

Preliminary Ecological Appraisal

Location: Land known as The Orchard, Snailswell Lane, Ickleford, Hertfordshire, SG5 3TS

Client: Shiril Patel

Authors: Eleanor Sheehan (Level 2 Bat Class Licence: 2024-11948-CL18-BAT)
Jason Walker (Level 2 Bat Class Licence: 2024-11947-CL18-BAT)

Report date: 14/10/2025



Email: info@battreesurveys.co.uk

Website: www.battreesurveys.co.uk

Executive summary

This preliminary ecological appraisal (PEA) report has been prepared by Bat Tree Surveys for Shiril Patel to inform a pre-planning application (application reference 25/01790/FP) involving the erection of a self-build, infill dwelling with associated works. The survey included a background data search, Phase 1 habitat survey, and assessment for protected species undertaken on 1st October 2025. The site and survey area are shown in Figure 1.

There is one statutory designated site located within 2km of the site, Oughtonhead Common Local Nature Reserve (LNR). A further twelve non-designated statutory nature sites lie in the same radius.

The site comprises of an unmanaged parcel of land with tall swards of grass, wild flowering plants, tall ruderal, bramble scrub, and immature trees/shrubs. None of the habitats recorded on site are considered locally notable or of significant botanical value. No invasive non-native species were identified at the site. On-site habitats do not represent a constraint to the development.

The suitability of the site to support protected or notable species is minimal, the only evidence identified was an inactive nest believed to belong to woodpigeon. There are opportunities for occasional nesting within scrub and trees along the southwest and northeast boundary, respectively. As a precaution, vegetation clearance should avoid the breeding bird season (May to September) or only be carried out after a breeding bird check has been complete.

The habitats on site are considered to hold low potential for commuting and foraging bats. Nonetheless, lighting should be minimised where possible to prevent potential disturbance of commuting and foraging bats. No evidence of badger was found during the survey and the habitats on site are considered unsuitable for these species. However, a transitory presence is possible.

There is a single pond identified within 500m of the site which was dry at the time of the survey. Results from the Habitat Suitability Index (HSI) assessment on the pond suggested a below average suitability for Great Crested Newt (GCN). The presence of the species at the site is considered unlikely. There are some habitats on site that could provide suitable hibernation refugia for amphibians and reptiles. A precautionary approach has been recommended during rubble and vegetation clearance at the site, including undertaking clearance outside of the amphibian hibernation period.

Enhancement measures have been recommended, including installation of bat and bird boxes, planting of native flowering species, and installation of access holes in boundary fences or walls to support commuting hedgehogs.

Contents

1. Introduction	
1.1. Background	1
1.2. Site description	1
1.3. Scope of survey	2
2. Protected species legislation and policy context	2
2.1. Wildlife and Countryside Act 1981 (as amended)	2
2.2. Conservation of Habitats and Species Regulations 2017	2
2.3. Habitats and species of principal importance	3
2.3.1. Habitats of principal importance	3
2.3.2. Species of principal importance	3
2.4. National Planning Policy Framework	3
3. Methodology	
3.1. Desk study	3
3.2. Extended UK Hab survey	4
3.3. Protected and notable species	4
3.3.1. Bats	4
3.3.2. Great Crested Newt and other amphibians	4
3.3.3. Badger	4
3.3.4. Breeding birds	4
3.3.5. Reptiles	4
3.4. Constraints and limitations	5
4. Results and assessment of impacts	
4.1. Desk study data search	5
4.1.1. Designated sites	5
4.1.2. Waterbodies and watercourses	7
4.1.3. Protected and noteworthy species	8
4.2. Extended UK Hab Survey	9
4.2.1. Neutral grassland (g3)	9
4.2.2. Bramble scrub (h3d)	9
4.2.3. Ruderal / ephemeral	9
4.2.4. Trees and shrubs	9
4.3. Protected and notable species	11
4.3.1. Bats	11
4.3.2. Badger	12
4.3.3. Great Crested Newt and other amphibians	12
4.3.4. Hedgehogs	13
4.3.5. Reptiles	13
4.3.6. Breeding birds	13
4.3.7. Protected flora	14
4.3.8. Invertebrates	14
5. Conclusion and recommendations	14
5.1. Designated sites	14
5.2. Habitat and vegetation	14
5.3. Protected species	14
5.3.1. Bats	14
5.3.2. Badger	15
5.3.3. Great Crested Newt	15
5.3.4. Hedgehog	16
5.3.5. Reptiles	16
5.3.6. Birds	16
5.4. Overall conclusion	17
6. References	18

Appendix 1: Statutory and non-statutory designated sites	19
Appendix 2: Habitat map	21
Appendix 3: Flora species list	22
Appendix 5: Legislation and planning policy framework.....	23
Appendix 6: Guidance on artificial light	26
Appendix 7: Proposed development plans	28

Disclaimer

This report has been prepared by Bat Tree Surveys for the exclusive use of the client in accordance with the terms of the contract and scope of work agreed upon. The information, assessments, and recommendations presented herein are based on data collected and conditions observed at the time of the study and are intended solely for the purposes described in this document.

No warranty, express or implied, is given as to the accuracy, completeness, or fitness for a particular purpose of the information contained in this report. Bat Tree Surveys accepts no liability for any loss or damage arising from the use of this report or its contents by any third party without prior written consent.

This report may contain interpretations or predictions based on ecological data, which are subject to inherent uncertainties and external influences. Environmental conditions can change over time, and the author bears no responsibility for changes that may occur after the date of the fieldwork or publication of this report.

This document must not be reproduced, disclosed, or distributed to any third party without the express written permission of the author.

1. Introduction

1.1. Background

The following report presents the results of a preliminary ecological appraisal (PEA) at Land known as The Orchard, Snailswell Lane, Ickleford, Hertfordshire, SG5 3TS (Grid reference TL 18149 32442), hereinafter referred to as the 'site'. The survey was undertaken to inform a pre-planning application proposing the erection of a self-build, infill dwelling with associated works (application reference 25/01790/FP).

The purpose of the report is to identify and classify habitats on the site, identify the potential of protected species at the site, and determine ecological constraints to the development. The report recommends the need for further surveys and mitigation or licensing requirements based on the survey results.

1.2. Site description

The site is located in the village of Ickleford, a village and civil parish in the North Hertfordshire district of Hertfordshire, England. It lies immediately north of the town of Hitchin, from which it is separated by the River Oughton. It lies west of the River Hiz and to the east of the A600 road. The site incorporates c. 460m² of an undeveloped parcel of land between two properties.

It is believed the site has historically been used for ancillary activities such as dog agility and as paddock land. The site currently presents as an unmanaged parcel of land dominated by tall swards of grass, patches of scrub, and ruderal growing among areas of rubble/debris. In the wider area the site is surrounded by residential housing and gardens, with arable farmland further north, south, and west.



Figure 1: Aerial image of the site, boundary shown by red line

1.3. Scope of surveys

The preliminary ecological appraisal was undertaken in line with best practice guidelines outlined by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2017). The scope of surveys is to gain baseline ecological information at the site. This was achieved by carrying out the following:

- A desk study to gather information on designated statutory nature conservation sites (within 5km) and non-statutory nature conservation sites (within 2km), and records of protected species (within 2km)
- A field survey including mapping of habitats at the site and surrounding the site, the importance of habitat features, identification of the potential presence of protected and/or notable species, and notes on incidental sightings of protected or notable species and non-native invasive plant species.

