

Ecological Impact Assessment

**Pearces Farm and Surrounding Land,
Wokingham**

August 2024

Ecology | Green Space | Community | GIS

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Report Produced for Nicholas King Developments PLC

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SUMMARY

Purpose of the Report	This Report has been produced by Ethos Environmental Planning on behalf of Nicholas King Developments PLC. It provides an assessment of the likely ecological effects associated with the proposed residential development of an area of land known as 'Pearces Farm and surrounding Land, Wokingham'. This report is to read alongside to ES chapter for the site.
Description of the scheme	The development proposals for the site include plans for up to 180 residential dwellings with associated access and green space.
Methodology	A desk study and UK Habitat Classification survey were undertaken for the site in May and April 2022. Detailed surveys for bats, amphibians and dormice were undertaken in 2022.
Key Baseline Ecological Conditions	- The site comprised three fields of modified and other neutral grassland with boundary hedgerows, a small area of woodland, mixed scrub, two ponds, developed land; sealed surface, unsealed surface, vegetated garden and seven structures. - The site is within the Zone of Influence (Zoi) of the Thames Basin Heaths Special Protection Area (SPA). - The bat surveys found the site to be of county importance for roosting brown long-eared bats and of local importance for commuting common pipistrelle bats. - A maternity roost for brown long-eared bat was identified in the barn structure, B3. - The eDNA survey for both ponds was returned as negative for great crested newt (GCN) DNA.
Key impacts and mitigation	The development layout has been designed to retain, protect and enhance the most valuable ecological features, namely the boundary hedgerows and woodland in the southwest corner of the site. Mitigation measures are described to ensure compliance with protected species legislation for hedgehog, hare, bats, birds and reptiles, details of which will be provided within a CEMP. SANG will be required as mitigation for the site being within the buffer zone of the Thames Basin Heaths SPA.
Conclusion	Assuming the implementation of effective mitigation measures, as set out in this report, no significant adverse ecological effects are predicted. The proposed development is therefore in accordance with relevant national and local planning policies in relation to nature conservation and relevant wildlife legislation.

1 INTRODUCTION

- 1.1 This Ecological Impact Assessment (EclA) report has been prepared by Ethos Environmental Planning (Ethos) on behalf of Nicholas King Developments PLC. The EclA was written by Kate Downes MSc BSc (Hons), Assistant Ecologist, and reviewed by Matt Attrill MSc BSc (Hons), Senior Ecologist at Ethos. The final report has been approved by Jim Phillips, Managing Director at Ethos. The details and experience of the authors and field survey team are provided in Section 3.8.
- 1.2 The report provides the results of an EclA in relation to the proposed development of Pearces Farm and surrounding lane, Wokingham (Central Grid Reference SU 82849 67425), hereafter referred to as 'the site' and shown in Figure 1. The site is located in the parish of Wokingham Without, Wokingham.
- 1.3 The site comprised 7.03 hectares and included two fields of modified grassland, one of other neutral grassland, a section of other broadleaved woodland, various native hedgerow types, areas of mixed scrub, two ponds, an area of unvegetated, unsealed surface, two sections of vegetated garden and seven structures and associated hardstanding.



Figure 1 Site location

- 1.4 The site is proposed for development of up to 180 residential houses and associated infrastructure.

1.5 The aims of this EclA report are to:

- provide an assessment of the likely effects of the proposed development on ecological features on site;
- identify the measures required to mitigate impacts on site biodiversity;
- identify opportunities to deliver ecological enhancements and measurable gains for biodiversity as part of the development proposals; and
- to enable the Local Planning Authority to assess whether the proposals comply with relevant planning policy or legislation.

1.6 This report has been produced following the approach set out in CIEEM's 'Guidelines for Ecological Report Writing' (CIEEM, 2017).

2 POLICY AND LEGISLATION

2.1 National Policy

- 2.1.1 The **National Planning Policy Framework (NPPF)** sets out national planning policy, including policies of relevance to conserving and enhancing the natural environment. Policies of relevance to the proposed development (parts of paragraphs 180 and 185) have been summarised below:

Para 180: When determining planning applications, local planning authorities should apply the following principles:

a) if significant harm to biodiversity 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;

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

Para 185: c) limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.

2.2 Local Policy

- 2.2.1 The Wokingham Borough Council's Core Strategy (adopted 2010) have provided guidance in relation to development and biodiversity in which includes:

CP1 – Sustainable development

Planning permission will be granted for development proposals that:

- 1) Maintain or enhance the high quality of the environment;
- 2) Minimise the emission of pollutants into the wider environment;
- 3) Limit any adverse effects on water quality (including ground water);
- 4) Ensure the provision of adequate drainage;
- 5) Minimise the consumption and use of resources and provide for recycling;
- 6) Incorporate facilities for recycling of water and waste to help reduce per capita water consumption;
- 7) Avoid areas of best and most versatile agricultural land;
- 8) Avoid areas where pollution (including noise) may impact upon the amenity of future occupiers;
- 9) Avoid increasing (and where possible reduce) risks of or from all forms of flooding (including from groundwater);
- 10) Provide attractive, functional, accessible, safe, secure and adaptable schemes;

- 11) Demonstrate how they support opportunities for reducing the need to travel, particularly by private car in line with CP6; and
- 12) Contribute towards the goal of reaching zero-carbon developments as soon as possible by:
 - a) Including appropriate on-site renewable energy features; and
 - b) Minimising energy and water consumption by measures including the use of appropriate layout and orientation, building form, design and construction, and design to take account of microclimate so as to minimise carbon dioxide emissions through giving careful consideration to how all aspects of development form.

CP3 – General Principles for development

Planning permission will be granted for proposals that:

- a) Are of an appropriate scale of activity, mass, layout, built form, height, materials and character to the area together with a high quality of design without detriment to the amenities of adjoining land users including open spaces or occupiers and their quality of life;
- b) Provide a functional, accessible, safe, secure and adaptable scheme;
- c) Have no detrimental impact upon important ecological, heritage, landscape (including river valleys) or geological features or water courses.
- d) Maintain or enhance the ability of the site to support fauna and flora including protected species;
- e) Use the full potential of the site and contribute to the support for suitable complementary facilities and uses;
- f) Contribute to a sense of place in the buildings and spaces themselves and in the way they integrate with their surroundings (especially existing dwellings) including the use of appropriate landscaping;
- g) Provide for a framework of open space in secure community use achieving at least 4.65 ha/1,000 population provision together with recreational/sporting facilities in addition to private amenity space;
- h) Contribute towards the provision of an appropriate sustainable network of community facilities;
- i) Do not lead to a net loss of dwellings and other residential accommodation or land; and
- j) Do not lead to a loss of community or recreational facilities/land or infrastructure unless suitable alternative provision is available.

CP7 – Biodiversity

Sites designated as of importance for nature conservation at an international or national level will be conserved and enhanced and inappropriate development will be resisted. The degree of protection given will be appropriate to the status of the site in terms of its international or national importance.

Development:

- A) Which may harm county designated sites (Local Wildlife Sites in Berkshire), whether directly or indirectly, or
- B) Which may harm habitats or, species of principle importance in England for nature conservation, veteran trees or features of the landscape that are of major importance for wild flora and fauna (including wildlife and river corridors), whether directly or indirectly, or
- C) That compromises the implementation of the national, regional, county and local biodiversity action plans will be only permitted if it has been clearly demonstrated that the need for the proposal outweighs the need to safeguard the nature conservation importance, that no alternative site that would result in less or no harm is available which will meet the need, and:
 - i) Mitigation measures can be put in place to prevent damaging impacts; or
 - ii) Appropriate compensation measures to offset the scale and kind of losses are provided.

CP8 – Thames Basin Heaths Special Protection Area

Development which alone or in combination is likely to have a significant effect on the Thames Basin Heaths Special Protection Area will be required to demonstrate that adequate measures to avoid and mitigate any potential adverse effects are delivered.

2.3 Relevant Legislation

- 2.3.1 The following pieces of legislation have been considered within this assessment with an explanation of their relevance provided.

Legislation	Relevance
The Habitats Directive (together with the Birds Directive) forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. All in all, the Directive protects over 1,000 animals and plant species and over 200 "habitat types" (e.g. special types of forests, meadows, wetlands, etc.), which are of European importance. The Habitats Directive and parts of the Birds Directive are transposed into legislation by The Conservation of Species and Habitat Regulations 2017 (as amended) .	Presence of the Thames Basin Heaths SPA. Presence of commuting/foraging bats onsite, utilising the hedgerows. Presence of a bat roost in the barn structure.
Wildlife and Countryside Act 1981 (as amended, including by the Countryside and Rights of Way Act 2000), which provides legislative protection for certain species. The Act also prohibits the spread of invasive plant species, as well as providing the mechanism for the designation and protection of Sites of Special Scientific Interest;	Presence of breeding birds in hedgerows.
Badgers and their setts are protected under the Protection of Badgers Act 1992 as amended by the Hunting Act 2004.	

Legislation	Relevance
The Natural Environment and Rural Communities Act 2006 (the NERC act) places a duty on all public authorities, including local planning authorities, to consider biodiversity in their work. Local planning authorities are to ensure that there is no net loss of biodiversity on a site, no net loss in habitat connectivity and aims to enhance biodiversity.	Enhancements for biodiversity. Potential presence of hedgehog. Potential presence of NERC S41 priority species hedgehog and brown hare.
The Hedgerows Regulations 1997 protect 'important hedgerows' from being removed (uprooted or destroyed). Hedgerows are protected if they are at least 30 years old and meet at least one of the criteria listed in part II of schedule 1.	Presence of species-rich hedgerows on site boundaries.

3 METHODOLOGY

3.1 Scope of Assessment

3.1.1 This assessment has been undertaken following the approach set out in the '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (CIEEM, 2018). The assessment has considered 'Important Ecological Features' that are present within the 'Zone of Influence' of the project. Important Ecological Features for this project comprise¹:

- Designated nature conservation sites;
- Habitats and Species of Principal Importance for the Conservation of Biodiversity in England;
- Legally protected species; and
- Red Listed or rare species (based on Red Data Book lists, Birds of Conservation Concern and species considered to be nationally rare / scarce).

3.1.2 The Zone of Influence (Zoi) is the area over which the project could have an influence on ecological features. The Zoi is likely to vary for different features. However, in general terms the Zoi for this development proposal is considered to comprise the land within the red line boundary as well as immediate adjacent habitat features. It also includes designated nature conservation sites in the surrounding area.

3.1.3 The scope of the assessment was informed by an 'ecological walkover' undertaken in April 2022. The purpose of this was to identify the habitats on site, their potential for protected species and to establish the scope of surveys that would be required to inform a future planning application at the site.

3.1.4 The overall assessment has been informed by guidelines provided in CIEEM (2017) Guidelines for Ecological Report Writing.

3.2 Background Data Search

3.2.1 A background data search was received from Thames Valley Environmental Records Centre (TVERC) on 9th May 2022. The search area included records of non-statutory designated sites and protected and notable species within 2km of the proposed development site.

3.2.2 An additional search for statutory designated sites within 2km of the development site and granted European Protected Species (EPS) licences within 1km of the site boundary was undertaken using publicly available information (DEFRA Magic map).

¹ Box 14 in CIEEM's ECiA Guidelines (2018)

3.3 UK Habitat Classification Survey

- 3.3.1 A UKHab survey was undertaken on 28th April 2022 and updated on 23rd June 202. The survey incorporated detailed assessment of the land within the development boundary, including a description and mapping of all key features and habitat types. The survey was carried out to identify the range of habitats within the site and the predominant and notable species of flora. This survey was informed by the UKHab classification User's Manual (Butcher et al, 2020).

3.4 Methodology for surveying grassland

- 3.4.1 Grasslands were surveyed using a systematic approach, using 1x1m² quadrats sample. A minimum of three quadrats were undertaken of each grassland section. However, this can be increased to take into account variation across the grassland or the extent of the field. Information collected within each quadrat included aspect, slope, average ground cover, sward variation, species, and their percentage cover.
- 3.4.2 Where the grassland differed to a certain extent or was divided by field boundary such as hedgerows it was considered that the grassland was a different habitat parcel, and another assessment was undertaken.
- 3.4.3 This survey methodology provides information required to classify the grassland to the correct grassland habitat type and provides sufficient information to undertake a metric 3.0 condition assessment.
- 3.4.4 This survey is undertaken using the Survey 123 NVC application.

3.5 Hedgerow Regulations

- 3.5.1 The hedgerows were assessed in terms of their importance under the Hedgerow Regulations 1997.

3.6 Protected Species Surveys

NERC S. 41 Mammals

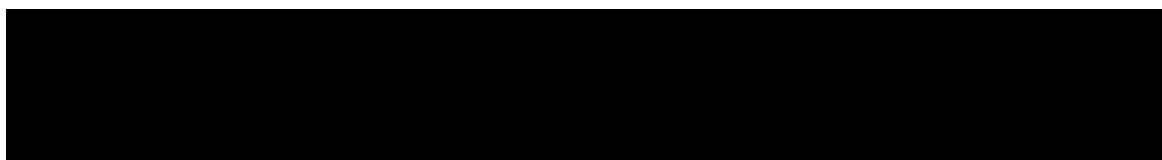
- 3.6.1 The survey included an assessment of the habitats on site for their potential to support NERC Section 41 species such as hedgehog (*Erinaceus europaeus*), polecat (*Mustela putorius*), harvest mouse (*Micromys minutus*) and brown hare (*Lepus europaeus*). This included a search for nests, runs, latrines, paw prints, and live specimens.

3.6.2



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3.6.3



Hazel Dormouse

- 3.6.4 The survey included an assessment of the potential of the site for hazel dormouse (*Muscardinus avellanarius*), focusing on the connectivity and suitability of the habitat on site.
- 3.6.5 Fifty dormouse tubes were deployed in suitable habitat across the site on 28th April 2022 at roughly 20 metre intervals. The tubes were checked over five surveys between May – November 2022. Table 1 below (taken from Table 5 of the *Dormouse Conservation Handbook*) shows the index of probability of finding evidence of dormouse in nest tubes. The score is based on 50 tubes deployed (doubled for 100 tubes and halved for 25 tubes) and a minimum score of 20 must be reached to determine presence/likely absence. The months and scores highlighted in red show the dates when the 120 dormouse tubes were deployed on site.

Table 1 Index of probability of finding dormice present in nest tubes in any one month

Month	Score
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2
Total	36

Riparian Mammals

- 3.6.6 The survey included an assessment of the site to support riparian mammals such as otter (*Lutra lutra*) and water vole (*Arvicola amphibius*). This included an assessment of the riparian habitats on site or within the wider environment to support these species.

Bats

- 3.6.7 The methodology for the bat survey has been informed by the Bat Conservation Trust *Bat Surveys Good Practice Guidelines* (Collins, 2016).

Habitat assessment

- 3.6.8 The habitats on site were assessed for their suitability to support foraging and commuting bats. This assessment was also contextualized through examination of suitable habitat and features in the wider landscape and possible flight-lines across the proposed site following natural linear features such as hedgerows.

Preliminary roost inspection

- 3.6.9 Physical external and internal inspection of the buildings were undertaken by the surveyor using the equipment described below to assist the inspection. Approximately 5 hours of search effort were expended.
- 3.6.10 The physical search includes a search for live animals and a search for other signs that give an indication of past or present occupancy as outlined below. In the case of bats, typical indicators include droppings (which are characteristic and can often be speciated or at least be indicative of species type), signs of staining, urine splashing, characteristic odours, and accumulations of discarded prey remains.

Preliminary ground roost level assessment - Trees

- 3.6.11 The methodology draws upon guidance within Collins (2016) and the Bat Tree Habitat Key (2018). The surveys were undertaken using binoculars and a high-powered torch to view features from the ground. Details on the potential roosting features were recorded as well as information to identify the specific trees. This included tree height, diameter at breast height, species, mortality of tree, and the tree location.
- 3.6.12 Potential roosting features on trees were identified as any feature within a tree that could provide shelter for a roosting bat. These features result from the following three mechanisms.
- Disease and Decay;
 - Damage; and,
 - Associations.
- 3.6.13 Tree with no potential roost features were assessed as having 'negligible' potential for roosting bats and no further surveys were carried out. Trees with features suitable for

roosting bats were assessed as having 'low', 'moderate' or 'high' potential for bats. Trees with 'low' potential for roosting bats were not subject to additional survey, in line with BCT survey Guidelines. Justification is provided, in the form of a detailed description and photographic evidence, to demonstrate how the classification of 'low potential' had been made. Recommendations will be made as necessary if any trees with low potential are to be impacted.

3.6.14 The definitions of 'negligible, low, moderate and high' used in this assessment are in accordance with those in BCT Survey Guidelines 2016:

- **Negligible:** Negligible habitat features on site likely to be used by roosting bats.
- **Low:** A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential
- **Moderate:** A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only)
- **High:** A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Emergence/re-entry surveys

3.6.15 The emergence surveys were informed by the results of the preliminary roost inspection. In line with the guidance in Table 7.3 of 'Bat Surveys Good Practice Guidelines' (Collins, 2016).

3.6.16 Two emergence surveys were undertaken on B3 on 23rd June and 28th July 2022.

3.6.17 The emergence surveys commenced 15 minutes before sunset and finished approximately an hour and a half after sunset. The dawn survey commenced two hours before sunrise and finished 15 minutes after.

3.6.18 One surveyor was positioned adjacent to potential roosting features, as shown in Figure 2 below.

3.6.19 One thermal imaging camera was used as a survey aid on all surveys. The thermal imaging surveys were led by Matt Attrill (see section 3.8), a licensed bat surveyor who has attended two training courses on the use of thermal imaging cameras for bat surveys (Wildlifetek, 2020, 2022) and considered to be 'suitably qualified' in the use of the cameras as both a survey aid and method. For these surveys, thermal imaging was used as a 'survey aid' in accordance with the Thermal Imaging Bat Survey Guidelines (Fawcett Williams, 2021).

3.6.20 The thermal imaging surveys used two Flir T540 thermal imaging cameras. Videos were recorded as non-radiometric files. This camera has a thermal resolution of 464 × 348

with a 42° lens which allows for the detection of bats up to a distance of 51m. The video files were transferred into standard video analysis software for later analysis.

