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Ecological Impact Assessment

Whitehill House,
Whitehill Lane,
Mere,
Wiltshire,
BA12 6JU

July 2023

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QUALITY CONTROL		
The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct.		
Prepared by	Ecologist Agnes Rutter	June 2023
Checked by	Consultant Ecologist Jessie Forster	July 2023

This report remains valid for 12 months from date of issue.

Survey data are valid for 12-18 months from the date the survey was undertaken.

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Whilst every effort has been made to guarantee the accuracy of this report, it should be noted that living creatures are capable of migration and whilst protected species may not have been located during the survey duration, their presence may be found on site at a later date.

The views and opinions contained within the document are based on a reasonable timeframe between the completion of the survey and the commencement of any works. If there is any delay between the commencement of works that may conflict with timeframes laid out within this document, or have the potential to allow the ingress of protected species, a suitably qualified ecologist should be consulted.

It is the duty of care of the landowner/developer to act responsibly and comply with current environmental legislation if protected species are suspected or found prior to works.

1. EXECUTIVE SUMMARY

1.1. Darwin Ecology Ltd was commissioned by Lucy Irwin to undertake an Ecological Impact Assessment (EcIA) of proposals for the building at Whitehill House, Whitehill Lane, Mere, Wiltshire, BA12 6JU[1]. The assessment was required to support a planning application for a single storey extension on the northern elevation of the main house, a replacement roof and a loft conversion and was informed by a desk study, internal / external building inspection and emergence surveys for bats.

1.2. During the internal / external building inspection, the roof void above the main house was confirmed as a serotine and brown long-eared bat roost, with further evidence of soprano pipistrelle droppings. Numerous external features with potential for crevice roosting bats were also recorded on the building.

1.3. During the emergence surveys, the main house (excluding the extension on the eastern elevation of the property) was confirmed to support five day roosts for soprano pipistrelle bats and one day roost for common pipistrelle within external crevices. A brown long-eared bat was also recorded emerging from the building. A peak count of four soprano pipistrelle bats, one common pipistrelle and one brown long-eared bat were recorded emerging from the building during the surveys. Serotine were not recorded emerging from the building and only a single pass from a serotine bat was recorded across all three emergence surveys. Based on the presence of serotine droppings in the loft void it is considered likely that the roost is used occasionally as a day roost by an individual or low numbers of bats.

1.4. The proposed plans show the works will directly impact confirmed roosts for serotine, brown long-eared bats, soprano pipistrelle and common pipistrelle bats and will cause disturbance to bats roosting within the building. Due to the range of species and roosts present, a full EPS mitigation licence will be required to permit the above actions.

1.5. Mitigation and compensatory measures to ensure the Favourable Conservation Status (FCS) of bats is maintained will include:

- Timing of works outside of the hibernation period for bats;
- Education of contractors on protection afforded to bats through a Tool Box Talk;
- Ecological supervision and soft strip of features suitable for use by bats by hand and using hand tools prior to the rest of the building works;
- Provision of three bat boxes suitable for serotine, brown long-eared bats and pipistrelle bats will be installed prior to works commencing on site. Bat boxes will comprise 1 x Schwegler 2F w. Double Front Panel, 1 x Schwegler 2FN, and 1 x Vincent Pro Bat Box for use as safe release sites. These are to be installed in a

[1] Ordnance Survey (OS) grid reference ST 81881 30737.

location determined by a licensed bat ecologist to ensure likelihood of uptake is increased;

- Creation of 2 x lead roll crevice features to compensate for the loss of a brown long-eared bat roost and a serotine roost;
- Creation of 4 x crevice roost features on the cheeks of the newly installed dormer windows to compensate for the loss of the soprano pipistrelle day roosts.
- Creation of 1 x crevice feature installed beneath lead flashing around a chimney, to compensate for the loss of the common pipistrelle day roost.
- Any new external lighting will be fitted with downward facing baffles and will be directed to avoid light spillage.

1.6. Recommendations for enhancements have also been made which include: One bee brick or alternative insect box will be installed on the western elevation of the proposed extension.

- Installation of 2 x house martin nest cups;
- Installation of 2 x bee bricks;
- Enhancements to the roof void above the car port to include installation of a gable end access point suitable for a range of species of bats and a fly-in access point (area of removed ceiling) above the car port suitable for long-eared bats.



Figure 1: Site location with the building surveyed outlined in red. (Copyright Google Earth 2023).



Figure 2: Site location within the wider landscape. (Copyright Google Earth, 2023).

2. INTRODUCTION AND BACKGROUND

2.1. Darwin Ecology Ltd was commissioned by Lucy Irwin to undertake an EcIA of proposals for the building at Whitehill House, Whitehill Lane, Mere, Wiltshire, BA12 6JU[2]. The assessment was required to support a planning application for a single storey extension on the northern elevation of the main house, a replacement roof and a loft conversion and was informed by a desk study, internal / external building inspection and emergence surveys for bats.

2.2. The proposed drawings on which this assessment is based are provided at **Appendix 1, Proposed Plans**.

2.3. The survey and report follow the Bat Conservation Trust (BCT) Good Practice Guidelines (2016).

2.4. The subsequent Ecological Impact Assessment (EcIA) follows the roost assessment methodology set out by Wray *et al*. (2010) and the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (2018).

Site Overview

2.5. The site is situated in a rural location, approximately 8 km south of Mere and 4 km north of Gillingham on Whitehill Lane.

2.6. The site comprises a detached two-storey residential dwelling with a conservatory on the western elevation and a double story extension on the eastern elevation. There are two outbuildings, a garage and a barn / workshop. The garden surrounding the house is predominantly amenity grassland with trees, shrubs and a pond (see **Figure 1**).

2.7. The wider landscape surrounding the site is a mosaic of arable and pasture fields with some small areas of woodland, well-linked by hedgerows. There is a small lake (trout fishery) 200 m north-east of the site and the small town of Mere is located to the north with associated residential and industrial areas (see **Figure 2**).

Scope of Assessment

2.8. The process of EcIA aims to identify, quantify and evaluate the potential effects of development-related or other proposed actions on habitats, species and ecosystems.

2.9. Potential effects on the following ecologically sensitive receptors have been considered during the EcIA of Whitehill House:

- Statutory and non-statutory designated sites; and
- Features of potential importance (such as loft voids or external crevice features).

[2] Ordnance Survey (OS) grid reference ST 81881 30737.

2.10. The aim of this report is to:

- Identify and describe bats roosts present within the site;
- Classify the the type of roost present (e.g. day roost, maternity roost etc);
- Carry out an impact assessment of the proposed works and how they will directly / indirectly affect bats and their roosts;
- Outline the relevant legislation and protection afforded to bats; and
- Provide avoidance, compensation, mitigation and enhancement measures recommended to avoid harm / injury to roosting bats.

