indirect impacts. The LWS incorporates relatively herb-rich meadows enclosed by thick hedges, Ifield brooks and some woodland.
- Hyde Hill LWS lies just to the west of Crawley. The habitats present comprise semi-natural woodland, thick hedgerows, streams, and rough grassland. It supports a range of uncommon plants and butterflies plus a diverse range of breeding birds. The site will not be directly affected by the onsite activities of Phase 1, but mitigation measures are required for potential indirect impacts.
- Ancient woodland is present within the overall Proposed Development redline boundary and is avoided as part of the Phase 1 highways infrastructure works. Whilst direct impacts are not anticipated, there is a risk of indirect impacts such as dust deposition during construction phase activities.

The main sites and habitat types to be affected by Phase 1 comprise:

- Ifield Brook Wood and Meadows LWS
- Hyde Hill LWS
- Ancient Woodland
- Veteran Trees
- Poor semi-improved grassland;
- Intact hedgerows;
- Marsh/ marshy grassland;
- Broadleaved scattered trees;
- Neutral semi-improved grassland;
- River Mole river corridor including broadleaved woodland;
- Arable farmland;
- Cultivated/ disturbed land- amenity grassland;
- Mixed parkland/ scattered trees;
- Broadleaved woodland plantation.

Habitats and plant species present on the site are of up to National Level importance, with most habitats of Local Level importance and lower with detailed habitat descriptions presented in the BNG report found in ES Appendix 8.1. The location of each habitat is presented in the UKHab figure in ES Appendix 8.25.

The LEMP and Landscape design present the proposals for Phase 1. The BNG report considers the baseline habitat conditions present and the proposed permanent landscape design which will establish post-construction. Direct land take will result in both permanent and temporary losses of habitats of importance up to the National Level (it is anticipated that no Ancient Woodland of National Level importance would be removed, but one veteran tree would be lost). The BNG Assessment Report in ES Appendix 8.1, provides details of temporary and permanent habitat losses.

It has not been possible to avoid all areas of priority habitat, including ponds (loss of 0.06 ha) and hedgerows (1.54 km), although remaining portions of these habitats in the remainder of the Site (beyond the infrastructure

elements) would be retained and, where feasible, enhanced. A minimum 10% BNG would be achieved, as detailed in the BNG Assessment Report[1], found in ES Appendix 8.1.

2.1.2 Invertebrates

2.1.2.1 Desk study results

The desk study searches returned 292 records of invertebrates within the last 10 years, within 2 km of the site. This includes 61 species including the butterflies: Brown Hairstreak *Thecla betulae*, Small Heath *Coenonympha pamphilus*, White Admiral *Limenitis Camilla* and Dingy Skipper *Erynnis tages*; Brilliant Emerald dragonfly *Somatochlora metallica* (listed under NERC S41); Dusky Thorn moth *Ennomos fuscantaria* and Cypress Carpet Moth *Thera cupressata.* Other species of note include Long-horned Bee *Eucera longicornis.*

2.1.2.2 Site survey results

Habitats on the site including tall sward grassland, mature unmanaged scrub edge, hedgerow, broadleaved woodland (including dead wood features) and riparian and pond wetland habitats which can support rare and nationally scarce invertebrate species, including species listed as S41 species. During the 2018 and 2019 invertebrate surveys, 719 invertebrate species were recorded from the site, with 34 of these of recognised conservation status in the UK, including one species classed as Red Data Book (RDB) nationally 'endangered' under pre-1994 IUCN criteria (a tephritid fly *Acinia corniculata*); two species classed as nationally 'vulnerable' under post-2001 IUCN criteria; two species classed as RDB3 nationally 'rare' and four species classed in the 'near threatened' post-2001 IUCN category. Two species classed within the RDB 'unknown' or Data Deficient (DD) categories were recorded, together with 22 species classed as nationally scarce in the UK. These species are described in ES Appendix 8.6. Of the 719 species identified, 639 were recorded from terrestrial and 80 from the aquatic samples collected.

The Site supports wetland habitat including well-vegetated ponds with potential to support aquatic invertebrates of conservation value, and slow-flowing habitats of the River Mole and Ifield Brook were identified as potential breeding habitat for the Brilliant Emerald dragonfly, as described in ES Appendix 8.6.

Brown Hairstreak, a NERC S41 species, was recorded from four locations around the central part of the Site.

Habitats considered to be most important for invertebrates at the Site include mature woodland/scrub edge (including wood decay habitat) and the tall and short grassland habitats associated with woodland edges; particularly these habitats present in the Golf Course and in the central area of the site. The large arable fields and open areas of the site, particularly in the north and central areas of the site, are of lower conservation importance for invertebrates.

The invertebrate assemblage as a whole should be considered to be of importance at the Regional Level, with woodland and scrub edge habitats and adjacent tall and short grassland at the Golf Course in the south of the site and around the central area of the site of highest invertebrate importance.

2.2 Further surveys

No further surveys are proposed at this stage.

2.3 Licensing requirements

No licensing requirements are anticipated. Refer to Appendix A for legislative protection details.

2.4 Construction mitigation for Phase 1

2.4.1 Habitats & invertebrates

- Avoidance of priority habitats and protected plants where possible.
- Creation of buffers around sensitive on-site and adjacent habitats (including watercourses and woodland), retention of key habitat corridors to avoid fragmentation, creation of ecologically valuable habitats delivered through a landscape scheme. Buffers would comprise vegetative strips and working location offsets to ensure no plant or equipment entered the valuable habitat areas such as watercourses and where woodlands are present. The demarcation of buffers for woodland areas could comprise fencing with the inclusion of signage. Buffers would be between 25 m and 30 m. It will be

[1] Ramboll, 2023. Land West of Ifield - Biodiversity Net Gain Report (May 2023)

necessary to install fencing and signage to demarcate exclusion zones for plant and site personnel. This would be applicable to locations such as sensitive habitat, such as river corridors, woodlands, hedgerows and water bodies, including in the south-east of the site buffering Ifield Brook Wood and Meadows LWS, in the south of the site buffering ancient woodland and veteran trees, and in the east buffering ancient woodland, with a 35 m buffer at Hyde Hill Wood LWS.

- Implementation of a OCEMP prescribing measures to reduce impacts caused during the demolition and construction period (such as dust and pollution).
- The proposed Development will retain veteran trees (of up to National Level importance and considered to be irreplaceable habitat) except where removal is unavoidable to facilitate construction of the Crawley Western Link where one veteran tree (T368) will be lost. Compensation would involve 'stacks' created using the arisings from the removed tree, and existing trees would be artificially veteranized.
- The landscape planting and green infrastructure would comprise the following habitat types, designed to be like-for-like or betterment, as shown in ES Appendix 8.1 and ES Appendix 8.28:
    - Modified and other neutral grassland;
    - Broadleaved woodland;
    - Mixed scrub;
    - SuDS / ditches;
    - Ponds (priority habitat);
    - Native species-rich hedgerows and native species-rich hedgerows with trees (priority habitat);
    - Urban trees;
    - Introduced shrubs.

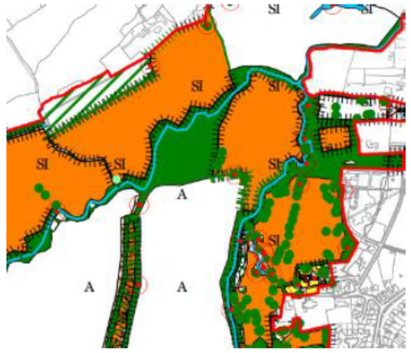
  The above would be achieved through the landscape design and LEMP.

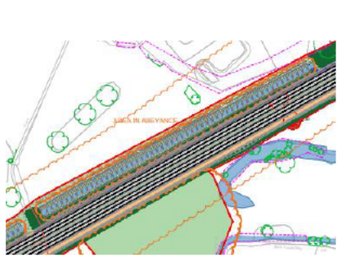
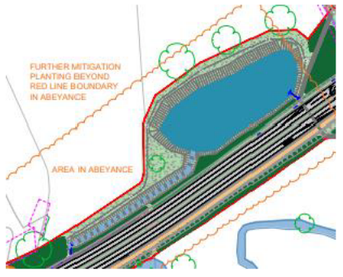
- Creation of new valuable wildlife areas, suitable for use by protected/notable species (e.g. Great Crested Newt, reptiles, bats, breeding birds and invertebrates) in the north of the site and in targeted areas around the southern parts of the site. This would include creation of Lowland Meadow areas, other grassland areas, new woodland, hedgerows, ponds, and ditches.
- Compensation for loss of a single veteran tree through creation of vertical 'stacks' of standing dead tree trunks where the removal cannot be avoided, whereby the main trunk of the veteran tree and standing deadwood would be cut in single sections and relocated within the retained parts of the site where they can decompose naturally and add invertebrate habitat value. The main body of the stumps would be excavated and replanted. Additional artificial veteranisation of existing mid-age trees in adjacent retained habitat, and planting of new trees in open area would take place. This would include fruit trees which veteranise faster than other tree species.
- Works on site would be subject to the provision of detailed method statements and toolbox talks with oversight (where appropriate) by a suitably qualified ecologist.
- Ongoing management of habitats on the site would be undertaken following completion of the development in accordance with a LEMP (to be secured via a Planning condition). This would ensure ongoing suitability for target invertebrate species, with areas inaccessible for recreational use:
- Protection and maintenance measures of the site's existing and newly created wetland habitats, including the Ifield Brook and River Mole and the retained Ifield Golf Course ponds.

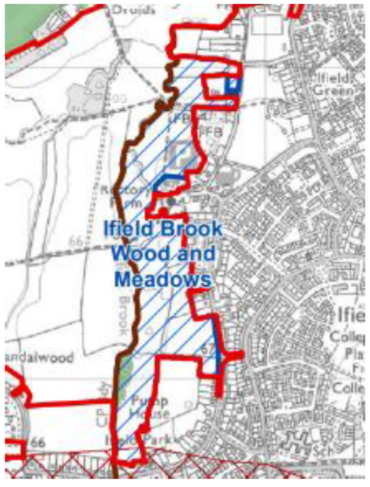
  Ongoing management of retained and new ecological corridor habitat, which would be sympathetic to the target invertebrate assemblages. Habitat would be maintained for scrub-edge, grassland, arboreal/wood decay and wetland invertebrate assemblages including species such as the S41 'Species of principal importance' the Brown Hairstreak, and other rarities recorded from the site.

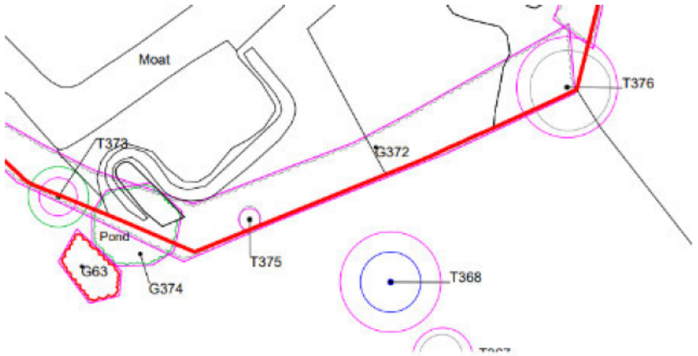
2.5 Phase 1 Site Areas, Impacts and Mitigation Summary Table – For Habitats and Invertebrates IEFs

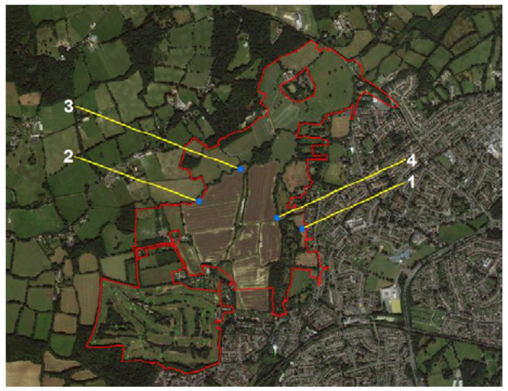
Table 2.5.1 presenting the locations where mitigation in relation to habitats and invertebrates is proposed. Refer to Appendix E for examples of habitat and invertebrate mitigation, habitat enhancements and measures which could be implemented. Appropriate timings for works are indicated in Appendix G.

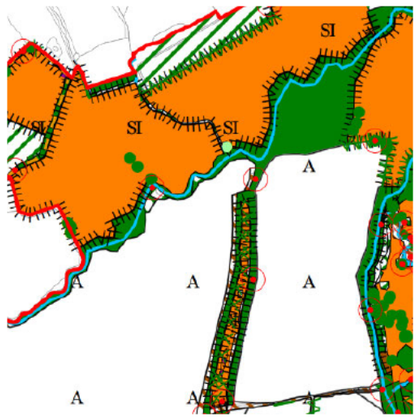
Area of Site	Area map (proposed development) extracts of relevant site layout locations	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
River Mole watercourse crossing and ditches on site	  	Habitat loss and fragmentation. Degradation of habitats (direct and indirect) through pollution. Direct mortality of invertebrate species due to habitat loss and degradation and pollution.	• Provision of vegetated buffers for a minimum of 25-30m from the top of bank for every watercourse and drainage ditch in site and for banks and bankside vegetation to remain unaffected during the construction phase activities. • Clear-span structure to be put in place during construction crossing the River Mole and to feature as part of the permanent long-term project design.  • OCEMP to provide details on surface water runoff management details and pollution control measures. • Drainage design to ensure robust pollution protection measures are in place to avoid impacts to the River Mole and other controlled waters in the long-term.	N/A

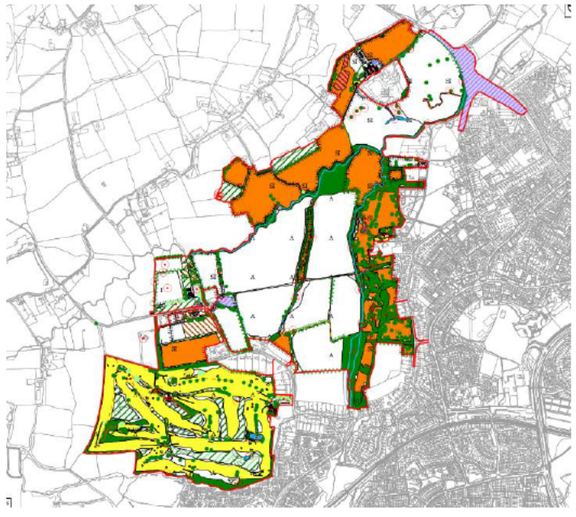
Area of Site	Area map (proposed development) extracts of relevant site layout locations	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
			• The permanent drainage design for Phase 1 comprises SuDS predominately featuring along the western side of the carriageway.    	