2. Protected species legislation and policy context

Certain species of animals and plants found in the wild in the UK are legally protected from being harmed or disturbed. These species are listed in the Wildlife and Countryside Act 1981 (as amended) or are named as European Protected Species (EPS) in the Conservation of Habitats and Species Regulations 2017 (as amended). These two main pieces of legislation have been consulted when writing this report and are therefore described within this section. See Appendix 5 for more detail.

2.1. Wildlife and Countryside Act 1981 (as amended)

The Wildlife and Countryside Act 1981 (as amended) is the primary piece of legislation relating to nature conservation in the UK. Protected species are listed under Schedule 5 of the Act which makes it an offence to intentionally or recklessly:

- a) kill, injure, or take any wild animal listed on Schedule 5
- b) damage, destroy or obstruct access to any structure or place which such an animal uses for shelter or protection or to disturb such an animal when it is occupying a structure or place for that purpose.

All nesting birds are protected by the WCA, making it an offence to intentionally kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. In addition, it is an offence to disturb any wild bird listed on Schedule 1 of the act whilst it is building a nest or is in, on, or near a nest containing eggs or young, or whilst lekking; or to disturb the dependent young of any wild bird listed on Schedule 1.

2.2. Conservation of Habitats and Species Regulations 2017

The Habitats Regulations 1994 implement the species protection requirements of the European Directive 92/43/EEC on the conservation of natural habitats. This regulation makes it an offence to deliberately or recklessly disturb European Protected Species (EPS), such as bats (all species) and great crested newt. Their places of shelter are fully protected, and it is an offence to damage, destroy or obstruct access to or otherwise deny the animal use of a breeding site or resting place, whether deliberate or not. It is also an offence to disturb in a manner that is likely to significantly affect the local distribution or abundance of the species; impair its ability to survive, breed or reproduce or rear its young.

2.3. Habitats and species of principal importance

The Natural Environment and Rural Communities (NERC) Act came into force on 1 October 2006. Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England, as required by the Act. The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the Natural Environment and Rural Communities Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

2.3.1. Habitats of principal importance

Fifty-six habitats of principal importance are included on the S41 list. These are all the habitats in England that were identified as requiring action in the UK Biodiversity Action Plan (UK BAP) and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework. They include terrestrial habitats such as upland hay meadows to lowland mixed deciduous woodland, and freshwater and marine habitats such as ponds and sub-tidal sands and gravels.

2.3.2. Species of principal importance

There are 943 species of principal importance included on the S41 list. These are the species found in England which were identified as requiring action under the UK BAP and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework.

2.4. National Planning Policy Framework

The National Planning Policy Framework (NPPF) was first published in March 2012. It sets out the Government's planning policies for England and how these are expected to be applied. It gives guidance to local planning authorities on the content of their local plans but is also a material consideration in determining planning applications. The NPPF states that the planning system should provide a net gain for biodiversity wherever possible. The NPPF replaces much of the previous planning policy guidance, including PPS9: Biodiversity and Geological Conservation. However, the Government Circular 06/05: Biodiversity and Geological Conservation – Statutory Obligations and Their Impact within the Planning System (which accompanied PPS9) remains valid.

3. Methodology

3.1. Desk study

A desk study data search was conducted in October 2025 to establish the presence of priority habitats, protected species, and statutory sites within the Zone of Influence (Zoi) of the development site. Information was gathered from the following sources:

- Internationally, nationally, and locally designated sites, within a 5km radius of the site using the Multi Agency Geographic Information for the Countryside (MAGIC) website, Herts Environmental Record Centre (HERC), and Bedfordshire & Luton Biodiversity Recording & Monitoring Centre
- Protected and priority species records and records of locally designated sites within a 2km radius of the site using the Herts Environmental Record Centre (HERC) and Bedfordshire & Luton Biodiversity Recording & Monitoring Centre
- Aerial photographs and Ordnance Survey (OS) maps were reviewed to identify habitats and features of ecological interest in the vicinity of the site, including water bodies within 500m

3.2. Extended UK Hab Survey

An Extended UK Hab Survey was undertaken on 1st October 2025 to record habitats and vegetation on the site. Weather conditions were mild (16°C) with a light breeze (Beaufort Scale 2), 80% cloud cover, and no precipitation. Habitats at the site were mapped according to definitions in UK HAB 2.0 (UK Habitats Classification Working Group, 2023). A list of plant species was compiled, using nomenclature taken from Stace (2010). Target notes were used where necessary to signify additional ecologically significant information on features of importance. Habitat surrounding the site were noted to establish the potential for movement of fauna between habitats.

3.3. Protected and notable species

The site was assessed for its suitability to support protected or priority species in the area, including non-native invasive species.

3.3.1. Bats

Habitats were assessed for their suitability for foraging and commuting bats at the site. Features of suitability include sheltered habitats with high insect populations, including scrub, woodland, water bodies, hedgerows and linear features. Trees were also assessed for suitability for roosting bats.

3.3.2. Great Crested Newt (GCN)

A Habitat Suitability Index (HSI) assessment was undertaken on all waterbodies located within 500m of the site that were accessible. These were assessed for their suitability to support Great Crested Newt (*Triturus cristatus*) following relevant guidance¹. The HSI is used to assess suitability based on factors including size, water quality, permanence, shading, presence of fish, the number of nearby ponds, and macrophyte cover. A score between 0 and 1 is calculated; 0 representing poor suitability and 1 representing excellent suitability.

The suitability of terrestrial habitat within the site was also assessed for GCN and other amphibians. Any suitable refugia that could be lifted were examined for amphibians. Throughout this survey, best-practice methodologies as set out by Froglife and Natural England were employed.

3.3.3. Badger

A walkover of the site and its boundaries was conducted to identify any evidence of badger (*Meles meles*) activity within the site and within approximately 30m from its boundaries. Surveyors checked for setts, latrines, pathways and fence/ hedge crossing points and any associated trapped hairs, scratching posts and ground disturbed by foraging.

3.3.4. Breeding birds

The survey area was assessed for its potential to support breeding birds. This included an assessment of trees, vegetation, and ground cover.

3.3.5. Reptiles

The habitats within the site boundary and surrounding habitats were assessed for suitability for reptile species, focusing on features such as basking areas, hibernation sites, and foraging opportunities. The most common and widespread species were considered, including slow worm (*Anguis gragilis*) and common lizard (*Zootoca vivipara*). Any suitable refugia that could be lifted were examined for reptiles.

3.4. Constraints and limitations

The desk study and field study will not necessarily produce an exhaustive list of fauna and flora at the site. Field sings of protected or priority species are often difficult to find or can be absent from the site. The species lists are intended to illustrate general species richness of the area and identify any species that may be considered uncommon or unusual.

Access could not be gained to a full 30m buffer around the site boundary due to the site being surrounded by residential gardens and housing. Surveyors made every effort to survey these habitats from public roads and footpaths.

Recommendations made in this report are based on the proposed plans provided by the client in October 2025. If the site plans are to change significantly, an ecologist must be contacted, and further assessment of the site may be necessary. No other limitations or constraints were recorded which would otherwise have significant limitations to this PEA.

4. Results and assessment of impacts

4.1. Desk study data search

4.1.1. Designated sites

There is one designated statutory protected site and 12 non-statutory designated sites within the 2km search radius. See Table 1 below for more information.

No significant or direct impacts to statutory or non-statutory wildlife sites are considered likely to arise due to the proposed development. The lack of ecological or hydrological connectivity from the site to protected habitats, together with the small scale of the proposed works, limit the potential impacts to these sites.