- 3.6.21 Static bat detectors were deployed as a survey aid for the emergence surveys carried out in June and July on building B3 (see Photo 1 below). The observations and recordings made by the surveyors and thermal cameras were cross referenced with the calls recorded on the static bat detectors to confirm species identification and support the overall assessment.

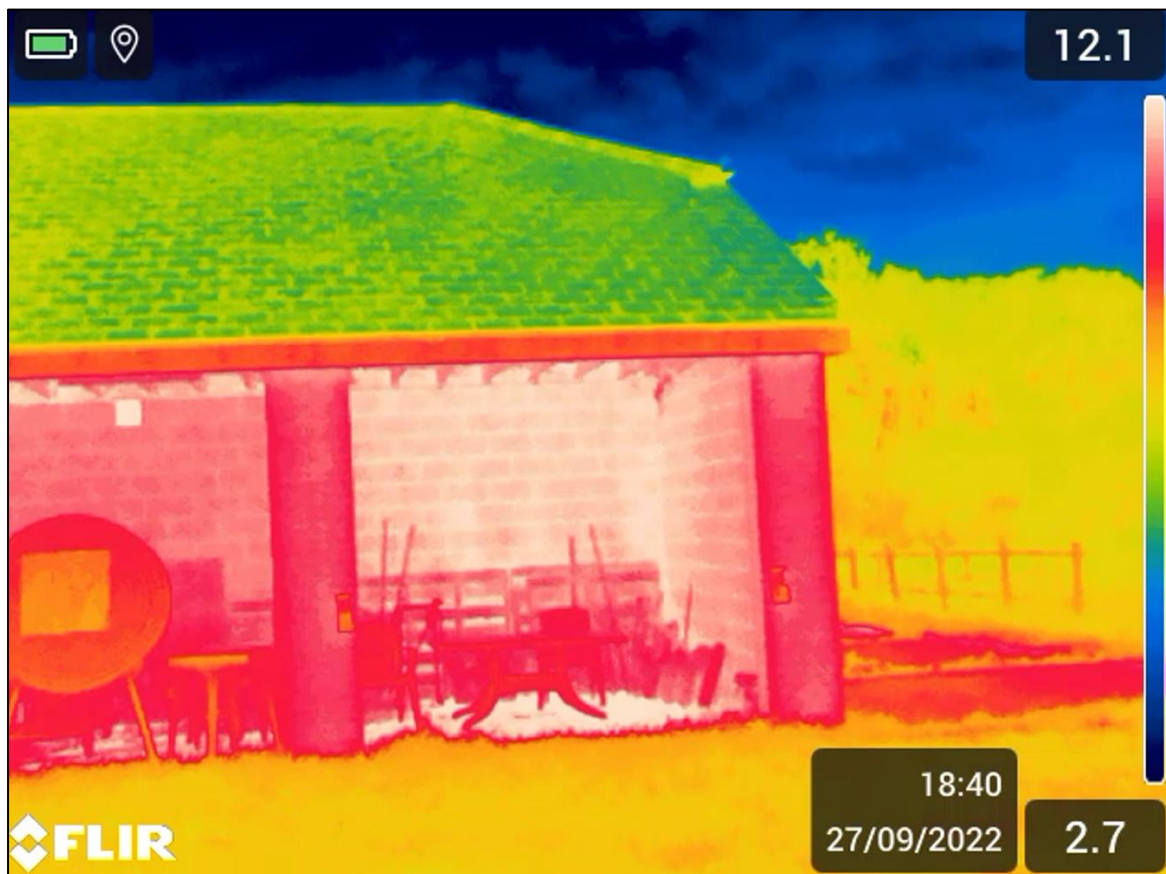


Photo 1 Eastern elevation (B3)

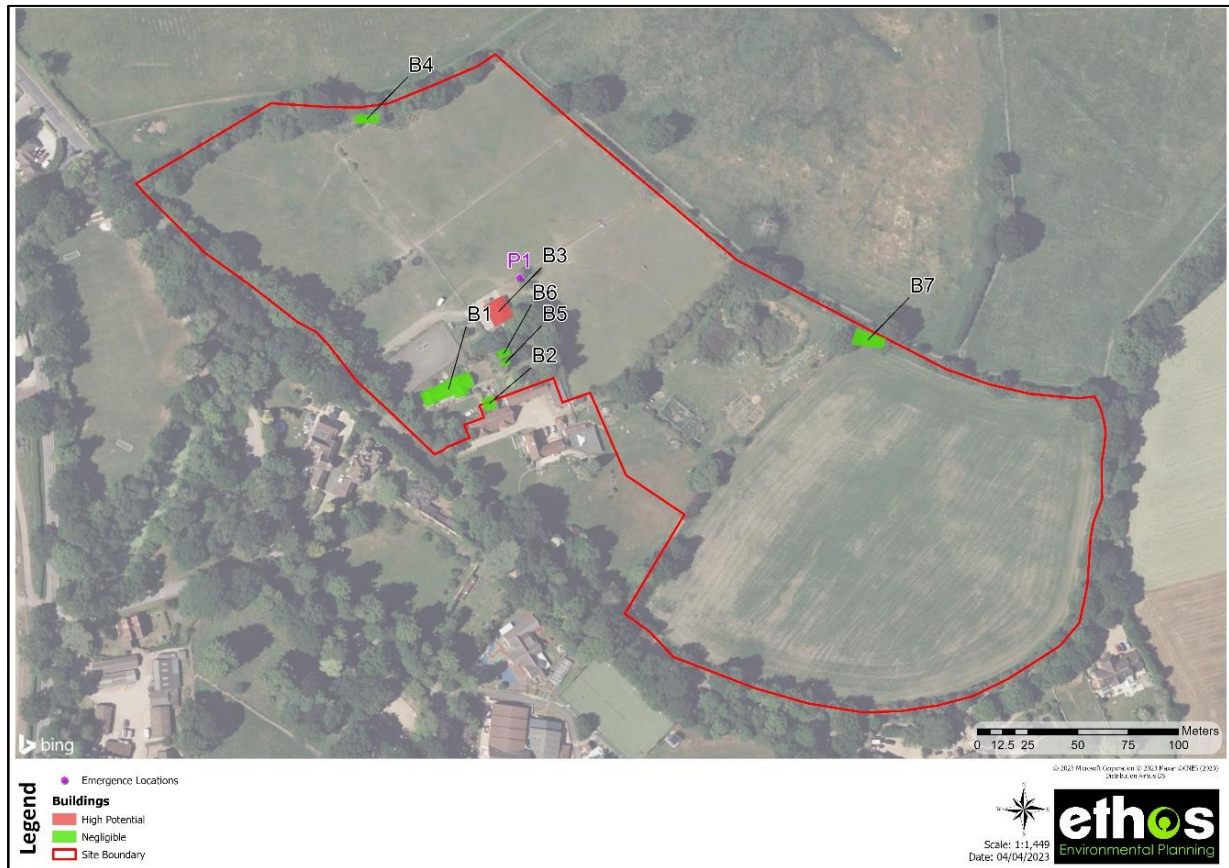


Figure 2 Building and emergence surveyor positions map

3.6.22 Echo Meter Touch (EMT) bat detectors were used for all the surveys. All calls recorded were analysed using the Echo Meter Touch app software. All calls recorded were cross referenced to a call reference collection library of known bat species to confirm species presence.

Activity surveys

3.6.23 Bat activity surveys were undertaken on site to highlight any important commuting or foraging features on site. This included two surveyors walking a planned transect of the site. The number of transects and number of surveys was informed by the habitats assessment which stated that the site provided moderate potential for bats.

3.6.24 Information recorded throughout the survey included the species present, their location, behaviour, and the identification of habitat features which were frequently used by the species. Surveyors were equipped with EMT bat detectors and notes were collected on Survey 123.

3.6.25 The transect location is displayed within Figure 3 below and the survey dates were as follows:

- Survey 1 – 28th April 2022
- Survey 2 – 16th May 2022
- Survey 3 – 23rd June 2022

- Survey 4 – 19th July 2022
- Survey 5 – 30th August 2022
- Survey 6 – 27th September 2022
- Survey 7 – 20th October 2022



Figure 3 Bat survey transect and listening points location map

Static Surveys

- 3.6.26 Bat static surveys were used to provide the composition of bat species present on site and were used to support the findings of the bat activity surveys. Bat surveys were undertaken between April – October with two statics deployed over a five-day period each month. The locations of the static detectors are shown in Figure 4 below. The number and timings of the surveys were informed by the habitats assessment undertaken within the extended UKHab survey.
- 3.6.27 The detectors used were Full Spectrum Wildlife Acoustics Song Meter 4 (SM4) passive bat detector. Each call was assigned a species using the BTO Acoustic Pipeline. The final data analysis was carried out using Microsoft Excel.

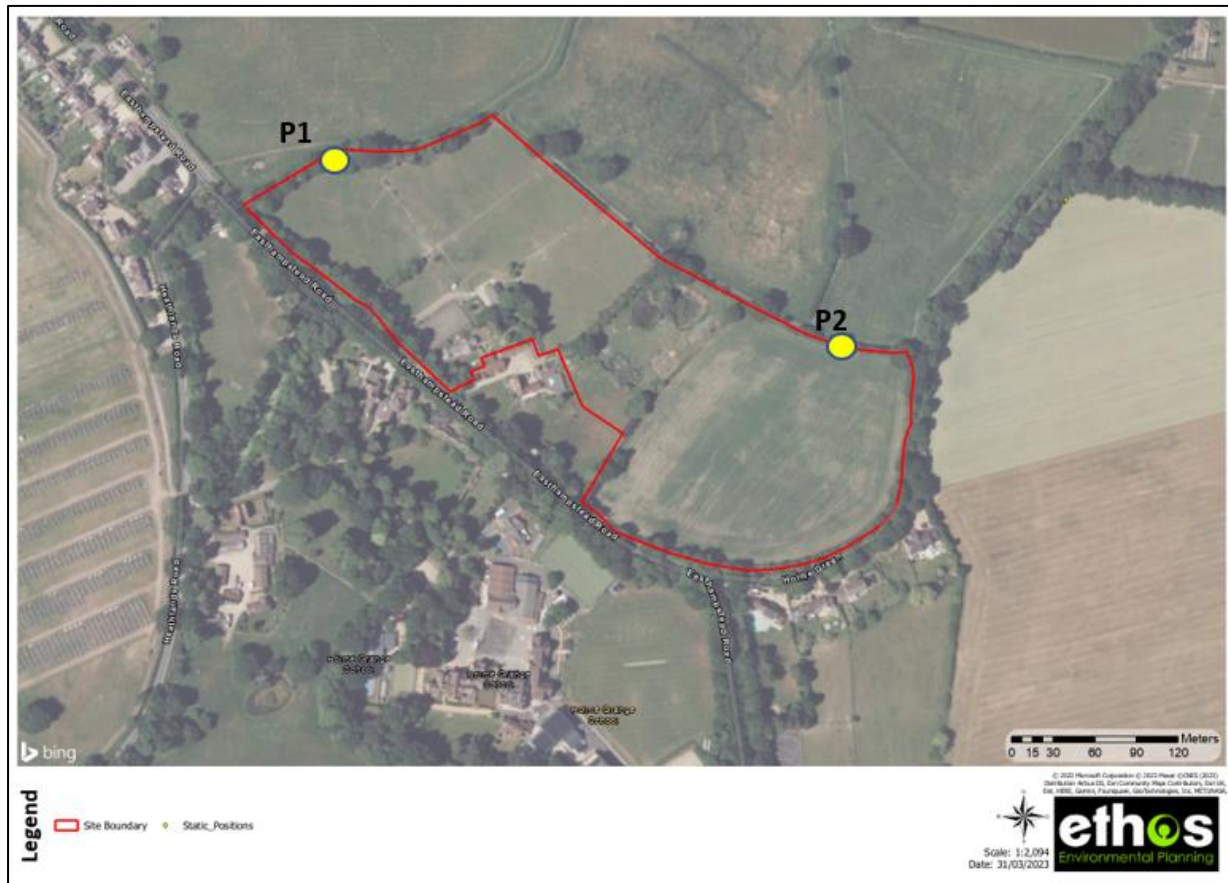


Figure 4 Bat static locations map

Birds

3.6.28 The bird survey included an assessment of the habitats on site for their potential to support protected and notable species of bird as well as their potential to support breeding birds.

Reptiles

3.6.29 The potential presence of reptiles on site was assessed considering the habitats present (availability of refugia and basking areas) and suitability of surrounding environment. Where possible, attempts to confirm reptile presence on site were made following *Froglife Advice Sheet 10 – Surveying for Reptiles* through direct observation in reptile “hotspots” and checking of any existing refugia.

Amphibians

Habitat Assessment

3.6.30 The site was examined for suitable waterbodies and for breeding terrestrial habitat. Terrestrial habitats providing sufficiently structured vegetation in which amphibians may forage or hibernate over winter were also surveyed for.

- 3.6.31 In addition to the on-site assessment, *Great Crested Newt Mitigation Guidelines* (English Nature, 2001) recommend that a desktop analysis of ponds within 500m of the site be undertaken, to identify any potential breeding ponds which may require further survey. Ponds within 500m of the site were mapped on GIS with an OS OpenData base map at 1:10,000 resolution.

HSI scoring

- 3.6.32 Habitat suitability indices (HSI) were calculated for every pond within the 500m buffer. The HSI was developed by Oldham et al. (2000) as a means of evaluating habitat quality and quantity. Ten suitability indices are assessed visually for each pond resulting in a numerical index between 0 (unsuitable) and 1 (highly suitable). As stated in ARG UK Advice Note 5, "In general, ponds with high HSI scores are more likely to support great crested newts than those with low scores. However, the system is not sufficiently precise to conclude that any pond with a high score will support newts, or that any pond with a low score will not do so."

eDNA surveys

- 3.6.33 Ponds 1 and 2 were subject to eDNA surveys on 28th April 2022. The surveys comprised the collection of 40ml samples from 20 locations around the edge of each pond. Samples are mixed together in a bag and six 15ml samples are extracted and stored within preserving fluid. These samples were then sent to ADAS, who analyse the samples for GCN DNA. This technique has been tested by DEFRA and found to have a reliability of 99.3%. Sampling methodology followed best practice guidance within Analytical and Methodological Development for Improved Surveillance of the Great Crested Newt (Freshwater Habitats Trust, 2014).

Invertebrates

- 3.6.34 Due to the many invertebrate taxonomic groups that exist, the often-large differences in invertebrate diversity between habitats and the many survey techniques available, invertebrate surveys are highly specific to individual sites. Therefore, an assessment of the potential site for invertebrates was undertaken, including the need for targeted surveys.

3.7 Limitations

- 3.7.1 A desk study was requested from TVERC as part of the EclA. The background data search relies heavily upon submitted records and therefore absence of protected species records cannot determine likely absence. This information is used in conjunction with the assessment, which draws upon the results of the habitat survey and assessment for protected species.
- 3.7.2 The bat species recorded on static bat detectors cannot be guaranteed to be fully accurate for all species. Whilst species such as common pipistrelle can be identified with a strong level of confidence, static recordings for certain species, most notably *Myotis*

spp. are difficult to separate from static recordings. This limitation is factored into assessing the assemblage of species recorded and identifying the requirement for additional survey effort, should it be considered necessary.

- 3.7.3 Two emergence surveys were undertaken on B3. These surveys were used to confirm that the building was a maternity roost for brown long-eared bats and confirm numbers of bats using the building. Although this is less than the usual three surveys required, with the use of thermal cameras and suitable building inspection beforehand, it is assessed that sufficient data has been collected to inform the compensation/mitigation required for this onsite roost.
- 3.7.4 The static bat detectors deployed at both locations only recorded one night of data due to an unknown failure and during September's static deployment. It was assessed that this was not a significant limitation due to the extensive monitoring throughout the remaining active season.
- 3.7.5 One of the structures on site, B4, could not be accessed internally during the structure inspection. However, there were no external features present for roosting bats and the interior was considered likely to be thermally insufficient for bats as it was open to the elements. It is therefore considered that this structure provides 'negligible' potential for roosting bats and this is not a significant limitation of the assessment.
- 3.7.6 Seven of the offsite ponds, identified in the desktop search were on private land and not accessible for surveying. The majority of the ponds were separated from the site by significant barriers to dispersal and it was considered that this did not constitute a significant limitation to the assessment.

3.8 Evaluation of Ecological Features

- 3.8.1 In line with CIEEMs guidelines on EclA, this assessment has focused on relevant Important Ecological Features. The scale of importance of these features has been determined based on available contextual information, which for this project are considered only to include:
 - **International** – of internationally and protected through international legislation;
 - **National** – of importance in England and protected through national legislation;
 - **County** – of importance to the county (North Somerset) but not sufficiently important to warrant 'National' scale of importance; and
 - **Local** – of importance to the local area (Winscombe and Sandford Parish), but not sufficiently important to warrant County scale of importance.

3.8.2 Potential impacts on Important Ecological Features are identified and assessed; likely significant effects are those likely to result in a change to the conservation status of a habitat or species population or undermine/support nature conservation policy. Mitigation measures have been devised following the mitigation hierarchy; appropriate mechanisms for securing mitigation measures have been identified.

3.9 Personnel

The surveyors on site have been detailed below in Table 2.

Table 2 Site surveyors

Ecologist	Position	Qualifications/ Licences	Experience	Survey Activity
Sarah Forsyth	Principal Ecologist	MSc DIC BSc (Hons), ACIEEM Class 1 GCN Licence Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306)	Sarah has over 15 years' experience in ecological management and assessment, both in consultancy and the public sector. Sarah is responsible for leading on ecological assessments and overseeing projects through various stages of planning and implementation.	Bat activity survey.
Steph Green	Principal Ecologist	MSc BSc (Hons), MCIEEM Class 1 GCN Licence Class 1 Hazel Dormouse Licence	Steph has over eight years' experience in ecological field survey and consultancy. Steph is responsible for leading and undertaking comprehensive habitat assessments, protected species surveys and is a licenced GCN and dormouse worker, as well as a Full Member of CIEEM.	Dormouse survey, Bat activity survey and bat static deployment.
Dan Carpenter	Principal Consultant (Biodiversity Net Gain)	BSc(Hons), PhD, CEnv, MIEnvSc, official position:	Dan is an ecologist and environmental data scientist with over twelve years of experience in ecological research and practice. His focus is on securing biodiversity and environmental net gains for Ethos' clients, both for individual projects and strategically. Dan has a broad range of ecological experience and its application in development, land management and nature conservation.	Bat emergence survey
Martin Smith	Senior BNG Consultant	BSc (Hons) Class 2 Bat Licence (NE)	Martin is a qualified tree climber and holds licences for dormouse, bats, and GCN. Martin specialises in	Dormouse survey, Bat activity survey and bat static deployment.