3. LEGISLATION & POLICY

General Wildlife Legislation

3.1. Wildlife in the United Kingdom (UK) is protected through European and national legislation, supported by national and local policy and guidance. Development can contribute to conservation and enhancement goals outlined by these various legislation and policy by retaining and protecting the most valuable ecological features within a site and incorporating enhancements to provide biodiversity net gain.

3.2. This section provides a brief summary of the principle legalisation and policy that triggers the requirement for PRA and further ecological assessments in the UK. The presence of protected species within a site are a material consideration during the planning process. PRAs and any necessary further ecological assessments provide an ecological baseline for a site and evaluation of the potential impact of proposals.

3.3. It is the responsibility of those involved with development works to ensure that the relevant legislation is complied with at every stage of a project. Such legislation applies even in the absence of related planning conditions or projects outside the scope of the usual planning process (i.e. permitted development projects or projects requiring Listed Building Consent only).

Bat Legislation

3.1. In England and Wales, all bat species and their roosts are legally protected under the European *Habitats Directive (1992)*; the *Conservation of Habitats and Species Regulations (2017)*; the *Wildlife and Countryside Act (1981) (as amended)*; the *Countryside and Rights of Way Act, 2000*; and the *Natural Environment and Rural Communities Act (NERC, 2006)*.

3.2. Barbastelle *Barbastella barbastellus*, Bechstein's *Myotis bechsteinii*, greater horseshoe *Rhinolophus ferrumequinum*, lesser horseshoe *Rhinolophus hipposideros*, brown long-eared *Plecotus auritus*, soprano pipistrelle *Pipistrellus pygmaeus*, and noctule *Nyctalus noctula* bats are all species of principal importance in England under *Section 41* of the *Natural Environment and Rural Communities Act 2006*.

3.3. You will be committing a criminal offence if you:

- Deliberately capture, injure or kill a bat;
- Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
- Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time);
- Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat; or
- Intentionally or recklessly obstruct access to a bat roost.

3.4. The government's statutory conservation advisory organisation, Natural England, is responsible for administering EPS licenses that permit activities that would otherwise lead to an offence.

3.5. A licence can be obtained if the following three tests have been met:

- Regulation 53(9)(a) - there is "no satisfactory alternative" to the derogation, and;
- Regulation 53(9)(b) - the derogation "will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range" and;
- Regulation 53(2)(e) - the derogation is for the purposes of "preserving public health or public safety or other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment".

National Planning Policy

3.1. The *National Planning Policy Framework (2021)* aims to minimise impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity. Chapter 15 'Conserving and enhancing the natural environment' details what local planning policies should seek to consider with regard to planning applications.

3.2. Planning policies and decisions should contribute to and enhance the natural and local environment by:

> *174 a)* Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
>
> *174 b)* Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
>
> *174 d)* Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
>
> *175)* Plans should: distinguish between the hierarchy of international, national and local designated sites; allocate land with the lease environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement

of natural capital at a catchment or landscape scale across local authority boundaries;

176) Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural beauty which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great weight in National Parks and Broads. The scale and extent of development within all these designated areas should be limited, while development within their settings should be sensitively located and designed to avoid or minimize adverse impacts on the designated area.

3.3. Specific policies regarding habitats and biodiversity comprise:

179) To protect and enhance biodiversity and geodiversity, plans should:

a) identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation and

b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species and identify and pursue opportunities for securing measurable net gains for biodiversity.

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 avoid (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;

b) development on land within or outside of Sites of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the feature of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) development resulting in the loss r deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d) development whose primary objective is to conserved or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around development 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.

3.4. *Circular 06/05: Biodiversity and Geological Conservation* provides guidance on the application of the law relating to planning and nature conservation and complements the *National Planning Policy Framework*.

3.5. *Biodiversity 2020: A strategy for England's wildlife and ecosystem services* provides the *UK Biodiversity Action Plan* and country level biodiversity strategies for England, based on the list of habitats and species listed on *Section 41* of the *Natural Environment and Rural Communities Act 2006*. These are considered the habitats and species of principal importance requiring conservation action.

Local Planning Policy

3.6. The local planning policy for the site is the Wiltshire Core Strategy (2015). In particular, Core Policy 50 (Biodiversity and Geodiversity) provides guidelines for protection and enhancement of the natural environment and refers to the planning guidance for Special Areas of Conservation (SACs) in Wiltshire, designated for the presence of nationally important bat species.

3.7. Wiltshire County Council (WCC), Natural England (NE) and local experts and researchers have jointly prepared the Bat Special Areas of Conservation (SAC) Planning Guidance for Wiltshire (2015). It is aimed at applicants, agents, consultants and planners involved producing and assessing development proposals in the landscapes surrounding Wiltshire's most sensitive bat roosting sites, which are protected by European wildlife legislation and applies to all types of developments that are subject to planning control.

3.8. The guidance gives details on how to mitigate any potential impacts on Wiltshire Bat SACs and to ensure that any potential issues are identified as early in the planning process as possible to prevent unnecessary delays to development projects. The guidance also outlines the ecological documents and plans, which should be submitted in support of planning applications, so as to ensure that the council has all the information required to undertake a reliable Habitats Regulations Assessment (HRA) should one be required.

3.9. In addition to policies relating to bat SACs, the Wiltshire Core Strategy (2015) includes Core Policy 51 (Landscape), which provides guidance for protecting, conserving and where

possible, enhancing landscape character, including locally distinctive patters and species composition of natural features (such as trees, hedgerows, woodland, field boundaries, watercourses and waterbodies). Core Policy 69 (Protection of the River Avon SAC) provides guidelines for the incorporation of measures during construction and operations to avoid and prevent pollution and to minimise disturbance effects.

Wiltshire Biodiversity Action Plan

3.10. The Wiltshire Biodiversity Action Plan was published in 2002 and reviewed in 2008 by the Wiltshire Wildlife Trust and over 40 delivery partners who make up the Wiltshire Biodiversity Action Plan Partnership. It includes habitat action plans for 11 of the most significant of the UK Priority Habitats in Wiltshire, which include woodland, wood-pasture, parkland and ancient trees, hedgerows, calcareous grassland, neutral grassland, traditional orchards, farmland habitats, built environment, standing open water and rivers, streams and associated habitats. In addition, a bat species action plan has also been included, covering all bat species found in Wiltshire, while other priority species have been included under the appropriate habitat action plans.

3.11. The Wiltshire Biodiversity Action Plan species list includes species that have national priority and also specie having local importance in Wiltshire including county notables. A total of 260 species have been included on the Wiltshire Biodiversity Action Plan species list.

3.12. The Wiltshire Biodiversity Action Plan aims to achieve the following:

- Enable prioritisation and define actions for priority habitats and species in Wiltshire;
- Create a plan of action that can be delivered through a partnership of statutory, private and third sector organisations;
- Provide a baseline of current knowledge and a tool to help monitor key habitats and species; and
- To link objectives, targets and actions to report nationally and enable conservation work carried out in Wiltshire to contribute to national targets and reporting.