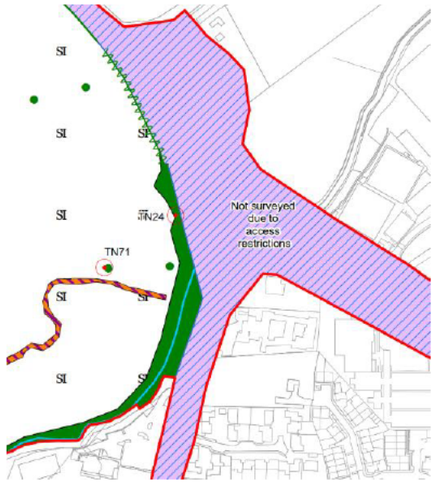
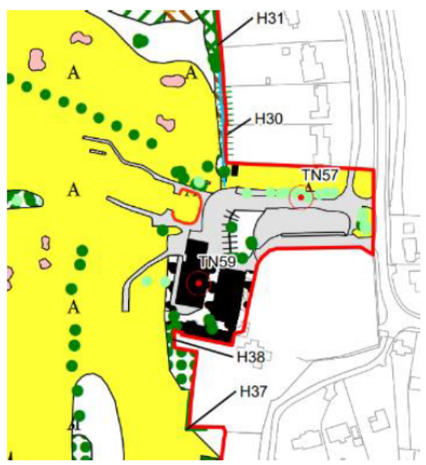
Area of Site	Area map (proposed development) extracts of relevant site layout locations	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
Southern woodland edges of the Golf Course (abutting Hyde Hill LWS), two existing ponds within the Golf Course and the off-site Ifield Brook Wood and Meadows LWS.	  	Habitat loss and fragmentation. Degradation of habitats (direct and indirect) through pollution.	• In addition to the River Mole, avoidance measures to be adopted in relation to the southern woodland edges of the golf course as well as the off-site Ifield Brook Woodland Meadows LWS. • Buffers to be incorporated into the construction phase site layout of 25-30m. It is anticipated that the site boundary of Phase 1 will be fenced to demarcate the active construction site and therefore this will provide further segregation and protection measures.	N/A

Area of Site	Area map (proposed development) extracts of relevant site layout locations	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
Veteran Trees		Habitat loss and fragmentation. Degradation of habitats (direct and indirect) through pollution	• One veteran tree is to be directly impacted/ removed as part of the Phase 1 highways infrastructure works. • Buffers of between 25m to 30m (width) to be implemented buffering works from retained veteran trees during the construction phase. • Compensation for loss of a single veteran tree through creation of vertical 'stacks' of standing dead tree trunks where the removal cannot be avoided, whereby the main trunk of the veteran tree and standing deadwood would be cut in single sections and relocated within the retained parts of the site where they can decompose naturally and add invertebrate habitat value. The main body of the stumps would be excavated and replanted. • There will be the artificial veteranisation of existing mid-age trees in adjacent retained habitat, and planting of new trees in open area would take place. This will feature as part of the wider site mitigation design. • The OCEMP details pollution control measures to be implemented during the construction phase to avoid impacts such as dust deposition.	N/A
Ancient Woodland		Habitat loss and fragmentation. Degradation of habitats (direct and indirect) through pollution	• Buffers of between 25m to 30m (width) buffering works from ancient woodland which is located adjacent to the site. Site buffering Ifield Brook Wood and Meadows LWS, in the south of the site buffering ancient woodland and veteran trees, and in the east buffering ancient woodland, with a 35 m buffer at Hyde Hill Wood LWS. • There will be no direct impacts upon ancient woodland as part of the Phase 1 highways infrastructure works. • The OCEMP details pollution control measures to be implemented during the construction phase to avoid impacts such as dust deposition.	N/A

Area of Site	Area map (proposed development) extracts of relevant site layout locations	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
River Mole Corridor (specifically in relation to Brown Hairstreak Butterfly)		Habitat loss and fragmentation. Degradation of habitats (direct and indirect) through pollution. Direct mortality of invertebrate species due to habitat loss and degradation and pollution.	• Whilst Brown Hairstreak has been identified in various locations across the site, the River Mole Corridor is most applicable and relevant to Phase 1 . • The landscape design will make efforts to focus on this area in terms of Blackthorn provision. In addition, it would be appropriate to include Blackthorn where possible within the wider Phase 1 landscape design to help increase the spread of Brown Hairstreak in the locality. ◦ Landscape planting design to include Blackthorn as the food source for Brown Hairstreak caterpillars. ◦ Further details on planting are presented in the landscape design. Further detailed information on the management of the landscape planting is presented in the LEMP. This will include long-term maintenance requirements such as three year cutting cycles in late winter and to ensure Brown Hairstreak egg laying sites are retained and protected.	Adult Brown Hairstreak are sometimes known to feed lower down from the tree canopy areas and will use plant species such as Hemp Agrimony, Common Fleabane and Bramble, these plant species should be retained if present.

Area of Site	Area map (proposed development) extracts of relevant site layout locations	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
Retained woodland blocks – site wide	  	Habitat loss and fragmentation. Degradation of habitats (direct and indirect) through pollution.	• Provision of vegetated buffers for a minimum of 25 to 30m from retained woodland habitats. • Where a buffer cannot be provided, temporary fencing would be used outside of the root protection zones and include signage to ensure site personnel and machinery remain excluded. • OCEMP to provide details on pollution control measures such as dust management. • Drainage design to ensure robust pollution protection measures are in place to avoid impacts to habitats of value and importance. Landscape design will minimise fragmentation effects and green corridors will be retained and enhanced becoming established during the operational phase. The landscape design provides further details on the planting species mixes and densities.	

Area of Site	Area map (proposed development) extracts of relevant site layout locations	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
Site wide – invertebrates (general)		Habitat loss and fragmentation. Degradation of habitats (direct and indirect) through pollution. Direct mortality of invertebrate species due to habitat loss and degradation and pollution. Permanent habitat loss	• The retention of large woody material from felled trees into log piles and consideration of retaining standing dead wood and 'planting' dead tree stumps as dead wood features. These are to be located in the vicinity of ponds to be created with the exact locations to be agreed onsite with the Clerk of Works. Such retained material may also be located along the edges of landscape planting blocks where appropriate.   • Incorporation of sparsely-vegetated, south-facing banks and slopes (i.e. bee banks) to provide invertebrate nesting, hunting and basking opportunities which will be detailed further in the landscape design. • Creation of areas of bare, sandy ground within landscape planting design. • Managed by grazing or cutting on rotation in autumn, after seeds have set, and with tall sward margins retained, further details have been provided within the LEMP. Planting species mix will include early flowing plants for pollinating insects further details have been provided in the landscape design. This will include wildflower meadow/herb-rich grassland with common knapweed *Centaurea nigra* (an important food plant for *Acinia corniculata*), managed by grazing	For invertebrates boxes or 'bee hotels' and bee bricks as described above would also act as an enhancement measure once impacts are mitigated. These would be distributed at key locations along the scheme corridor. Exact locations would be agreed with the landscape design team and ecological clerk of works towards the latter stages of construction.

Area of Site	Area map (proposed development) extracts of relevant site layout locations	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
			or cutting on rotation in autumn, after seeds have set, and with tall sward margins retained. Spring blossoming trees and shrubs such as willows *Salix sp*., blackthorn *Prunus spinosa*, hawthorn and wild cherry *Prunus avium* should be used as these are important for early pollinating insects. Other 'pollinator friendly' plants should also be used in landscape planting.	
	  	• Spreading of Schedule 9 invasive plant species particularly during the construction phase resulting in degradation of existing habitats.	• Invasive plant species recorded on site will be managed through the methods detailed in the OCEMP. Survey information to date as confirmed the presence Rhododendron (see Target Notes 24 and 57) as well as New Zealand Pigmyweed within two of the ponds located in Ifield Golf Course (see TN 63 and 64).	

2.6 Proposed Monitoring

2.6.1 Habitats

Monitoring of the habitats is detailed within the LEMP. The monitoring activities to take place over the course of the five-year aftercare period would be used to inform the on-going maintenance and management of the site.

2.6.2 Invertebrates

The monitoring of invertebrates would be detailed as part of the site-wide mitigation strategy and approach to the local invertebrate assemblage.

3 Reptile Mitigation

3.1 Site conditions/ survey results summary

3.1.1 Desk Study

A series of reptile surveys were undertaken to determine the presence/ likely absence of reptiles on the Site between March and September 2022, and previously in May to June 2020. The survey findings of which are presented in the ES:

- Appendix 8.10: Land West of Ifield – Reptile Survey Report 2020 (July 2020);
- Appendix 8.11: Land West of Ifield – Reptile Survey Report (November 2022);
- Appendix 8.12: Land West of Ifield – Reptile Survey Report (October 2019);

The desk study searches returned 60 records of reptiles within the last 10 years within 2 km of the site. This includes adder (*Vipera berus)*, grass snake *(Natrix helvetica)*, slow worm *(Anguis fragilis)* and common lizard *(Zootoca vivipara)* records. Three reptile species have been recorded on the site (grass snake, slow worm, and common lizard). the overall reptile population on the site is assessed as being indicative of a 'Good' population (between 5 – 20 individuals found) at the Golf Course and Pastoral and Arable Fields (Area 1 and 2), and 'Low' at the remainder of the site.

3.1.2 Survey Results

Previous surveys carried out in 2022 showed 'Good' populations of slow worm across the site, with an 'Exceptional' population at the adjacent Ifield Brook Wood and Meadows LWS, beyond the eastern boundary of the site.

The Key Reptile Site Register was created by the Kent Reptile and Amphibian Group (KRAG) to identify, promote, and safeguard habitat of notable importance to Reptiles in Kent. The register consists of a list of sites that qualify as 'Key Reptile Sites' and informs decisions by Kent Wildlife Trust to designate an area as a Local Wildlife Sites (LWS). Therefore, these sites have potential to be legally protected, which would illegalise any developments from impacting local species. The Golf Course meets the definition of a 'Key Reptile Site' due to meeting two of the five criteria:

- supporting three or more reptile species; and
- supporting an assemblage of species scoring at least four.

No adders were recorded on the site during any of the surveys, though desk study records were identified, and it can be assumed that they are in the wider area in small numbers and may make occasional use of the site.

A number of habitat types were identified across the site as being suitable for use for reptiles and/ or confirmed as supporting local reptile populations. These habitat types included other neutral grassland, hedgerows and areas of standing open waters such as ditches and ponds.

3.2 Licensing requirements

Licensing is not required/ applicable given the species present. Refer to Appendix A for legislative protection details.

3.3 Further surveys

No further targeted surveys proposed at this stage based on the age of survey data currently available. Refer to Appendix A for legislative protection details.

3.4 Construction phase mitigation for Phase 1

To avoid significant effects on the reptile population, it would be necessary to undertake reptile mitigation and a reptile translocation. Displacement may also be appropriate in discrete areas of the site, where suitable habitat would be retained, including in the south of the Golf Course. The northern section of the site, which will be retained for natural and semi-natural green space, is of an appropriate size and with a limited existing reptile population and would be appropriate for habitat enhancement to ensure it is a suitable receptor for the three reptile species present on the site. All mitigation measures described would be appropriate for all of the reptile species recorded across the site, as well as for adder which can be considered to make occasional use of the site.

- Reptile capture and relocation.
- Habitat manipulation and displacement into suitable adjacent habitat.
- Topsoil stripping and destructive searches overseen by a suitably experienced ecologist.
- Specific timings of works to avoid impacts.
- Reptile specific Method Statement including Toolbox Talks.

Details of the proposed mitigation approaches is provided below, with site specific locations presented in the table below. Refer to Appendix A for legislative protection details.

3.4.1 Displacement and habitat manipulation

In locations within the redline boundary where habitat conditions are less favourable for reptiles or previous surveys have found negligible numbers, habitat manipulation can be applied to clear areas and minimise the risk to reptiles.

Displacement into suitable adjacent habitat and therefore not within the footprint or proposed working areas of Phase 1can be undertaken by carefully strimming any grassland/ tall ruderal and scrub vegetation. Strimming would take place over two phases, with at least 24 hours between them: an initial cut of vegetation down to 150 and 300mm, and a final cut to ground level, with raking off and removal of arisings at each stage. The strimming activities would work in the direction heading towards the retained vegetation/ habitat areas in which reptiles are to be displaced into and therefore outside the area of the works. Refer to Appendix A for legislative protection details.

3.4.2 Capture and relocation

Given the varying suitability of different areas of the site to support reptiles it would be appropriate to take a flexible approach to the use of reptile-proof fencing applying professional judgement as to whether fencing would be required. Given the footprint of Phase 1, working areas and the range of habitats present, fencing may be deemed appropriate to aid capture and ensure the long-term exclusion of reptiles during the construction phase from areas which have been cleared. In areas which are fenced, the use of artificial refugia to aid the capture of individuals would be appropriate. Once the number of reptiles being captured has fallen and catch rates have become low, strimming and habitat manipulation should commence as detailed above. However, where larger numbers of reptiles are confirmed as present, strimming works may need to take place over a series of weeks to create increasingly small islands of vegetation and therefore creating an effective method of increasing the numbers of reptiles using the refugia and thus the capture rates.

Once catch-rates are approaching zero, and/or the number of reptiles captured and moved is similar to the estimated population density of the habitat in question, the area would be actively managed to maintain an unfavourable condition and avoid recolonization. Vegetation clearance would need to consider other ecological constraints, for example nesting birds and hedgehogs. Refer to Appendix A for legislative protection details.

3.4.3 Destructive searches

A destructive search methodology would be implemented as part of a final site clearance immediately prior to vegetation clearance and the start of construction to rescue any animals not caught during the preceding translocation. Destructive searching would require oversight by suitably experienced ecologists. Site equipment would need to include a small excavator and this must be fitted with a toothed bucket in order to effectively undertake the works and maximise the success of salvaging any remaining animals which may remain present. Refer to Appendix A for legislative protection details.