Ecologist	Position	Qualifications/ Licences	Experience	Survey Activity
		Class 1 dormouse licence (NE) Class 1 GCN Licence	undertaking BNG assessments and works on offsetting projects for Ethos. Martin manages multiple projects with Ethos and is competent at a range of phase 1 and phase 2 ecological surveys.	
Matt Attrill	Senior Ecologist	Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306) BSc (Hons) Class 2 Bat Licence Class 1 GCN Licence	Matt is a highly experienced field surveyor with over 7 years ecological experience. Matt is competent in surveying for a wide variety of wildlife gained experience from both the commercial and voluntary sectors.	Dormouse survey, Bat activity survey, bat static deployment, structures inspection, UKHabs survey, GCN DNA sampling, and project management.
Kane Burchill	Senior Ecologist	Level 2 Certificate and Diploma in Work-based Environmental Conservation Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306) ACIEEM Class 1 Bat Licence (NE) Class 1 Hazel Dormouse Licence (NE) Class 1 GCN Licence (NE)	Kane has over eight years' experience in ecological field survey and consultancy. As an Senior Ecologist with Ethos; Kane is responsible for leading and undertaking comprehensive habitat assessments protected species surveys and is a licenced bat, GCN and dormouse worker.	Dormouse survey, Bat activity survey and bat static deployment.
George Clutterbuck	Environmental Analyst	Level 2 Certificate and Diploma in Work-based Environmental Conservation Working towards a certificate of higher learning: Field Ecology - currently Level 2 Certificate and Diploma in Work-based Environmental Conservation	George has over seven years' experience in ecological field survey and consultancy. George is responsible for undertaking comprehensive habitats and protected species assessments. Much of his time is spent digitising using GIS software to achieve Biodiversity Net Gain.	Bat emergence survey.
Joel Sellors-Moore	Ecologist	MSc, Qualifying CIEEM	Has over four years' experience in ecological field survey and consultancy. Joel is responsible for managing	Dormouse survey, Bat activity survey, bat static deployment,

Ecologist	Position	Qualifications/ Licences	Experience	Survey Activity
			projects and undertaking comprehensive habitat and protected species assessments in addition to biodiversity net gain and nutrient neutrality assessments.	structures inspection and GCN DNA sampling.
Becky Morris	Ecologist	PhD, DIC, MSc, BSc, MCIEEM Class 1 GCN Licence	Becky has 16 years' experience working as an Ecological Consultant, specialising in botanical surveys. She holds a great crested newt survey licence.	Bat activity survey and bat static deployment.
Joe Bamforth	Ecologist	MSc, BSc (Hons) Class 1 Bat Licence 2022-10148-CL17-BAT Tree Climbing and Rescue, City and Guilds NPTC Level 2 Award (206 and 306)	Joe has over three years' experience in ecological consultancy and assists with habitat assessments, protected species surveys and data analysis.	Bat activity survey.
Sarah Roberts	Assistant Ecologist	MSc, BA, Qualifying CIEEM Class licence WML-CL29 To survey for barn owl (<i>Tyto alba</i>)	Sarah has over three years' of consultancy and biodiversity project management experience. Sarah assists with fieldwork and report-writing for habitats and protected species. She specialises in ornithology and ecological provisions for urban developments.	Bat activity survey and bat static deployment.
Ellie Shearn	Assistant Ecologist	BSc (Hons), Qualifying CIEEM	Ellie is an assistant ecologist at Ethos with relevant experience in ecological field survey. Ellie assists senior ecologists on site with protected species surveys including bat surveys and assessment.	Dormouse survey, Bat activity survey and bat static deployment.
Ben Smurthwaite	Ecologist	MSc, BSc (Hons) Qualifying CIEEM Class 1 GCN Licence (NE) Class 1 Bat Licence (NE)	Ben has over three years' experience in ecological field surveys and consultancy, and is responsible for managing projects, undertaking habitat and protected species surveys and biodiversity net gain assessments, and is a licenced bat and great crested newt worker.	Dormouse survey, Bat activity survey and bat static deployment.
Kate Downes	Assistant Ecologist	MSc, BSc (Hons), DET, QTLS Qualifying CIEEM	Kate is an assistant ecologist at Ethos with a special interest and relevant field survey experience in ornithology.	Dormouse survey, Bat activity survey, bat static

Ecologist	Position	Qualifications/ Licences	Experience	Survey Activity
			Kate assists with fieldwork and report-writing for habitats and protected species.	deployment and report author.
Katie Munday	Assistant Ecologist	MSc, BSc (Hons)	Katie has experience with a variety of ecological field surveys, including protected species surveys and habitat assessments. She assists with bat call data analysis and report-writing.	Bat activity survey, bat static deployment and bat data analysis.
Holly Atkinson	GIS Officer	MSc, BSc (Hons)	Holly has worked for two ecological consultancies in the South West and currently supports the Ethos team by producing GIS maps for a wide range of projects. Her GIS skills have been enhanced through use of the software both during her Masters and while carrying out ecological research abroad. She also has experience in the field performing ecological surveys, primarily of bats.	Bat activity survey.

4 BASELINE ECOLOGICAL CONDITIONS

4.1 Designated Sites

Statutory designated sites

- 4.1.1 There are one statutory designated site present within 2km of the site and the site is within the Zone of Influence (Zol) for one other statutory designated site due to recreational pressures and the mobility of the species for which the site is designated.

Thames Basin Heaths SPA

- 4.1.2 The site is 3km from The Thames Basin Special Protection Area (SPA), within the 400m to 5km Zol, as shown in Figure 5.
- 4.1.3 The site comprises of lowland heath habitat. The site is designated as it supports breeding populations of Annex I species including nightjar (*Caprimulgus europaeus*), woodlark (*Lullula arborea*) and Dartford warbler (*Sylvia undata*).
- 4.1.4 The Thames Basin Heaths SPA is of **International importance** for nature conservation, in line with its designation. Potential impacts on the SPA as a result of the development will be mitigated through the provision of SANG and are part of the planning decision process.

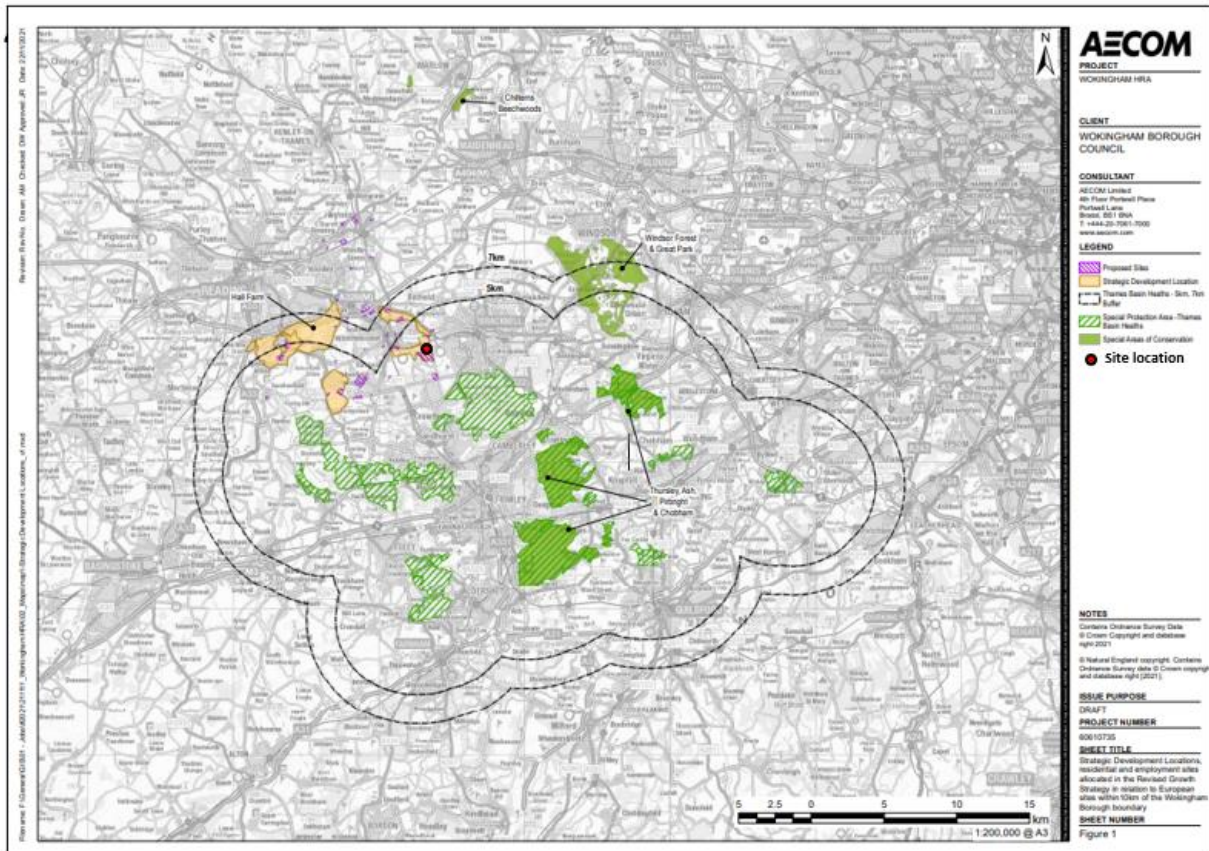
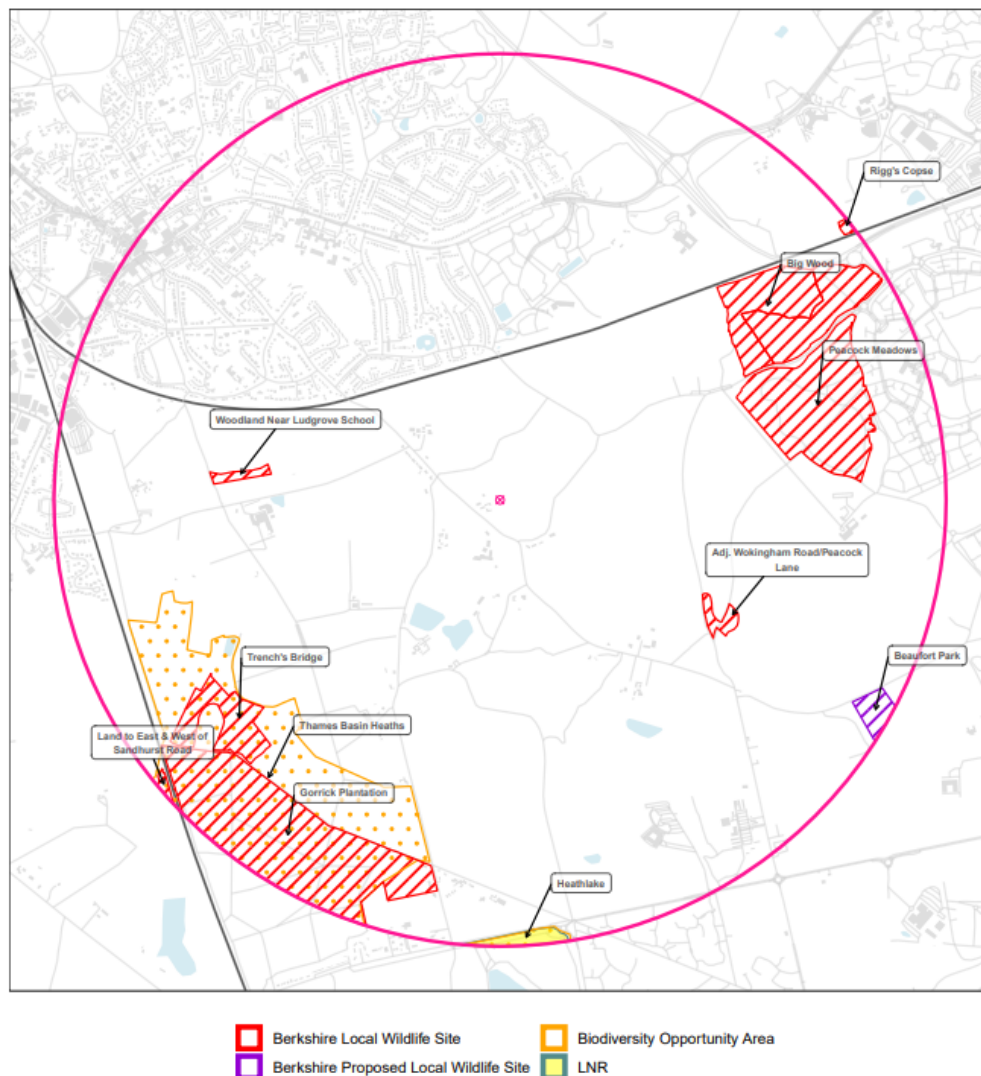


Figure 5 Wokingham Borough Council Thames Basin Heaths SPA Buffer Zones Map

Heathlake SSSI, LNR

- 4.1.5 Heathlake Site of Special Scientific Interest (SSSI) and Local Nature Reserve (LNR) is located 1.8km south of the development site, as shown in Figure 6.
- 4.1.6 Heathlake is an area of woodland and heathland with a seven acre lake, described as an acid lake and the only one of its kind found in Berkshire. The lake supports several rare plants, including water-milfoil (*Myriophyllum spicatum*) and six-stemmed water crowfoot (*Ranunculus fluitans*).
- 4.1.7 Heathlake SSSI/LNR is of **National Importance** for nature conservation, in line with its designation. Heathlake is a considerable distance from the site and impacts on it are considered highly unlikely. Therefore, Heathlake SSSI/LNR is not considered further in this assessment.



Map produced by Thames Valley Environmental Records Centre in 2022
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Figure 6 Statutory and non-statutory sites within 2km of the development, map provided by records centre.

Non-statutory designated sites

- 4.2 Nine Local Wildlife Sites (LWS) were present within 2km of the development site, which are described in Table 3 and shown in Figure 6 above. The LWS are of **Country Importance** for nature conservation, in line with their designations.
- 4.3 It was assessed that these LWS will not be impacted by the development and are not considered further in this assessment.

Table 3 Local Wildlife Sites (LWS) within 2km of the development site described

Site name	Designation	Description	Distance and Direction from Site
Adjacent Wokingham Road/Peacock Lane SU86I01	LWS	A small area of acidic, birch (<i>Betula spp.</i>) woodland with sections of oak (<i>Quercus robur</i>) woodland and old lime (<i>Tilia platyphyllos</i>) coppice.	361m east.
Woodland Near Ludgrove School SU86D07	LWS	A dense area of woodland with willow (<i>Salix spp.</i>) carr and rich ground flora.	858m north-west.
Big Wood 86J01	LWS	Largely ancient woodland with notable species present including; baron strawberry (<i>Fragaria vesca</i>) and a open area of acid grassland with rare marsh stitchwort (<i>Stellaria palustris</i>) present.	981m north-east.
Beaufort Park SU86N05	Proposed LWS	The site consists of an area of heathland, acid grassland and woodland.	1.1km south-east.
Gorrick Plantation SU86C05	LWS	A conifer plantation with wet alder (<i>Alnus glutinosa</i>) woodland. The site has remnants of heathland and bog habitat with nightjar	1.3km south-west.

		(<i>Caprimulgus europaeus</i>) recorded on site.	
Trench's Bridge SU86D02	LWS	An area of oak dominated woodland with sections of wet alder woodland present.	1.6km south-west.
Rigg's Copse 86P01	LWS	A small ancient woodland with stands of wild service tree (<i>Sorbus torminalis</i>) and a variety of ground flora.	1.9km north-east.
Land to the East and West of Sandhurst Road SU86C08	LWS	A diverse mixture of woodland, wetland, heathland and grassland can be found onsite with notable habitats including remnant purple moor grass (<i>Molinia caerulea</i>) and rush pasture.	2km south-west.
Peacock Meadows SU86N06	LWS	A large area of open space comprising a recreated wildflower meadow which is notable for its species. Native woodland and scrub is also present.	2km north-east.

Ancient woodland

- 4.1.1 Parcels of ancient woodland are found within the search radius of the site, namely Woodland near Ludgrove school, Easthampstead Park, Watley's Copse and Big Wood, as shown on Figure 7 below.
- 4.1.2 Ancient woodland is considered to be of **County Importance** for nature conservation. There are no parcels of ancient woodland which are located on or adjacent to the site and no potential impacts have been identified, therefore the ancient woodland sites are not considered further in this assessment.