Table 1: Statutory and non-statutory designated sites within a 5km radius

Site name	Designation	Description	Distance (m)
Oughtonhead Common	LNR	Wild variety of habitats including wet and dry woodland and areas of fen. The River Oughton flowing through the site. Species encountered at the site include kingfisher, water rails, woodcock, and water shrew.	3370 SW
Oughton Head	LWS	Oughton Head consists of the main area of common in the south-east and the wet woodland band to the north of the river. The common supports marshy grassland with fen but with drier areas of neutral grassland, scrub and woodland. An unusual geology has resulted in a very diverse flora. The river supports aquatic plants of note, the remnant fen components are notable within the county and the area is important for a range of invertebrates, amphibians, reptiles, birds and mammals, with grass snake (<i>Natrix natrix</i>), harvest mouse (<i>Micromys minutus</i>), European hare (<i>Lepus europaeus</i>) and water voles (<i>Arvicola amphibius</i>) recorded.	1510 SW

Ickleford Common North	LWS	Traditionally grazed pastures supporting unimproved neutral and wet acid grasslands, and a stretch of the River Hiz. The rich flora (over 100 species) includes spiny rest-harrow (<i>Ononis spinosa</i>), pepper-saxifrage (<i>Silene silaus</i>), salad burnet (<i>Sanguisorba minor</i>), fen bedstraw (<i>Galium uliginosum</i>) and marsh valerian (<i>Valeriana dioica</i>). The common is also important for its fauna with water vole (<i>Arvicola amphibius</i>), water shrew (<i>Neomys fodiens</i>), and ant hills in abundance in the old pasture. Many breeding, passage and wintering birds also use the site.	4000 NE
Lower Green, Ickleford	LWS	An area of moderately diverse rough grassland dissected by a road. Ditches, some planted trees, and a pond in the north corner add to the habitat diversity.	340 NE
River Hiz, Ickleford North	LWS	Stretch of River Hiz important for water vole (<i>Arvicola amphibius</i>).	550 NE
Cadwell Grove Meadows	LWS	Old damp meadows adjacent to the River Hiz supporting neutral marshy grassland. A ditch cuts through the meadows. Several species of sedge (<i>Carex</i> spp.) have also been noted.	560 SW
Cadwell Crossing	LWS	Scrubby railway banks by Icknield Way with records for great pignut (<i>Bunium bulbocastanum</i>), a possible Herts Vulnerable species.	850 E
Icknield Way, Wilbury	LWS	Grass track running through arable fields with records for great pignut (<i>Bunium bulbocastanum</i>), a possible Herts Vulnerable species.	1360 E
Cadwell Marsh & Burymead Springs	LWS	A mosaic site supporting a variety of habitats including derelict marshy meadows, scrub, reed beds, hazel (<i>Corylus avellana</i>) coppice, willow (<i>Salix</i> sp.) plantation, a dismantled railway embankment, an old hedge (along the Icknield Way) and spring-fed pools (old borrow pits). The site is bordered by the Rivers Hiz and Purwell. Water voles (<i>Arvicola amphibius</i>) have been recorded beside the Purwell and harvest mice (<i>Micromys minutus</i>) within Burymead Springs.	830 SE
Cadwell Lane Gasworks Meadow	LWS	Site dominated by dense Hawthorn (<i>Crataegus monogyna</i>) scrub in the south with open patches of herb rich communities on calcareous spoil. Some remnant old grassland is present at the northern end of the site. Two orchids, common spotted-orchid (<i>Dactylorhiza fuchsii</i>) and southern marsh-orchid (<i>Dactylorhiza praetermissa</i>), have been	990 SE

		recorded. Across the lower third of the site is an old boundary feature and there is a hedgerow to the eastern border.	
Westmill Lane, Ickleford	LWS	Buildings and environs important for protected species.	1270 SW
River Hiz, Cadwell	LWS	Stretch of river with tall herbs, grassland and scattered trees. Habitat important for water vole (<i>Arvicola amphibius</i>).	550 E
Wilbury Hill	LWS	Chalk hills capped with sand and gravel glacial deposits comprising varied soils that support acid, neutral and chalk grassland. There are prominent scots pines (<i>Pinus sylvestris</i>). The site supports a nationally notable species and county rarities including purple-stem cat's-tail (<i>Phleum phleoides</i>) and large, yellow-faced bee (<i>Hylaeus signatus</i>). Some nationally scarce species of moss have also been recorded and the site is important for its fauna with protected species present.	1880 NE

4.1.2. Waterbodies and watercourses

Whilst no waterbodies were identified within the site boundary, MAGIC maps revealed a single pond (340m northeast) and streams descending from the River Purwell within 500m of the site boundary.

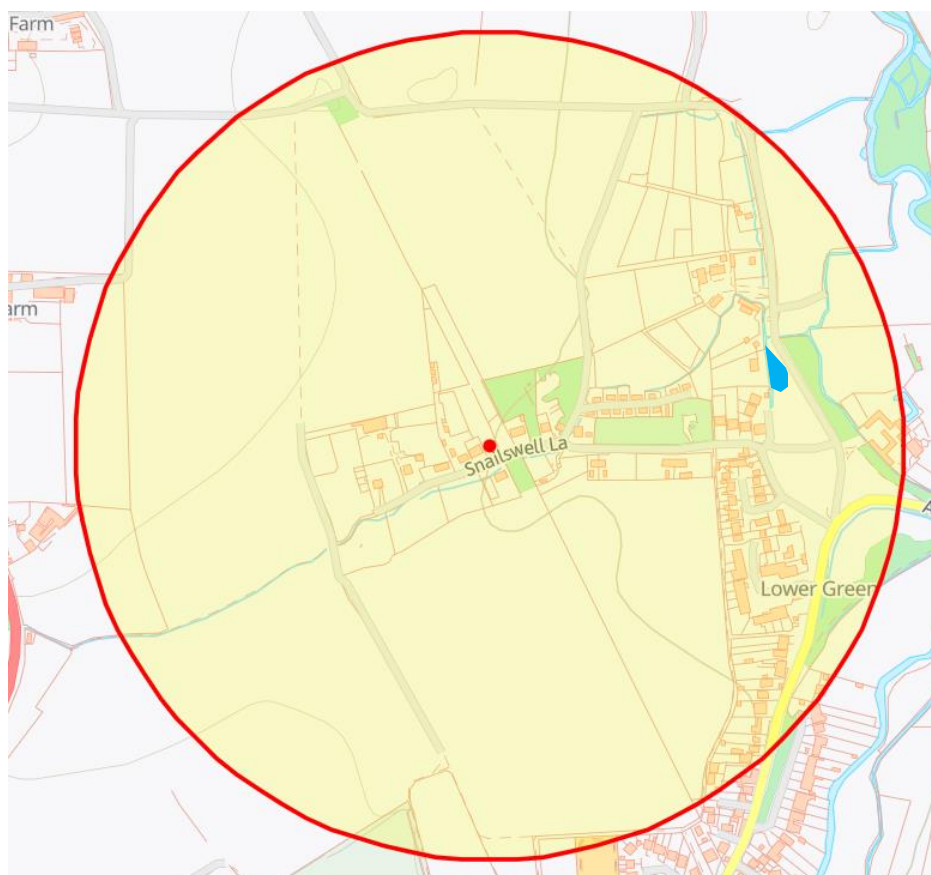


Figure 2: Location of waterbodies within 500m of site boundary (MAGIC maps)

4.1.3. Protected and noteworthy species

At least 700 records of protected and noteworthy species have been returned within 2km of the site. Table 4 below summarises the protected and priority species records found within the radius. Only records from the past 15 years are included.