3.4.4 Receptor sites

The ES states that there are two receptor sites to be used for any reptiles captured during the site clearance and construction phases of the proposed Development. One of the receptor sites is located in an area at the northern extent of the site. The second receptor site is located to the south and includes retained habitats. Given the footprint and extents of habitats to be lost for Phase 1it is anticipated that the areas to the north and south of the site will be used. It is recommended that a minimum of three reptile hibernacula are constructed within the proposed northern receptor site area in the event of large numbers of reptiles being encountered and therefore the northern receptor site being required. Two further hibernacula will be created within the golf course area of the scheme. In the event of the hibernacula not being required as parts of Phase 1, they can be used and incorporated into the wider site reptile mitigation strategy. Five hibernacula will be constructed in total during the early stages of the project. Additional hibernacula are also proposed at each of the pond locations and

anticipated to total four. Overall, nine hibernacula are proposed. However, those to be created adjacent to the ponds will be in place towards the later stages of construction once the ponds have been built.

The management of the reptile receptor sites is detailed in the OLEMP (produced by Arcadis 2024). In the event of the receptor sites not being required for Phase 1, the long-term management of these areas will sit within the wider proposed Development LEMP.

The key design features of hibernacula are as follows:

- a sunny position;
- a well-drained site not prone to flooding;
- orientation so that one of the long banks faces south;
- access for reptiles through openings;
- location in a patch of habitat such as tussocky grassland;
- minimal public disturbance; and
- size - at least 4m long and 2m wide, by 1m high, but can be larger.

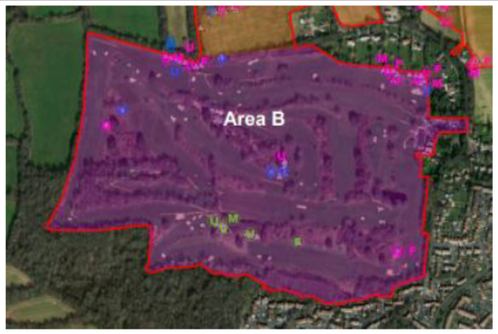
Hibernacula can be made of a range of materials including timber, brash, inert hardcore and bricks, grubbed up roots, or general building rubble. Hibernacula can be constructed by digging a pit and then placing the materials partially buried inside, rather than creating a mound on the surface. The top surface of the hibernacula should be covered in soil and seeded or have excavated turves from the base placed on top. It is important to create access holes that are continuous with voids deeper within the structure.

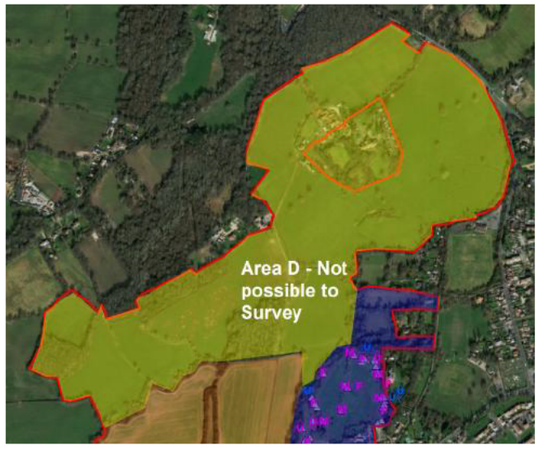
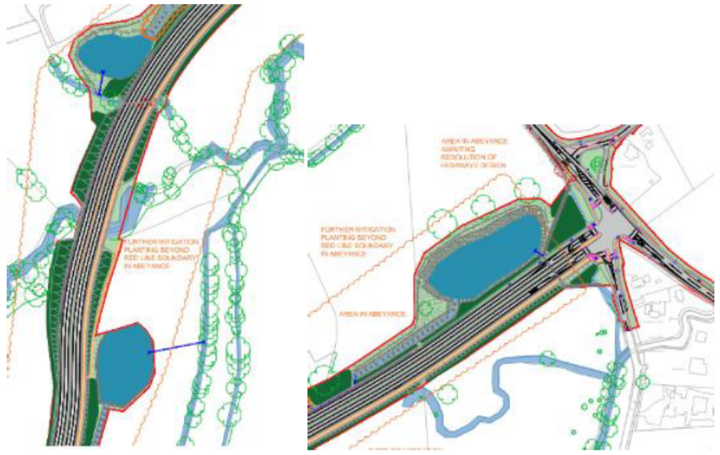
Log and brash piles should be at least 10m by 10m in area and 1m high. The material should only be moderately compacted. They should be in sunny locations and preferably set within existing vegetation; for example, on the edge of shrub areas.

Hibernacula and log/ brash piles can be created using brash and vegetation clearance materials as part of the initial Phase 1 works. Refer to Appendix A for legislative protection details.

3.5 Phase 1 Site Areas, Impacts and Mitigation Summary Table – Reptiles

Table 3.5.1 presenting the locations where mitigation in relation to reptiles is proposed. Refer to Appendix B for examples of reptile mitigation, habitat enhancements and features which could be implemented. Appropriate timings for works are indicated in Appendix G.

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s) and site boundary
Area A		Mortality, habitat loss, fragmentation and degradation of habitat.	• To be avoided as part of the proposed Phase 1 highways infrastructure works. • Provision of buffers and offsets to ensure no site personnel or plant machinery enter into the area.	N/A
Area B- Golf Course		Mortality, habitat loss, fragmentation and degradation of habitat.	Identified as a Key Reptile Site with slow worm, grass snake and common lizard present. Recommend this area is: • subject to strimming and habitat manipulation to be carried out in conjunction with; • the capture and relocation of reptiles from beneath the footprint of the highways infrastructure and associated working areas; • given the high number of reptiles present, suggest this area is also fenced off for the duration of the construction phase activities to ensure that reptiles do not recolonise the area; • two reptile hibernacula to be included within the golf course area in the southern extent of the site.	The identified receptor sites to the northern extent of the overall development and retained habitat areas to the south of the golf course. Further enhancements will be detailed in the site wide mitigation strategy.
Area C- Predominantly arable		Mortality, habitat loss, fragmentation and degradation of habitat.	The survey results of the arable field margins found few reptiles present (small numbers of grass snake, slow worm and common lizard). Therefore, as a precautionary measure: • strimming to displace reptiles into suitable adjacent habitat is recommended and to avoid reptiles moving into these areas when vegetation clearance works commences, these areas should be cleared first. • In the event of any potential hibernacula features being encountered, these would be subject to destructive searches which will be overseen by a suitably qualified ecologist.	

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s) and site boundary
Area D- Predominantly grazed pasture	 	Mortality, habitat loss, fragmentation and degradation of habitat.	The survey results for the pasture field margins confirmed the presence of a low population of slow worm and grass snake. Common lizard and adder were not confirmed as present in two locations along the site boundary edge. Given the low number of reptiles confirmed as present over the course of the surveys, as a precautionary measure the following mitigation works are recommended: • strimming to displace reptiles into suitable adjacent habitat is recommended and to avoid reptiles moving into these areas when vegetation clearance works commences, these areas should be cleared first. • in the event of any potential hibernacula features being encountered, these would be subject to destructive searches which will be overseen by a suitably qualified ecologist. Five hibernacula are proposed across the two receptor sites. In addition, reptile hibernacula is to be provided in locations adjacent to ponds. The pond locations have been provided below. Hibernacula would be positioned in areas where access and extensive site maintenance (to ensure engineering function) would not be required:  The two receptor sites will be subject to maintenance and management in the event of being required as part of Phase 1. If not used as part of the Highways infrastructure works, the long-term management and maintenance of the sites will form part of the wider proposed site development LEMP.	

3.6 Monitoring requirements

It is anticipated at this stage that some post-construction monitoring would be carried out to confirm that local reptile population numbers and the species assemblage present would be in line (or has increased) when compared to the baseline numbers recorded. The monitoring of the success of the ecological mitigation would be carried out on a project wide basis and will be detailed further within the site wide mitigation strategy. This would include a monitoring plan for the reptile receptor site for a minimum period of 5 years after the translocation

4 Dormouse Mitigation

4.1 Site conditions/ survey results summary

4.1.1 Desk Study

The desk study searches returned one record of hazel dormouse within the last 10 years at Crawley Target Hill approximately 1.8 km south of the site. This site is adjacent to Buchan Country Park where it is noted in the desk study that there are dormouse present within the denser areas of woodland.

4.1.2 Survey Results

Targeted dormouse surveys were undertaken within the study area in 2018 and 2022 and found no confirmed evidence of dormouse. No hazel dormouse was found on site during the surveys as presented in the ES.

One potential hazel dormouse nest was found along a woodland boundary within the arable fields (Area 2). This potential nest had some features that indicated a hazel dormouse nest, notably the nest was in woven form; however, this was not conclusive and does not confirm the presence of hazel dormouse within the arable fields (Area 2).

4.2 Habitat loss / gain

At this stage, based on the survey findings to date, quantities of vegetation loss/ gain has not been calculated in relation to dormouse as at present, dormouse has not been confirmed as present.

In the event of dormouse being encountered and confirmed as present, dormouse habitat loss will need to be calculated and presented in the dormouse development licence application and landscape planting ratios (usually 2:1) will need to be specified to ensure sufficient new and appropriate planting mixes are provided thereby not resulting in a loss of dormouse habitat.

4.3 Further surveys

An updated assessment for the presence of dormouse in the north of the site should be undertaken prior to work commencing in this area. Email dated 24 January 2024 from Ramboll, recommends further surveys for dormouse as whilst previous surveys suggest absence, there is some uncertainty that they are not present.

4.4 Licensing

At present, based on the surveys undertaken to date and their findings, dormouse has not been confirmed as present within the site boundary. At this stage, a dormouse development licence is not anticipated to be required. However, in the event of dormouse being encountered and subsequently confirmed as present when vegetation clearance works commence, works on site will need to cease and a dormouse development licence applied for from Natural England. Refer to Appendix A for legislative protection levels.

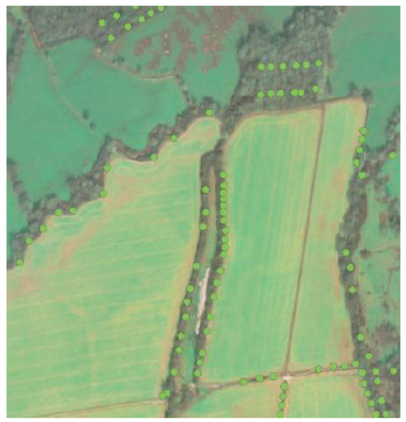
4.5 Construction mitigation

At present, based on the surveys undertaken to date and their findings, no specific construction working methods are proposed in relation to dormouse. However, it should be noted that in the event of dormouse being encountered and a protected species licence being required, specific working methodologies and timeframes for vegetation clearance activities to take place will be stipulated.

This could include two-stage clearance activities commencing over the winter months with vegetation being cleared using hand tools to above ground level and no stump or root removal/ ground disturbance until May (the spring) once dormouse has emerged from hibernation. Or a single-phase clearance in spring (prior to June) in which small sections can be cleared each day under the supervision of a licensed ecologist. However, this is not preferable as this is also during the nesting bird season and likely to result in delays and increased costs.

4.6 Phase 1 Site Areas, Impacts and Mitigation Summary Table – Dormouse

Table 4.6.1 presenting the locations where mitigation in relation to dormice may be required depending upon the findings of further surveys. Appropriate timings for works are indicated in Appendix G.

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Phase 1 Proposed Mitigation	Enhancement works required in receptor areas(s)
Hedgerows and treelines along the golf course northern boundary and to the north of the golf course where Phase 1will intersect suitable habitats.	  	In the event of dormouse being confirmed as present during the further assessment of the site, impacts on dormouse (if present) could be injury, mortality, habitat fragmentation, loss of breeding sites, loss of foraging resources	• No dormouse specific mitigation proposed at this stage. However, in the event of dormouse being confirmed as present on site, a development licence will be required from Natural England and this will set out specific short and long-term mitigation requirements as well as the programme of works.	No dormouse specific enhancement works proposed at this stage.

4.7 Proposed requirements

In the event of a dormouse licence being required, the licence will set out any monitoring requirements. If a dormouse licence is not required, then no specific monitoring for dormice will be undertaken.

5 Bat Mitigation

5.1 Site conditions/ results

5.1.1 Desk study

The desk study searches returned a total of 621 records of bats within 5 km within the last 10 years. The species of bats include common pipistrelle *Pipistrellus pipistellus*, brown long-eared, noctule *Nyctalus noctula*, pipistrelle species *Pipistrellus sp.*, soprano pipistrelle *Pipistrellus pygmaeus*, long-eared species *Plecotus sp.*, Bechstein's, Daubenton's *Myotis daubentonii*, myotis species *Myotis sp.*, Leisler's *Nyctalus leisleri*, Nathusius's pipistrelle *Pipistrellus nathusii*, Natterer's, serotine *Eptesicus serotinus*, barbastelle, Whiskered *Myotis mystacinus*, Brandt's *Myotis brandtii* and unidentified bat species *Chiroptera*.

MAGIC maps identified two European Protected Species Mitigation (EPSM) licences for bats within 2 km of the site, both to the east of the site within Ifield residential areas, approximately 650m and 850m from the site.

5.1.2 Survey Results

During updated Ground Level Roost Assessment (GLRA) of trees throughout the site conducted by Ramboll and Simlaw in 2021 / 2022 (ES Appendix 8.17), 55 trees were assessed across the full proposed Development site, with six classified as having either high or moderate bat roosting potential, and subject to subsequent emergence / re-entry surveys. One tree at the north of the golf course (T108A) sits outside the works footprint for Phase 1of the highways infrastructure works and will not be affected.

In summary, emergence / re-entry surveys since 2018 have consistently recorded several day roosts of common and soprano pipistrelle at buildings and trees within the site (although not in the numbers or exhibiting behaviour indicative of maternity roosts). Whilst roosting bats have been confirmed at various locations across the site. No bat roosts have been identified within the redline boundary of Phase 1 highways infrastructure works and therefore at this stage, no protected species bat development licence is required from Natural England. Whilst for Phase 1 there is no requirement for a protected species licence, there is the need to ensure bats are considered within the scheme design and that appropriate mitigation measures are put in place during the short-term construction phase and for the longer-term operational stage.