3.13. In 2012, a landscape scale framework for conservation in Wiltshire was developed, identifying 11 Landscape Biodiversity Areas across Wiltshire and Swindon, made up of a number of priority habitats, designated sites and other areas of conservation significance. This aims to encourage landscape scale planning for species and habitat conservation across Wiltshire.

4. METHODOLOGY

Desk Study

4.1. A desk study was undertaken for designated sites and bat species records within 2 km of the site:

- The MagicMap website was reviewed to obtain information on any designated sites of nature conservation interest within 2 km of the site and details of any EPS licences issued within 2 km;
- The Wiltshire Council Planning Portal was searched for past and pending planning applications that may have associated ecological documents detailing results of bat surveys; and
- A data search was requested from Wiltshire and Swindon Biological Records Centre and Dorset Environmental Records Centre for records of bat species within 2 km; and
- Google Maps and Ordnance Survey (OS) Leisure Maps was utilised to view aerial photographs, maps and mapnik data, and to assess the ecological context of the site within the wider landscape.

Building Inspection

4.2. Ecologist Jessie Forster BSc (Hons) conducted a PRA at the site at Whitehill House on 7 February 2023 in accordance with the following methodology:

External Survey

4.3. An investigation was carried out of external features with potential for use by roosting bats, such as gaps under roof and ridge tiles, gaps at soffit boxes or fascias. A search for bat droppings was made beneath each potential entry/exit point identified where accessible. The surveyor used binoculars and powerful, low-heat LED torch.

Internal Survey

4.4. An investigation was carried out of the roof void (including the floor and walls) for signs of bats roosting and the access potential into the roof void for bats. The surveyor looked for bats, bat droppings, likely access points, signs of feeding, dead bats, scratch marks and staining, and made a suitability assessment of the structure of the roof.

Emergence / Re-Entry Surveys

4.5. Three dusk emergence surveys were conducted during the 2023 survey season. Surveys were undertaken in line with BCT Good Practice Guidelines (2016), with any limitations outlined below.

4.6. The surveyors who conducted each survey are listed in **Table 1** below.

Table 1: Emergence and re-entry survey dates and weather conditions

Date	Survey type	Sunset/ sunrise time	Start weather conditions	End weather conditions	Surveyors
02/05/23	Emergence	20:32	Rain: 0 Wind: 1 Cloud cover: 1 Temperature: 14ºC	Rain: 0 Wind: 1 Cloud cover: 1 Temperature: 11ºC	Agnes Rutter Jessie Forster Michael Cummings
16/05/23	Emergence	20:53	Rain: 0 Wind: 2 Cloud cover: 5 Temperature: 16ºC	Rain: 0 Wind: 2 Cloud cover: 2 Temperature: 12ºC	Agnes Rutter Jessie Forster Camera surveyor
30/05/23	Emergence	21:12	Rain: 0 Wind: 4 Cloud cover: 4 Temperature: 13ºC	Rain: 0 Wind: 3 Cloud cover: 7 Temperature: 12ºC	Agnes Rutter Michael Cummings Sarah Firmin

4.7. Surveyors were positioned strategically around the building in order to provide adequate coverage of all elevations. Surveyors focused on any features identified during the Preliminary Roost Assessment (PRA) as having potential to be used as bat access points. The location of the surveyors are shown on **Figure 3, Bat Survey Results**.

4.8. Dusk emergence surveys were conducted in preference to dawn return surveys due to the higher likelihood of spotting bats as detailed in updated BCT guidance “Interim Guidance Note: Use of night vision aids for bat emergence surveys and further comment on dawn surveys” (Bat Conservation Trust, May 2022).

4.9. Dusk surveys began 15 minutes prior to sunset and lasted 1.75 hours after sunset. Surveyors recorded bat activity using hand-held Echometer Touch detectors connected to Android or iPhone devices. Analysis of recordings was undertaken after the surveys to confirm species identification. Observations recorded during surveys included bat access points, bat species, time, and type of activity (e.g. emergence, re-entry, commuting, foraging, etc.). Incidental records of bats within the vicinity of the building (but not necessarily roosting) were also recorded.

4.10. Canon XA20 video cameras and Black Sun 2 B502 infra-red illuminators were also used to film bat activity at fixed positions. A minimum of two cameras were used as survey aids during each emergence survey and an additional camera was used in place of a surveyor during emergence survey 2. The video footage was reviewed following the survey to identify any bat activity captured and any significant activity patterns and access points were identified and recorded.

4.11. A summary of the survey dates and weather conditions are provided in **Table 1**.

4.12. The extension on the eastern elevation of the building was not subject to survey and is not considered within the EcIA as it is not due to be impacted by the proposals.

Evaluating Bat Roosts

4.13. The value of the bat roosts on site was assessed in accordance with the article published in the CIEEM, In Practice Magazine - *Valuing Bats in Ecological Impact Assessment* (Wray, *et al.*, 2010).

4.14. Roosts are assigned a relative ecological value based on the rarity of the species (**Table 2**) and categorisation of roost type (**Table 3**), informed by survey results. Once a value has been calculated, robust mitigation for any impacts identified from the proposed development can be determined.

Table 2: Categorising bat species by distribution and rarity

Rarest	Rare	Common
Greater horseshoe Bechstein's Alcathoe Greater mouse-eared Grey long-eared Barbastelle	Lesser horseshoe Whiskered Brandt's Daubenton's Natterer's Leisler's Noctule Nathusius' pipistrelle Serotine	Common pipistrelle Soprano pipistrelle Brown long-eared

Table 3: Valuing bat roosts

Geographic Frame of Reference	Roost Type
District, Local or Parish	Feeding perches (common species) Individual bats (common species) Small numbers of non-breeding bats (common species) Mating sites (common species)
County	Maternity sites (common species) Small number of hibernating bats (common and rarer species) Feeding perches (rarer/rarest species) Individual bats (rarer/rarest species) Small numbers of non-breeding bats (rarer/rarest species)

Regional	Mating sites(rarer/rarest species) including well-used swarming sites Maternity roosts (rarer species) Hibernation sites (rarest species) Significant hibernation sites for rarer/rarest species or all species assemblages
National/UK	Maternity sites (rarest species) Sites meeting Sites of Special Scientific Interest (SSSI) guidelines
International	Special Areas of Conservation (SAC) sites

Limitations

4.15. The surveys were undertaken in accordance with the best practice guidelines within the peak bat activity period (May to September inclusive). The results are therefore considered to be an accurate representation of the general use of the building(s) by roosting bats.

4.16. Nevertheless, bats may use roosting features intermittently throughout the year and may be present in larger or smaller numbers depending on their breeding cycle, weather conditions and in response to disturbance. Bats may be present at other times of the year and the results in this report should therefore be viewed in the context intended.