Table 2: Protected and noteworthy species records

Species	No. of records	Closest record (m) (accuracy)	Most recent record (year)
Bats			
Brown long-eared bat <i>Plecotus auritus</i>	-	-	-
Common pipistrelle <i>Pipistrellus pipistrellus</i>	1	1700 (100m)	2013
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	-	-	-
Amphibians			
Common frog <i>Rana temporaria</i>	-	-	-
Common toad <i>Bufo bufo</i>	2	500 (1m)	2024
Great Crested Newt <i>Triturus cristatus</i>	-	-	-
Smooth newt <i>Lissotriton vulgaris</i>	-	-	-
Mammals			
Badger <i>Meles meles</i>	27	500 (1km)	2023
Hedgehog <i>Erinaceus europaeus</i>	25	570 (1m)	2023
Reptiles	-	-	-
Birds			
Schedule 1	500+	100 (1m)	2019
Plants	3	1560 (100m)	2022
Invertebrates	200	460 (100m)	2024

Protected species licences

A 2km search on MAGIC maps revealed 2 granted European Protected Species Licences for the destruction or disturbance of a bat roost. Details of the licences are listed in Table 3 below.

Table 3: Granted European Protected Species licences within 2km

Case reference	Bat species	Distance and direction to nearest (m/km)	Licence start & end dates
EPSM2012-5071	Common pipistrelle <i>Pipistrellus pipistrellus</i>	1370m S	25/10/2012 to 31/07/2013
EPSM2013-5803	Common pipistrelle <i>Pipistrellus pipistrellus</i>	1300m N	07/05/2013 to 30/08/2014

4.2. Extended UK Hab Survey

Priority Habitats including, calcareous grassland, good quality semi-improved grassland, and deciduous woodland, occur within 2km of the site. The closest of which is a small area of deciduous woodland approximately 500m east.

The vegetation within the boundary of the site was assessed as having limited biodiversity value. The habitats present within the site boundary are described below (according to UKHab classifications) and mapped in Appendix 2. A full list of identified flora species identified on site is provided in Appendix 3.

4.2.1. Neutral Grassland (UK Habitat Classification g3)

The site is currently unmanaged and dominated by tall swards of grass, patches of scrub, immature shrubs/trees, and ruderal. Ground flora is dominated by couch grass (*Elymus repens*), orchard grass (*Dactylis glomerata*), white deadnettle (*Lamium album*) and lesser knapweed (*Centaurea nigra*).

The land is bordered on the southeast by the neighbouring property's timber fence and the southwest by a wood post fence. The northwest boundary of the site is open to a continuation of the same habitat. The front southeast of the site is bordered by a timber post and rail fence with gate.

4.2.2. Bramble scrub (UK Habitat Classification h3d)

There are patches of bramble (*Rubus fruticosus*) scrub growing amongst grass at the site, the largest area being along the southwest boundary fence and is interspersed with ruderal species including common nettle (*Urtica dioica*).

4.2.3. Ruderal / ephemeral

A dense patch of tall ruderal grows along the southwest boundary on debris and rubble. Dominant species include common nettle and lesser knapweed.

4.2.4. Trees and shrubs

A mature apple tree was recently felled near the front of the site due to rot, the extent of which is evident from the remaining stump. Several young trees lie alongside the northeast border of the site, including holly (*Ilex aquifolium*), and three multi-stemmed golden chain trees (*Laburnum* sp). A number of young blackthorn (*Prunus spinosa*) are scattered around the larger trees, with some spreading further southwest into the centre of the site. A single elder (*Sambucus nigra*) stands adjacent to the apple tree stump. Trees are immature to semi-mature with a maximum height of 4m.

A mature field maple (*Acer campestre*) clad with common ivy (*Hedera helix*) and golden chain-tree lie within the grounds of the neighbouring property to the northeast but overhang the site to an extent.

No invasive non-native species were recorded at the site. The habitats described above are not considered to be ecologically important due to the small extent of the habitats and the limited botanical diversity. The loss of the habitats as a result of the proposed development is not anticipated to result in a significant ecological effect.



Figure 3: Southern end of the site facing northwest



Figure 4: Southeast corner of site with mature field maple and elder



Figure 5: Immature elder with bramble and ruderal, facing south



Figure 6: Front southeast of the boundary, bramble scrub adjacent to fence



Figure 7: Centre of the site facing north



Figure 8: Immature trees along northeast border



Figure 9: Northwest end of site, continuation of the same habitats



Figure 10: Remaining stump from felled apple tree

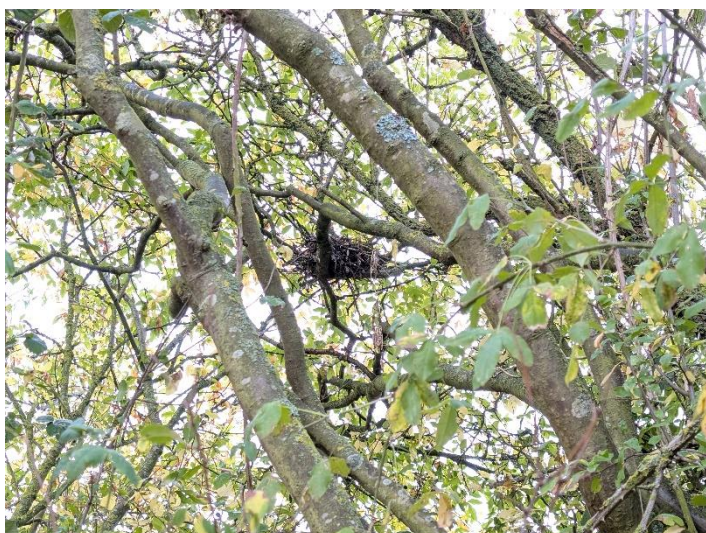


Figure 11: Nest in golden chain tree



Figure 12: Dried pond northeast of site

4.3. Protected and notable species

Biological records have been provided by Herts Environmental Records Centre and Bedfordshire & Luton Biodiversity Recording & Monitoring Centre. The data is licenced for use by Bat Tree Surveys and the client for a 48-month period and are not owned by the author or client.

Records of protected and notable species considered relevant to the site are described below.

4.3.1. Bats

A single record of a Common pipistrelle (*Pipistrellus pipistrellus*) bat was returned from the desk study. This was registered in 2013 from an unspecified roost approximately 1700m away from the site. No other records have been identified within the last 15 years.

Commuting and foraging habitat

No records of bats in flight were found during the desk study in the last fifteen years. The habitats at the site are considered to have low suitability for foraging bats owing to the small scale of the site and limited botanical diversity (suggesting low invertebrate abundance).

The site's immediate surroundings are a mix residential with housing and managed gardens to the east, providing little in the way of foraging or commuting habitat. There are some linear features such as tree lined hedgerows connecting the site to the wider landscape, including suitable commuting and foraging habitat at Ickleford common further east. The arable fields to the north, south and west have limited suitability for foraging bats. There is potential for low-level opportunistic foraging by a small range of common species along the surrounding hedge and tree lines, but local bat populations are not expected to depend on the site for foraging.

The proposed development will not adversely affect suitable foraging habitats in the wider area, nor are any fragmentation effects considered likely. The mature trees surrounding the site within the bordering properties are to be retained so it can be assumed any commuting and foraging within the area would continue unaffected. The proposals to introduce hedgerows and trees in association with the new development would improve the site for the species.

The site is unlikely to be ecologically important for foraging and commuting bats and no significant impacts on foraging and commuting bats are anticipated as a result of the proposed development. No further surveys are considered necessary, but recommendations to improve the site for bats have been made in section 5.3.

4.3.2. Badger

Twenty-seven records of Eurasian badger were returned within 2km of the site, the closest being a road casualty approximately 940m away. Most records are attributed to road casualties; no setts have been recorded within the search radius.