5.2 Further surveys

The ES makes reference to the need for bat monitoring which includes flightlines. Crossing point surveys are recommended where the scheme corridor intersects key commuting routes. These should be carried out over the course of the survey season prior to vegetation clearance and construction works commencing. This would provide a pre-construction baseline upon which to assess the levels of uptake and effectiveness of crossing point mitigation. Crossing point surveys would be carried out at dusk monitoring flightlines/ commuting route corridors with species and the times of passes recorded along with approximate heights and direction. The purpose of these surveys is to provide a baseline and then undertake construction and post-construction monitoring to understand the effectiveness of the mitigation once implemented.

Pre-construction checks should be undertaken of any trees identified as potentially suitable to support roosting bats prior to site-clearance.

Post-construction monitoring should then be carried out to review the effectiveness of the mitigation measures put in place and to review whether bats are still using the commuting and foraging routes during the operational phase. Commuting features will be monitored over a time period and at a frequency in accordance with current bat mitigation guidelines. At this stage post-construction monitoring is proposed for years three and six in conjunction with the lighting assessment as detailed in the ES.

5.3 Construction mitigation

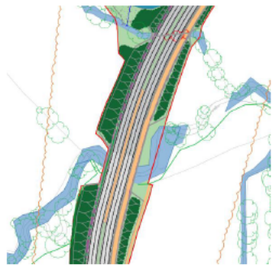
- Given the absence of bat roosts within the footprint and immediately adjacent to Phase 1, construction phase mitigation will focus upon the provision and continuation of bat flightlines where applicable and the maintaining of dark corridors.
- Habitat enhancement and creation strategy, including creation of areas of habitat within natural and semi-natural green space, ecological buffers and green corridors retaining connectivity through the site (including

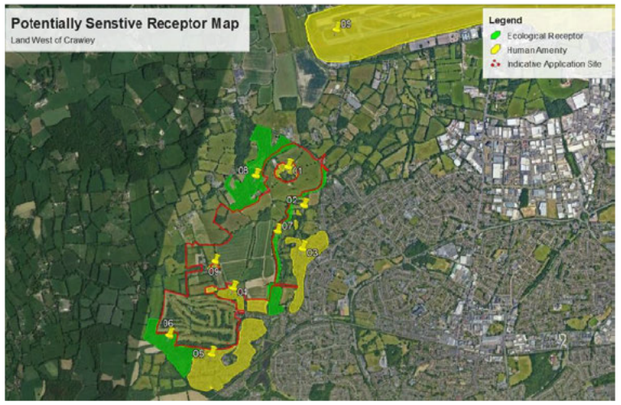
road narrowing in residential areas and bat hop-overs), tailored towards bat species requirements (particularly mimicking existing habitats found at the golf course, such as grassland and scrub mosaics).

- Temporary flightline mitigation in the absence of planting can include Heras fencing panels with debris netting applied to mimic landscape features which bats have been using within the site.
- Lighting during the construction phase will need to be contained and focused upon key areas using task lighting or columns fitted with baffles to ensure no light spill. Landscape features such as hedgerows, woodland blocks and edges as well as foraging habitat areas must remain in darkness and not illuminated by construction phase lighting.
- Landscape planting design would provide appropriate woodland edge features for foraging and commuting bats as well as the retention and enhancement of key ecological corridors by retaining and improving connectivity such as north-south and east-west corridors.
- Bat hop-overs will be incorporated into the long-term scheme design. The vertical alignment of the carriageway is currently anticipated to be at grade and therefore the provision of bat underpasses and oversized culverts is not possible.
- Clear-span bridge structure to be constructed as part of the long-term scheme design which will provide a safe crossing point for bats to pass beneath the road and continue to follow the River Mole corridor.
- Measures to enhance the value of the site for invertebrates will also be of benefit to the local bat species assemblage as providing potential feeding resources.
- The OLEMP will detail the long-term monitoring, management and maintenance requirements for the long-term landscape design.

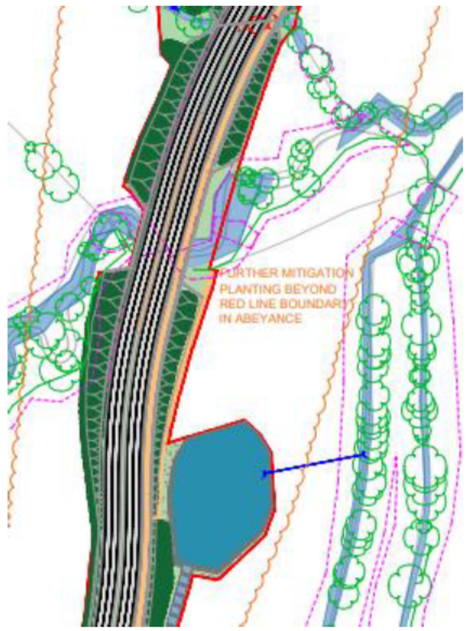
5.4 Phase 1 Site Areas, Impacts and Mitigation Summary Table – Bats

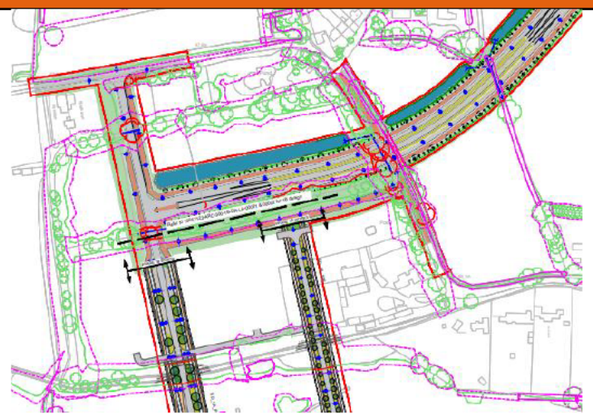
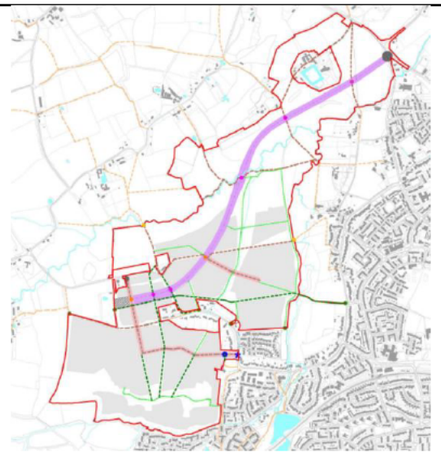
Table 5.4.1 presenting the locations where mitigation in relation to bats is proposed. Refer to Appendix C for examples of bat mitigation, habitat enhancements and measures which could be implemented. Appropriate timings for works are indicated in Appendix G.

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
Site wide	   	Increased injury, killing or disturbance resulting from increased vehicular collisions. Disturbance from increased traffic, recreational use of sensitive areas (such as woodland and riparian habitats, both within the site and immediately adjacent), and light spill onto roost access and entry / exit flight paths In the event of any pre-construction surveys identifying the presence of roosting bats for Phase 1 a licence will be required from Natural England.	• Habitat enhancement and creation strategy, including creation of areas of habitat within natural and semi-natural green space, ecological buffers and green corridors retaining connectivity through the site (including road narrowing in residential areas and bat hop-overs), tailored towards bat species requirements (particularly mimicking existing habitats found at the golf course, such as grassland and scrub mosaics • Use translocated material if possible to maximise growth and height at hop-over locations. If appropriate material cannot be translocated from the site, it will be necessary to incorporate more mature planting into the scheme design at these key locations. • The bridge structure to be incorporated into the scheme design to cross the River Mole will be a clear-span design, thereby providing a safe crossing point beneath the structure and permitting bats to continue to utilise this flightline. • The River Mole corridor will remain unlit. • Roost compensation features at a ratio of 1:1, including provision of a suitable variety of tree-mounted bat boxes, boxes built into the fabric of new buildings, and veteranisation features at retained trees will be incorporated into the wider project mitigation strategy.	N/A

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
		Fragmentation effects	• The lighting strategy for the site would be implemented at the demolition and construction phase, based on details in the OCEMP presented in the appendix of the ES. Its continued use would go through the completed development phase ([ref to lighting strategy]). It would be devised with input from lighting specialists and experienced bat ecologists, following current guidelines as set out by BCT[2] (or as updated) and adhering to the following parameters: ▪ Implementation of "dark sky hours", particularly at residential areas at the south of the site, adjacent to the retained buffer at the site boundary with Hyde Hill Wood; ▪ Using low or high-pressure sodium lights or LEDs instead of mercury or metal halide lamps where possible; Directing lighting to where needed and avoiding spillage, including the use of hoods, cowls, shields etc. to avoid spillage onto sensitive areas; ▪ Only lighting areas which need to be lit, and using the minimal level of lighting required to comply with building regulations; ▪ Using where possible movement sensors or timers on security lighting; ▪ Consideration of use of red light where appropriate; and ▪ Avoiding the use of lamps greater than 150 W.	
		Fragmentation effects	• Habitat enhancement and creation strategy, including creation of areas of habitat within natural and semi-natural green space, ecological buffers and green corridors retaining connectivity through the site (including road narrowing in residential areas and bat hop-overs), tailored towards bat species requirements (particularly mimicking existing habitats found at the golf course, such as grassland and scrub mosaics) as well as ponds and SUDS will be incorporated into the landscape design as best possible. However, it is acknowledged that this will be limited within the footprint of Phase 1 (road verges) and will most likely be incorporated into the wider site mitigation strategy.	

2 Bat Conservation Trust (2018) Bats Artificial Lighting in the UK. Guidance Note 08/18

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
	 			

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Proposed mitigation	Enhancement works required in receptor areas(s)
				
Site wide		Degradation of sensitive habitats due to pollution resulting directly from the Proposed Development (air quality, water quality and light pollution);	• OCEMP to be implemented to provide pollution control measures and to avoid effects on habitats, specifically those which provide value to foraging bats.	

5.5 Proposed Monitoring

- The success of the implemented lighting strategy would be reviewed and monitored on a regular basis (such as in years three and six post-construction) and may need to be amended if it is found to be ineffective. This could be subject to a planning condition.
- Post-construction monitoring should then be carried out to review the effectiveness of the mitigation measures put in place and to review whether bats are still using the commuting and foraging routes during the operational phase. Commuting features will be monitored over a time period and at a frequency in accordance with current bat mitigation guidelines. At this stage post-construction monitoring is proposed for years three and six in conjunction with the lighting assessment as detailed in the ES.

6 Breeding Bird Mitigation

6.1 Site conditions / survey results summary

6.1.1 Desk Study

The desk study searches returned 365 records of birds within the last 10 years within 2 km of the site. This includes 43 bird species, 17 of these species are listed under NERC S41 and seven are listed under the WCA Sch 1.

Species under NERC S41 are: Bullfinch *Pyrrhula pyrrhula*; Corn Bunting *Emberiza calandra*; Cuckoo *Cuculus canorus*; Dunnock *Prunella modularis*; Hawfinch *Coccothraustes coccothraustes*; Herring Gull *Larus argentatus*; House Sparrow *Passer domesticus*; Lapwing *Vanellus vanellus*; Marsh Tit *Poecile palustris*; Nightjar *Caprimulgus europaeus*; Skylark *Alauda arvensis*; Song Thrush *Turdus philomelos*; Spotted Flycatcher *Muscicapa striata*; Starling *Sturnus vulgaris*; Turtle Dove *Streptopelia turtur*; White-fronted Goose *Anser albifrons*; Wood Warbler *Phylloscopus sibilatrix*.

Species listed under WCA Sch 1 Part 1 are Barn Owl; Black Redstart *Phoenicurus ochruros*; Crossbill *Loxia curvirostra*; Firecrest *Regulus ignicapilla*; Hobby *Falco Subbuteo*; Kingfisher *Alcedo atthis*; Red Kite *Milvus milvus*.

6.1.2 Survey Results

Breeding bird surveys were initially undertaken between May and July 2019 (later part of the breeding season) by Arcadis with a total of 55 different bird species recorded.

An updated breeding bird survey was undertaken between March and April 2020 (early part of the breeding season) by Ramboll with a total of 46 different species recorded.

Surveys undertaken also included wintering bird and surveys for farmland birds.

The survey findings of which are presented in the ES:

- Appendix 8.13: Land West of Ifield – Early Breeding Bird Survey March to April 2020 (July 2020);
- Appendix 8.14: Land West of Ifield – Breeding Bird Survey Report including Barn Owl Assessment (November 2019);
- Appendix 8.16: Land West of Ifield – Barn Owl Survey 2020 (August 2020);

The site and its immediate surroundings support scrub, hedgerow, mature tree, arable and grassland habitat suitable for breeding birds. Overall, 19 species were identified as being 'notable'. Birds were considered notable if one or more of the following criteria applied:

- Listed on Schedule 1 of the WCA;
- Listed on S41 NERC Act;
- Listed on the BoCC (2021) (Birds of conservation concern as being either Red or Amber listed); and
- Listed on the Sussex BAP.

Details of the legislative compliance is provided in Appendix A.

Error! Reference source not found.. The table shows the initial list of notable bird species and the subsequent species categorisations.

Common Name	Species	Schedule 1	BAP	NERC S41	BOCC List
Common Black-head gull	*Chroicocephalus ridibundus*				Amber
Common Kestrel	*Falco tinnunculus*				Amber
Common Linnet	*Linaria cannabina*		Yes	Yes	Red
Common Swift	*Apus apus*				Amber
Dunnock	*Prunella modularis*			Yes	Amber

Common Name	Species	Schedule 1	BAP	NERC S41	BOCC List
Eurasian Bullfinch	*Pyrrhula pyrrhula*		Yes	Yes	Amber
Eurasian Skylark	*Alauda arvensis*		Yes	Yes	Red
European Herring Gull	*Larus argentatus*		Yes	Yes	Red
European Starling	*Sturnus vulgaris*		Yes	Yes	Red
Fieldfare	*Turdus pilaris*	Yes			Red
Grey Wagtail	*Motacilla cinerea*				Red
House Sparrow	*Passer domesticus*		Yes	Yes	Red
Mallard	*Anas platyrhynchos*				Amber
Mistle Thrush	*Turdus viscivorus*				Red
Northern House Martin	*Delichon urbicum*				Amber
Redwing	*Turdus iliacus*	Yes			Red
Song Thrush	*Turdus philomelos*		Yes	Yes	Red
Stock dove	*Columba oenas*				Amber
Western lesser black-backed gull	*Larus fuscus*				Amber

Farmland bird assemblages of notable species were recorded. Most of these species were 'confirmed', 'probably' or 'possibly' breeding within the site, except for Common Kestrel, Mallard and Yellow Wagtail. In total, 181 individual 'farmland birds' were recorded, an average of 45 birds recorded per survey. This is a recorded average of less than 1 bird per four hectares of survey area, per survey. It was noted that the number of each farmland bird species recorded during the surveys remained relatively constant.