4.17. The roof valley on the northern aspect of the roof was not visible during the external assessment and the emergence surveys due to the height of the building and pitch of the roof. However, surveyors were positioned to surround the roof and were equipped with radios to account for all bat emergences, even if they could not be accurately located. As such, this limitation has been fully accounted for during the surveys and in the impact assessment.

5. SURVEY RESULTS

Desk Study

5.1. There are no records of designated sites within 2 km of the site at Whitehill House.

5.2. MagicMap shows two records of EPS licences for bats within 2 km of the site, comprising:

- 2020-44497-EPS-MIT - Destruction of resting places for soprano pipistrelles, approximately 0.3 km east of the site;
- 2015-15118-EPS-MIT - Damage to breeding places for serotines *Eptesicus serotinus*, approximately 1.8 km east of the site.

5.3. A search of Wiltshire Council Planning Portal found a single relevant planning application with associated ecological documents within 1 km of the application site in the last 2 years; two common pipistrelle *Pipistrellus pipistrellus* day roosts were recorded 0.7 km to the west of the site.

5.4. There are multiple areas of priority deciduous woodland within 2 km of the site, these are mostly small woodlands around 1 hectare in size located to the west, north and east. A priority deciduous woodland of 1.5 hectares lies 0.2 km to the north of the site. These areas of woodland are also registered on the National Forest Inventory (Woodland - Broadleaved). Further priority habitats comprise lowland meadows, traditional orchards and wood pasture and parkland.

5.5. There is one area of ancient woodland within 2 km of the application site, Chaddenwick Wood, a 7 hectare woodland located 1.8 km north-east of the site.

Building Inspection

External Assessment

5.6. The main house is of stone construction with a complex multi-pitched roof with interlocking concrete tiles and two chimneys. There is a conservatory with lead-work on the western elevation and a double story extension with a pitched roof and dormer windows on the eastern elevation.

5.7. Features with potential for use by roosting bats recorded externally include mortar gaps beneath ridge and hip tiles and gaps beneath the wooden fascia boards. No external features with potential for roosting bats were recorded on the conservatory on the western elevation.

Internal Assessment

5.8. The main house has a single large roof void. The dimensions are approximately 9.5 m in width, 11 m in length and 2 m in height with a traditional cut roof and a complex shape. The void is insulated and the roof is lined with bitumen felt.

5.9. No bats were recorded during the internal assessment, however, evidence of bats was present throughout the loft void with 10s droppings recorded scattered at various locations - particularly beneath the southern ridge beam (which is the longest flight space in the void). The droppings were submitted for multi-species DNA analysis and confirmed to belong to soprano pipistrelle, brown long-eared and serotine bat. Staining was also recorded along the southern ridge/ rafters.

5.10. Features with potential for use by roosting bats recorded internally include the multiple ridges present within the loft void, gaps where the purlins enter the stonework and crevices within the stone wall. The crawl spaces behind the chimneys also offer potential roosting locations for hibernating bats.

5.11. Potential access points to the loft void include a gap with light ingress at the southwestern eaves and a rip in the felt on the eastern roof valley.

Building Inspection Photos



Image 1: Southern elevation of Whitehill House



Image 2: Northern elevation of the main house



Image 3: Gaps in mortar along the ridge



Image 4: The roof void above the main house



Image 5: Potential bat access point at the southwestern hip/eaves



Image 6: Scattered bat droppings within the roof void above the main house

Emergence / Re-Entry Survey Results

5.12. **Figure 3 Bat survey results plan** shows surveyor locations and bat activity at the site.

Survey 1

5.13. During the emergence survey on 2 May 2023, five soprano pipistrelles and a single brown long-eared bat were recorded emerging from the main house at Whitehill House. Three soprano pipistrelles emerged from fascia boards on three separate elevations, a single soprano pipistrelle emerged from a gap beneath the window frame on the south of the eastern elevation, and a single brown long-eared bat was recorded emerging from the fascia board also at the south of the eastern elevation. Further details are provided in **Table 5** below.

5.14. Overall, there was moderate bat activity with frequent foraging activity from soprano pipistrelle in the garden to the south and north of the building. Frequent foraging passes were also recorded from common pipistrelle and noctule. Several passes were also noted from brown long-eared bats and single passes were recorded from Nathusius' pipistrelle and a myotis species.

Table 5: 02/05/23 - Dusk emergence survey.

Timing	Species	Roost type	No. of bats	Structure	Location on structure	Roost description	Ref
Start: 20:17 Sunset: 20:32 End: 22:17	Soprano pipistrelle	Day	1	Main house	Fascia board to the south of the eastern elevation	Crevice behind fascia board	A
	Soprano pipistrelle	Day	1	Main house	Fascia board on the southern elevation	Crevice behind fascia board	B
	Soprano pipistrelle	Day	1	Main house	Fascia board on the western elevation	Crevice behind fascia board	C
	Soprano pipistrelle	Day	1	Main house	Window to the south of the eastern elevation	Gap beneath window frame (bottom left corner)	D
	Brown long-eared bat	Day	1	Main house	Access point at fascia board to the south of the eastern elevation	Roof void in main house	E

Survey 2

5.15. During the emergence survey on 16 May 2023, a single soprano pipistrelle was recorded re-entering a gap beneath the fascia board on the western elevation, before emerging

again 30 seconds later. A pipistrelle bat (unknown species) was also seen to emerge from the roof tiles on the southern elevation of the extension.

5.16. Overall, there was a low to moderate level of bat activity during the survey with common and soprano pipistrelle foraging across the garden and demonstrating some social activity. Occasional passes were recorded from brown long-eared bat and a *Myotis* species. A pass from a serotine bat was also recorded.

Table 6: 16/05/23 - Dusk emergence survey.

Timing	Species	Roost type	No. of bats	Structure	Location on structure	Roost description	Ref
Start: 20:38 Sunset: 20:53 End: 22:38	Pipistrelle sp.	Day	1	Extension	Roof tiles on the southern elevation	Crevice beneath roof tiles	F
	Soprano pipistrelle	Day	1	Main house	Fascia board on the western elevation	Crevice behind fascia board	C

Survey 3

5.17. During the emergence survey on 30 June 2023, a total of five soprano pipistrelle were recorded emerging from the main house. Two emerged from previously recorded locations at fascia boards and two emerged from the fascia board on the northern elevation of the main house. A bat was also recorded emerging from a location on the extension. The bat was not echolocating but is considered likely to be a pipistrelle species due to size and emergence time. Further details can be found below in **Table 6**.

5.18. Overall, there was a low level of bat activity with occasional passes from common and soprano pipistrelle and noctule. Single passes were also recorded from myotis and Nathusius' pipistrelle as well as several passes from a single brown long-eared bat.