No evidence of badger activity was recorded during the field survey (i.e. active or inactive setts, droppings, latrines) and the habitats at the site and within the immediate surroundings were considered to be unsuitable for use by badgers. However, a transitory presence is potential in the area, supported by multiple records of road casualties within 1km of the site.

It is considered unlikely that badgers will be adversely affected by the proposed development, no further surveys are considered necessary in respect of badgers.

4.3.3. Great Crested Newt and other amphibians

There are two records of common toad, but no records of smooth newt, common frog or great crested newt within 2km of the site in the last fifteen years. The site lies within the green risk zone for GCN but is close to the margins of an amber zone to the east of the site.

There are no waterbodies within the survey boundary, however the field and desktop study identified a single pond within 500m of the site (350m northeast). At the time of the survey, the pond was dry and appeared to have been for a considerable time (see Figure 12). There are narrow streams running from the River Purwell close to this pond that were also dry at the time of the survey. The results from the HSI assessment on the suitability of the pond to support GCN revealed a below average score (0.50).

There is an absence of records within 2km of GCN after consultation with the National Biodiversity Network (NBN), and an absence of granted European Protected species licences for the species according to MAGIC. The site's surroundings of arable fields, residential housing, and public roads are barriers to migration and dispersal of the species. Based on these factors, and the low suitability of the assessed pond, the presence of GCN at the site is considered unlikely.

The site supports some suitable terrestrial habitat for amphibians in the way of scrub and piles of wood and rubble. This could offer refugia and hibernacula for amphibians during winter months.

It is considered unlikely that amphibians will be adversely affected by the proposed development if a cautious approach is undertaken in relation to debris and scrub removal. No further surveys are considered necessary in respect of amphibians.

4.3.4. Hedgehog

Twenty-five records of hedgehog were returned within 2km of the site, the closest being approximately 700m south of the site. The site is largely surrounded by arable parcels of land with some residential properties to the east. Hedgehogs thrive in urban environments; thus, the surrounding habitats could present a partial barrier to their dispersal. The overgrown scrub and vegetation may provide suitable foraging and shelter habitat for hedgehogs in all seasons. A transitory presence is possible, with the timber fence at the front of the property allowing access from the road.

The proposed development has potential to adversely affect individual hedgehogs within the boundary of the site during machine works or being trapped in excavations. The effects are unlikely to cause a significant effect to the local hedgehog population; however, precautionary measures have been recommended to reduce the likelihood of any negative impacts.

4.3.5. Reptiles

No records of reptile were returned from the records centre search. Whilst the site supports some suitable habitats for reptiles, particularly winter refugia (i.e. dense scrub, piles of logs, debris), there is an absence of connectivity to potentially suitable habitat.

The presence of reptiles at the site is highly unlikely, thus, it is unlikely the proposals will have any adverse effects on reptile species or their conservation status. No further surveys are considered necessary in respect of reptile species.

4.3.6. Breeding birds

The local records search revealed over 500 records of Schedule 1 bird species within 2km of the search area, including swift (*Apus apus*), barn owl (*Tyto alba*), fieldfare (*Turdus pilaris*), and skylark (*Alauda arvensis*). During the survey, very few birds were encountered, species were limited to blue tit (*Cyanistes caeruleus*) and woodpigeon (*Columba palumbus*).

An inactive nest, believed to belong to woodpigeon, was noted within a golden chain tree on the northeast of the site. These trees have potential to support nesting and roosting birds. The mixed scrub to the west of the site could provide limited nesting habitat for wild birds such as whitethroat (*Curruca communis*) and song thrush (*Turdus philomelos*) (both species recorded within 500m of the site). No bird nests were observed within scrub at the site, and the lack of density and subsequent high risk of predation make nesting within scrub unlikely.

There is a low risk of breaching Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) in relation to damage or destruction of bird nests and their eggs if mixed scrub is removed or trees removed/pruned during the nesting bird season. Mitigation measures have been proposed within this report to reduce the risk of breaching legislation.

It is considered unlikely the site is significant for wintering, breeding or migratory populations nor that the proposed development will result in significant adverse ecological effects to wild birds.

4.3.7. Protected flora

Two plant species listed on Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) have been recorded within 2km of the site. This includes bluebell (*Hyacinthoides non-scripta*) recorded at Oughton Head.1560m from the site in 2015 and lizard orchid (*Himantoglossum hircinum*) recorded 1800m from the site in 2022.

The isolation and previous management of the site mean it is unlikely the site will support protected or notable plant species. Species encountered at the site are typical of disturbed ground in derelict urban sites. No protected or notable plant species were observed during the field survey.

4.3.8. Invertebrates

A minimum of 500 records from 3 protected species of butterfly were identified within a 2km radius of the site. Species include small blue (*Cupido minimus*), chalkhill blue (*Lysandra coridon*), and large tortoiseshell (*Nymphalis polychloros*). Invertebrate species observed during the survey included Common wasp (*Vespula vulgaris*), and Ladybird (*Coccinellidae* sp.).

As the botanical diversity of the site is low, the likelihood of notable species being present is unlikely. It is probable that common invertebrate species use the plant species on site for food and for larval and egg-laying, but the site is considered unlikely to be vital for invertebrates.

5. Conclusions and recommendations

5.1. Designated sites

The desktop data search returned a single statutory designated site and twelve non statutory designated sites within 2km of the site. There is a lack of ecological and hydrological connectivity from the site to designated sites within the area, as well as the small scale of the proposal meaning any impacts to such sites are considered negligible.

5.2. Habitat and vegetation

No priority habitats were identified within the boundary of the site. The site is dominated by common and widespread species with no rare or protected species identified, thus, the habitats are considered to hold low biodiversity value. No significant ecological effects are expected as a result of its removal.

5.3. Protected species

5.3.1. Bats

The site was assessed as having low potential for foraging and commuting bats due to the relative isolation of the site from more suitable habitat. The low number of flowering plants on site will attract small numbers of insects which may be suitable for opportunistic foraging bats. There are some linear features such as tree lines which could provide commuting routes from the site to the wider landscape, but bats are not expected to rely on them for regular commuting routes.

Nevertheless, any new lighting to be installed as part of the proposed development (temporary or permanent) should be kept to a minimum and directed away from the sky or suitable commuting routes nearby to the site (guidance provided by the Bat Conservation Trust and Institute of Lighting Professionals is summarised in Appendix 6).

Enhancement measures

The new dwellings should incorporate bat safe roofing membrane, including bituminous felt that does not contain polypropylene/polyethylene filaments that pose an entanglement risk to bats. A suitable example includes hessian reinforced 1F bitumen felt.

Planting of native, insect-attracting shrubs is encouraged to improve foraging opportunities at the site for bats. The proposed development should include at least one wall mounted bat box or integrated bat box and/or bat tile into the brickwork of the proposed buildings. Bat boxes or integrated roosting features should be installed a minimum of 4m above ground, preferably on a south/southeast facing wall. Examples of suitable bat roosting features are shown in Figure 13.



Figure 13: Schwegler 2F bat box (left), Schwegler 2FR integrated bat tube (middle) and bat access tile (right)

5.3.2. Badger

There are a number of records of road casualty badgers within 2km of the site but no records of setts within 2km. Records of road casualties could be from transitory badgers or unidentified setts within the rural surroundings. No evidence of badger was found within the site boundary or outside it and there is limited habitat with potential to support this species within the survey area. No further surveying, licencing, or mitigation is considered appropriate for the site.