The data collected suggests that the site supports a relatively broad assemblage of common farmland birds, with a density that is likely to be limited by the low productivity of the habitats within the site (i.e. most of the site is intensively farmed arable land of limited value to nesting and foraging birds). No specific mitigation requirements have been set out for wintering or farmland birds but further mitigation for breeding birds in general has been provided below.

Records of Barn Owl (*Tyto alba*) were returned at least 1.4km from the site, but none were recorded on the site during the breeding bird surveys (which is as would be expected since most of the survey took place when Barn Owl are not active). During the building inspection, 12 buildings had potential to support Barn Owl roosting, with three structures with potential to support Barn Owl breeding. Two structures had evidence of usage by Barn Owl (B21a and B21c). However, these are located within the wider site and will not be impacted by Phase 1 and therefore Barn Owls have not been considered further within this mitigation strategy.

6.2 Licensing

Licensing is not required/ applicable given the species present. Barn Owls whilst present within the wider site are not applicable to Phase 1 given their location. Refer to Appendix A for breeding bird legislative requirements.

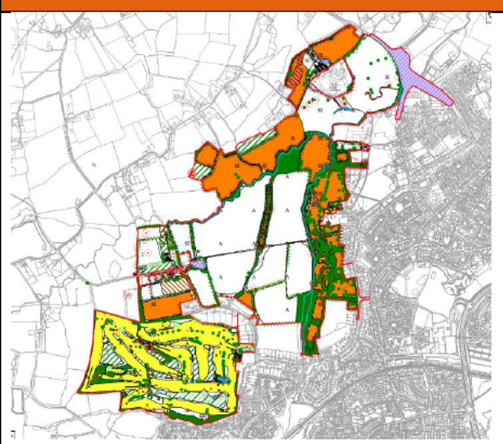
6.3 Construction mitigation

- To accommodate Phase 1 vegetation clearance will be required which will include the removal of individual mature trees, areas of scrub, some sections of hedgerow, arable fields and grazed pasture. Given the habitats present and that the nesting bird season can run from March to the end of August (weather dependent). During this time, vegetation clearance should be avoided.

- Vegetation clearance should be carried out over the course of autumn/ winter thereby avoiding the nesting bird season.
- In the event of some vegetation clearance being required during the nest bird season, pre-construction inspections/ surveys should be carried out by a suitably experienced ecologist to ensure no nesting birds are present. In the event of nesting birds being confirmed as present, the area should be cordoned off to ensure that no site personnel or machinery entering into this area or cause any disturbance. Only once the young have fledged will vegetation clearance in this area be permitted.
- It should be acknowledged that nesting birds may have a second brood.
- Nesting bird inspections when carried out would usually remain “valid” for a 24 hour period during the height of the nesting bird season. In the event of the vegetation not being cleared within that timeframe, a further inspection/ survey should be carried out. Ideally the vegetation will be cleared immediately following inspection/ survey.
- A site-specific nesting bird method statement and toolbox talks would be provided for the project.

6.4 Phase 1 Site Areas, Impacts and Mitigation Summary Table – Breeding Birds

Table 6.4.1 presenting the locations where mitigation in relation to breeding birds may be required and measures to be implemented. Appropriate timings for works are indicated in Appendix G.

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Phase 1 Proposed Mitigation	Enhancement works required in receptor areas(s)
Site Wide		Vegetation clearance resulting in the disturbance of nesting birds, destruction of nests and nesting sites, loss of foraging resources.	• Vegetation clearance to take place outside of the nesting bird season. This applies to trees, scrub and hedgerows as well as any potential ground nesting bird habitats. • In the event of any vegetation clearance being required during the nesting bird season, surveys/ pre-clearance inspections to be carried out immediately prior to clearance works. • In the event of nesting birds being confirmed as present, cordons and offsets to be put in place to ensure no site personnel or machinery enter into these. • Ideally bridge construction relating to the Crawley Western Multi-Modal Corridor will commence outside the nesting bird season. Checks for presence/ absence of nesting king fisher will be required if not.	Bird box provisions within the wider site mitigation design. LEMP to include planting species mix details and maintenance and management requirements.

6.5 Monitoring requirements

The monitoring of the success of the ecological mitigation in relation to birds would be carried out on a project wide basis and will be detailed further within the site wide mitigation strategy.

7 Otter Mitigation

7.1 Site conditions/ survey results summary

7.1.1 Desk Study

The desk study searches returned one record of Otter within 2 km of the site, within the last 10 years. Furthermore, two historic records of Otter were provided from 2012.

7.1.2 Survey Results

There is suitable habitat for Otters within the wider landscape with three main rivers on or adjacent to the site.

Targeted surveys undertaken in June 2018 found no evidence of Otter within the study area. However, it is acknowledged that Otter range is increasing and there is potential for Otter to colonise the site in the future. Targeted surveys undertaken in June 2018 and August 2018, and further river surveys in 2023, found no evidence of Water Vole within the study area.

The site is considered to be of Negligible importance for Otters. However, as Otter may become present on the site in the future as they are expanding their range, appropriate mitigation may be required.

7.2 Further Survey

Although surveys have not confirmed the presence of Otters on site to date, as a precaution it would be appropriate to undertake pre-construction checks to ensure Otters remain absence from the works areas for Phase1.

7.3 Construction Mitigation

- Construction mitigation would comprise best practice measures such as the covering of excavations or the provisions of ramps to ensure Otters do not get trapped in excavations.

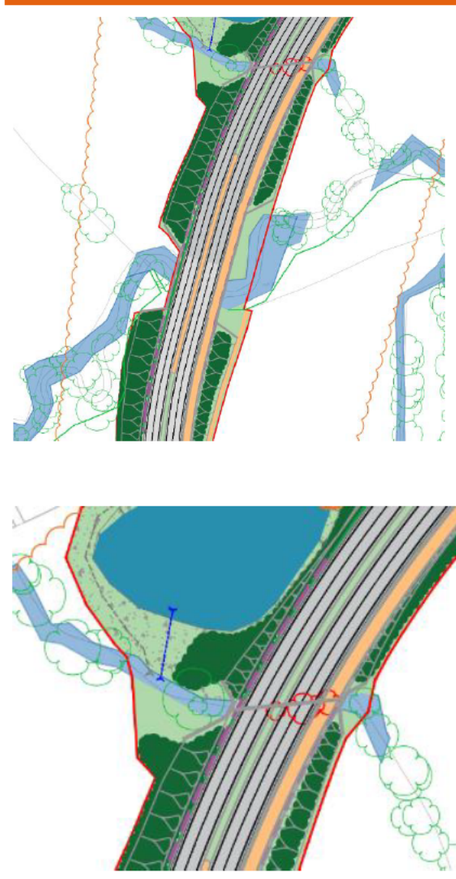
- Landscape features potentially used by Otters such as the River Mole would remain unlit during the construction phase and the watercourse banks would remain accessible for Otters and passage beneath the scheme/ bridge structure retained during the construction phase.

- The construction phase would ensure the longer-term permanent mitigation such as the provision of clear span structures crossing watercourses and the provision of Otter fencing in strategic locations along the scheme corridor where watercourses interface with the carriageway are effectively implemented for the long-term operational phase.

- Given the absence of Otter on site at present, construction phase mitigation measures such as the covering of excavations will be detailed further in the OCEMP. However, pre-construction checks are recommended along the River Mole prior to any site clearance or construction phase activities progressing.

7.4 Phase 1 Site Areas, Impacts and Mitigation Summary Table- Otter

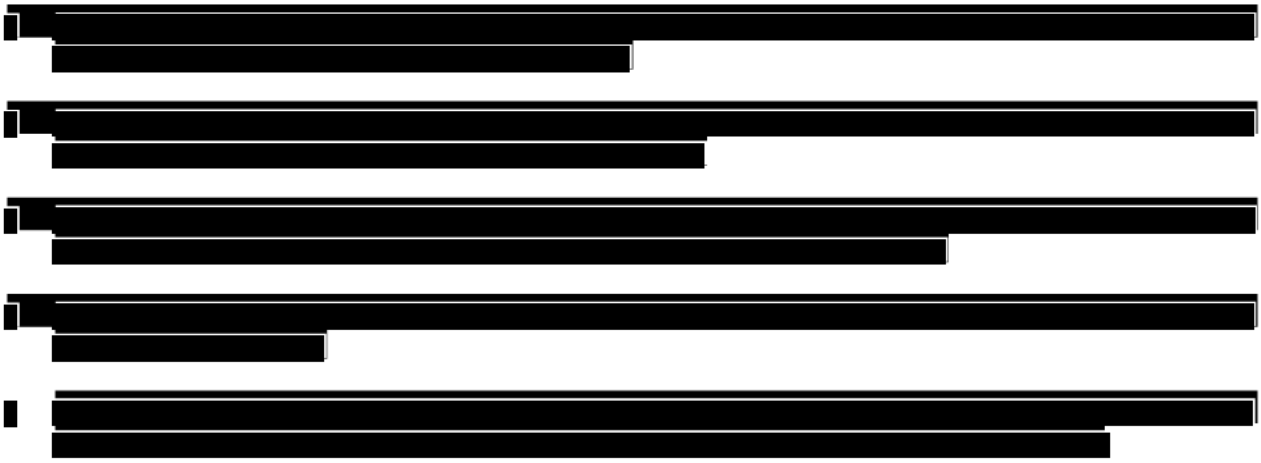
Table 7.4.1 presenting the locations where mitigation in relation to otter is proposed. Refer to Appendix F for examples of otter mitigation, habitat enhancements and measures which could be implemented. Appropriate timings for works are indicated in Appendix G.

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Phase 1 Proposed mitigation	Enhancement works required in receptor areas(s)
River Mole Other watercourse and ditch crossings		Increased injury, killing or disturbance resulting from increased vehicular collisions.	▪ Ensure features remain unlit and dark corridors such as the River Mole are retained during the construction phase and form part of the operational phase lighting design. ▪ Ensure that excavations during construction include a means of egress if mammals become trapped. ▪ Ensure the banks of the River Mole available for accessing by Otters and no barriers put in place. ▪ Provision of permanent Otter fencing in accordance with Manual for Highways Construction Works (MHCW) fencing specifications. ▪ Provision of permanent Otter ledge. ▪ Provision of mammal dry pipe.	N/A

7.5 Monitoring requirements

During the construction phase and the aftercare period, the mitigation features implemented such as the provision of the Otter ledge and mammal dry pipe could be subject to monitoring using a variety of techniques such as the temporary installation of motion sensitive wildlife cameras as each extent of the mitigation feature as well as the searching for field signs of Otters such as spraint and prints. Sand padding could also be used in key locations if considered appropriate. Other factors such as no RTAs being recorded would also be a means of monitoring success. The uptake of the mitigation by Otters would demonstrate effectiveness. However, it should be noted that the site currently has been identified in the ES as being of negligible value to Otters and that their continued absence would not mean that the construction of Phase 1have resulted in a negative effect upon Otters in the locality in the event of a nil return during monitoring survey works.

[redacted]



[redacted]

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

9 Great Crested Newt Mitigation – traditional licensing approach

9.1 Site conditions/ survey results summary

9.1.1 Desk Study

As presented in the ES a number of amphibian records including great crested newt were identified as part of the desk study search. No protected species licenses were identified at the time of writing in the vicinity of the site as part of the desk study exercise.

9.1.2 Survey Results

Surveys were carried out in 2021 and 2022 with eDNA surveys being undertaken in 2021 providing a positive eDNA result of six waterbodies (Pond 2, Pond 3, Pond 3B, Ditch 3, Pond 5 and Pond 6). Negative results were obtained from four tested waterbodies (Ditch 1, Pond 1, Ditch 2 and Pond4).

Following the results of the eDNA surveys, targeted surveys were carried out of those ponds which had positive results return as presented in the Ramboll Report R-1620007949_1-GCN Survey 2022:

- In 2021 it was found that GCN were present in Pond 3 and Pond 3B, with the peak count of GCN present in Pond 3 being 6 and the peak count of GCN in Pond 3B being 7.
- GCN were identified during the bottle trapping surveys and torching surveys. GCN eggs were identified in Ponds 3 and Pond 3B during the egg-search surveys.
- In 2022 it was found that GCN were present in Pond 16A and Pond 16, with a peak count of GCN present in Pond 16A being 2 and the peak count of GCN in Pond 16 being 7.
- The GCN were identified during the bottle trapping surveys and torching surveys. No GCN eggs were identified during the egg search surveys.

The ES states that GCN were distributed in the Golf Course in the south of the Site, and in the central west area of the Site, as shown in ES Appendix 8.8. Ponds and ditches in the north and east of the Site were not used by GCN. Small numbers of individuals (fewer than 10 newts) were recorded in each pond, with a maximum combined count of 13 at Ponds 3 and 3b which are within 20 m of each other. Based on this, the population using the Site is considered to be a medium size population based on the Great Crested Newt Mitigation guidance, with the highest number of individuals being recorded on the Golf Course.

The ES states that the great crested newt population present on site is considered to be of Local Level importance.

9.2 Licensing requirements

As detailed earlier in this document, DLL is being considered in relation to great crested newts. However, in the event of traditional approaches being adopted, a development licence would be required from Natural England which would include the provision of a detailed method statement. A summary of likely mitigation requirements has been provided below in the event of a more traditional approach being adopted in relation to GCN.

9.3 Further surveys

As development licenses in relation to protected species will not be issued until planning has been granted for a development, given the timescales involved further updated targeted surveys will be required.