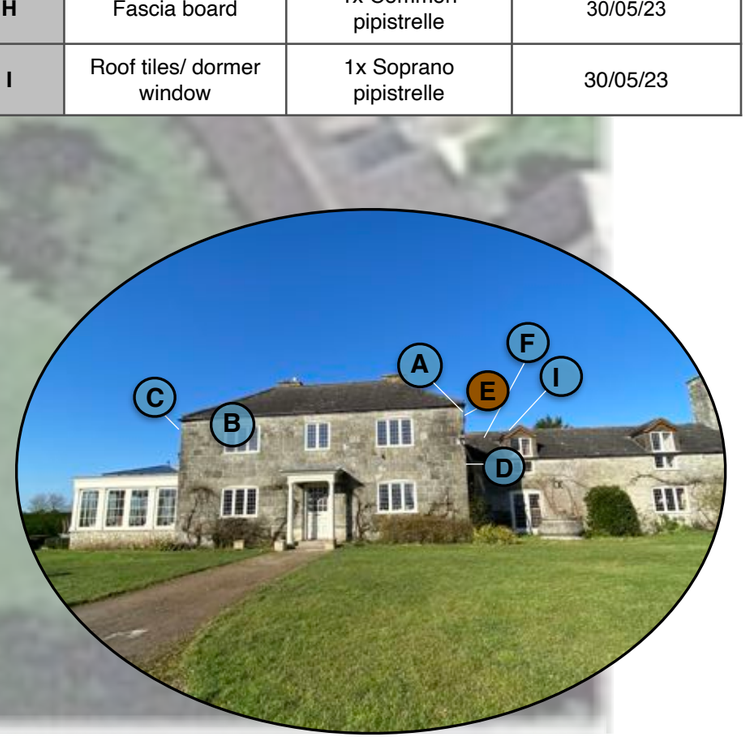
Table 7: 30/05/23 - Dusk emergence survey.

Timing	Species	Roost type	No. of bats	Structure	Location on structure	Roost description	Ref
Start: 20:57 Sunset: 21:12	Soprano pipistrelle	Day	1	Main house	Fascia board on the southern elevation	Crevice behind fascia board	B
	Soprano pipistrelle	Day	1	Main house	Fascia board on the northern elevation	Crevice behind fascia board	G
	Common pipistrelle	Day	1	Main house	Fascia board on the northern elevation	Crevice behind fascia board	H

End: 22:57	Soprano pipistrelle	Day	1	Main house	Fascia board on the western elevation	Crevice behind fascia board	C
	Pipistrelle sp.	Day	1	Extension	Roof tiles on the southern elevation (leftmost dormer window)	Crevice beneath roof tiles	I

Roost	Feature	Species	Date Observed
A	Fascia board	1x Soprano pipistrelle	02/05/23
B	Fascia board	1x Soprano pipistrelle	02/05/23; 16/05/23; 30/05/23
C	Fascia board	1x Soprano pipistrelle	02/05/23; 16/05/23
D	Gap beneath window frame	1x Soprano pipistrelle	02/05/23
E	Roof void	1x Brown long-eared bat	02/05/23
F	Roof tiles	1x Pipistrelle sp.	16/05/23
G	Fascia board	1x Soprano pipistrelle	30/05/23
H	Fascia board	1x Common pipistrelle	30/05/23
I	Roof tiles/ dormer window	1x Soprano pipistrelle	30/05/23





***NOTE Areas are indicative and are not shown to exact scale.**

Building surveyed

Roof pitch

Surveyor location

Emergence/Re-entry Location (coloured by species)

Bat Flight Path (coloured by species)

Outline of void identified as a roost (coloured by species)

Bat Species

Soprano pipistrelle

Brown long-eared

Common pipistrelle

Multiple species including: serotine, soprano pipistrelle, brown long-eared.

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Project: Whitehill House

Figure 3: Emergence Survey Results

Date: June 2023

6. IMPACT ASSESSMENT

Designated Sites

6.1. There are no records of designated sites within 2 km of the site at Whitehill House. It is not anticipated that the proposed works will impact any priority habitats or ancient woodlands through land take. There will be no net increase in residential units and therefore no resulting impacts to surrounding designated sites, green space and wildlife sites through increased footfall or amenity pressures.

Evaluation of Bat Roosts on Site

6.2. The main house (excluding the extension on the eastern elevation of the property) is confirmed to support five day roosts for soprano pipistrelle bats and one day roost for common pipistrelle within external crevices and a day roost for brown long-eared bats and a day roost for serotine bats within the loft void. A peak count of four soprano pipistrelle bats, one common pipistrelle and one brown long-eared bat were recorded emerging from the building during the surveys. Serotine were not recorded emerging from the building and only a single pass from a serotine bat was recorded across all three emergence surveys. Based on the presence of serotine droppings in the loft void it is considered likely that the roost is used occasionally by an individual or low numbers of bats.

6.3. See **Table 8** for value of each roost in accordance with Wrey *et al.*, 2010. Impact of works.

Table 8: Value of bat roosts at Whitehill House.

Species	Rarity	Roost Type	Value
Soprano pipistrelle	Common	Day	District, Local, or Parish
Common pipistrelle	Common	Day	District, Local, or Parish
Brown long-eared bat	Common	Day	District, Local, or Parish
Serotine	Rare	Day	County

Roost Impact Assessment

6.4. The proposed plans at Whitehill House comprise a single storey extension with a flat roof on the northern elevation of the main house and a loft conversion above the main house. A replacement roof to the main house is also proposed, replacing the current concrete interlocking tiles with slate tiles with lead rolls at the hips, replacing fascia board with eaves detail/corbel moulding and timber, inserting dormer windows, and extending the chimneys.

6.5. Potential impacts to bats at Whitehill House therefore include the destruction of a brown long-eared day roost and serotine day roost in the loft void, the destruction of four soprano

pipistrelle day roosts and one common pipistrelle day roost, with potential for disturbance, injury or killing of bats in their roosts during works.

6.6. In the absence of mitigation, the works would therefore result in an offence under the *Conservation of Habitats and Species Regulations (2017).*

Mitigation

6.7. The following mitigation strategy provides details of the mitigation measures to minimise the risk of killing or injury of individual bats during the works process. The compensation strategy demonstrates that compensatory roosts will be provided to replace the roosting opportunities present at the existing building, which will be lost.

6.8. In line with the Bat Mitigation Guidelines (Mitchell-Jones, 2004) the soprano pipistrelle and brown long-eared day roosts are of **low** conservation status and the serotine day roost is of **low to moderate** conservation status. Therefore the mitigation and compensation strategy should provide new roost facilities which need not be exactly like-for-like, but should be suitable, based on species' requirements. There are minimal timing constraints and monitoring requirements. Due to the number of species / roosts present a full EPS mitigation licence will be required.