5.3.3. Great Crested Newt

No records of GCN within 2km of the site have been returned within the last 15 years. There are no waterbodies or water features within the site itself, the pond identified within 500m of the site is assessed as having below average suitability to support GCN. The site supports some terrestrial winter refugia in the way of dense scrub and piles of rubble/wood suitable for hibernating amphibians.

If possible, clearance at the site should avoid the winter hibernation period and take place during the active season for GCN (March to September inclusive). Care should be taken when removing debris, log piles, scrub, and the tree stump to avoid undue harm to amphibian species. If possible, dead/cut

wood from felled trees should be left in situ to act as hibernacula (winter refugia) for herpetofauna species post development.

5.3.4. Hedgehog

Hedgehogs have been recorded within 500m of the survey site and there is a possibility of hedgehogs using the site for foraging and shelter, although access to the site is limited. As a precautionary measure, mixed scrub due to be cleared at the site should be checked for hedgehogs immediately prior to removal to reduce the likelihood of adverse effects to the species.

Open excavations must be covered overnight with a solid sheet material (i.e. plywood) to prevent individuals from falling into excavations and becoming trapped. Where this is not possible, a shallow slope or access ramp should be incorporated into the excavation before being left overnight to allow an escape route for any fauna that might fall in. Areas of excavation must be checked before commencement of works the following morning.

Enhancement measures

Any new fencing or hard boundaries if proposed as part of the development should incorporate 13cm by 13cm holes to allow movement of hedgehogs between gardens and other suitable habitats. Hedgehog shelters should also be incorporated where possible to enhance opportunities for sheltering and hibernating hedgehogs. These should be placed within vegetation, such as within the proposed hedgerow at the north of the site, and away from roads.

5.3.5. Reptiles

No records of reptiles were returned from the desk study and suitability of habitats to support reptiles at the site is low. There is some suitable hibernation refugia for reptiles, but the lack of connectivity to more suitable habitats is poor. The likelihood of reptile species being on site and being impacted by the development proposals is considered to be negligible.

5.3.6. Birds

No further surveys for breeding, migratory or wintering birds are required at the site.

All wild birds and their nests are protected under the Wildlife and Countryside Act 1981 (as amended). The site offers limited suitable nesting habitat for bird species within patches of scrub and in immature trees. A single inactive nest was identified within a tree along the northeast margin. The survey was undertaken outside of the peak bird nesting season; thus, a full assessment of nesting birds at the site could not be complete.

Pruning or removal of trees and scrub to facilitate the development should avoid nesting bird season (March to August inclusive) or if the works programme cannot be amended to facilitate this, a pre-works check should be undertaken no more than 48 hours prior to works. If active nests are found, there would be no other option but to delay works until chicks have fledged which could be a period of up to ten weeks.

Enhancement measures

The proposed development should include installation of at least two bird boxes. Boxes must be positioned facing between north and east, out of direct sunlight, and at a height of approximately 4m. Boxes that target notable species are recommended, including swift (*Apus apus*) boxes that are

installed near the eaves of the house. Other boxes can be placed on a suitable retained tree within the boundary of the site or on the building itself.

Planting of a variety of plants that attract insects and/or produce berries will provide seasonal food resources for many bird species. Flowering plants also support invertebrates and pollinating insects.



Figure 14: Woodstone swift nest box (left), cedar nest box (middle), and woodstone bird box (right)

5.4. Overall conclusion

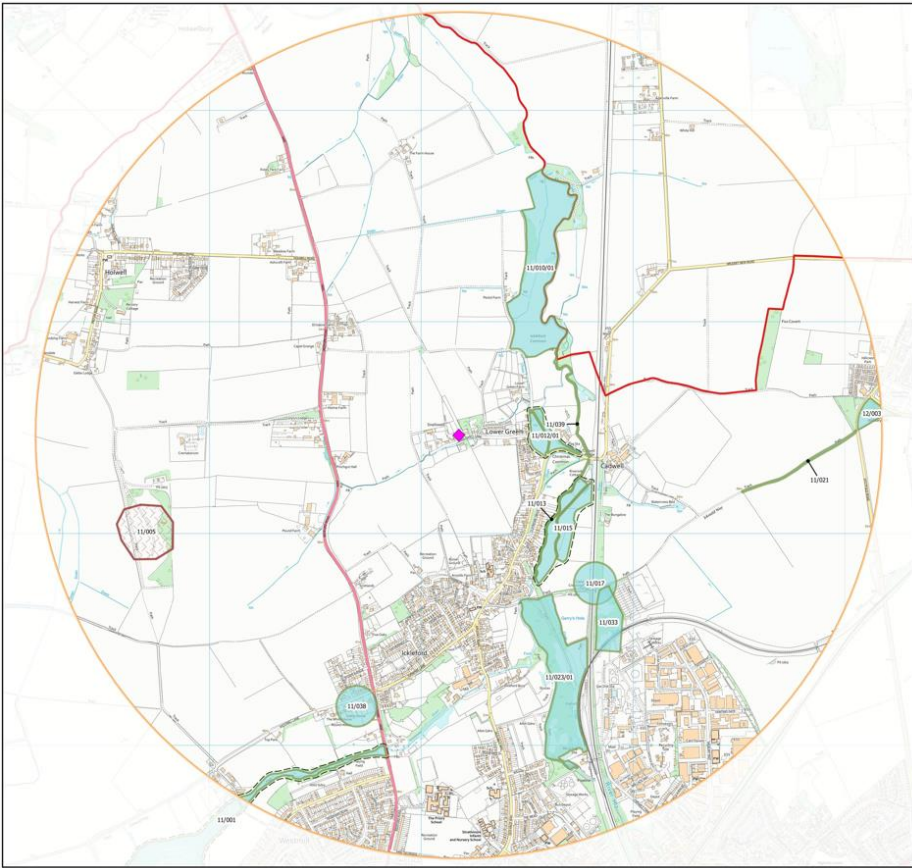
Providing that the recommendations outlined within this report are successfully implemented, it should be possible for the proposed development to proceed without any long-term impacts on protected or notable species. Specific recommendations for the site will be made once details of the proposed development become available.

This ecological report will remain valid for a period of 18 months from the date of the PEA survey. Further surveys may be required to update the site information if planning is not obtained or works are delayed beyond this time period.

6. References

- Bat Conservation Trust and the Institution of Lighting Professionals (2018) *Bats and artificial lighting in the UK; Bats and the Built Environment series* (Guidance Note 08/18), The Bat Conservation Trust, London.
- British Standards Institution, 2013. BS 42020:2013 *Biodiversity — Code of practice for planning and development*. London: BSI.
- BSI (2013) British Standards Institute BS 42020:2013 Biodiversity — Code of Practice for Planning and Development.
- CIEEM (2018) *Guidelines for Preliminary Ecological Appraisal* (4th edn). Chartered Institute of Ecology and Environmental Management, Winchester.
- Collins, J (2024) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (4th edn). The Bat Conservation Trust, London.
- English Nature (2001) Great Crested Newt Mitigation Guidelines. Peterborough: English Nature.
- HMSO (1981) *Wildlife and Countryside Act 1981* [online]. <http://www.legislation.gov.uk/ukpga/1981/69> [accessed August 2025]
- HMSO (2006) *Natural Environment and Rural Communities Act 2006* [online]. Available at: <http://www.legislation.gov.uk/ukpga/2006/16/contents> [accessed August 2025].
- HMSO (2017) *Conservation of Habitats and Species Regulations 2017* [online]. Available at: <http://www.legislation.gov.uk/uksi/2017/1012/contents/made> [accessed August 2024].
- Mitchell-Jones, A.J. and McLeish, A.P. (2004) *The Bat Worker's Manual*. 3rd Edition. Peterborough: JNCC.
- Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000) *Evaluating the suitability of habitat for the great crested newt (Triturus cristatus)*. Herpetological Journal, 10, pp.143-155.