9.4 Construction phase mitigation for Phase 1

Given the presence of great crested newts and in the event of traditional licensing being progressed, a formal licence would need to be submitted to Natural England setting out a detailed method statement including the approach to works, mitigation, compensation, enhancements, long-term monitoring and management commitments as well as a programme of works. Given that a number of confirmed great crested newt breeding ponds will be lost, replacement ponds will be required with enhancements to existing ponds recommended. Given

the nature of the site and the approach to the project, in the event of a traditional licensing approach being progressed, it is recommended that the client engaged with Natural England and requests the use of their Discretionary Advisory Service (DAS) which provides pre-licence application advice. Construction mitigation (which can only be carried out under licence) is anticipated to include:

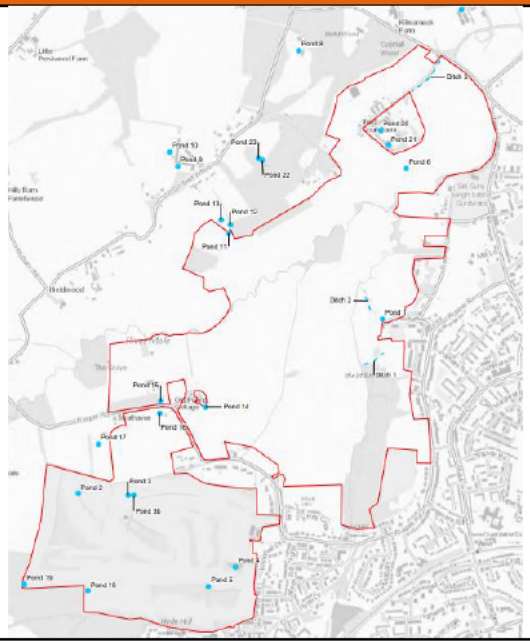
- De-watering of breeding ponds to be directly lost beneath the footprint of the scheme following by destructive searches of banks and infilling.
- Installation and maintenance of drift fencing (or similar) as well as pitfall traps if displacement methods alone are not possible.
- Phased strimming of vegetation with the removal of arisings following by destructive searches and topsoil stripping. Refer to table 9-5-1 below for further details.

9.5 Phase 1 Site Areas, Impacts and Mitigation Summary Table – Great Crested Newt (Traditional Licensing Method)

Table 9.5.1 presenting the locations where mitigation in relation to great crested newt is proposed. Appropriate timings for works are indicated in Appendix G.

Area Of Site	Area map (proposed development) extracts of site layout	Impact Summary	Phase 1 Proposed mitigation	Enhancement works required in receptor area(s) and site boundary
Golf course and southern extent of the site *(map image extracted from Ramboll GCN Survey Report 2022)*	 	Mortality, habitat loss, fragmentation and degradation of habitat.	No works could proceed until a formal licence has been obtained from Natural England and works must adhere to the detailed methods presented and agreed with Natural England. The following information provides a summary of potential mitigation measures if the traditional licensing approach was to be adopted: • As three ponds will be lost beneath the footprint of the new highways infrastructure, specifically Ponds 3, 3B and 16A, which have been confirmed to support great crested newts, compensatory, replacement ponds will need to be included within the masterplan design in the vicinity of the golf course. • Pond replacements should be discussed and agreed with Natural England given the limited land available around the long-term proposed development for the site. • Compensatory replacement ponds should take place well in advance of any proposed translocation works (6 months minimum, preferably 1-2 years) in order for vegetation to begin to establish and the waterbodies to become suitable for use particularly if anticipated to be used as a receptor site. The design and specific locations of these ponds should be agreed with a suitably competent ecologist and inline with the great crested newt mitigation guidance documents. • Given the confirmed presence of great crested newts in this location which includes breeding	Enhancement to existing ponds. Woodland and scrub planting as part of the landscape design will provide good terrestrial habitat for great crested newts.

Area Of Site	Area map (proposed development) extracts of site layout	Impact Summary	Phase 1 Proposed mitigation	Enhancement works required in receptor area(s) and site boundary
			ponds and suitable terrestrial habitat for foraging and hibernating, it is recommended that drift fencing is installed not only to aid with the capture of great crested newts but also to avoid the risk of great crested newts entering into the works area during the construction phase. • Under licence any ponds to be lost (currently anticipated to the Ponds 3, 3B and 16A) these would need to be de-watered under the supervision of the licensed ecologist and likely require the assistance of a number of accredit agents. Once the pond has been drained down and any amphibians present moved to appropriate receptor locations, the pond can be destructively searched and infilled. The detailed approach to works would be specified in the formal licence application. • Existing ponds to be retained within the redline boundary could be enhancement and improved as part of the mitigation package required under licence for great crested newts. • Vegetation clearance would be undertaken in a similar fashion to that detailed earlier in the document for reptiles. This would include a phased approach to strimming with arisings being removed as well as destructive searches and topsoil stripping. • Given that a number of breeding ponds are anticipated to be lost and the locations and extent of the works across the site. Pitfall trapping in conjunction with drift fencing is anticipated and again, would be further detailed in the formal licence application method statement. • Terrestrial habitat enhancements would also be required. The hibernacula proposed along the boundary of the golf course would benefit great crested newts.	

Area Of Site	Area map (proposed development) extracts of site layout	Impact Summary	Phase 1 Proposed mitigation	Enhancement works required in receptor area(s) and site boundary
Site Wide			Updated surveys required for all ponds to confirm presence/ absence and to undertake population density assessments to inform traditional licensing approach.	

9.6 Monitoring requirements

Construction phase and aftercare monitoring requirements will be stipulated in any formal licence agreement. Monitoring surveys will need to be undertaken by a licensed ecologist and/ or their accredited agents. It is anticipated that survey reporting will need to be submitted to Natural England as part of the licence conditions.

10 Hedgehog Mitigation

10.1 Site conditions/ survey results summary

As identified in the ES the desk study searches returned 16 records of hedgehogs within 2 km of the Site within the last 10 years. No targeted hedgehog Erinaceus europaeus surveys were undertaken of the Site. As these species are in decline nationally and are listed on S41 of the NERC Act, appropriate measures to provide habitat and connectivity for this species are included.

10.2 Licensing

No protected species licence is required in relation to hedgehogs.

10.3 Further surveys

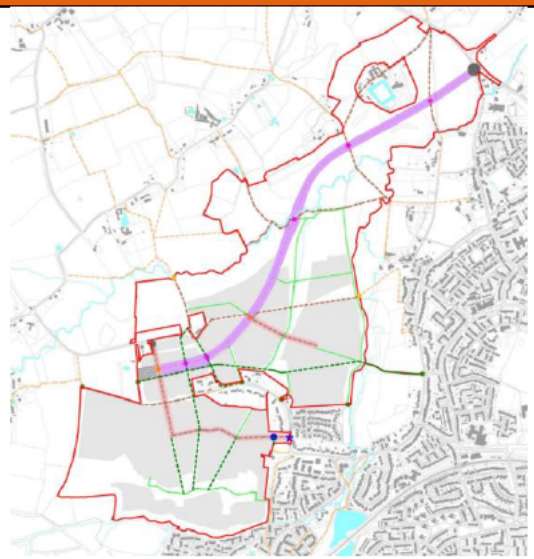
Whilst no targeted hedgehog surveys have been carried out to date and none are proposed, mitigation is required to be implemented, as set out in the ES which will be applicable to the infrastructure early development works. Refer to section 10.4 below.

10.4 Construction mitigation

- To avoid the direct mortality of individual hedgehogs due to construction vehicle movements, this would be minimised through embedded mitigation. For example, the programme would be used to ensure that areas where hedgehog could be hibernating would be avoided over the course of the winter months.
- Habitat loss resulting from the clearance of vegetation for compounds and areas for construction.
- Open excavations in which hedgehogs could become trapped. Such mitigation measures such as the provision of ramps/ means of egress at night for mammal from excavations through the use of scaffolding boards will be detailed further within the CEMP.
- Hedgehogs shall also utilise mitigation such as mammal pipes and open areas to pass beneath the scheme during the later stages of construction and operational phases. Badger fencing shall also provide a means to exclude hedgehogs from the scheme footprint. However, the badger fencing is anticipated to be installed towards the later stages of the construction phase and will be more relevant to the operational/ aftercare period.

10.5 Phase 1 Site Areas, Impacts and Mitigation Summary Table – Hedgehog

Table 10.5.1 presenting the locations where mitigation in relation to hedgehog is proposed.

Area of Site	Area map (proposed development) extracts of site layout	Impact Summary	Proposed mitigation	Enhancement works required in receptor area(s)
Site wide		• Direct mortality through site clearance and becoming trapped in excavations. • In the absence of mitigation mortality during the operational phase through road traffic accidents.	• Areas potentially suitable for use by hedgehogs would be checked and their removal supervised by an ECoW on site to ensure on killing or injuring of any hedgehogs present. • The programme will be designed to ensure the hibernation period is avoided where there is a need to remove potential hibernation features used by hedgehogs, this would overlap with mitigation approaches for reptiles and amphibians too. • The CEMP will provide further details on construction activity management. However, in general excavations should not be left open at night and should be covered or fenced off to avoid animals falling into the excavations and getting trapped. In the event of this not being possible, scaffolding boards (or similar) should be used to provide a means of egress for any animals which may enter these areas. This is standard practice and applicable to numerous species including badger and otter too. • The provision of mammal fencing in key locations will also benefit hedgehog and avoid them entering into the live carriageway once the highways infrastructure is operational. • The hibernacula created will also provide refuges for hedgehogs. • Further mitigation measures in relation to hedgehog will also be detailed in the wider project ecological mitigation strategy.	N/a

10.6 Monitoring requirements

No monitoring requirements are proposed at this stage.

11 Conclusions

This mitigation strategy details the requirements specified for Phase 1, highways infrastructure of the Proposed Development West of Ifield. The mitigation requirements in summary are as follows:

- Habitats, Veteran Trees and Terrestrial Invertebrates.
- Reptiles.
- Bats (roosting bats currently confirmed absent from the works areas for Phase 1 but pre-construction surveys will be required).
- Breeding Birds.
- Otters.
- Badgers.

The mitigation measures detailed will be a material consideration in the development of the construction phase programme of works. In addition, the above mitigation measures should be considered in conjunction with the LEMP, BNG Report and OCEMP. Further pre-construction surveys will be required prior to works on site commencing with the Contractor undertaking liaison with the project Ecological Team and Clerks of Works.

APPENDIX A: Legislation

Species Group	Legislation	Details
Habitats	Conservation of Habitats and Species Regulations 2017 (as amended) ('Habitats Regulations') (HMSO, 2019)	The relevant authority should be consulted regarding works in or near a National Nature Reserve (NNR), LNR, LWS, or Protected Road Verge. There are two Local Wildlife Sites (LWS) with which this project is concerned (Ifield Brook Wood and Meadows LWS and Hyde Hill LWS).
Invertebrates	HMSO (2006). The Natural Environment and Rural Communities NERC Act. London.	The NERC Act 2006 places a duty upon public bodies to maintain Section 41 (S41) lists of flora, fauna, and habitats and to consider these ecological features as a material consideration in planning. It also requires decision-makers to have regard to the conservation of biodiversity in England, when carrying out their normal functions. The hairstreak butterfly *Thecla betulae* is listed under S41 are included in species of principal importance as listed in S41
Reptiles	The Wildlife and Countryside Act 1981, as amended (WCA) (HMSO, 1981)	Common lizard, slow worm, grass snake and adder receive partial protection under Schedule 5 of the Wildlife and Countryside Act 1981, and it is an offence to intentionally kill or injure these species.
	HMSO (2006). The Natural Environment and Rural Communities NERC Act. London.	The NERC Act 2006 places a duty upon public bodies to maintain Section 41 (S41) lists of flora, fauna, and habitats and to consider these ecological features as a material consideration in planning. It also requires decision-makers to have regard to the conservation of biodiversity in England, when carrying out their normal functions. The slowworm, grass snake, common lizard and adder are protected under this legislation.
Wild Mammals	HMSO (1996). Wild Mammals (Protection) Act 1996.	It is an offence to inflict unnecessary suffering to any wild mammal with intent.
Dormouse	The Wildlife and Countryside Act 1981, as amended (WCA) (HMSO, 1981)	It is an offence under the WCA to intentionally or recklessly: Disturb dormouse while they occupy a structure or place used for shelter or protection. Obstruct access to a place of shelter or protection.
Dormouse	Conservation of Habitats and Species Regulations 2017, as amended ('Habitats Regulations') (HMSO, 2019)	The Regulations require authorities on behalf of the Secretary of State to maintain a list of sites which are important for either habitats or species (Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)) and to provide protection for these sites through designation, planning and other controls. The Regulations make it an offence (subject to exceptions) to deliberately kill, injure, disturb, or capture, trade in the animals such as dormouse listed in Schedule 2. It is also an offence to damage or destroy their breeding sites and resting places, and possess, control, transport them (alive or dead). However, these actions can be made lawful through the granting of licences by the appropriate authorities (Natural England in England). Licences may be

Species Group	Legislation	Details
		granted for several purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on the favourable conservation status of the species concerned.
Dormouse	The Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006)	The NERC Act 2006 places a duty upon public bodies to maintain Section 41 (S41) lists of flora, fauna, and habitats and to consider these ecological features as a material consideration in planning. It also requires decision-makers to have regard to the conservation of biodiversity in England, when carrying out their normal functions. Dormouse is listed in S41 and as such identified as species of principal importance.
Bats	Conservation of Habitats and Species Regulations 2017 (as amended) ('Habitats Regulations') (HMSO, 2019)	The Regulations require authorities on behalf of the Secretary of State to maintain a list of sites which are important for bats (Special Areas of Conservation (SACs)) and to provide protection for these sites through designation, planning and other controls. Barbastelle, Bechstein's bat (*Myotis bechsteinii*), greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*) are also listed on Annex II of the Habitats Directive, which means that SACs may be attributed to internationally important roosts and foraging areas of these species. The Regulations make it an offence (subject to exceptions) to deliberately capture, kill, injure, disturb, trade in, damage or destroy a breeding site or resting place of the animals listed in Schedule 2. However, these actions can be made lawful through the granting of licences by the appropriate authority (Natural England). Licences may be granted for several purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on the favourable conservation status of the bat species concerned.
Bats	The Wildlife and Countryside Act 1981, as amended (WCA) (HMSO, 1981)	The Act is the main mechanism for legislative protection of wildlife in England. It gives protection to native species (particularly threatened species), their resting places and places of shelter by making it an offence to kill, injure, take, damage, destroy, sell, or possess them (with exceptions). All 18 native UK bat species receive protection under Schedule 5 of the Wildlife and Countryside Act 1981 (WCA) (as amended).

