



**BAT EMERGENCE SURVEY FOR:**

WISHANGER COTTAGE, FRENHAM LANE, FRENHAM, SURREY, GU10 2QQ

For: Conrad Shutte  
Wishanger Cottage

Issued by: **Wychwood Environmental Ltd**

[www.wychwoodenvironmental.com](http://www.wychwoodenvironmental.com)

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## EXECUTIVE SUMMARY

### *Proposed development*

- Development proposals involve demolition of the existing dwelling and replacement with a new dwelling.

### *Likely impact on protected species*

- Moderate risk of encountering crevice roosting species of bats (*Pipistrellus sp.*) in the existing dwelling, under roof tiles and close to the chimney.

### *Proposed mitigation*

- A European Protected Species and Mitigation (EPSM) will be required for works to progress and complete the extension of the existing dwelling.
- Roofing work is recommended for Autumn (September –November) or Spring (March-April) to avoid periods of maternity roosting and hibernation, however other times are permitted. Tile removal to be done under supervision of a suitably qualified and licensed ecologist, whilst site is under an EPSM.
- Replacement and enhancement of roosting areas in the new dwelling (e.g. via an integrated maternity roost box).
- Inclusion of at least 4 ‘access’ bat tiles/slates (or similar) across the roof of the new extension (southern elevation).
- A Tool Box Talk will be provided to roofers outlining precautionary working practices.

### *Further actions to be taken*

- The erection of one maternity and one day roost bat box for pipistrelle bats (e.g. crevice bat box) on site prior to any works commencing, and then retained as an enhancement.
- A plan to be drawn up showing the proposed location of retained roost areas, lipped tiles, as part of any EPSM application to Natural England.
- Appropriate (wildlife friendly) landscaping.
- Lighting plan to be agreed as part of any EPSM application.

**Report completed by:** Dr. Craig Turner FRGS FLS MCIEEM



**Verified by:** Rosalind Salter BSc MSC MCIEEM



**Date of issue:** 12<sup>th</sup> October 2020

## 1.0 INTRODUCTION

- 1.1 Wychwood Environmental Ltd was instructed by Conrad Shutte to undertake bat emergence surveys on Wishanger Cottage in order to provide supporting information for a planning application for the demolition and replacement of the existing dwelling. These surveys follow an earlier potential roost assessment completed as part of a Preliminary Ecological Assessment (PEA) in May 2020<sup>1</sup>, which identified that the house has moderate roost potential for soprano pipistrelle (*Pipistrellus pygmaeus*). No other structures were identified on site as having potential for roosting bats. This in turn, updates an ecological appraisal of the site originally completed in 2016<sup>2</sup>. The GS Ecology surveys identified a soprano pipistrelle maternity roost in the house. The current nature /type of any roosts still present had yet to be determined.
- 1.2 The surveys were necessary to collect data relating to the possible presence of roosting bats and to provide any necessary guidance and mitigation advice to ensure that no bats or roosts are likely to be adversely affected by the development. The surveys were conducted to ensure that plans would not be constrained by the presence of roosting bats. The surveys should also refine the classification of the roost.
- 1.3 *Bats are European protected species, protected via The Conservation of Species and Habitats Regulations (2017) and also the Wildlife and Countryside Act 1981, as amended. Therefore, it is an offence to kill or injure a bat or interfere with any roosting or resting site. A bat roost is interpreted as "any structure or place used for shelter or protection" whether or not bats are present at the time.*
- 1.4 The surveys were completed to inform the Local Planning Authority (LPA) of any material impacts resulting from the proposed development and to ensure compliance with the requirements of the Natural Environment and Rural Communities (NERC) Act (2006) (Section 40) and the Government Circular: Biodiversity and Geological Conservation –Statutory obligations and their Impact within the Planning System

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<sup>1</sup> Wychwood Environmental (2020) Preliminary Ecological Assessment: Wishanger Cottage, Frensham, Surrey, GU10 2QQ.

<sup>2</sup> GS Ecology (2016) Ecological Assessment: Wishanger Cottage, Frensham, Surrey, GU10 2QQ.

(ODPM 06/2005, Defra 01/2005). Details of legislation and legal protection afforded to all species of British bats are given in Appendix 1.