Appendix 1: Statutory and non-statutory wildlife sites



Local Sites Map 1

Search Information

- Search point
- Search area

Local Sites

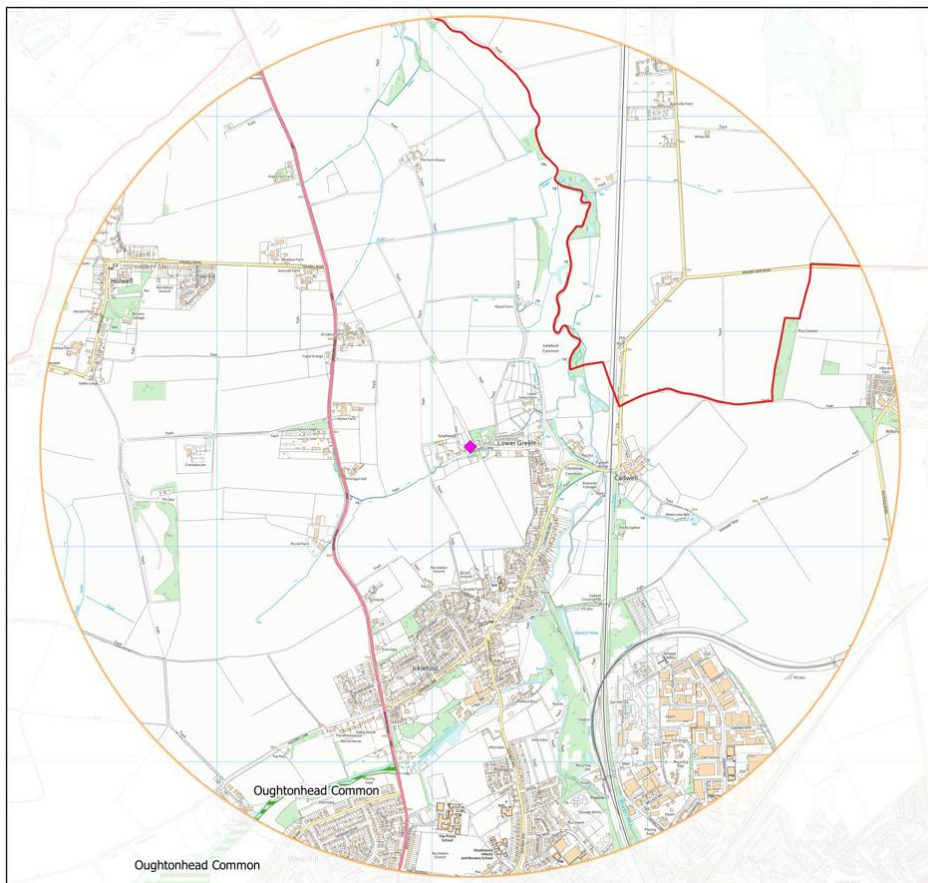
- RIGS
- Local Wildlife Sites

Administrative Area

- Herts County Boundary

© Crown copyright and database rights 2025 Ordnance Survey AC0000849954. You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form. (This restriction may not apply to HCC and its licensed contractors, agents & partners.)

Contains, or is derived from, information supplied by Ordnance Survey. © Crown copyright and database right 2025. All rights reserved. Ordnance Survey Licence number 100030835.



National Sites Map 1

Search Information

- Search point
- Search area

National Sites

- Statutory Sites
- LNR

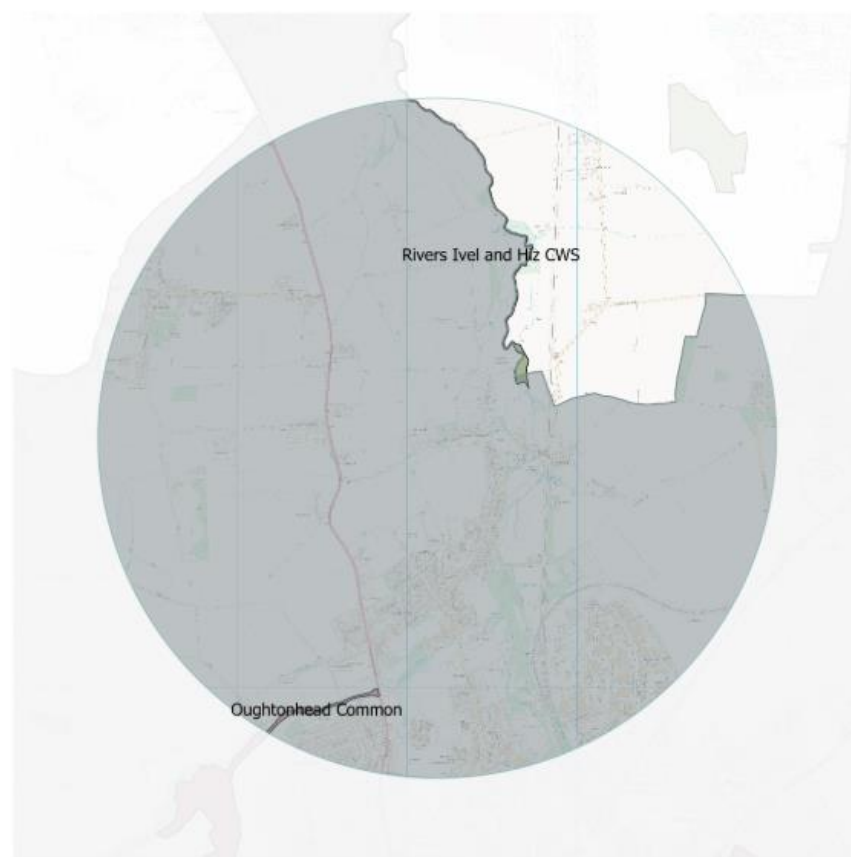
Administrative Area

- Herts County Boundary

© Crown copyright and database rights 2025 Ordnance Survey AC0000849954. You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form. (This restriction may not apply to HCC and its licensed contractors, agents & partners.)

Contains, or is derived from, information supplied by Ordnance Survey. © Crown copyright and database right 2025. All rights reserved. Ordnance Survey Licence number 100030835.





Sites

- Data Search Boundary
- County Boundary
- County Wildlife Site
- District Wildlife Site
- Roadside Nature Reserve
- Local Geological Site
- Local Nature Reserve
- Site of Special Scientific Interest
- Greensand Ridge NIA

© Crown copyright and database rights 2025
Ordnance Survey AC0000806481 Bedford Borough Council, AC0000851074 Central Bedfordshire Council, AC0000808846 Luton Borough Council. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or criminal proceedings. Contains public sector information licensed under the Open Government Licence v3.0

Bedfordshire & Luton

**Biodiversity
Recording &
Monitoring
Centre**



Appendix 2: Habitat map



Appendix 3: Species list

The following table lists the flora species identified at the site during the field survey

Common name	Scientific name
Blackthorn	<i>Prunus spinosa</i>
Bramble	<i>Rubus fruticosus</i>
Bushgrass	<i>Elymus repens</i>
Common comfrey	<i>Symphytum officinale</i>
Common holly	<i>Ilex aquifolium</i>
Common lilac	<i>Syringa vulgaris</i>
Common nettle	<i>Urtica dioica</i>
Common ragwort	<i>Jacobaea vulgaris</i>
Common yarrow	<i>Achillea millefolium</i>
Doves foot cranesbill	<i>Geranium molle</i>
Elder	<i>Sambucus nigra</i>
Field bindweed	<i>Convolvulus arvensis</i>
Golden chain tree	<i>Laburnum anagyroides</i>
Hawthorn	<i>Crataegus monogyna</i>
Lesser knapweed	<i>Centaurea nigra</i>
Orchard grass	<i>Dactylis glomerata</i>
Red dead nettle	<i>Lamium purpureum</i>
Spotted knapweed	<i>Centaurea stoebe</i>
White nettle	<i>Lamium album</i>
Common ivy	<i>Hedera helix</i>

Appendix 5: Legislation and planning policy framework

A level of statutory protection is afforded to specific species, largely as a consequence of dramatic declines in populations caused by habitat loss and/or degradation (both direct and indirect impacts) and persecution. In England the various statutes which provide this protection include the following:

- The Wildlife & Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000);
- The Conservation of Habitats and Species Regulations 2017 (as amended); and
- Natural Environment and Rural Communities Act (NERC) 2006.