Species Group	Legislation	Details
		Under this Act it is an offence to intentionally kill, injure or take any protected species; intentionally or recklessly damage, destroy or obstruct access to any structure or place which a protected species uses for shelter or protection; and intentionally or recklessly disturb any protected species while it is occupying a structure or place which it uses for shelter or protection.
Bats	The Natural Environment and Rural Communities (NERC) Act 2006 (HMSO, 2006)	The NERC Act 2006 places a duty upon public bodies to maintain Section 41 (S41) lists of flora, fauna, and habitats and to consider these ecological features as a material consideration in planning. It also requires decision-makers to have regard to the conservation of biodiversity in England, when carrying out their normal functions. Seven species of bats are identified as species of principal importance these are: greater horseshoe bat; lesser horseshoe bat; Bechstein's bat; noctule (*Nyctalus noctula*); soprano pipistrelle (Pipistrellus pygmaeus); brown long-eared bat (*Plecotus auritus*); and barbastelle. The Soprano pipistrelle is of importance in this development as it was regularly identified in surveys.
Otter	The Wildlife and Countryside Act 1981, as amended (WCA) (HMSO, 1981)	The Act is the main mechanism for legislative protection of wildlife in England. It gives protection to native species (particularly threatened species), their resting places and places of shelter by making it an offence to kill, injure, take, damage, destroy, sell, or possess them (with exceptions). The WCA grants full legal protection to Otters. The Act prohibits intentional killing, injuring, or capturing of Otters, as well as disturbing their places of shelter. Additionally, it is an offence to sell, possess, or transport Otters or any parts of Otters without a licence.
Otter	HMSO (2006). The Natural Environment and Rural Communities NERC Act. London.	The NERC Act 2006 places a duty upon public bodies to maintain Section 41 (s41) lists of flora, fauna, and habitats and to consider these ecological features as a material consideration in planning. It also requires decision-makers to have regard to the conservation of biodiversity in England, when carrying out their normal functions. Otters are included in species of principal importance as listed in S41.
Otter	Conservation of Habitats and Species Regulations 2017, as amended ('Habitats Regulations') (HMSO, 2019)	The Regulations require authorities on behalf of the Secretary of State to maintain a list of sites which are important for either habitats or species (Special Areas if Conservation (SACs) and Special Protection Areas (SPAs)) and to provide protection for these sites through designation, planning and other controls. Otter is listed on Annex II of the Habitats Directive. This listing signifies that Special Areas of Conservation (SACs) can be designated to safeguard this species.

Species Group	Legislation	Details
		The Regulations make it an offence (subject to exceptions) to deliberately capture, kill or injure, disturb, or trade in, damage or destroy a breeding site or resting place of the animals listed in Schedule 2 (i.e., Otter). However, these actions can be made lawful through the granting of licences by the appropriate authorities (Natural England in England). Licences may be granted for several purposes (such as science and education, conservation, preserving public health and safety), but only after the appropriate authority is satisfied that there are no satisfactory alternatives and that such actions will have no detrimental effect on the favourable conservation status of the species concerned.
Breeding Birds	HMSO (2006). The Natural Environment and Rural Communities NERC Act. London.	The NERC Act 2006 places a duty upon public bodies to maintain Section 41 (s41) lists of flora, fauna, and habitats and to consider these ecological features as a material consideration in planning. It also requires decision-makers to have regard to the conservation of biodiversity in England, when carrying out their normal functions. The Common linnet (*Linaria cannabina*), Dunnock (*Prunella modularis*), Eurasian Bullfinch (*Pyrrhula pyrrhula*), Eurasian skylark, (*Alauda arvensis*), European herring gull (*Larus argentatus*), European starling (*Sturnus vulgaris*), House sparrow (*Passer domesticus*), and Song thrush (*Turdus philomelos*) are included in species of principal importance as listed in S41.
Breeding Birds	The Wildlife and Countryside Act 1981, as amended (WCA) (HMSO, 1981)	It is an offence to damage or destroy a wild bird's nest whilst it is in use, and to kill or injure a wild bird or destroy a wild bird's egg. For some species, their nests are protected year-round whether in use or not, and it is also an offence to disturb these species while they are nesting or to disturb their dependant young. The WCA grants full legal protection to Fieldfare (*Turdus pilaris*) and Redwing (*Turdus iliacus*). The Act prohibits intentional killing, injuring, or capturing of listed birds, as well as disturbing their places of shelter. Additionally, it is an offence to sell, possess, or transport the birds or any parts of the birds without a licence.
[redacted]	[redacted]	[redacted]

Species Group	Legislation	Details
		[redacted]

APPENDIX B: Reptile mitigation, habitat enhancements and features.

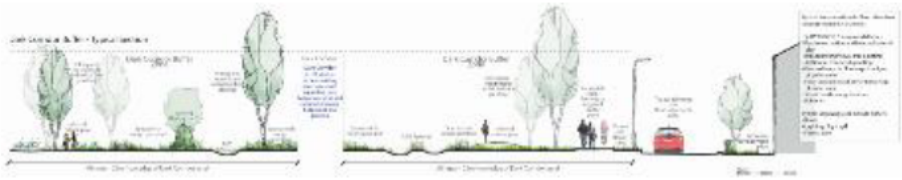
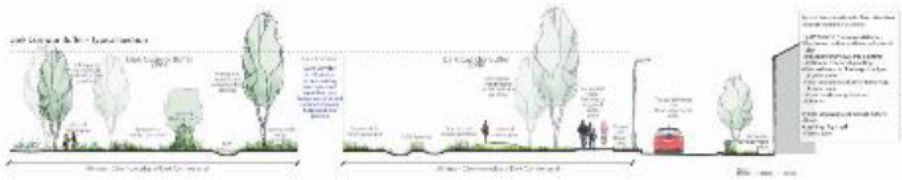
Table B1: Reptile mitigation habitat enhancements and features

Feature and description	Photograph
Hibernacula / basking bank / log pile *"Brash/log piles can be created from arisings of scrub control. Piles should be placed in a sunny location and set within existing vegetation (for example, areas of long grass or long grass and scattered scrub), so that there is cover immediately surrounding, or adjacent to, the pile."* – Edgar et al. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth. *"Creating hibernation sites (hibernacula) is a useful management measure either following recent habitat restoration, where such features may be absent, or where traditional hibernation sites are degrading through subsidence or excessive shade."* – Edgar et al. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.	
Egg laying site *"For many sites with grass snake present, creating egg-laying heaps is one of the most productive management measures. Egg-laying sites are often a limiting factor, and population declines may be traced back to their destruction or reduction in quality. If grass snakes currently only disperse through a site (as is often the case with this highly mobile species), creating an egg-laying site may encourage the snakes to form a new population centre, and spend more time there.* *Grass snakes usually nest in heaps of decaying organic material of various kinds, where the heat of decomposition incubates the eggs. Natural nesting sites include piles of vegetation deposited by flood water or cavities within dead, rotting tree trunks and, in coastal areas, seaweed piles. More commonly, grass snakes use material provided by humans, including heaps of manure, compost, grass clippings, sawdust, garden waste or cut reeds.."* – Edgar et al. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.	 Natural England (2011) *Natural England Technical Information Note TIN102: Reptile mitigation guidelines*.

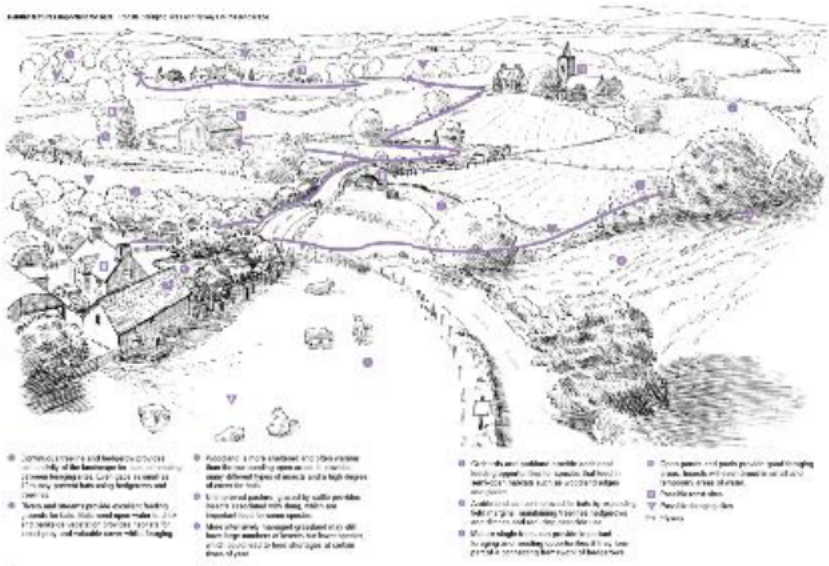
Feature and description	Photograph
Mosaic of water and grassland / scrub *"Due to their need for warm sites, reptiles prefer south-facing slopes, or varied topography, usually on well-drained soils. They also need diverse vegetation structure, creating open areas and nearby cover, to provide protection from predators and the elements."* – Edgar et al. (2010). *Reptile Habitat Management Handbook*. Amphibian and Reptile Conservation, Bournemouth.	

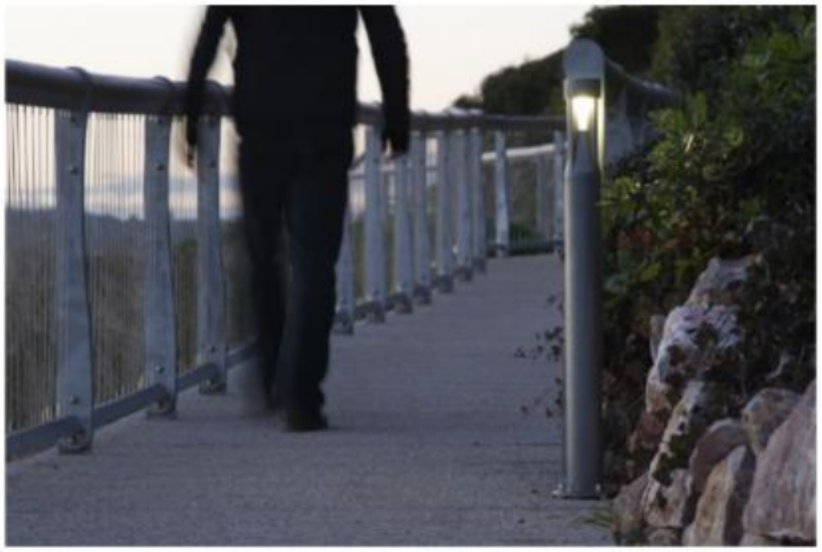
APPENDIX C Bat mitigation habitat enhancements and features

Table C1: Bat mitigation habitat enhancements and features

Feature and description	Photograph
Commuting feature - dark corridor Within this corridor, lighting is kept below 1lux. Planting is used to screen this area.	
Commuting feature – Habitat corridor / hedgerow *"Linear habitats such as hedgerows, tree lines, overgrown banks, ditches and the edges of watercourses are important foraging habitats that provide an abundance of insects. Linear features are also important to bats as they move between different foraging sites. Many species will not fly across open areas and instead follow these features that provide shelter from wind for both the bats and their insect prey, as well as cover from predators. Bats may travel significant distances to circumnavigate open areas rather than cross them by the most direct route."* – JNCC (2001) *Habitat management for bats: A guide for land managers, land owners and their advisors.*	
Commuting feature – double hedgerow *"Corridors can be composed of man-made or natural materials (e.g. fences, brick walls, tree lines or hedges). Corridors with outgrown vegetation are preferable as they create dark fly ways sheltered from predators and the elements. Heavily clipped low hedges or tree-lines are less suitable."* – Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation.*	 Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation.*

Feature and description	Photograph
Roosting feature – tree bat boxes *"The primary function of bat boxes is to provide artificial roost sites for bats, particularly in areas such as coniferous plantations where there is a shortage of natural sites."* – JNCC (2004) *Bat Workers Manual* 3rd ed.	
Foraging habitat – pond *"Water and wetlands can be excellent feeding grounds for bats. Many insects have aquatic larval stages and bats take advantage of the emerging insects. Bats need open water to drink, and bankside vegetation provides food and valuable cover for foraging. Some species preferentially select roost sites close to water."*	

Feature and description	Photograph
Foraging habitat scrub, hedgerow, trees, species rich grassland *"Several habitats are particularly important for foraging bats: freshwater, woodland, grassland and linear habitats (see box below, Habitats of importance to particular bat species). This holds true throughout a range of landscape types and across the regions of the UK."* – JNCC (2001) *Habitat management for bats: A guide for land managers, land owners and their advisors.*	
Lighting – LED *"LED units can be used to direct the light into small target areas. Composite LEDs can be switched off to reduce/direct the light beam to specific areas. New design down lights can be used to ensure minimal sky glow and limited trespass"* – Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation.*	 **Figure 6.7.** LED lamps installed along Warren Footpath, London to reduce spill onto surrounding vegetation (© Alison Furel). Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation*.

Feature and description	Photograph
Lighting LED bollard *"Reducing the height of light units will keep the light as close to the ground as possible, reducing the volume of illuminated space. This will also give bats a chance to fly over the light units in the dark area above the light (as long as the light does not spill above the vertical plane). There are many low level lighting options for pedestrian and cycle path lighting which minimise spill and reduce overall illumination including: low level illuminated bollards, down-lights, handrail lighting or footpath lighting."* – Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation*.	 **Figure 6.2.** Pharola illuminated bollard. DW Windsor Ltd. Stone, E.L. (2013) *Bats and lighting: Overview of current evidence and mitigation*.

[redacted]

[redacted] *mitigation habitat enhancements and features*

[redacted]	[redacted]
[redacted]	
[redacted]	
[redacted]	
[redacted]	

APPENDIX E Habitat and invertebrate mitigation, enhancements, and features

Table E1: Habitat and Terrestrial Invertebrate mitigation, habitat enhancements and features

Feature and description	Photograph
Trees *Identify and preserve veteran trees as they provide unique microhabitats and food sources for many invertebrates.* *Encourage the planting of native tree species to enhance habitat diversity and create connections between different habitats.* *Retain standing deadwood and fallen logs to provide breeding sites, food sources, and shelter for invertebrates.*	
Woodlands Promote mixed-age and mixed-species woodlands to provide a variety of niches and resources for invertebrates. Implement selective thinning to increase light levels, benefiting understory vegetation and associated invertebrates. Create deadwood piles and log stacks within woodlands to provide crucial habitats for beetles, fungi, and other decomposers.	