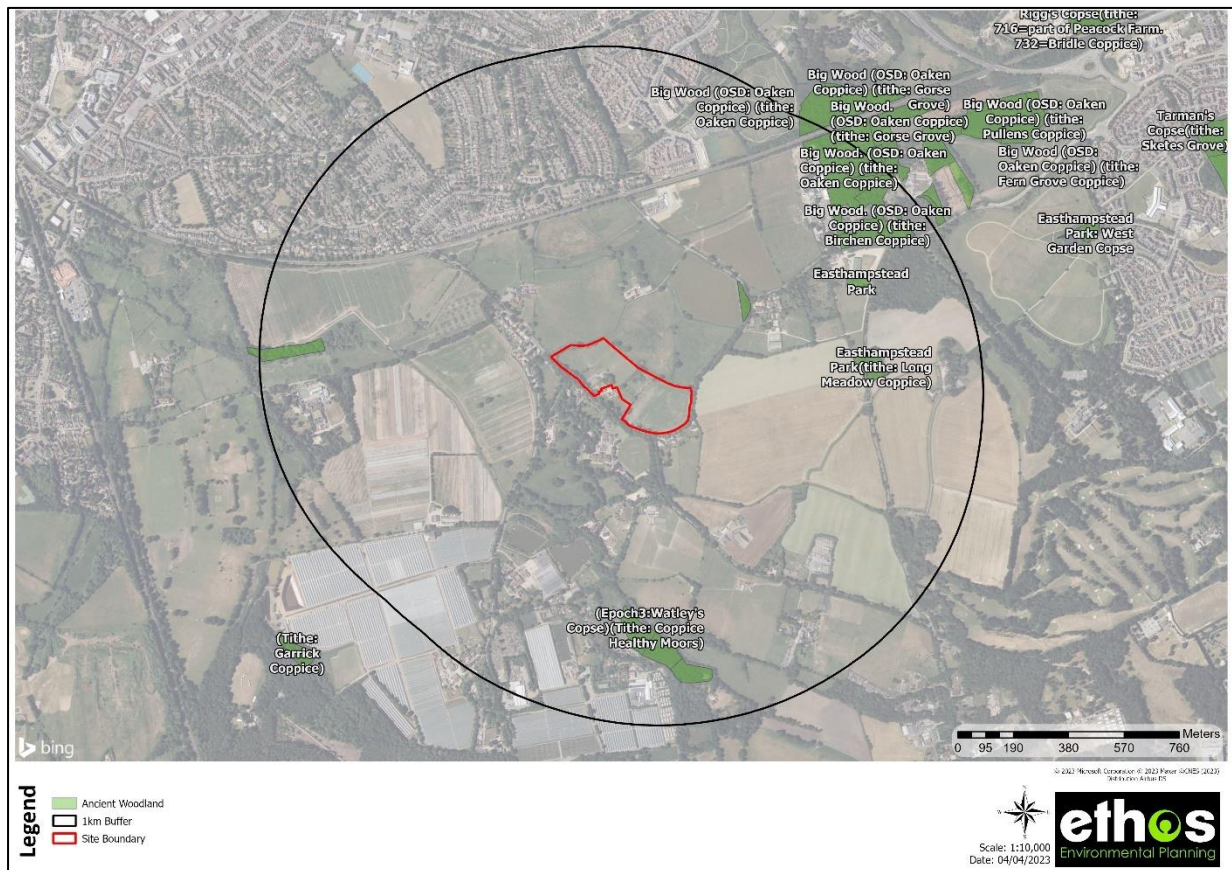


Figure 7 Ancient woodland within 1km of the development site

4.2 Habitats

General Site Description

- 4.2.1 The site comprises of three fields, the eastern field and northern section of the central field being modified grassland and the western field and southern section of the central field being other neutral grassland.
- 4.2.2 The eastern field is bordered in the north and east by native species rich hedgerow with trees and a line of trees in the south-western corner. There is a structure in the north-eastern corner.
- 4.2.3 The central field has a section of other neutral grassland to the south with a larger parcel of modified grassland to the north. Within this modified grassland there are two parcels of vegetated garden and a pond which is surrounded by mixed scrub. The modified grassland parcel is bordered to the north by native hedgerow with trees.
- 4.2.4 The western field comprises of a large parcel of other neutral grassland, bordered in the south by a native species rich hedgerow with trees with a section extending into the grassland, native hedgerow with trees along the western and north-western boundary and a native hedgerow along the northern border. Along the western boundary of the

grassland there is a section of other broadleaved woodland in the south-west corner and a section of mixed scrub in the central area of the western boundary, encroaching into the grassland.

- 4.2.5 In the south-eastern corner of the western grassland there is an area of vegetated garden, an area of sealed surface, areas of artificial unvegetated surface, a section of modified grassland and a small pond.

UKHab Survey

- 4.2.6 Figure 8 below displays the key habitats using the UK Habitat classifications. Descriptions of the habitats are provided in the following section.

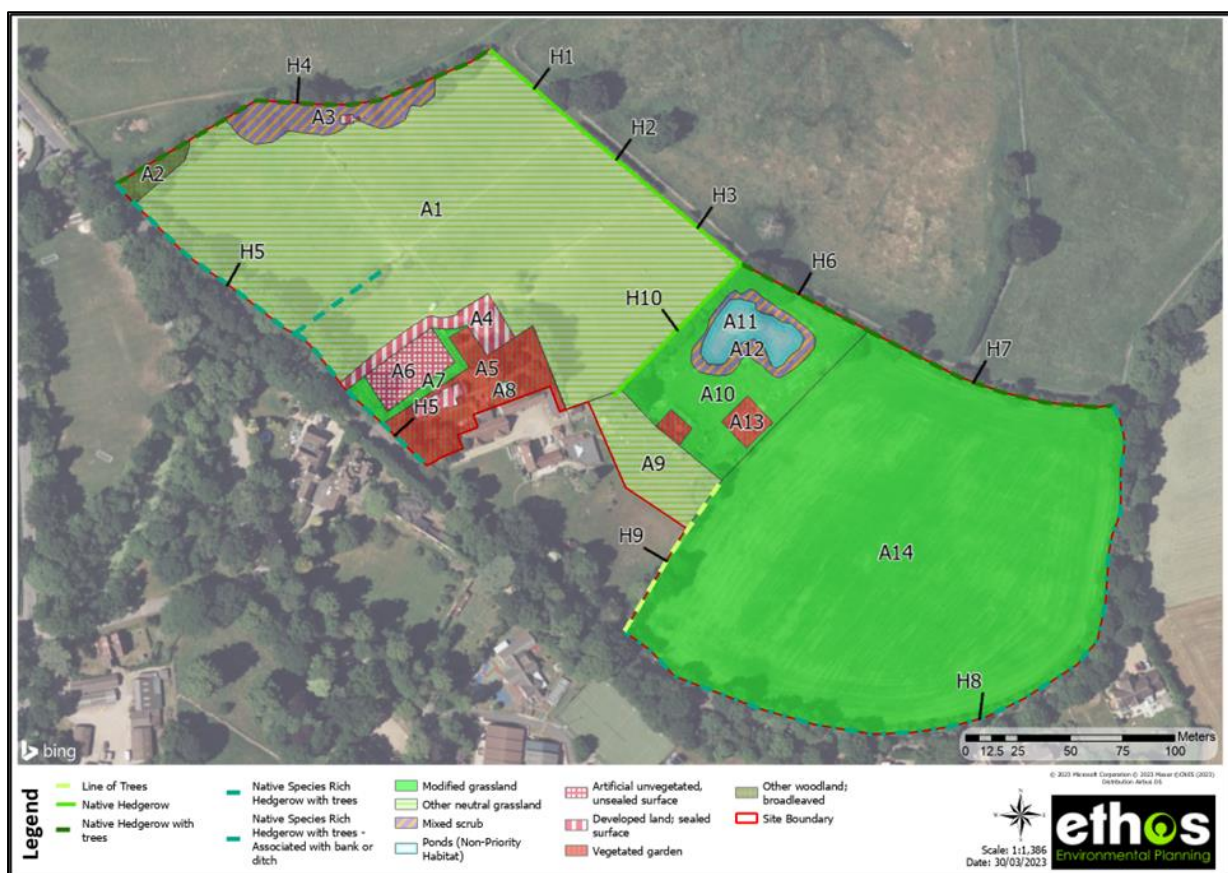


Figure 8 Existing habitats

Modified grassland

- 4.2.7 The largest parcel of modified grassland (A14) is be found in the eastern field. This is a hay cut field sown with a tussocky grasses seed mix. The species recorded within the grassland comprise of ragwort (*Jacobaea vulgaris*), broadleaved dock (*Rumex obtusifolius*), curled dock (*Rumex crispus*), dandelion (*Taraxacum spp.*), field buttercup (*Ranunculus arvensis*), common bent (*Agrostis capillaris*), oat grass (*Arrhenatherum spp.*), cocks' foot (*Dactylis glomerata*) and rough meadow grass (*Poa trivialis*).

- 4.2.8 The central field has a parcel of modified grassland to the north (A10) and in the south-eastern corner of the western grassland there is a small, modified grassland section adjacent to the residential dwelling (A7).
- 4.2.9 The modified grassland on site is species-poor, agriculturally seeded and appears to be regularly maintained at a short sward height. It is not considered to be a habitat of particular nature conservation importance and is therefore not considered further in this assessment.



Photo 2 Eastern field (A14)



Photo 3 Central field (A10)



Photo 4 Modified grassland (A7)

Other neutral grassland

- 4.2.10 The field to the west is previously horse-grazed, other neutral grassland (A1) and comprises of a set of small paddocks. Species present within this grassland were Red clover (*Trifolium pratense*), White clover (*Trifolium repens*), Bird's-foot trefoil (*Lotus corniculatus*), Meadow buttercup (*Ranunculus acris*), Perennial rye-grass (*Lolium perenne*), Ribwort plantain (*Plantago lanceolata*), Dandelion (*Taraxacum officinale*), Yorkshire fog (*Holcus lanatus*), Creeping bent (*Agrostis stolonifera*), Sweet vernal (*Anthoxanthum odoratum*), meadow foxtail (*Alopecurus pratensis*), bush vetch (*Vicia*

sepium), common cats ear (*Hypochaeris radicata*), black knapweed *Centaurea nigra*), cocks foot (*Dactylis glomerata*), black medick (*Medicago lupulina*).

- 4.2.11 Within the central field, there is a parcel of other neutral grassland to the south (see Photo 7). This section is managed to lawn but with indicator species of other neutral grassland recorded, including; field wood rush (*Luzula campestris*), bush vetch (*Vicia sepium*), Yorkshire fog (*Holcus lanatus*), perennial rye grass (*Lolium perenne*), lesser stitchwort (*Stellaria graminea*), meadow fox tail (*Alopecurus pratensis*), field buttercup, sweet vernal grass (*Anthoxanthum odoratum*), common sorrel (*Rumex acetosa*), oxeye daisy (*Leucanthemum vulgare*) and common daisy (*Bellis perennis*).
- 4.2.12 The other neutral grassland is not a Habitat of Principal Importance and is not considered to be of particular nature conservation importance. It is therefore only considered further in this assessment in relation to its potential to support protected species.



Photo 5 Parcel A1 from western edge of the site



Photo 6 Parcel A1 photo dated June 2022.



Photo 7 Parcel A11

Other woodland; broadleaved

- 4.2.13 There is a small woodland copse in the south-west corner of the site which qualifies as a habitat of principle importance in England. Species recorded included mature and immature English oak, horse chestnut (*Aesculus hippocastanum*), young hazel (*Corylus avellana*) and holly (*Ilex aquifolium*). Ground flora recorded included lesser stitchwort, bluebell (*Hyacinthoides non-scripta*), ivy (*Hedera helix*) and bramble (*Rubus fruticosus*).
- 4.2.14 There are extensive areas of woodland in the local area (see site location in Figure 1), with the woodland on-site only forming a small percentage of the local resource. On this basis it is considered that the woodland is of **Local importance** for nature conservation.



Photo 8 Onsite woodland parcel A2



Photo 9 Woodland ground flora dated April 2022.

Ponds

- 4.2.15 There are two ponds onsite. One is located in the northern section of the central field and has mixed scrub around its edges. The other pond is a manmade, ornamental pond with associated formal planting, located in the associated garden area adjacent to the residential dwelling.
- 4.2.16 The pond in the central field is considered as a Habitat of Principal Importance and therefore is considered to have **Local importance** for nature conservation. The manmade pond is not a Habitat of Principal Importance, and so is not considered further in this assessment.



Photo 10 Central Pond A11



Photo 11 Central Pond A11



Photo 12 Ornamental Pond A8

Mixed scrub

- 4.2.17 There are two areas of mixed scrub onsite; one area surrounds the larger pond in the northern section of the central field; and the other section is located along the western site boundary.
- 4.2.18 The mixed scrub along the western site boundary (A3) has species recorded as follows; goat willow (*Salix caprea*), common gorse (*Ulex europaeus*), hawthorn (*Crataegus monogyna*) and bramble with high concentrations of common nettle (*Urtica dioica*). The old stables adjacent to the scrub area is used for storing horse manure which may indicate why nettle concentration is so high.
- 4.2.19 There is a band of scrub around the larger pond onsite (A12) with species recorded as follows, goat willow, silver birch (*Betula pendula*), blackthorn (*Prunus spinosa*) and bramble.
- 4.2.20 Mixed scrub is not a Habitat of Principal Importance and is not considered to be of particular nature conservation importance. It is therefore only considered further in this assessment in relation to its potential to support protected species.



Photo 13 Mixed Scrub A3



Photo 14 Mixed scrub A3



Photo 15 Mixed scrub surrounding pond A12



Photo 16 Mixed scrub surrounding pond A12

Hedgerows

- 4.2.21 There are several hedgerows located onsite which are shown in Figure 10 and described in Table 3 below.
- 4.2.22 All native hedgerows onsite qualify as Habitats of Principle Importance in England and are assessed to be of **Local importance** for nature conservation. Impacts on hedgerows as a result of the development are considered further in Section 6.

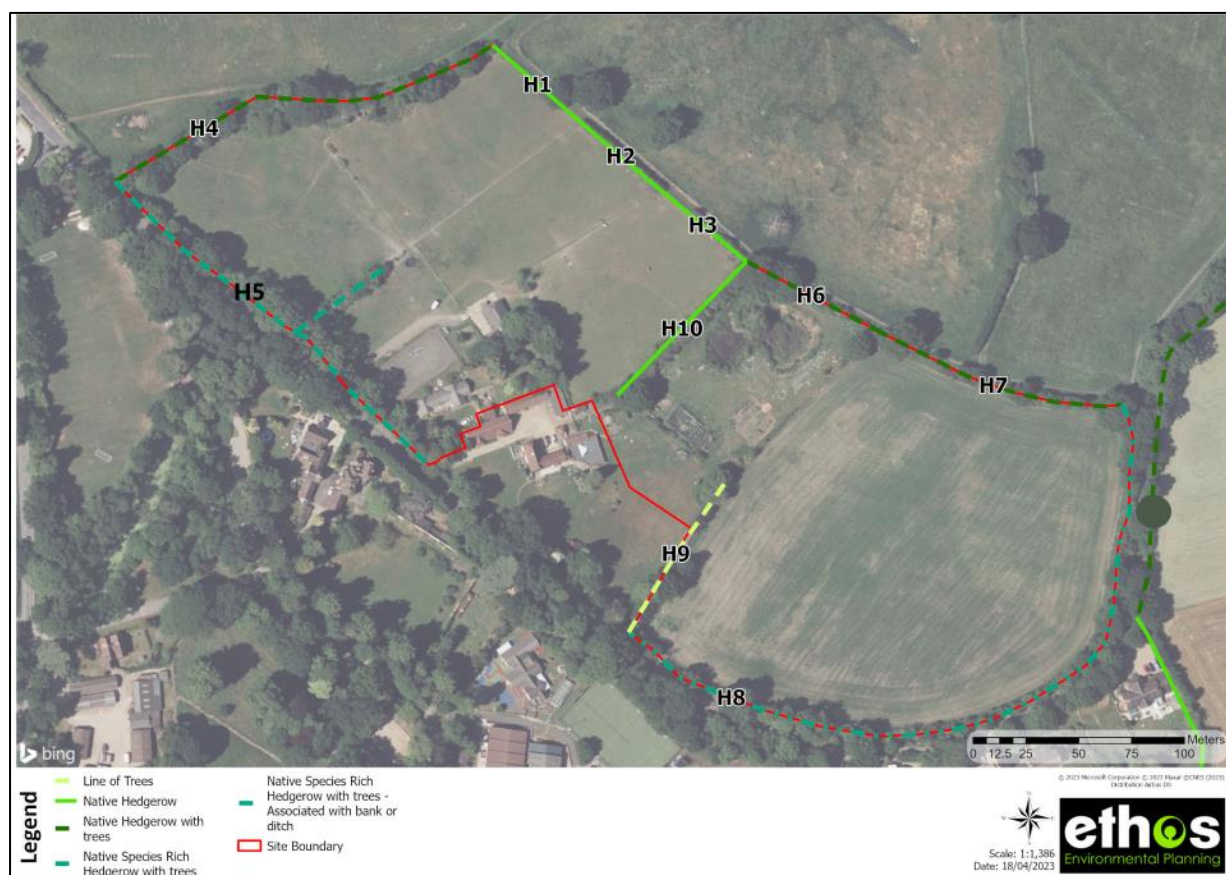


Figure 9 Linear habitats onsite

Table 4 Hedgerows

Hedgerow Number And type	Description	Photo
H1 Native Hedgerow	A native hedgerow with trees comprising of newly planted hawthorn, established but still young, with two mature oaks.	 Photo 17

H2 Native Hedgerow	A native hedgerow, newly planted with established hawthorn. Other species includes bramble, dog rose (<i>Rosa canina</i>) and a high concentration of nettles along the base.	 Photo 18
H3 Native Hedgerow	A native hedgerow, newly planted with two established hawthorn trees. All planted hawthorn have tree guards.	 Photo 19
H4 Native Hedgerow with trees	A native hedgerow with trees, this hedgerow is unmanaged with large gaps evident. There are mature oak trees with hawthorn and ivy present.	 Photo 20
H5 A native species rich hedgerow with trees	This hedgerow is unmanaged with large growth of bramble at the base. Species present includes sycamore (<i>Acer pseudoplatanus</i>), ash (<i>Fraxinus excelsior</i>), holly, hawthorn, elm (<i>Ulmus procera</i>), dog rose and blackthorn.	 Photo 21

H6 Native hedgerow with trees	Hedgerow largely unmanaged with trees to the northern area only and not along full length. Species present were oak, hawthorn, elm, holly, birch spp.,	 Photo 22
H7 native species rich hedgerow with trees	This hedge is a mature hedge with occasional mature trees. Species present includes mature oak, hawthorn, blackthorn, elder (<i>Sambucus nigra</i>), ash and English bluebell.	 Photo 23
H8 native hedgerow with trees and associated ditch	This hedge contained mature trees, was species rich and had an associated ditch for the majority of its length. Species present includes oak, field maple (<i>Acer campestre</i>), blackthorn, hawthorn, holly, elder, dog rose, elm, English bluebell, lesser stitchwort and honey suckle (<i>Lonicera periclymenus</i>).	 Photo 24
H10 Native hedgerow	Hedge extends into the centre of the site from the northern boundary. Species present includes one mature oak, hawthorn dominated with minor elder, bramble and ivy. Ground flora of nettle and garlic mustard (<i>Alliaria petiolata</i>).	 Photo 25

Line of trees

- 4.2.23 There is a line of trees in the south-western corner of the eastern field which extends into the site. The species present includes copper plum (*Prunus cerasifera*) which have bracket fungus (*Basidiomycete*), horse chestnut, hazel, hawthorn, elder and bramble.
- 4.2.24 The line of trees (H9) is assessed to be of **Local importance** to nature conservation and potential impacts to H9 are discussed further in Section 6.