6.9. *EPS Mitigation Licence:* A licence application can be submitted following planning approval by the Local Planning Authority (LPA) and a licence must be granted prior to any works commencing on site with potential to impact bats or their roosts. Licences will be issued by Natural England if the three licensing tests detailed in Section 3 are met. Whilst Natural England aim to provide licensing decisions within 30 working days, current processing times have ranged between 30 and 60 working days.

6.10. Please note that such licences will only be granted where it can be shown that there will be no detriment to the species of bat concerned, and therefore suitable mitigation measures are required. In order to ensure that the 'Favourable Conservation Test' can be met, a mitigation statement will need to be submitted as part of the licence application. This includes measures to minimise the risk of killing or injury of bats during the proposed works and to ensure that there is long term provision of roosting opportunities on site. Input from a licensed consultant will be required during licensable activities at the site (such as the removal of features with potential for roosting bats).

6.11. *Timing of Works:* The majority of works affecting summer bat roosts can take place between March and October, avoiding the winter hibernation season (November to February inclusive).

6.12. *Toolbox Talk:* Before commencing any work on site, all contractors will be inducted by a licensed bat ecologist or accredited agent in a tool box talk, to ensure they are aware of the risks to wildlife on site, particularly the presence of bat roosts, their legal protection and of working practices to avoid harming bats and other species in order to ensure working practices on site follow legal requirements.

6.13. *Ecological Supervision:* Immediately prior to any works on site, the buildings must be subject to an internal and external survey by a suitably qualified and licensed bat ecologist to ensure as far as possible that no bats are present. In addition, hand removal / soft strip of internal features suitable for use by bats must be done very cautiously and under supervision by a bat licensed ecologist.

6.14. Bat Boxes: To provide a compensatory roosting and safe release site for bats during demolition works at least three bat boxes suitable for serotine, brown long-eared bats and pipistrelle bats will be installed prior to works commencing on site. Bat boxes will comprise 1 x Schwegler 2F w. Double Front Panel, 1 x Schwegler 2FN, and 1 x Vincent Pro Bat Box. These boxes will remain on site in perpetuity. Suitable locations such as trees or other buildings on site will be determined by a licensed bat ecologist to ensure likelihood of repeated use is increased. The bat boxes will be installed at a height of at least 4 m, preferably on a southern un-cluttered aspect with good connectivity to linear features such as other mature trees and hedgerows. See **Appendices** for further information on bat boxes.

6.15. *Roofing Membrane:* **NO breathable roofing membrane will be permissible in any part of the building that may be used by bats.** Type 1F bitumen roofing felt must be used at areas where bats may gain access (to be discussed with licensed ecologist but generally including features such as traditional clay-tiled roofs, verges, ridges, chimney bases, dormer windows, etc.) or where specific bat roosting features are created, as breathable roofing membranes are proven to create a lethal entanglement hazard to bats. Natural England will not permit the use of breathable roofing membranes at sites where confirmed bat roosts have been recorded.

6.16. Any deviation from use of Type 1F bitumen roofing felt must be discussed and approved in advance by a licensed ecologist. Mitigation solutions can sometimes be found where optimal ventilation is required. For example, if breathable roofing membrane cannot be avoided, a certificate that proves the roofing membrane has passed a 'snagging propensity test' must be provided.

6.17. A snagging propensity test checks that the membrane can stand the repeated snagging actions of roosting bats. To pass, a membrane must show no change in the average number of loops per cm2 as rotations are increased from 0 to 1000.

6.18. You do not need a certificate for bitumen 1F felt that has a non-woven, short fibre construction.

6.19. *Timber Treatment*: Any use of timber-treatment or pest control treatment must be selected from the approved lists for safe use in or near bat roosts which can be provided on request.

6.20. *Lighting:* Any new external lighting must be directed to avoid light spillage onto vegetation, particularly linear habitat features such as woodland edges or potential roosting sites within trees and buildings. Bats are sensitive to light and could potentially avoid the area if access

points or the surrounding areas become lit. Appropriate lighting options will prevent a negative impact on bats potentially using the habitats on site and should be approved by a suitably qualified and licensed bat ecologist. Lighting plans should be approved and signed off by a licensed bat ecologist prior to submission, to ensure the scheme is suitable for bats. If appropriate measures are taken to reduce light spillage from the development, it is likely that there will be no negative impacts on local bat populations.

6.21. See **Appendices** for further information on designing lighting to minimise impacts on bats.

6.22. *Habitats*: The proposals do not result in significant loss of foraging habitat for bats, however, a wildlife friendly landscaping scheme is recommended to enhance the site for bats and other wildlife.

Compensation

6.23. *Accommodating brown long-eared and serotine bats:* The existing roof void will be converted into liveable space and therefore the roosting space for bats will be lost. Features suitable for use by a single or low numbers of brown long-eared and serotine bats will be incorporated into the replacement roof as compensation for the two roosts to be lost. Wet or mortared ridges/hips are always the preferred technique on buildings where bat access needs to be reinstated. A minimum of two lead roll crevice features will be installed, a features with a bat access point approximately 20 mm by 50 mm.

6.24. *Accommodating common and soprano pipistrelle bats:* The existing fascia boards are proposed to be removed as part of the new roof design and therefore four soprano pipistrelle day roosts and a single common pipistrelle day roost will be lost. The gap beneath the window frame on the south of the eastern elevation of the main house will be retained, although access for bats will be obstructed by scaffolding during the works. Features suitable for use by low numbers of pipistrelle bats will be incorporated into the replacement roof. Access points for bats will be created to each of the cheek battens of the newly installed dormer windows, providing at least four new roosting features suitable for common and soprano pipistrelle. Roosting features will consist of either crevices beneath the lead cheek covering, or preferably, by the installation of hanging tiles with access created under lifted tiles. A minimum of one crevice feature will be installed beneath lead flashing around a chimney.

6.25. The location and design of these features must be be determined and installation supervised by an ecologist on site, but should face unobstructed flight lines and suitable commuting habitat, such as hedgerows or tree lines.

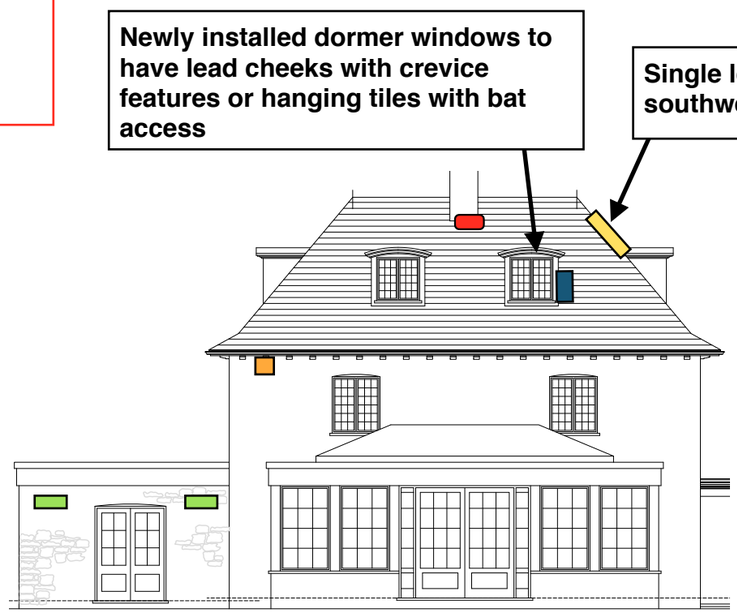
6.26. **Figure 4 Mitigation and Enhancement Plan** shows indicative locations for the mitigation and enhancement recommendations.