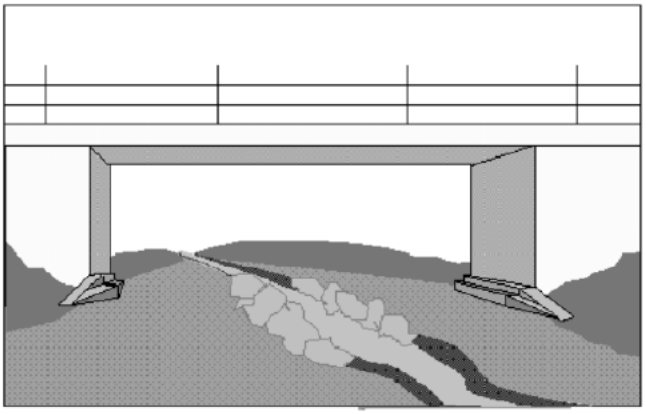
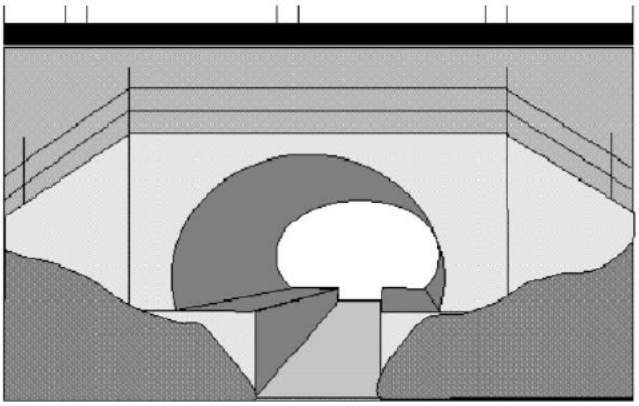
Feature and description	Photograph
Hedgerows *Maintain hedgerows with a variety of native shrub and tree species to support diverse invertebrate communities.* *Adopt a rotational cutting regime, ensuring sections of hedgerows are left uncut each year to provide overwintering sites and food sources.* *Encourage hedgerow gapping and the planting of hedgerow trees to enhance connectivity and improve foraging opportunities for invertebrates.*	
Grassland *Establish and maintain species-rich grassland areas with a diverse mix of native wildflowers to support a range of invertebrates.* *Implement a rotational mowing regime, allowing some areas to grow long and flower, providing nectar sources for pollinators.* *Create small areas of rough grassland or tussocks to accommodate invertebrates that prefer these habitats.*	
Ponds *Establish and maintain a variety of pond sizes and depths to accommodate different aquatic invertebrate species.* *Avoid excessive shading by trees to allow sunlight penetration, aiding the growth of aquatic plants and promoting invertebrate diversity.* *Avoid the use of pesticides or fertilizers near ponds to protect water quality and prevent harm to invertebrate populations.*	

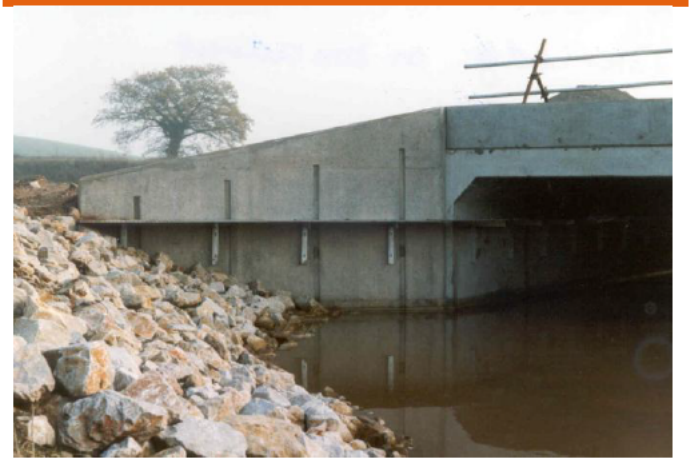
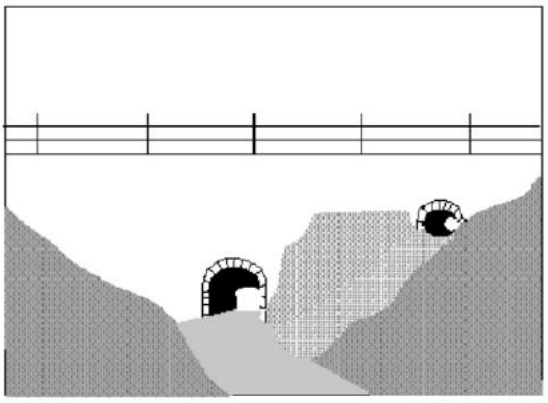
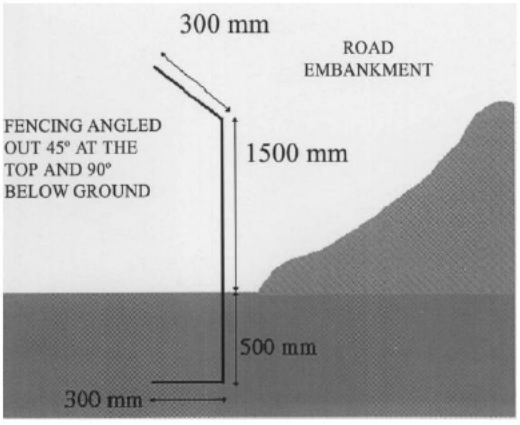
Feature and description	Photograph
Monitoring and Evaluation *Regularly monitor invertebrate populations using appropriate survey techniques, such as pitfall traps, sweep netting, and light trapping.* *Record and analyse data on species abundance, diversity, and distribution to assess the effectiveness of management practices.* *Adjust management strategies based on monitoring results to optimize invertebrate biodiversity enhancement.*	
Education and Outreach *Provide educational materials and interpretive signage to raise awareness about the importance of invertebrates and their habitats.* *Engage with local communities, schools, and stakeholders to promote the value of invertebrates and encourage their conservation.* *Organise guided walks, workshops, or training sessions to share knowledge and best practices for managing habitats to enhance invertebrate biodiversity.*	
Collaboration and Partnerships *Collaborate with local conservation organizations, universities, and research institutions to share knowledge, resources, and expertise.* *Seek funding opportunities and partnerships to support habitat management initiatives aimed at enhancing invertebrate biodiversity.* *Engage with landowners and farmers to promote sustainable land management practices that benefit invertebrate populations.*	

APPENDIX F Otter mitigation, enhancements, and features

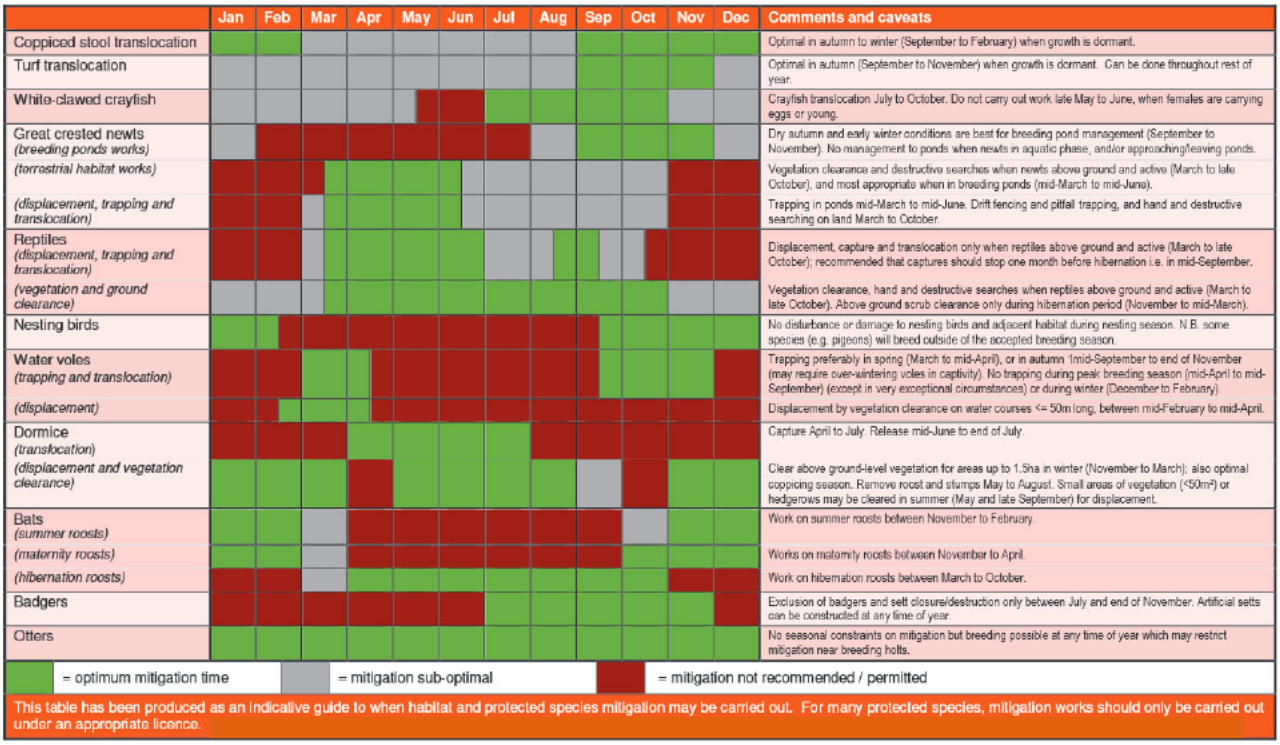
The extracts below have been taken from the Design Manual for Roads and Bridges (1999) Volume 10, Section 1, Part 9 HA81/99. Whilst this guidance has been withdrawn, CIEEM still refer to this documentation and its reference forms part of CIEEMs Good Practice Guidance for Otters. Barriers to movement can fragment habitats and catchment accessibility as well as resulting in higher levels of road traffic collisions. This can be exacerbated further at times of flood when water levels increase.

Table F1: Otter mitigation, enhancement, and features

Feature and description	Photograph
Clear span bridge structures for new infrastructure *Provisions of clear span bridge structure set back from the top of bank and providing sufficient access for Otter outside of the wetted channel.*	
Otter/ mammal ledges to permit dry access through culvert structures where required *Pre-cast concrete ledges can be incorporated into culvert structures. However, flood calculations and levels need to be understood to ensure a dry safe means of passage. Alternatives can include bolt on galvanised ledges but sufficient head room/ clearance needs to be incorporated into the design.*	

Feature and description	Photograph
	
Dry pipes to permit safe access beneath carriageways at times of flood/ high water flow. *Dry pipes to be located and positioned within the scheme design to ensure accessibility by mammals/ Otters with pathways leading to these structures. Dry pipes need to be positioned at an elevated location to the watercourse so outside of flood risk zones.*	
Guide and barrier fencing to ensure Otters do not access live carriageways *Otter proof fencing to also be incorporated into highway boundary fencing design. Otter fencing can be used to also guide Otters to safe crossing points. Otter fencing specification details can also be found in the Manual for Construction Highways Works (MCHW).*	

APPENDIX G Timings of mitigation works.



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Comments and caveats
Coppiced stool translocation													Optimal in autumn to winter (September to February) when growth is dormant.
Turf translocation													Optimal in autumn (September to November) when growth is dormant. Can be done throughout rest of year.
White-clawed crayfish													Crayfish translocation July to October. Do not carry out work late May to June, when females are carrying eggs or young.
Great crested newts *(breeding ponds works)*													Dry autumn and early winter conditions are best for breeding pond management (September to November). No management to ponds when newts in aquatic phase, and/or approaching/leaving ponds.
(terrestrial habitat works)													Vegetation clearance and destructive searches when newts above ground and active (March to late October), and most appropriate when in breeding ponds (mid-March to mid-June).
(displacement, trapping and translocation)													Trapping in ponds mid-March to mid-June. Drift fencing and pitfall trapping, and hand and destructive searching on land March to October.
Reptiles *(displacement, trapping and translocation)*													Displacement, capture and translocation only when reptiles above ground and active (March to late October); recommended that captures should stop one month before hibernation i.e. in mid-September.
(vegetation and ground clearance)													Vegetation clearance, hand and destructive searches when reptiles above ground and active (March to late October). Above ground scrub clearance only during hibernation period (November to mid-March).
Nesting birds													No disturbance or damage to nesting birds and adjacent habitat during nesting season. N.B. some species (e.g. pigeons) will breed outside of the accepted breeding season.
Water voles *(trapping and translocation)*													Trapping preferably in spring (March to mid-April), or in autumn 1mid-September to end of November (may require over-wintering voles in captivity). No trapping during peak breeding season (mid-April to mid-September) (except in very exceptional circumstances) or during winter (December to February).
(displacement)													Displacement by vegetation clearance on water courses <= 50m long, between mid-February to mid-April.
Dormice *(translocation)*													Capture April to July. Release mid-June to end of July.
(displacement and vegetation clearance)													Clear above ground-level vegetation for areas up to 1.5ha in winter (November to March); also optimal coppicing season. Remove roost and stumps May to August. Small areas of vegetation (<50m²) or hedgerows may be cleared in summer (May and late September) for displacement.
Bats *(summer roosts)*													Work on summer roosts between November to February.
(maternity roosts)													Works on maternity roosts between November to April.
(hibernation roosts)													Work on hibernation roosts between March to October.
Badgers													Exclusion of badgers and sett closure/destruction only between July and end of November. Artificial setts can be constructed at any time of year.
Otters													No seasonal constraints on mitigation but breeding possible at any time of year which may restrict mitigation near breeding holts.

= optimum mitigation time | = mitigation sub-optimal | = mitigation not recommended / permitted

This table has been produced as an indicative guide to when habitat and protected species mitigation may be carried out. For many protected species, mitigation works should only be carried out under an appropriate licence.

Arcadis UK

80 Fenchurch Street
London EC3M 4BY
United Kingdom

T: +44 (0) 20 7812 2000

arcadis.com