Photo 26 H9 Line of Trees



Photo 27 H9 Line of Trees

Vegetated garden

- 4.2.25 There are three areas of vegetated garden, two in the central field and one in the western field, adjacent to the residential dwelling.
- 4.2.26 The vegetated gardens on site are species-poor with non-native species present in a highly managed space. It is not considered to be a habitat of particular nature conservation importance and is therefore not considered further in this assessment.



Photo 28 Vegetated Garden A13



Photo 29 H9 Vegetated Garden A13



Photo 30 Vegetated Garden A5

Artificial unvegetated, unsealed surface

- 4.2.27 In the western field, within the south-eastern corner there is an area of loose gravel, used as a horse training area. This habitat has no particular ecological importance for nature conservation and is not considered further in this assessment.

Developed land; sealed surface

- 4.2.28 Adjacent to the horse training area there is a concrete, compressed path which runs from the barn structure to the north, down to the hedgerow boundary in the south. This habitat has no particular ecological importance for nature conservation and is not considered further in this assessment.



Photo 31 Unsealed surface A6.



Photo 32 Compressed concrete path A4.

4.3 NERC S. 41 Mammals

- 4.3.1 Forty-nine records of hedgehog (*Erinaceus europaeus*) were returned from the data search, with six records being the most recent in 2021, 800m north-west of the site boundary, within a residential area. No records of other NERC S41 mammals were identified by the data search.

- 4.3.2 During an ecological walkover in April 2022, a single hedgehog dropping was found, adjacent to B1, as shown in Photo 33 below.



Photo 33 Hedgehog dropping

- 4.3.3 The on-site habitats offer refuge and foraging opportunities for hedgehog, with good connectivity to other suitable habitats in the wider environment. It is considered likely that hedgehog are present on site and utilise the hedgerows, scrub and tussocky grassland throughout the site for foraging and commuting.
- 4.3.4 Brown hare favour areas of open farmland with patches of long grass to 'lay-up' during the day. There are large areas of open grassland on site suitable for the species. Therefore, there is the potential for brown hare to be present on site or within the vicinity of the site and to use the site to forage.
- 4.3.5 Polecat are found in many habitats including hedgerows and small areas of woodland, as well as riverine habitats. Although some of these habitats are found on site, distribution records from the Vincent Wildlife Trust (2016) suggest that polecat is sparsely distributed across the county, with only two records received as part of the 2016 study to the area immediately west of Reading. Due to a lack of records of the species it is considered unlikely that polecat are present on site.
- 4.3.6 The tussocky grassland and hedgerows on site offer a small amount of suitable habitat for harvest mouse. Therefore, there is the potential for harvest mouse to be present on site or within the vicinity of the site and to use the site to forage and nest.
- 4.3.7 Hedgehog and brown hare are listed as Species of Principal Importance for the conservation of biodiversity in England. Any animals using the site are likely to form part of a wider population within the local area, which would be of **Local importance** to nature conservation.

4.4

4.4.1

4.4.2

4.5 Hazel Dormouse

- 4.5.1 There were two records of hazel dormouse (*Muscardinus avellanarius*) in the data search, one from 1995 and one from 2017. Both records were taken at Big Wood LWS, 981 north-east of the site boundary.
- 4.5.2 The site is bordered by species-rich hedgerows with trees and comprises a mosaic of habitats including scrub and broadleaved woodland. These habitats offer suitable habitat for dormice and are well-connected to other suitable habitats in the wider environment, including significant areas of woodland to the north of the site.
- 4.5.3 No evidence of dormouse was found during the nest tube surveys, with several wood mouse nests recorded in H7 & H8. Due to a lack of evidence of dormouse on site, as well as a lack of desk study records of the species, it is therefore assessed that dormouse are absent from the site and the species is not considered further in this assessment.

4.6 Riparian Mammals

- 4.6.1 No records of otter (*Lutra lutra*) or water vole (*Arvicola amphibius*) were identified by the data search.
- 4.6.2 The Emm brook is located 700m south-east of the site, a small stream which connects to a network of ditches in the area. There are no functional links from the brook to the development site therefore it is unlikely that otter or water vole would be resident onsite.
- 4.6.3 Overall, due to a lack of records, evidence and suitable habitat on or adjacent to the site, otter and water vole are assessed to be likely absent from the site and are not considered further in this assessment.

4.7 Bats

Data search

- 4.7.1 There were 380 records of bats returned within the last ten years, including records of common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, whiskered/Brandt's bat, serotine, noctule, Leisler's noctule, Natterer's, brown long-eared, Daubenton's and Bechstein's. These records were located within a 1km radius of the site. The one record of Bechstein's bat was dated 2017 and located at Big Wood LWS, 981m north-east from the site boundary.
- 4.7.2 There was one European Protected Species (EPS) licence recorded within 1km of the site relating to bats:
- (2018-34805-EPS-MIT) granted for brown long-eared bat and common pipistrelle (2018-2023), within 700m of the site.

Habitats

- 4.7.3 The site is dominated by other neutral and modified grassland with hedgerows with mature trees, a section of woodland, and areas of scrub. The hedgerows on site connect to an extensive network of hedgerows, woodland and pasture in the wider environment. Overall, the site is assessed to have moderate potential for foraging and commuting bats.

Preliminary ground level tree roosting assessment

- 4.7.4 The preliminary ground level assessment did not identify any potential roost features on any trees present on site. Therefore, all trees are assessed to contain 'negligible' potential for roosting bats and no additional surveys are required.

Preliminary building roost inspection

- 4.7.5 There are seven structures onsite, which are shown in Figure 11. One of the structures is a residential dwelling which is in active use and the remaining six are outbuildings with a variety of uses. Descriptions of the buildings onsite are provided in Table 5 below along with their potential for roosting bats.

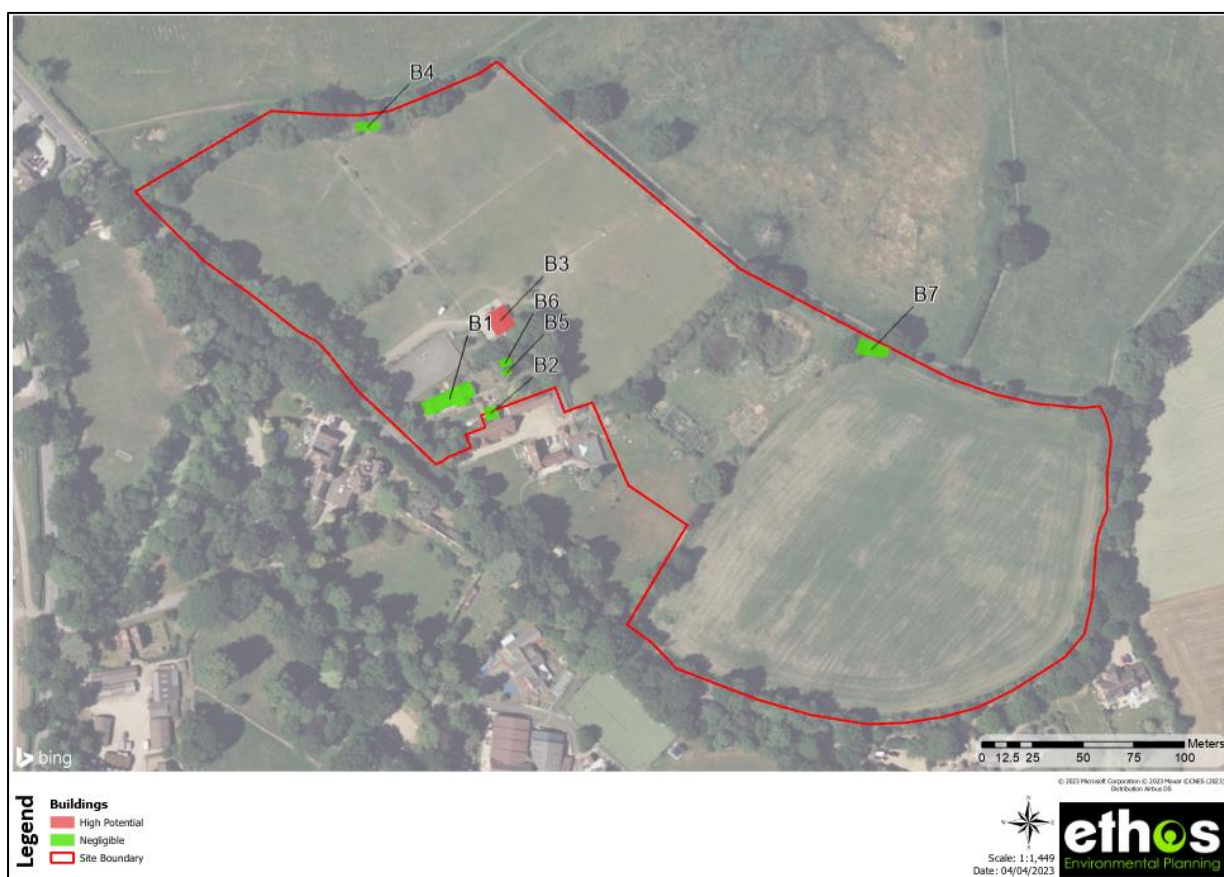


Figure 10 Structures location and assessment for bat roosting potential

Table 5 Results of the preliminary roost inspection

Structure	Description	Evidence	Potential
B1	A bungalow, residential, dwelling with an intersecting hip roof with stone and composite tiles, wooden barge boards, soffits and fascia. Tiles and roof structure is mostly in good condition, with few slipped tiles noted, but no gaps seen from within the roof void. The structure has one brick chimney, the walls are constructed of painted brick, all in good condition with no potential features seen. The internal loft void comprises an A-frame of timber beams with sarking. Holes were seen in the sarking but no light was observed coming through. Mouse droppings were found.	None	Negligible
B2	B2 is a single storey brick construction with a gable ended pitched roof of timber, constructed with slate and uPVC soffits. There are hanging wall tiles on the southern elevation, all in	None	Negligible

	good condition apart from one missing. The northern elevation is timber clad. The roof has recently been fitted with new sparking. Internal inspection revealed no obvious access from the missing hanging wall tile.		
B3	B3 is a brick open access barn with wooden beams and concrete floor. No obvious potential features seen externally on the structure for bats, however structure allows constant open access to the loft void inside. Internally there is a timber A-frame with an open loft void space. An open hatch leads directly from the loft void space into the barn below.	Two clustered piles of dropping under the ridge beam in the loft void and scattered throughout the void were seen along with eight live bats. One bat was identified as a brown long-eared bat (BLE). Droppings were sent off for DNA analysis with a positive result for BLE received (results shown in Appendix 1).	High (confirmed roost)
B4	B4 is a single storey shed of timber construction with corrugated asbestos cladding and a flat timber roof with felt cladding. No internal inspection was carried out for health and safety reasons, due to the presence of degraded asbestos.	None	Negligible
B5	B5 is a dilapidated timber shed with a once flat roof open with birds nest inside.	None	Negligible
B6	B6 is a one storey shed timber construction with a slightly pitched felt roof. Newly constructed and in active use. Looks clean and tight no evidence.	None	Negligible
B7	Timber clad, single skin, open fronted structure with tiled, pitched roof. The internal structure is a timber frame with tiles directly attached, there is no	None	Negligible

	sarking and no evidence of suitable crevices for bats.		
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Photo 34 Residential dwelling (B1)



Photo 35 Residential dwelling (B1)



Photo 36 Residential dwelling (B1)



Photo 37 Residential dwelling (B1)



Photo 38 Slipped tiles (B1)



Photo 39 Birds nest (B1)



Photo 40 Residential dwelling (B1)



Photo 41 Brick outbuilding (B2)



Photo 42 Brick outbuilding (B2)



Photo 43 Missing wall tile (B2)



Photo 44 Internals of outbuilding (B2)



Photo 45 Internals of outbuilding (B2)



Photo 46 Barn structure (B3)



Photo 47 Barn structure (B3)



Photo 48 Barn structure (B3)



Photo 49 Barn structure (B3)



Photo 50 Storage room (B3)



Photo 51 Bird nest inside barn (B3)



Photo 52 Loft hatch used as an entrance by BLE bats



Photo 54 Cluster of bat droppings pile 1 (B3)

Photo 53 Barn loft void (B3)



Photo 55 Cluster of bat droppings pile 2 (B3)



Photo 56 Stables (B4)



Photo 57 Stables (B4)



Photo 58 Dilapidated structure (B5)



Photo 59 Dilapidated structure (B5)



Photo 60 Internal storage (B5)



Photo 61 Timber shed (B6)



Photo 62 Timber shed (B6)



Photo 63 Timber shed internals (B6)



Photo 64 Timber outbuilding (B7)



Photo 65 Timber outbuilding internals (B7)

Emergence surveys

4.7.6 Emergence surveys were carried out on B3, the brick barn building, in line with guidance provided in 'Bat Surveys Good Practice Guidelines' (Collins, 2016). The detailed results of the emergence surveys are provided in Appendix 2 and a summary is provided below:

- On both emergence surveys in June and July 2022, BLE were identified emerging from the structure B3.
- On 23rd June 2022 a BLE was identified exiting the structure through the open front on the eastern elevation, re-entering the structure one minute later and continuing

to exit and re-enter the building over a period of three minutes. Three other BLE were identified exiting and re-entering the structure via the same access point later, during the survey.

- On 28th July 2022, a BLE was identified emerging from the structure through the open front on the eastern elevation and re-entering the structure shortly after to forage in the open barn.
- During each survey, it was confirmed that the bats had exited the structure (B3) via the open hatch, found towards the back right corner of the barn structure, which opens into the loft void space. The bats scattered on exit with no regular commuting route away from the roost.

4.7.7 These observations were supported by both the thermal imagery and static detector recordings obtained during the emergence surveys to increase confidence.

Activity transect surveys

4.7.8 Seven activity transect surveys were undertaken between April and September 2022 with six species recorded, namely common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nyctalus noctula*), serotine (*Eptesicus serotinus*), brown long-eared bat (*Plecotus auritus*) and Myotis spp. bat. Detailed results of the activity surveys are located in Appendix 2 and summarised below:

- The highest levels of activity were recorded along the northern hedgerow boundary, however activity was fairly consistent along all site boundaries.
- Common pipistrelle was the most frequently recorded species for each survey undertaken. Low numbers of noctule, soprano pipistrelle, brown long-eared bat and Myotis spp. were also seen.
- Activity levels were assessed to be low-moderate across the survey period, with the highest number of bats recorded during the May and June surveys.
- Common pipistrelles were frequently seen foraging above the mature oak trees along the boundary in the north-western corner.

Static detector surveys

4.7.9 Results from the static detector surveys are summarised below, with full results detailed in Appendix 2.

- A total of eight species of bat were recorded across the site, namely common pipistrelle, soprano pipistrelle, noctule, Leisler's bat (*Nyctalus leisleri*), serotine (*Eptesicus serotinus*), brown long-eared bat (*Plecotus auritus*), myotis spp. barbastelle (*Barbastella barbastellus*).
- Myotis species bat calls were identified to the following possible species onsite with Brandts, whiskered, bechsteins, daubentons and natterers. In total myotis calls totalled less than 3% and did not warrant advance surveys to confirm species.
- The number of calls recorded at Location 1 were higher than at Location 2 (see Figure 15). Different assemblages of bat species were recorded at each location.

Common pipistrelle and soprano pipistrelle were most frequently recorded at location 1 (west of the site) whereas serotine, Natterer's and barbastelle bat were more frequently recorded at location 2 (east of the site).

- Common pipistrelle was the most recorded bat on site across all detectors, comprising 68.7% of all bat calls. Soprano pipistrelle were the second most recorded species, comprising 25% followed by Natterer's (1.8%), Brown long-eared (1.7%), Noctule (1.1%), and Barndt's/Whiskered bat (0.8%) of all bat calls.
- The highest number of mean bat passes per hour related to common pipistrelle at location 1 (see Figure 17)

Barbastelle

- Barbastelle calls comprised 0.25% of all bat calls with a total of 45 calls throughout the survey period (Figure 24).
- Barbastelle calls were also recorded at location 1, with 12 calls recorded.
- There was a peak of barbastelle calls recorded in May and August. During August, activity was fairly consistent throughout the nights, with no particular peak in activity (which could suggest occasional commuting activity) by this species of bat.
- Given the low number of calls recorded this species is not considered further within this assessment.

Brown long-eared

- 4.7.10 During building inspections on B3, a maternity roost for brown long-eared bat was identified within the structure. The species was also confirmed exiting and re-entering the structure during emergence surveys. Due to the presence of a maternity roost, the population of brown long-eared bats is assessed to be of **County importance** for nature conservation.

Common pipistrelle

- 4.7.11 Static detector surveys identified a high number of common pipistrelle calls across the site, with the majority of calls recorded at location 1. Common pipistrelle were frequently seen foraging and commuting on site during the activity transect surveys and therefore, the population of common pipistrelle bats using the site for commuting and foraging activities is assessed to be of **Local importance** for nature conservation.

Other bats

- 4.7.12 The assemblage of other bat species on site identified by the bat surveys is not assessed as particularly important for nature conservation and is only discussed further in this assessment in relation to precautionary mitigation during and post-construction.

4.8 Birds

4.8.1 The data search returned 171 records for birds in the last ten years. These records were all within 2km radius of the development site. Thirty-seven species of bird were identified. All bird species are protected under the Wildlife and Countryside Act 1981, however species afforded extra protection under Schedule 1 of the act and those assessed under the Birds of Conservation Concern (BoCC) as UK Red listed, and amber listed which were identified within the data search, are listed in Table 6 below.