NB:- Locations and design of bat roost features as shown in this plan are illustrative only and exact location and design must be determined by a suitably qualified ecologist on site.

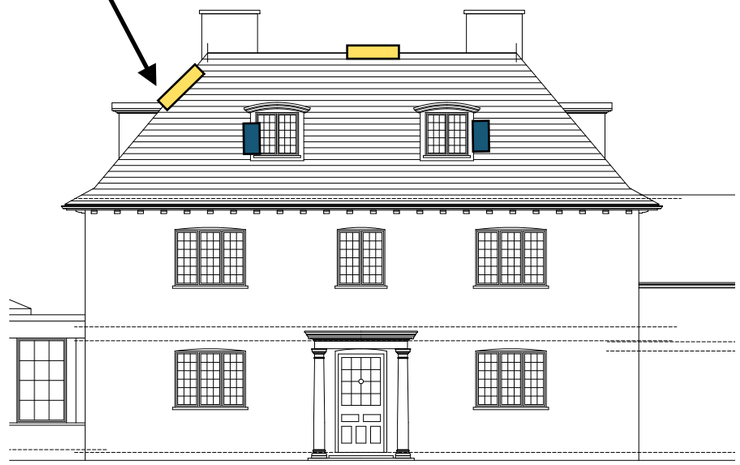
It is advised that type 1F bitumen felt is used. **If breathable membrane cannot be avoided, a certificate must be provided to prove that the membrane has passed a 'snagging propensity test', and does not present a hazard to bats.**



NORTH ELEVATION



WEST ELEVATION



SOUTH ELEVATION 1:100

Lead roll crevice feature:



An access point for bats approximately 20mm by 50 mm leading to an internal crevice suitable for roosting bats.

Enhancement features for bats:



Enhancement features for bats to include new access points to the roof void above the carport in the garage.

Examples of tree mounted bat boxes:



Four boxes, suitable for the species using the building will be installed in suitable trees on site.

Lead roll crevice features to provide compensation for brown long eared and serotine day roosts

Crevice features at cheek battens to provide compensation for common pipistrelle and soprano pipistrelle crevice roosts

Crevice feature at the lead flashing around the chimney to provide compensation for common pipistrelle and soprano pipistrelle crevice roosts

Fly-in bat access enhancement suitable for long-eared bats

A gable end access point suitable for a range of species of bats

2 x house martin nest cups to provide enhancement for birds

2 x integrated bee brick to provide enhancement for invertebrates

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Project: Whitehill House

Figure 4: Mitigation, compensation and enhancement plan

Date: June 2023

7. ENHANCEMENT RECOMMENDATIONS

7.1. National planning policy states that all developments should seek to enhance onsite biodiversity whether impacts on protected species are recorded or not. Incorporating enhancement features into new or renovated buildings should be carefully considered. These features can be simple and inexpensive, please see below for specific recommendations.

Bats

7.2. The garage outbuilding provides an excellent opportunity to create an enhanced roosting space for bats suitable for void dwelling species such as long-eared and serotine bats, as it contains an enclosed roof void above an open car port. Enhancements are recommended to include a minimum of a gable end access point suitable for a range of species of bats and a fly-in access point (area of removed ceiling) above the car port suitable for long-eared bats. This would need to be designed in collaboration with an ecologist to ensure access for jackdaw is restricted.

Birds

7.3. Two house martin nest cups will be installed under the eaves on the western and northern elevations of the house.

Invertebrates

7.4. Two bee bricks or alternative insect box will be installed on the western elevation of the proposed extension.

Wildlife Beneficial Landscaping Scheme

7.5. Any future landscape planting should seek to enhance biodiversity, improve connectivity to the surrounding habitats and provide food and shelter for a wide range of wildlife. All amenity planting and formally landscaped areas should be designed using a variety of plant species beneficial for wildlife. These do not necessarily have to be native but should be chosen for their ability to provide nectar or fruit and should be non-invasive species. There are a number of specialist seed mixes available specific to certain soil types, growing conditions and designed to benefit different groups of species such as bees or butterflies and moths.

7.6. All habitats should be managed in a suitable way to encourage a wide variety of insects and other wildlife to use the site.

7.7. Further information about these enhancement measures can be found in **Appendices.**

8. REFERENCES

CIEEM (2012) Guidelines for Preliminary Ecological Appraisal. *Technical Guidance Series*.

Collins, J. (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)* The Bat Conservation Trust, London.

Mitchell-Jones, A.J., (2002). *Bat Mitigation Guidelines*. English Nature, Peterborough.

Mitchell-Jones, A. J. & McLeish, A. P. (2004). *Bat Workers' Manual (3rd Edition)*. JNCC, Peterborough.

Google Earth [online] https://earth.google.com/ [June 2023].

Schofield, H. W. & Mitchell-Jones, A.J. (2004). The Bats of Britain and Ireland. Vincent Wildlife Trust, Ledbury.

UK Government's Countryside Geographc Information Website [online] www.magic.gov.uk [April, 2023].

Wray, S., Wells, D., Long, E. & Mitchell-Jones, T. (2010) Valuing Bats in Ecological Impact Assessment. In Practice, No. 70.