These are further described for specific protected species surveyed for or expected at the site below.

Species of Principle Importance in England

The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England, as required by the Act.

The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

There are 943 species of principal importance included on the S41 list. These are the species found in England which were identified as requiring action under the UK Biodiversity Action Plan (UK BAP) and which continue to be regarded as conservation priorities under its successor, the UK Post-2010 Biodiversity Framework.

Great Crested Newt

The great crested newt *Triturus cristatus* is protected under UK and European legislation. Great crested newt is included in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and Regulation 40 and The Conservation of Habitats and Species Regulations 2017. It is an offence to:

- Deliberately capture, injure or kill a great crested newt;
- Damage or destroy a breeding site or resting place of a great crested newt; and
- Disturb a great crested newt, including disturbance of a great crested newt in such a way as to be likely to affect:
 - i) the ability of great crested newts to survive, reproduce or breed, or to rear or nurture their young;
 - ii) their ability to hibernate or migrate; and
 - iii) to significantly affect the local distribution or abundance of great crested newt.

Provisions are made within the UK legislation to allow for disturbance of great crested newt to take place under licence where works affect the species. The licence is issued by the appropriate statutory authority, which in England is Natural England. Licences can only be granted if there is no satisfactory alternative or if the action authorised will not be detrimental to the maintenance of the population of the species at a favourable conservation status in their natural range. Licences can be issued for scientific, research purposes (including survey work), and for the disturbance of great crested newt in relation to a development.

Bats

All species of bat and their roost are protected under UK and European legislation. Bats are included in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), the Countryside and Rights of Way Act 2000 and Regulation 40 and Schedule 2 of The Conservation of Habitats and Species Regulations 2017. It is an offence to:

- Deliberately capture, injure or kill a bat;
- Damage or destroy a breeding site or resting place of a bat; and
- Disturb a bat, including disturbance of a bat in such a way as to be likely to affect:
 - i) the ability of bats to survive, reproduce or breed, or to rear or nurture their young;
 - ii) their ability to hibernate or migrate; and
 - iii) to significantly affect the local distribution or abundance of bats.

Provisions are made within the UK legislation to allow for disturbance of bats or their roosts to take place under licence where works affect any bat species. The licence is issued by the appropriate statutory authority, which in England is Natural England (NE). Licences can only be granted if there is no satisfactory alternative or if the action authorised will not be detrimental to the maintenance of the population of the species at a favourable conservation status in their natural range. Licences can be issued for scientific, research purposes (including survey work), and for the disturbance of bats in relation to a development.

Birds

All birds are protected under the Wildlife and Countryside Act 1981 (as amended), making it an offence, with certain exceptions (e.g. game birds), to intentionally:

- Kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird while it is in use or being built; and
- Take or destroy the egg of any wild bird

Schedule 1 of the Act contains a list of birds which are conferred extra protection and for which all offences carry harsher penalties. Under the legislation it is illegal to: intentionally or recklessly disturb a Schedule 1 bird while it is building a nest or is in or near a nest containing eggs or young; and intentionally or recklessly disturb dependent young of such a bird. Examples of species covered under Schedule 1 include: barn owl *Tyto alba*, kingfisher *Alcedo atthis* and little-ringed plover *Charadrius dubius*.

Hedgehogs

Hedgehogs are listed on schedule 6 of the Wildlife and Countryside Act (1981) which makes it illegal to kill or capture wild hedgehogs by certain methods. They are also listed under the Wild Mammals Protection Act (1996), which prohibits cruel treatment of hedgehogs.

Hedgehogs are listed as a species of 'principal importance' under the NERC Act, which is meant to confer a 'duty of responsibility' to public bodies during the planning process.

National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2023) was first published on 27 March 2012 and updated on 24 July 2018, 19 February 2019, 20 July 2021, 5 September 2023 and 19 December 2023. This sets out the government's

planning policies for England and how these are expected to be applied. The NPPF states that 'planning policies and decisions should contribute to and enhance the natural and local environment by:

- Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils in a manner commensurate with their statutory status or identified quality in the development plan;
- Recognising the intrinsic character and beauty of the countryside and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- Maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
- Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions, such as air and water quality, taking into account relevant information such as river basin management plans; and
- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'

A list of principles which local planning authorities should follow when determining planning applications is included in the NPPF which includes the following;

- If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest; and
- Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

Appendix 6: Guidance on artificial light

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Artificial lighting can also cause significant impacts to other nocturnal species, most notably moths and other nocturnal insects. It can also result in disruption of the circadian rhythms of birds, reducing their fitness.

Guidelines issued by the Bat Conservation Trust should be referred to when designing the lighting scheme. Note that lighting designs in very sensitive areas should be created with consultation from an ecologist and using up-to-date bat activity data where possible. The guidance contains techniques that can be used on all sites, whether a small domestic project or larger mixed-use, commercial or infrastructure development. Lighting design should be flexible and be able to fully consider the presence of protected species.

Where bat habitats and features are considered to be of lower importance or sensitivity to illumination, the need to provide lighting may outweigh the needs of bats. Consequently, a balance between a reduced lighting level appropriate to the ecological importance of each feature and species, and the lighting objectives for that area will need to be achieved. The following are techniques which have been successfully used on projects and are often used in combination for best results:

- Dark buffers, illuminance limits and zonation
- Sensitive site configuration, whereby the location, orientation and height of newly built structures and hard standing can have a considerable impact on light spill
- Consideration of the design of the light and fittings, whereby the spread of light is minimised ensuring that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Consideration should be given to the height of lighting columns. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light-spill or require more columns. Column height should be carefully considered to balance task and mitigation measures. Consider no lighting solutions where possible such as white lining, good signage, and LED cats eyes. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times
- Screening, whereby light spill can be successfully screened through soft landscaping and the installation of walls, fences and bunding
- Glazing treatments, whereby glazing should be restricted or redesigned wherever the ecologist and lighting professional determine there is a likely significant effect upon key bat habitat and features
- Creation of alternative valuable bat habitat on site, whereby additional or alternative bat flightpaths,
- Dimming and part-night lighting. Depending on the pattern of bat activity across the key features identified on site it may be appropriate for an element of on-site lighting to be controlled either diurnally, seasonally or according to human activity. A control management system can be used to dim (typically to 25% or less) or turn off groups of lights when not in use

The Bat Conservation Trust recommends the following specifications for lighting on developments to prevent disturbance:

- Lighting spectra: peak wavelength >550nm
- Colour temperature: <2700K (warm)
- Reduction in light intensity
- Minimal UV emitted
- Upward light ratio of 0% and good optical control.