Table 6 Bird species identified within the data search, within 2km of the site

Common name	Scientific name	Notes	Nearest distance and directions from the site	Conservation status and legal protection
Black-headed gull	<i>Chroicocephalus ridibundus</i>	2 records.	Multiple locations adjacent to site.	BoCC amber list.
Bullfinch	<i>Pyrrhula pyrrhula</i>	1 record.	Easthampstead park 1.4m south-east.	BoCC amber list.
Crossbill	<i>Loxia curvirostra</i>	1 record from 2012.	Gorrick plantation 1.3km south-west.	BoCC Red list, Schedule 1.
Dunnock	<i>Prunella modularis</i>	3 records.	Multiple locations adjacent to site.	BoCC amber list.
Fieldfare	<i>Turdus pilaris</i>	4 records.	Multiple locations adjacent to site.	BoCC Red list, Schedule 1.
Firecrest	<i>Regulus ignicapilla</i>	2 records.	Gorrick plantation 1.3km south-west.	Schedule 1.
Gadwall	<i>Mareca strepera</i>	5 records.	Heathlake 1.8km south of the site.	BoCC amber list.
Green Sandpiper	<i>Tringa ochropus</i>	1 record.	Buckhurst Meadow 1km north-east.	BoCC amber list.
Hawfinch	<i>Coccothraustes coccothraustes</i>	1 record.	2km north.	BoCC Red list.
Hobby	<i>Falco subbuteo</i>	5 records.	Gorrick plantation 1.3km south-west.	BoCC Red list, Schedule 1.
House Martin	<i>Delichon urbicum</i>	18 records.	Jeanetts park 1km north-east.	BoCC Red list, Schedule 1.
House Sparrow	<i>Passer domesticus</i>	2 records.	Multiple locations adjacent to site.	BoCC Red list.
Kingfisher	<i>Alcedo atthis</i>	3 records.	Heathlake 1.8km south of the site.	Schedule 1.
Lapwing	<i>Vanellus vanellus</i>	6 records.	Holme Grange 136m south.	BoCC Red list.
Linnet	<i>Linaria cannabina</i>	2 records.	Jeanetts park 1km north-east.	BoCC Red list.
Meadow Pipit	<i>Anthus pratensis</i>	7 records.	Jeanetts park 1km north-east.	BoCC Amber list.

Mistle Thrush	<i>Turdus viscivorus</i>	6 records.	Multiple locations adjacent to site.	BoCC Red list.
Nightjar	<i>Caprimulgus europaeus</i>	1 record.	Gorrick plantation 1.3km south-west.	BoCC Amber list.
Peregrine	<i>Falco peregrinus</i>	1 record.	Jeanetts park 1km north-east.	Schedule 1.
Pochard	<i>Aythya ferina</i>	2 records.	Heathlake 1.8km south of the site.	BoCC Red list.
Red Kite	<i>Milvus milvus</i>	18 records.	Multiple locations adjacent to site.	BoCC Red list, Schedule 1.
Redwing	<i>Turdus iliacus</i>	8 records.	Multiple locations adjacent to site.	BoCC Amber list, Schedule 1.
Shoveler	<i>Spatula clypeata</i>	2 records.	Heathlake 1.8km south of the site.	BoCC Amber list.
Skylark	<i>Alauda arvensis</i>	22 records.	Jeanetts park 1km north-east.	BoCC Red list.
Song Thrush	<i>Turdus philomelos</i>	4 records.	Multiple locations adjacent to site.	BoCC Amber list.
Spotted flycatcher	<i>Muscicapa striata</i>	2 records.	Bigwood 981 north-east.	BoCC Red list.
Starling	<i>Sturnus vulgaris</i>	8 records.	Multiple locations adjacent to site.	BoCC Red list.
Swift	<i>Apus apus</i>	8 records.	Multiple locations adjacent to site.	BoCC Red list.
Tawny Owl	<i>Strix aluco</i>	4 records.	Gorrick plantation 1.3km south-west.	BoCC Amber list.
Whinchat	<i>Saxicola rubetra</i>	2 historic records.	Jeanetts park 1km north-east.	BoCC Red list.
Willow Warbler	<i>Phylloscopus trochilus</i>	4 records.	Gorrick plantation 1.3km south-west.	BoCC Amber list.
Woodcock	<i>Scolopax rusticola</i>	4 records.	Gorrick plantation 1.3km south-west.	BoCC Red list.
Woodlark	<i>Lullula arborea</i>	1 record.	2km south-east.	Schedule 1.

4.8.2 A majority of the records were located in Gorricks Plantation, over 1km away.

4.8.3 During bat surveys in 2022, a single barn owl (*Tyto alba*) was seen foraging on the site, in the western field during July and August. There were no suitable roosting features onsite for breeding barn owls, however areas of the western field which were unmanaged could provide suitable foraging habitat for barn owls.

4.8.4 Tawny owl was heard during a July 2022 bat survey, located along the eastern boundary of the site. Tawny owl may utilise the mature hedgerows onsite to hunt and will likely be nesting in woodland within 1km of the site.

4.8.5 During the preliminary roost inspections for bats, a bird nest was recorded on the north-east gable end of building B1, one nest behind a missing tile within the loft space of building B2, ten house martin nests were recorded inside the building B3 and a

blackbird nest was found within hedgerow H5, where the hedgerow bisects the western field.



Photo 66 Bird nest on B1



Photo 67 Bird nesting behind slipped tile



Photo 68 One of ten house martin nests within B3



Photo 69 Blackbird nest within onsite hedge

- 4.8.6 The habitats onsite were dominated by modified and other neutral grassland, which provides some opportunities for ground-nesting birds like lapwing. The woodland strip, scrub and hedgerows could provide potential breeding habitats for common and widespread species of birds.
- 4.8.7 Overall, the desk study identified several Red List and Amber List species found within a 2km radius of the site, with the closest record for Lapwing identified 136m south of the site. Nests for Red List species; house martin were found onsite, giving evidence of the sites importance for breeding. Due to the mix of favourable habitats onsite for breeding birds, it is considered that the likely assemblage of birds present within the hedgerows and woodland is of **Local importance** for nature conservation.

4.9 Reptiles

- 4.9.1 There were 180 records of reptile returned in the data search including twenty-five records of adder (*Vipera berus*), seventeen of grass snake (*Natrix helvetica*), thirty-four of common lizard (*Natrix helvetica*), one of sand lizard (*Lacerta agilis*) and 103 of slow worm (*Anguis fragilis*), all of which are NERC S41 and UK BAP species.

- 4.9.2 All adder records were located at Gorrick Plantation 1.3km south-west of the site from 2015-2016. The grass snake records were also located at Gorrick Plantation, apart from one record located 198m south of the site at Holme Green. The common lizard records were also mostly found at Gorrick Plantation, however one record was closer to site, located 400m north along the train line. The sand lizard record identified two adult individuals at Gorrick Plantation in 2015 and the slow worm records dated from 2008-2019 were all from various locations with the closest 600m north of the site in a residential area.
- 4.9.3 The site is dominated by modified and other neutral grassland, which provides some habitat for reptiles. The key features on site are assessed as the hedgerows and patches of grassland/scrub in the west of the site.
- 4.9.4 The majority of the site was managed or agricultural land with habitats suitable for reptiles restricted to boundary and scrub areas only. Reptiles are likely absent from the site and are not considered further within this report.

4.10 Amphibians

Data search

- 4.10.1 There were thirteen records of great crested newt (GCN) identified by the data search, all of which were over ten years old and located within 600m of the site. The closest of these records was 522m north-west of the site boundary with a breeding population of eighteen individuals recorded. There were also records of GCN surveyed under licence, most recently in 2017, confirming their presence in a residential area, 500m north-west of the site.
- 4.10.2 There were twenty records of smooth newt (*Lissotriton vulgaris*) identified by the data search, all of which were over ten years old. The closest record was 242m south-east of the site boundary in 2006 and one record 522m north-west of the site was for a breeding population of 180 individuals in 2008. There were two records of palmate newt (*Lissotriton helveticus*) identified from the data search, one from 2005 located over 1km south-east of the site and one from 2013, located over 1km east of the site.
- 4.10.3 Five records of common frog (*Rana temporaria*) were returned from the data search, all over ten years old, with the closest record located 510m north-east of the site boundary in a residential area. There were four records of common toad (*Bufo bufo*), a UK BAP species, returned in the data search with one record from 2016 and the others being over ten years old. The closest record was located 500miles north-east in a residential area, from 2000.
- 4.10.4 There were no European Protected Species (EPS) licence recorded within 1km of the site relating to GCN.

Habitat assessment

On-site waterbodies

- 4.10.5 There are two ponds onsite, one found adjacent to the farm buildings in the western field and the other, a larger pond in the central field. There are no other waterbodies present on the site.
- 4.10.6 The terrestrial habitat in the west of the site is assessed as having potential for GCN, containing unmanaged grassland, scrub and woodland, which would provide foraging and hibernating habitat for amphibians. These habitats are also well-connected to offsite suitable terrestrial habitats to the north and west of the site, which would support amphibians migrating through the wider landscape.

Nearby waterbodies

- 4.10.7 The desk-based assessment identified seven ponds within 500m of the site, and three additional ponds outside of the 500m radius, as shown in Figure 15. Ponds 3-9 are located on private land and could not be accessed for the survey. Ponds 10-11 which are located to the east are within the site boundary of the Priors Farm development, whereby Ethos carried out surveys in 2022. Ponds 10-11 were both man-made fishponds and were both assessed as unsuitable for GCN due to the high concentration of fish within them. Environmental DNA analysis was carried out on both ponds with a negative and indetermined result. The latter result is believed to be due to sample degradation.
- 4.10.8 Ponds 3-9, which could not be assessed, were considered a significant distance from the site and separated by barriers to dispersal, including a main road. Therefore, GCN within these ponds would be unlikely to be impacted by the development.

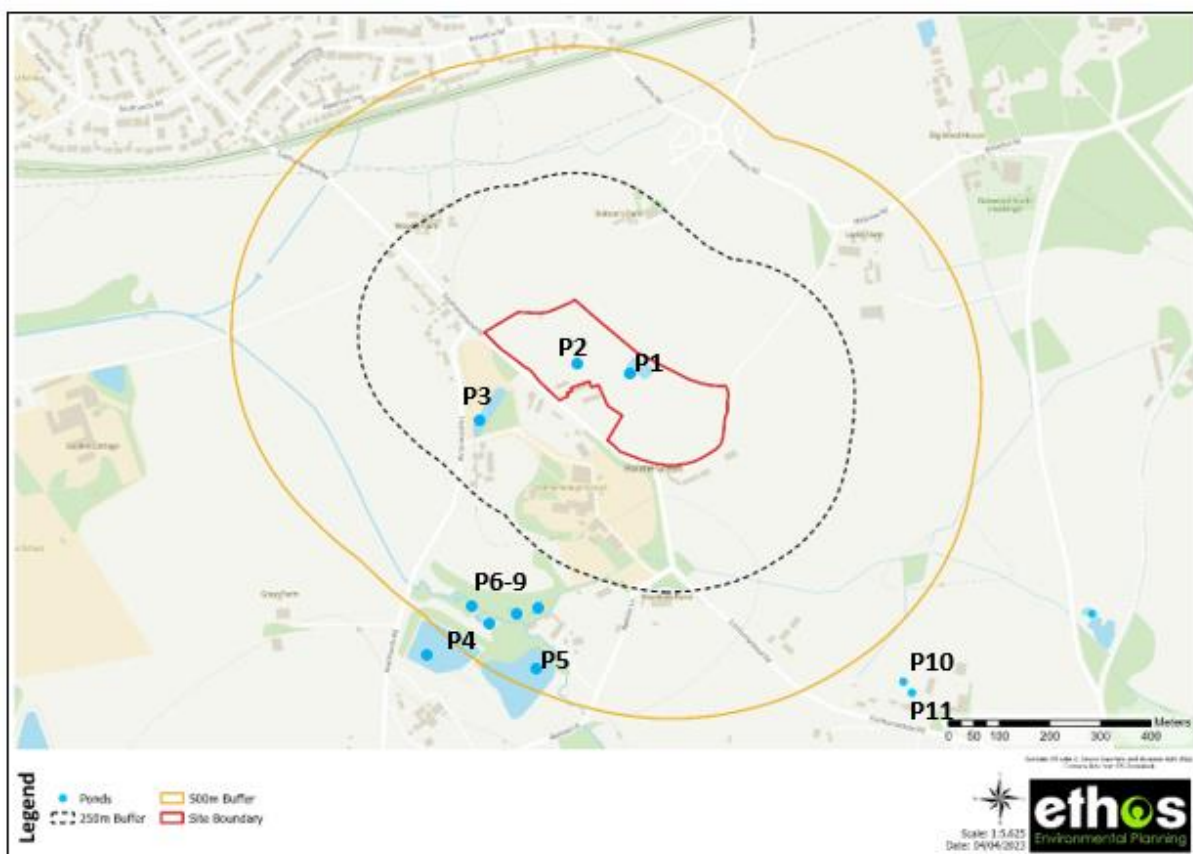


Figure 11 Ponds within 500m radius of the site

HSI

4.10.9 The HSI of both ponds on site was carried out and identified Pond 1 have a value of 0.90 and Pond 2 to have a value of 0.80, which gives a classification of 'Excellent' for both, regarding their suitability to support GCN, as shown in Table 7 below.

Table 7 Habitat suitability index calculations for ponds onsite

Indices	Value	Description	Value	Description
Geographic location	1	Optimal	1	Optimal
Pond area	1	50	1	800
Pond permanence	1	Drying rarely	1	Drying rarely
Water quality	0.67	Moderate	0.67	Moderate
Shade	1	40%	1	60%
Waterfowl effect	0.67	Minor	1	Major
Fish presence	0.67	Possible	0.67	Possible
Pond density	1	6 ponds	1	6 ponds
Terrestrial habitat	1	Good	1	Good
Macrophyte cover	0.35	10%	0.8	45%
Score	0.80		0.90	
Assessment of suitability	Excellent		Excellent	

eDNA

4.10.10 The eDNA survey of both ponds onsite identified GCN DNA to be absent from the pond, as detailed in Appendix 3.

Assessment

4.10.11 GCN were assessed to be absent from the ponds on site, however there were GCN records from in the local area, therefore precautionary measures during construction are recommended in Section 6 to safeguard amphibians potentially present.

4.11 Invertebrates

4.11.1 Records of the NERC S41 species stag beetle (*Lucanus cervus*), small heath (*Coenonympha pamphilus*), cinnabar (*Tyria jacobaeae*), mottled rustic (*Caradrina Morpheus*), oak hook-tip (*Watsonalla binaria*), olive crescent (*Trisateles emortualis*), and small phoenix (*Ecliptopera silaceata*) were identified by the data search. Additionally, records of the Notable A species red-girdled mining bee (*Andrena labiata*) and yellow loosestrife bee (*Macropis europaea*) and the Notable B species four-banded flower bee (*Anthophora quadrimaculata*) were identified within 1km of the site.

4.12 Invasive Species

4.12.1 No invasive species were identified during the site visits, and it was assessed that invasive species were likely absent from the site.

4.13 Summary

Table 8 Summary of important ecological features

Important Ecological Features	Scale of Importance
Thames Basin Heaths SPA	International
Other broadleaved woodland	Local
Pond	Local
Hedgerows (H1, H2, H3, H4, H5, H6, H7, H8, H10)	Local
Line of trees (H9)	Local – opportunity for enhancement
Brown long-eared (Roosting)	County
Common pipistrelle (commuting & foraging)	Local
Hedgehog	Local – no impacts providing hedgehog highways
Brown hare	Local
Badger	N/A – Legal protection only

5 DESCRIPTION OF THE PROPOSED DEVELOPMENT

- 5.1 The development proposals comprise of up to 180 mixed residential units and associated infrastructure.
- 5.2 The layout is still in draft and has yet to be finalised.

6 ASSESSMENT OF IMPACTS AND MITIGATION MEASURES

The following section is based on assumed impacts from the draft layout. This section is aimed to create a discussion to inform any future layout amendments to the scheme.

6.1 Designated sites

- 6.1.1 The site falls within the buffer zone for the Thames Basin Heaths SPA. This usually requires development sites to mitigate impacts to the SPA through the provision of suitable SANG. The site may fall within a Strategic Development Zone and therefore the mitigation requirements may be less onerous. The full mitigation required for the proposed development site will need to be agreed with the council throughout the planning process.

6.2 Habitats

- 6.2.1 Habitats of local importance for the site are the onsite hedgerows, pond and small woodland copse only. Other onsite habitats are assessed for their potential to support other protected species only.
- 6.2.2 Onsite hedgerows will be punctuated to allow access for infrastructure to the proposed development. The proposed punctuations must be located away from mature trees within the hedgerow and will need to be compensated for their loss.
- 6.2.3 All retained hedgerows must be outside of any proposed garden curtilages and be accessible for maintenance by an outside contractor.
- 6.2.4 The single line of trees hedgerow should be enhanced into a Native Hedgerow With Trees through the introduction of new planting of a hedgerow understory.
- 6.2.5 The woodland copse will need to be retained within the proposals and provided with a suitable buffer zone to ensure no impacts. The buffer zone could be utilised to enhance the woodland through increasing its size and diversity, aiming to expand the extent of the existing ground flora into a newly planted woodland area.
- 6.2.6 The large pond onsite will need to be compensated for its loss by creation of a new standing water habitat. Any onsite SuDS as required should be designed to permanently hold water to create pond like habitats. These should then be enhanced through surrounding landscaped habitats that are semi-natural and designed to be wildlife friendly.

6.3 Protected Species

- 6.3.1 The species impacts the proposed is likely to create is on bats; roosting brown long-eared and commuting/foraging common pipistrelles, hedgehog, badger and hare.
- 6.3.2 Brown long-eared bats have a maternity roost in an onsite building, B3, within the loft space above a stables building. This will require a full licence issued by Natural England for the legal destruction of a roost. In order to gain this licence, suitable mitigation and compensation will be required onsite. This should be designed to offer a similar situation that the bats currently have, a modified lofted car port in a suitable location could be a suitable compensation feature. The location of the car port must be close to the original roost, in the same orientation (for solar gain) and provide suitable vegetated dark links to foraging habitats. A licence can only be applied for after planning permission has been granted and will be defined by timing constraints which will likely be that the roof of the building will need to be soft striped during the winter months.
- 6.3.3 Common pipistrelles regularly used the site for commuting and foraging behaviour with their numbers and regular usage confirming the site is of local importance. The proposed development could impact common pipistrelle by direct (change/removal of habitats) and indirect (lighting) impacts. The proposals will need to consider mitigation for this species such as incorporation of suitable dark corridors at the boundaries and enhanced areas for foraging. Enhancement features for this species could be the incorporation of integrated bat bricks into the proposed houses.
- 6.3.4 Hedgehog are considered to be of local importance to this site and the proposals could negatively impact through loss of habitat and commuting areas. Mitigation for hedgehog should include 'hedgehog highways' to be incorporated into the design scheme, whereby all adjacent gardens are linked through gaps in fences to allow hedgehog to continue to forage. Hedgehog friendly curtilage should also be incorporated into the scheme and provision of suitable rough areas within landscaping plans.
- 6.3.5 Brown hare are likely to be found within the local area and could occasionally use the site. Mitigation will be required for the construction phase only to ensure that this species is not accidentally killed/injured during the initial phases of development. This mitigation could be ensuring that the grasslands are kept tightly mown up to the start of development to reduce the likelihood that the site is used by hare.
- 6.3.6 No badger setts have been identified onsite and this species is highlighted for its legal protection only. Mitigation should be included into the construction phases of the scheme to avoid any killing/injury to this species. Mitigation includes the sensible storage of materials and covering of trenches overnight.