Legislation and Policy

Council of the European Communities (1992) *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (EN).* Official Journal of the European Communities [online] www.eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:1992:206:TOC [April, 2023]

Council of the European Communities (2009) *Council Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds (EN).* Official Journal of the European Union [online] eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:020:0007:0025:EN:PDF [April, 2023]

Department for Environment, Food and Rural Affairs (2011) *Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services* [online] www.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf [April, 2023]

Ministry of Housing, Communities & Local Governments (2021) National Planning Policy [online] assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf [April, 2023]

Natural Environment and Rural Communities Act 2006 (UK Parliament). *The National Archives* [online] www.legislation.gov.uk/ukpga/2006/16/contents [April, 2023]

Office of the Deputy Prime Minister Circular (2005) *Government Circular: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System* [online] www.gov.uk/government/uploads/system/uploads/attachment_data/file/7692/147570.pdf [April, 2023]

Protection of Badgers Act 1992 (UK Parliament). *The National Archives* [online] www.legislation.gov.uk/ukpga/1992/51/contents *The Hunting Act, 2004* [April, 2023]

The Conservation of Habitats and Species (Amendment) Regulations 2012 (UK Parliament). *The National Archives* [online] www.legislation.gov.uk/uksi/2012/1927/contents/made [April, 2023]

The Hunting Act (2004) The National Archives [online] www.legislation.gov.uk/uksi/2012/1927/contents/made [April, 2023]

The Wildlife and Countryside Act 1981 (England and Wales) (Amendment) Regulations 2004 (UK Parliament). *The National Archives* [online] www.legislation.gov.uk/ukpga/1991/39/contents*Countryside and Rights of Way Act, 2000 [*April, 2023]

APPENDICES

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Bats & Lighting



THE IMPACT OF LIGHTING ON BATS

Bats favour a dark environment for both roosting and foraging as they are adapted to low-light conditions. Artificial lighting will disturb bats if the lighting covers roost access points, flight paths or foraging habitats.

The main peak of nocturnal insect abundance occurs at dusk and a delay in emergence results in a lower foraging rate for bats.

Artificial lighting creates a 'vacuum effect' for nocturnal insects. During the night nocturnal insects use the light of the moon* to navigate. However, artificial lighting and even sky glow above cities obscures the natural moonlight as it is closer and radiates light in multiple directions.

Some species of bats have been recorded foraging around street lights such as Pipistrelle species and Nyctalus species. However, species that are less tolerant of artificial light are at a disadvantage when foraging as insects are drawn away from these species usual foraging grounds into the zones of artificial light.

Lighting must be considered in context to any development as increased lighting may cause roost abandonment, reduced reproductive success, and reduced foraging. Mitigation to reduce the impacts of lighting for bats is therefore of great importance in bat conservation.

Table 1: Summary of predicted impact of lighting for each species/genus

Impact / Behaviour	High	Medium	Low
Maternity roost	All species	-	-
Night roost	*Rhinolophus hipposideros* *Rhinolophus ferrumequinum* *Myotis* spp. *Plecotus* spp.	*Pipistrellus* spp. *Nyctalus* spp. *Eptesicus serotinus* *Barbastella barbastellus*	-
Emergence	All species	-	-
Foraging	*Rhinolophus hipposideros* *Rhinolophus ferrumequinum* *Myotis* spp. *Plecotus* spp.	-	*Pipistrellus* spp. *Nyctalus* spp. *Eptesicus serotinus* *Barbastella barbastellus*
Commuting	*Rhinolophus hipposideros* *Rhinolophus ferrumequinum* *Myotis* spp. *Plecotus* spp.	-	*Pipistrellus* spp. *Nyctalus* spp. *Eptesicus serotinus* *Barbastella barbastellus*
Swarming	All species	-	-
Hibernation	All species	-	-

*For more information see Warrant, E., and Dacke, M. (2016) Visual Navigation in Nocturnal insects. *Physiology*, 31, 182-196.

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Bats & Lighting

Sources of light that can disturb bats include; light spill via windows, sport floodlighting, car headlights, roadside lighting, security lighting, aesthetic lighting of waterways, and aesthetic illumination of buildings. Glare will affect bats over greater distance than the target area directly illuminated.

Avoidance is the most effective method, but if this is not possible the following measures should be considered.

What lighting should I use?

- Low pressure sodium lights or 'warm' LEDs
- Wavelength above 540nm
- Colour temperature below 2700K
- Shielded lights that prevent light spill above a 70 degree angle
- Passive infrared (PIR) motion sensors





What to avoid:

- Lighting roost entrances, flightpaths, and foraging or commuting routes
- Reflective surfaces beneath lighting
- High level lights
- Non-directional lighting

Lighting should be considered at an early stage allowing impacts to be minimised through the design of the site.

Key Points

- Keep lighting intensity to the minimum level required
- Limit the times that lights are on to provide some dark periods (e.g. switching installations off between midnight and 5am)
- Dim lighting according to demand
- As an alternative to lighting pathways use paving materials that reflect moonlight
- Low level lighting allows darkness to be retained within higher vegetation
- Set dark habitat buffers - lighting should always be a minimum of 25m from vegetated margins and 40m from waterbodies
- Incorporate dark corridors within the site
- Compensate for the loss of dark areas by enhancing other dark areas
- Consider building design - install internal lighting away from windows

Bat Conservation Trust guidance note 08/18 'Bats and artificial lighting in the UK & http://www.cost-lonne.eu/recommendations/

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External Bat Boxes



TYPES OF BAT BOXES



Schwegler 2F Double Front Panel

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for pipistrelle and Myotis species
- A second inner wooden panel is fitted adjacent to the front panel imitating a cavity wall



Schwegler 1FD Double Front Panel

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for pipistrelle and Myotis species
- A second inner wooden panel is fitted adjacent to the front panel imitating a cavity wall
- Small entrance hole discourages birds from using the box



Vincent Pro Bat Box

- Manufactured from timber and recycled plastic
- The front and the top of the box is black, which helps heat absorption
- Suitable for a range of species including pipistrelle species, Myotis species, and brown long-eared bats.
- No maintenance required



Schwegler 2FN

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for pipistrelle species, Myotis species, serotine, brown long-eared, noctule and Leisler's bats
- Dual entrance
- Birds and dormice have also been found using this box
- A newer model is now available, Schwegler 3FN, designed with smaller entrance holes which discourage birds and dormice

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External Bat Boxes



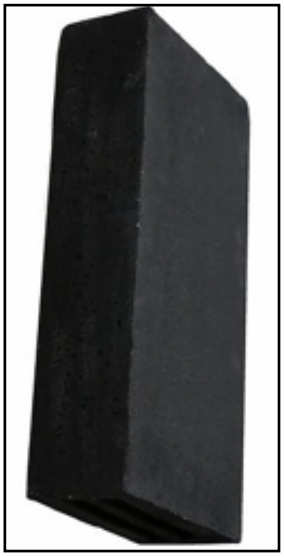
Schwegler 1FS Large Colony Box

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for a range of bats including pipistrelle species, Myotis species, Noctule, and brown long-eared bats
- Three grooved inner wooden panels are connected to the front panel, which are ideal for bats to cling to.
- Accommodates large summer colonies



Schwegler 1FF Colony Box

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for a range of crevice dwelling bats including pipistrelle species, barbastelle, noctule, and brown long-eared bats
- Rough wooden surface for bats to cling onto and climb



Greenwoods Ecohabitats Small Hollow Bat Box

- Manufactured from long-lasting ecostyrocrete
- Lifetime - 20-25 years
- Suitable for a range of bats preferring a cavity space, including pipistrelle species, myotis species, noctule, and brown long-eared bats
- Suitable for hibernating bats