6.4 Cumulative Effects

- 6.4.1 Note – To be completed on provision of ES information.

7 MONITORING

- 7.1 Monitoring will be required as part of the bat licence for onsite BLE roost in line with any agreements made through the licence procurement process.
- 7.2 Habitat monitoring will be required for the site through the LEMP. This will likely require site visits every 5 years post completion to ensure that the proposed habitats and maintenance is working and to advise on any remedial actions required.

8 CONCLUSIONS

- 8.1 Assuming the implementation of effective mitigation measures, as set out in this report, no significant adverse ecological effects are predicted.
- 8.2 The proposed development is therefore in accordance with relevant national and local planning policies in relation to nature conservation and relevant wildlife legislation.

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APPENDIX 1 BAT GENOTYPING RESULTS



4 July 22

Re: Identification Results for Ellie Shearn, Ethos Environmental Planning

Job number 18234, received 20 June 2022

Sample labelled: Pearces Farm, near entrance, B3 larger tube

PCR amplification successful. DNA sequence:

ATGACCAACATTTCGAAAGTCCCACCCTCTCATAAAAATTATCAATGACTCATTATTG
ACTTACCTGCTCCCTCAAATATTTTCATCATGATGAAACTTTGGATC

Phylogenetic analysis identification: *Plecotus auritus*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

Professor Robin Allaby

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APPENDIX 2 BAT SURVEY DATA

The following section details the results of the bat surveys at the site. Codes used in the description of bat species are as follows:

CP	Common pipistrelle (<i>Pipistrellus pipitrellus</i>)
SP	Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)
NOC	Noctule bat (<i>Nyctalus noctula</i>)
LEI	Leisler's bat (<i>Nyctalus leisleri</i>)
SER	Serotine bat (<i>Eptesicus serotinus</i>)
MYODAU	Daubenton's bat (<i>Myotis daubentonii</i>)
MYONATT	Natterer's bat (<i>Myotis nattereri</i>)
WHI/BRA	Whiskered/Brandt's bat (<i>Myotis mystacinus/ brandti</i>)
BLE	Brown long-eared bat (<i>Plecotus auritus</i>)
BARB	Barbastelle bat (<i>Barbastella barbastellus</i>)

A summary of the bat activity surveys is included below, and the environmental variables recorded during the surveys are shown in Table 8.

Table 9 Activity surveys environmental variables

Date	28/04/2022		16/05/2022		23/06/2022		19/07/2022		30/08/2022		27/09/2022		20/10/22	
Sunset/Sunrise	20:21		21:22		21:24		21:10		19:54		18:50		18:15	
Start / End time	20:13	22:20	20:50	22:56	21:24	23:25	21:10	22:45	19:48	21:58	18:39	20:44	18:15	20:15
Temperature (°C)	11	10	15	14	19.2	19	26	23	20.7	21	14.5	12	11	8
Humidity (%)	69	74	80	85	77	81.9	58	77	65	64	71.7	70	90	91
Cloud cover (oktas)	7/8	6/8	2/8	4/8	8/8	0/8	7/8	1/8	1/8	0/8	0/8	0/8	8/8	8/8
Avg. Wind speed (m/s)	0.2	0.5	10	10	0.4	0.4	4.4	5.8	1.1	1.3	0	0	1.5	1.7
Rain	None		Earlier		Earlier		Earlier		None		During		None	

28th April 2022 Activity Survey (sunset: 20:21)

- 20:36 -SP heard not seen by residential dwelling.
- 21:00 - SP heard not seen at LP8.
- 21:03 – SP heard not seen at LP8.
- 21:12 – SP heard not seen by residential dwelling.
- 21:31 – SP commuting by LP2. Very faint registration.
- 21:41 – CP heard not seen foraging by barn LP9.

- 21:56 – CP and SPIP foraging along the byway north of LP6.
- 22:00 – CP commuting east then south along hedgerow at LP7.
- 22:01 – SP commuting north at LP7.
- 22:04 - CP commuting heard not seen at LP8.
- 22:17 – SP heard not seen. Faint registration.

Moderate bat activity of CP and SP. Most activity centred around LP8 and LP7 in the north-east corner of the site and around the buildings in the western field, south-eastern corner.

16th May 2022 Activity Survey (sunset: 21:22)

- 21:34 – CP heard not seen south of LP7, a single pass commute.
- 21:46 - NOC commute high over site east along hedgerow towards LP5.
- 21:52 - BLE at LP9, foraging, 3 of them around the barn, 1 flew directly over field.
- 21:59 - CP 1 pass at LP1.
- 22:10 - CP by barn with bat droppings LP9, heard not seen, 1 pass.
- 22:12 – MYO spp. At LP9, potential Natterer's bat. CP and SP passes.
- 22:15- CP over small pond by residential bungalow.
- 22:16 - CP near the front of residential bungalow.
- 22:17 - SP near the front of residential bungalow.
- 22:23 – BLE commuting at LP5.
- 22:25 - CP foraging between LP5 and 6.
- 22:29 - MYO at LP6 commuting east along hedgerow, potential whiskered or Natterer's bat.
- 22:35 - SP at LP7.
- 22:47 - MYO spp. at LP 5.
- 22:51 - SP by driveway, central area of the site.
- 23:22 - Faint CP pass, heard but not seen.

Overall, early and busy start with CP and SP and BLE around the barn at LP9. Most activity along the boundaries of the eastern field.

23rd June 2022 Activity Survey (sunset: 21:22)

- 21:42 - NOC foraging high over road and tree line above residential dwelling.
- 21:54 - NOC foraging over byway north of LP6.
- 22:05 - CP foraging in residential garden.
- 22:10 - CP foraging over barn, LP9, low.
- 22:20 - CP foraging at LP1.
- 22:30 - CP foraging over barn at LP9.
- 22:36 - SER commuting west over LP9.
- 22:39 - CP foraging at over LP9.
- 22:47 - CP foraging along hedge by LP6.
- 22:56- SP foraging at LP8.
- 23:01 – SER foraging around LP9.
- 23:06 - CP foraging at LP2.

Fairly quiet survey with individual bats foraging across most hedgerows onsite, main activity around stables and barn buildings.

19th July 2022 Activity Survey (sunset: 21:10)

- 21:29 - NOC foraging high over hedgerow over centre barns, LP9.
- 21:56 - NOC foraging over LP8.
- 22:03 - barn owl fly by at lp5.
- 22:05 – CP foraging in residential garden area near LP5.
- 22:06 – SER foraging in residential garden area near LP3.
- 22:13 - SP commuting near LP1.
- 22:19 - SP foraging at LP1.
- 22:27 - CP foraging at LP3.
- 22:34 – SER foraging at LP3.
- 22:35 – BLE foraging at row stables LP9.
- 22:36 - SP foraging at row stables LP9.
- 22:39 – CP foraging at LP2.
- 23:00 - CP foraging over front lawn of residential dwelling.
- 23:02 – CP and BLE foraging within barn by LP9.

A quiet survey with scattered activity across the site. Individual bats foraging at hedgerows and some more open areas of the site. Recorded as the hottest day on record for the UK, so a very hot and dry evening. Some rain earlier but very short isolated and light showers only.

30th August 2022 Activity Survey (sunset: 19:54)

- 20:10 - NOC foraging above site circling, continuous for 5mins plus near LP6.
- 20:19 - CP pass between LP7-6 heading south west.
- 20:21 - SP commuting, heading south west LP7 -6.
- 20:24 – SP foraging up and down hedgerow to LP7.
- Tawny owl heard LP7.
- 20:27 - NOC heard not seen at LP7.
- 20:36 - CP foraging up and down hedgerow between LP7-8.
- 20:37 - suspected barn owl at LP8.
- 20:40 – SP foraging over central field, in southern section.
- 20:43 – BLE heard not seen between LP8-5 BLE.
- 21:03 - CP foraging near residential dwelling with social calls.
- 21:14 - suggested whiskered MYOTIS pass along hedgerow. Then CP heading south-east at LP2.
- 21:16 - MYO foraging up and down hedgerow, followed by CP between LP3-4.
- 21:19 – SP and CP foraging around oak trees near LP2 with social calls.
- 21:21 – CP foraging at LP2. Faint registration.
- 21:23 - BLE foraging at LP2 from oak trees to hedgerow west / north-west followed by MYOTIS.
- 21:23 – CP after LP2 foraging above heads by oak trees in hedgerow between LP2-1.
- 21:29 – CP foraging at LP2.

- 21:33- CP foraging at LP1 with social calls.
- 21:41 – CP heard not seen at LP10.
- 21:52 – CP heard not seen at LP5.
- 22:04 – CP in multiple foraging at LP7 around oak trees

Overall, lots of CP and SP activity occurred around the mature trees and hedgerows on site. Minimal myotis activity was recorded.

27th September 2022 Activity Survey (sunset: 18:50)

One CP was recorded at 19:43 near LP7. No other bats or activity was recorded during this survey.

20th October 2022 Activity Survey (sunset: 18:15)

- 18:15 - CP X3 foraging around house.
- 18:23 - SP at LP8 Pass.
- 18:31 - CP foraging on eastern boundary.
- 18:47 - CP south of residential dwelling.
- 18:51 - CP at LP10 foraging.
- 18:57 - CP foraging southwestern boundary.
- 18:59 - CP southwest foraging.
- 19:20 – Natterer's LP7 pass east.

Mainly CP and SP with no focused activity but mostly on boundaries mature trees adjacent to house at the start of the survey. All pipistrelle bat species, except myotis NATT near the end of survey. Very foggy and poor conditions for bats.

A summary of the bat emergence surveys is included below, and the environmental variables recorded during the surveys are shown in Table 9.

Table 10 Emergence surveys environmental variables

Date	23/06/2022		28/07/2022	
Sunset/Sunrise	21:24		21:10	
Start / End time	21:24	23:25	21:10	22:45
Temperature (°C)	19.2	19	26	23
Humidity (%)	77	81.9	58	77
Cloud cover (oktas)	8/8	0/8	7/8	1/8
Avg. Wind speed (m/s)	0.4	0.4	4.4	5.8
Rain	Earlier		Earlier	

23rd June 2022 Emergence Survey (sunset: 21:24)

- 22:03 – BLE emerged from building.
- 22:03 – BLE re-entered building, exited, entered and exited again between 22:06.
- 22:06 – Bat foraging in front of building.
- 22:07 – Three BLE flying into the barn structure and foraging.

- 22:08 – Three BLE flying into the loft space of the barn, one exits structure, followed by second, then third, followed by one of the three re-entering the building.
- 22:55 – BLE foraging at the front of the building. Bat enters building and shortly after exits.
- 23:10 – BLE enters structure.

Four BLE confirmed emerging from the structure, through the open hatch in the loft void and out of the eastern elevation, open side of the barn (B3). No other species recorded as emergences.

28th July 2022 Emergence Survey (sunset: 21:10)

- 21:10 - CP pass, heard not seen.
- 21:20 - BLE commuting north to south across east elevation of barn.
- 21:22 - BLE commuting south to north across east elevation of barn.
- 21:28 - BLE foraging around barn.
- 21:34 - BLE emergence – through open front of eastern elevation.
- 21:37 - CP flew past barn roof from east.
- 21:42 - faint NOC pass heard not seen.
- 21:49 - BLE calls registered, heard not seen.
- 21:58 - CP pass heard not seen.
- 21:59 - BLE calls registered, heard not seen.
- 22:19 - CP foraging (over top of barn).
- 22:31 - BLE pass, heard not seen.

BLE confirmed emerging from the structure, through the open hatch in the loft void and out of the eastern elevation, open side of the barn (B3). No other species recorded as emergences.

**NB: The term 'Activity' has been used during the analysis of the static bat detectors. Whilst static bat detectors cannot give an accurate indication of the number of bats foraging/commuting on site, they provide valuable information relating to species composition and comparisons from the number of records across the site. In this instance, the term 'activity' is based off the mean average records per night in order to prevent a period of intensive foraging over a short period of time skewing the results. It also allows for true comparison when detectors are deployed for different periods of time.*

Table 11 Static detector survey results summary

Static Number	Location Deployed	Average calls/night (across all species)	Species Recorded	Comments
1	Centre of the western boundary hedgerow	480	10 species: CP, SP, NOC, LEI, SER, WHI/BRA, MYODAU, MYONATT, BLE, BARB, BEC.	CP accounted for 70% of records
2	Near the north-eastern corner of	148	11 species: CP, SP, NOC, LEI, SER,	CP accounted for 62% of records.

Static Number	Location Deployed	Average calls/night (across all species)	Species Recorded	Comments
	the site, on the northern hedgerow		WHI/BRA, MYODAU, MYONATT, BLE, BARB.	

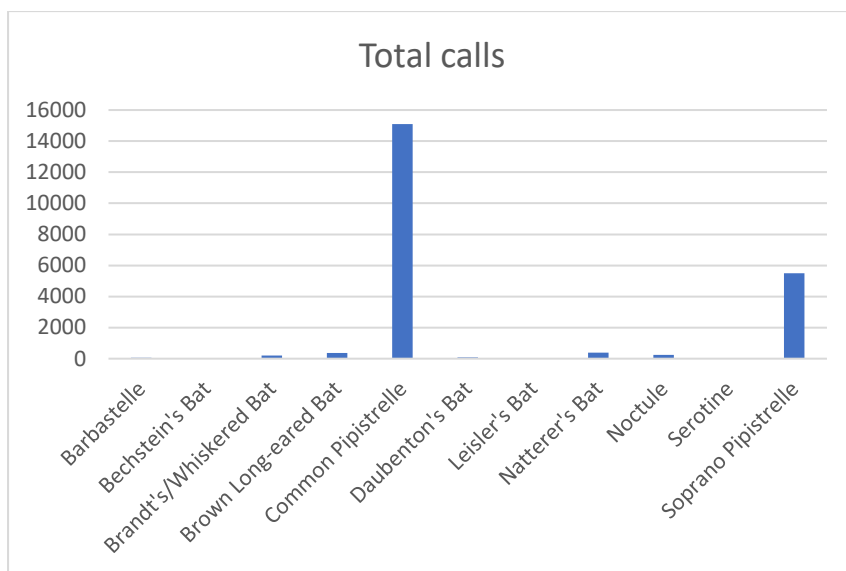


Figure 12 Total bat calls across the site

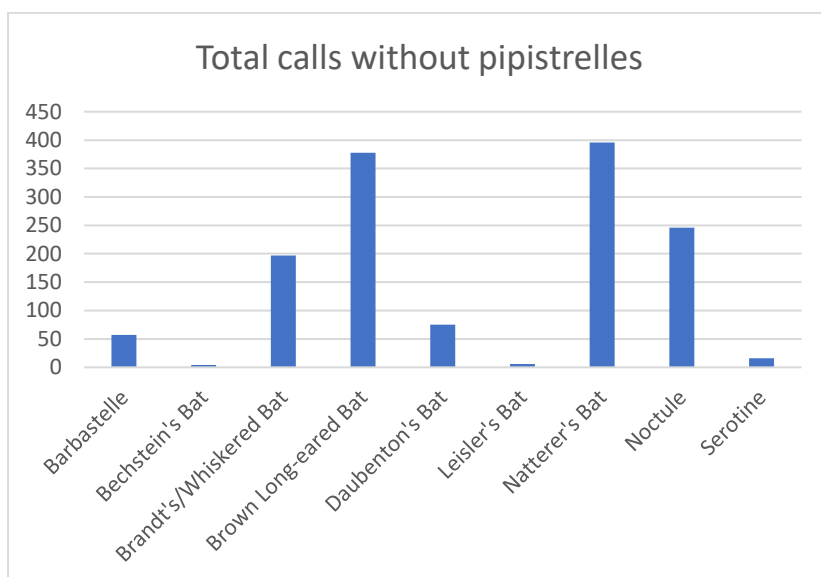


Figure 13 Total bat calls across the site excluding pipistrelle bats

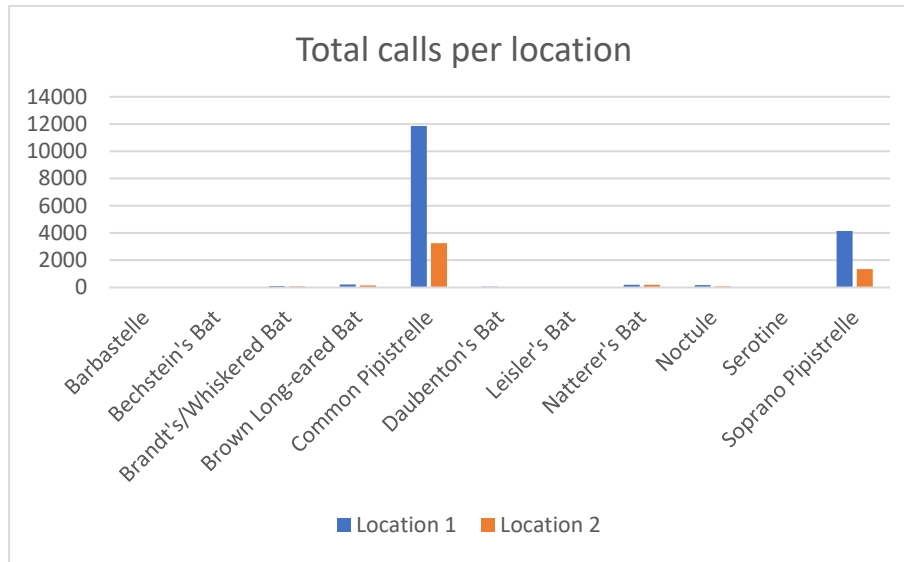


Figure 14 Total bat calls per location

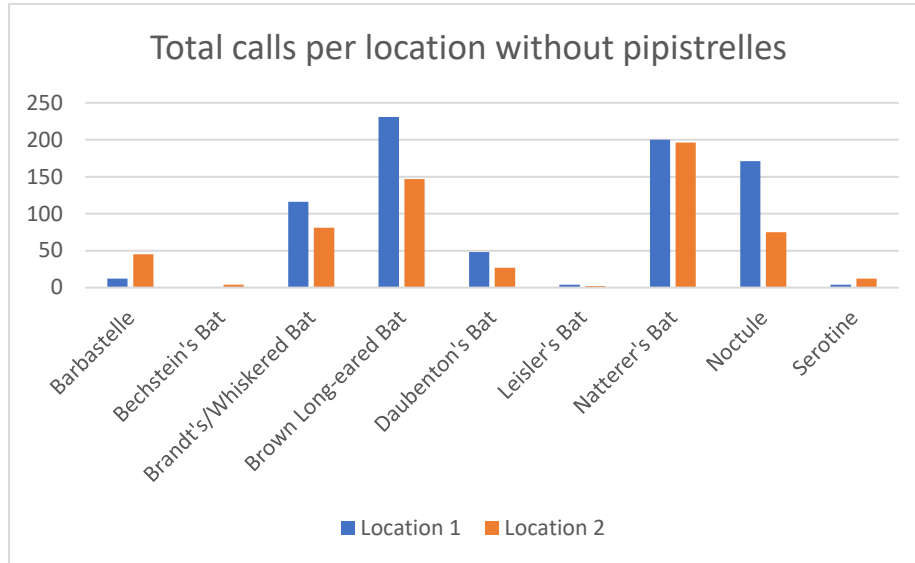


Figure 15 Total bat calls per location without pipistrelles

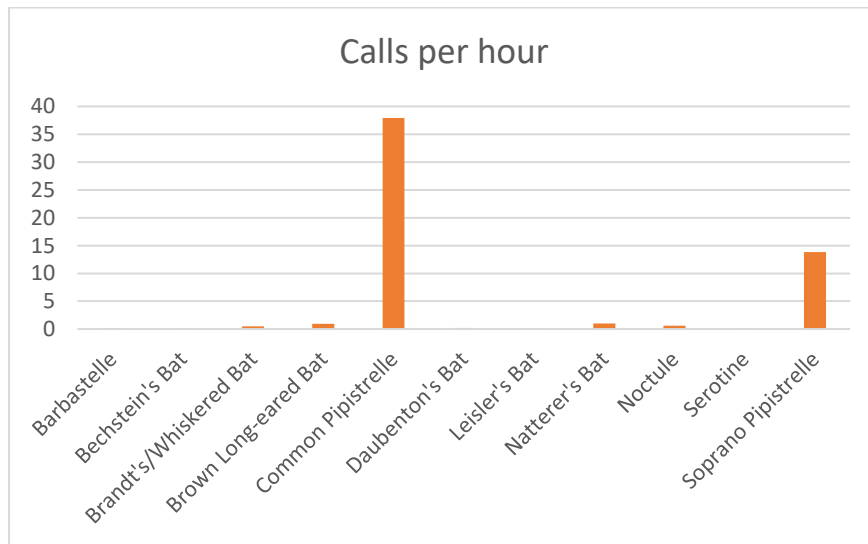


Figure 16 Total bat calls per hour

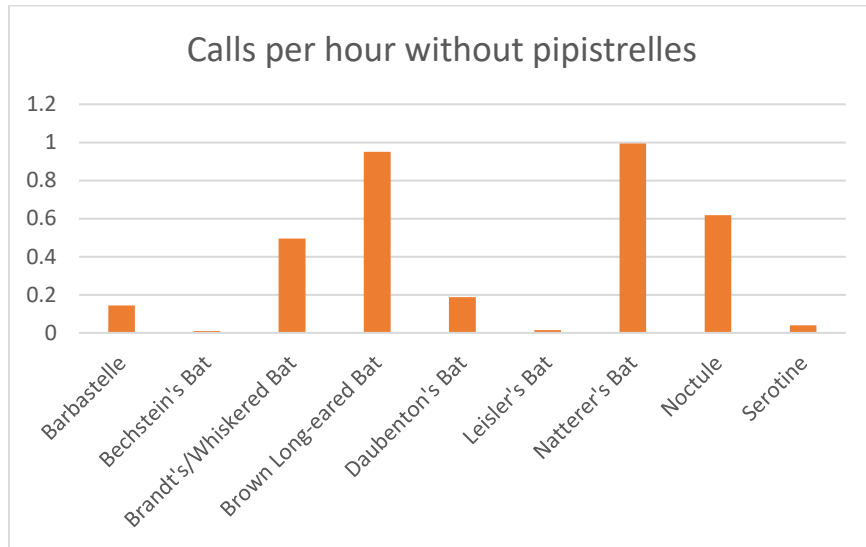


Figure 17 Total bat calls per hour without pipistrelles

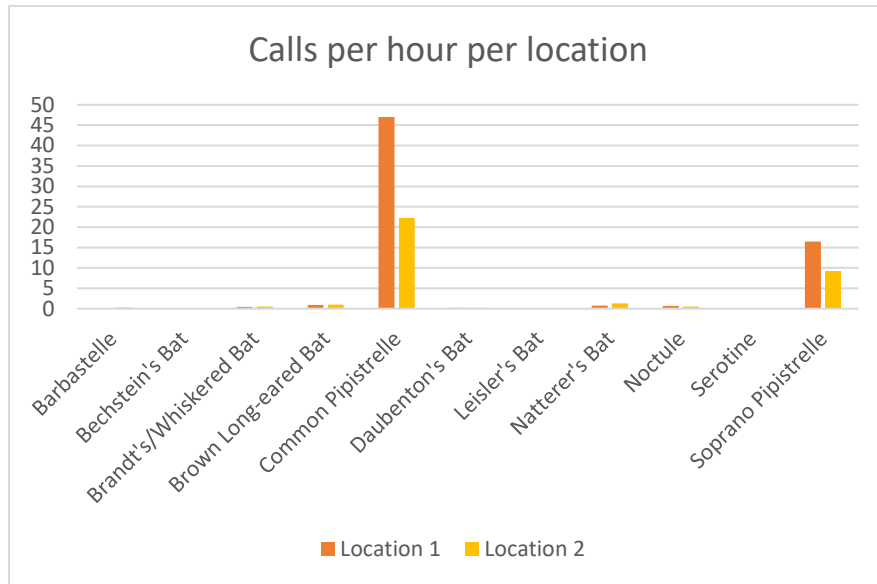


Figure 18 Calls per hour per location

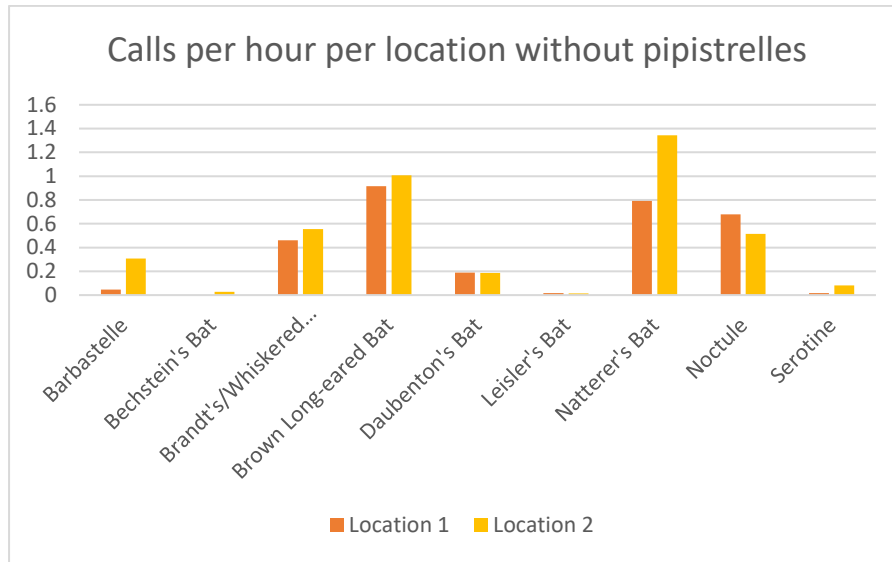


Figure 19 Calls per hour per location without pipistrelles

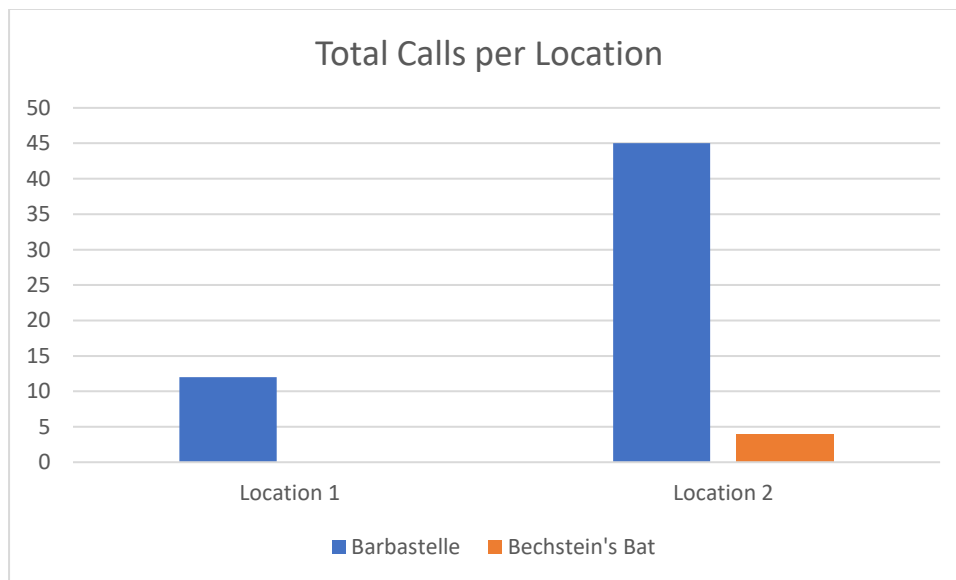


Figure 20 Total Barbastelle and Bechstein's Bat calls per location

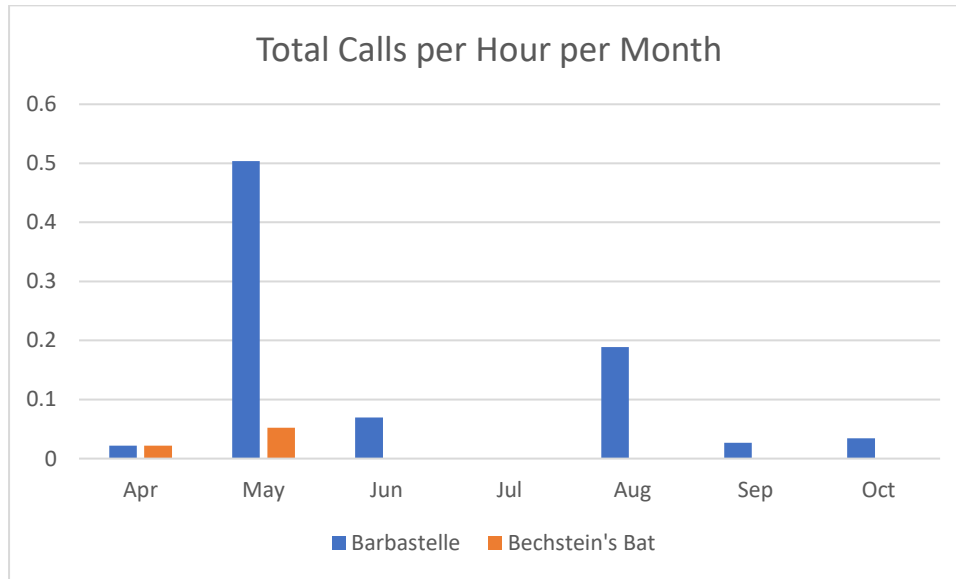


Figure 21 Total barbastelle and Bechstein's bat calls per hour per month

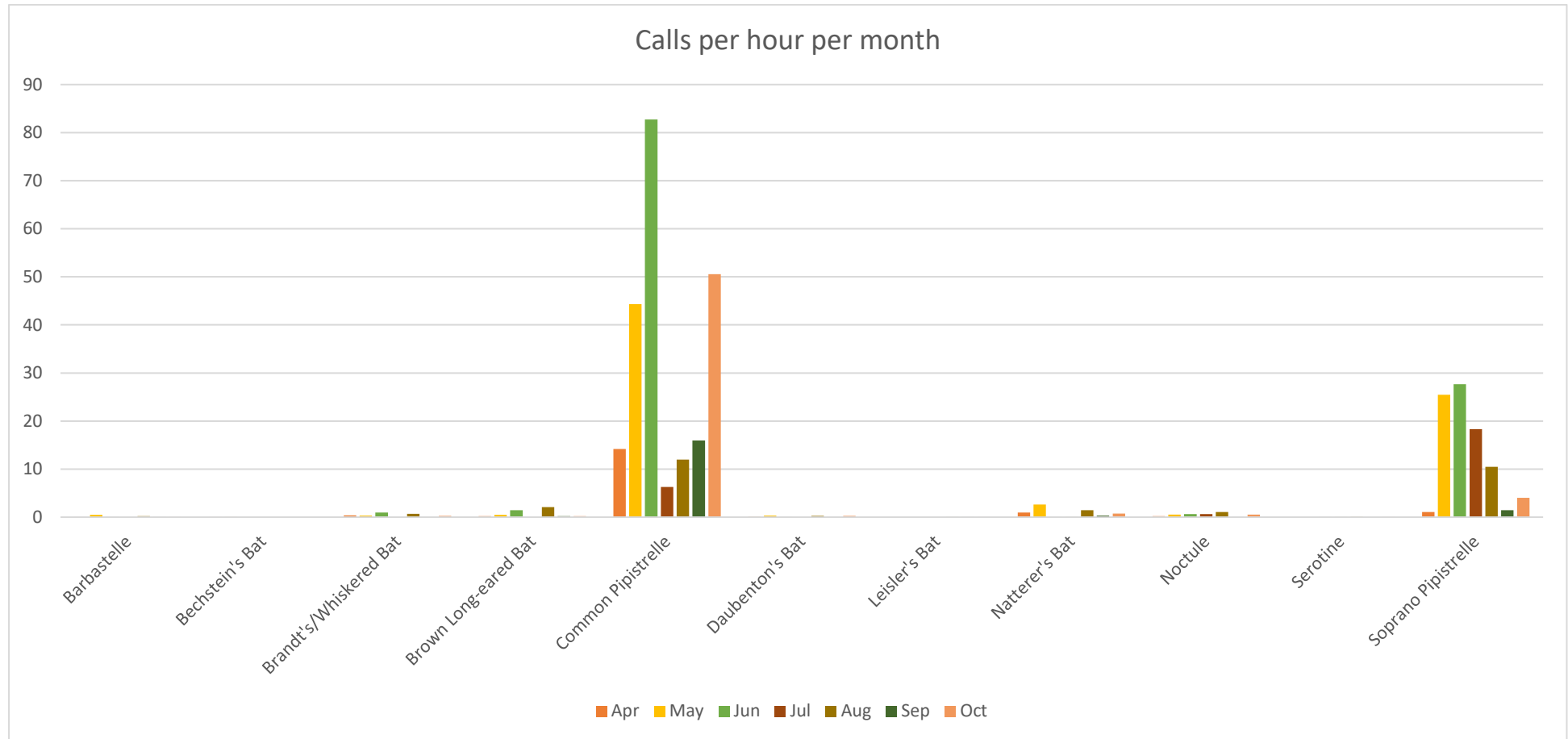


Figure 22 Calls per hour per month

APPENDIX 3 GCN EDNA RESULTS

Client: Stephanie Green,
Ethos Environmental Planning



ADAS
Spring Lodge
172 Chester Road
Helsby
WAS 6AR

Tel: 01159 229249
Email: Helen.Rees@adas.co.uk
www.adas.co.uk

Sample ID: ADAS-3587 Condition on Receipt: Good Volume: Passed
Client Identifier: Wilson's
Pearce's Farm Description: pond water samples in preservative
Date of Receipt: 05/05/2022 Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control ¹	2 of 2	Real Time PCR	09/05/2022
Degradation Control ⁵	Within Limits	Real Time PCR	09/05/2022
Great Crested Newt ⁴	0 of 12 (GCN negative)	Real Time PCR	09/05/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10 ⁴ ng/μL) ⁶	4 of 4	Real Time PCR	As above for GCN

Report Prepared by: Dr Helen Rees Report Issued by: Dr Ben Maddison

Signed:



Signed:



Position: Director: Biotechnology

Position: MD: Biotechnology

Date of preparation: 10/05/2022

Date of issue: 10/05/2022

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

¹ If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.

⁴ Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

⁵ No degradation is expected within time frame of kit preparation, sample collection and analysis.

⁶ Additional positive controls (10⁴, 10³, 10² ng/μL) are also routinely run, results not shown here.

Client: Stephanie Green,
Ethos Environmental Planning



ADAS
Spring Lodge
172 Chester Road
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WAS 6AR
Tel: 01159 229249
Email: Helen.Rees@adas.co.uk
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Sample ID: ADAS-3608 Condition on Receipt: Medium Sediment Volume: Passed

Client Identifier: Pearce's Farm Description: pond water samples in preservative

Date of Receipt: 05/05/2022 Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control ¹	2 of 2	Real Time PCR	09/05/2022
Degradation Control ²	Within Limits	Real Time PCR	09/05/2022
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	09/05/2022
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10 ⁻⁴ ng/μL) ³	4 of 4	Real Time PCR	As above for GCN

Report Prepared by: Dr Helen Rees Report Issued by: Dr Ben Maddison

Signed:



Signed:



Position: Director: Biotechnology

Position: MD: Biotechnology

Date of preparation: 10/05/2022

Date of issue: 10/05/2022

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¹ Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

² No degradation is expected within time frame of kit preparation, sample collection and analysis.

³ Additional positive controls (10⁻⁵, 10⁻², 10⁻³ ng/μL) are also routinely run, results not shown here.