- 1.5 The site is located approximately 4km to the southwest of the village of Frensham within a rural area, largely surrounded by broadleaved woodland, pasture, heathland and large rural properties and their associated gardens (Figures 1-2). A more detailed description of the site is given in the PEA report.
- 1.6 Development proposals include complete demolition of the existing dwelling, to make way for a new dwelling, slightly to the north of the existing footprint. The location of the site is shown in Figures 1-3 (Annex 2). Full details are given in the planning submission.
- 1.7 The desk study (as shown in the PEA report) showed there are three records for European Protected Species Mitigation Licences within 2km of the site<sup>3</sup> (Figure 4). These include three roosts for common pipistrelle (*Pipistrellus pipistrellus*), two roosts for brown long eared bats (*Plecotus auritus*), a single roost for soprano pipistrelle bats (*Pipistrellus pygmaeus*) and a single roost for serotine (*Eptesicus serotinus*). None of the roosts were of high conservation significance (i.e. maternity or hibernation roosts) and all were for species that are both common and widespread throughout southern England.
- 1.8 Section two of this report describes the methodologies used for the bat surveys. Section three provides the results of these surveys, section four provides discussion and implications for development and conclusions are made in section five. Details of legislation relating to, and legal protection afforded to all species of British bats are given in Appendix 1.

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<sup>3</sup> [www.magic.defra.gov.uk](http://www.magic.defra.gov.uk)

## 2.0 METHODOLOGY

### Activity/Emergence Surveys

- 2.1 Activity/emergence/re-entry surveys were conducted on the 30<sup>th</sup> May and 19<sup>th</sup> June 2020, by Dr. Andrew Perkin (Natural England Bat Class license holder: 2020-47354-CLS-CLS), Sally Dalrymple-Smith MCIEEM CEnv (Natural England Bat Class license holder: 2018-34389-CLS-CLS), and Dr. Ryan Walker MCIEEM CEnv (Natural England Bat Class license holder: 2015-16736-CLS-CLS), following best practice guidelines as outlined by the Bat Conservation Trust (BCT 2016). All surveys were planned and coordinated by Dr. Craig Turner MCIEEM FRGS FLS (Natural England Bat Class license holder: 2016-21436-CLS-CLS). Two dusk activity/emergence surveys were conducted at the proposed site making use of two surveyors/cameras for each of the dusk surveys (Figure 5). The surveys were conducted 15 minutes before sunset and for 1.5 hours after sunset (Table 1).
- 2.2 Surveyors positioned themselves to allow for the best visibility of areas, identified as possible emergence points (Figure 5). Echometer Touch<sup>4</sup> and Anabat SDII/Express<sup>5</sup> bat detectors were used to assist with determining the nature of any bat activity and with bat identification. Analysis software (Analook W and Kaleidoscope) was used to verify calls identified in the field. All data was verified by Dr. Craig Turner MCIEEM FRGS FLS (Natural England Bat Class license holder: 2016-21436-CLS-CLS). Infra-red cameras (and IR lights) were trained on the parts of the building during some surveys to aid observation and monitoring for any emergence/re-entry behaviour.

**Table 1** – Survey weather conditions

Date	Sunset/Sunrise	Temp °C	Weather Conditions	Wind
30/05/2020	2108 BST	21.6 - 13.4	1/8 Dry	BF 0-1
19/06/2020	2120 BST	14.8 - 12.5	2/8 Dry	BF 0-1

### Constraints and Limitations

- 2.3 It should be noted that lack of evidence of a protected species does not necessarily preclude it from being present at a later date. In relation to use of habitats or roost

<sup>4</sup> <https://www.wildlifeacoustics.com/products/echo-meter-touch-2-ios>

<sup>5</sup> <https://www.titley-scientific.com/uk/>

sites by bat species, use of a particular area of land can vary not only on a seasonal basis but also from day to day. Whilst activity surveys are used to provide an estimate of the likely importance of a given area of habitat for bats, due to the highly mobile nature of bats, it is not possible to accurately determine the exact numbers of bats using standard non-intrusive survey methods.

- 2.4 The echolocation used by some bats is very quiet and difficult to detect; species such as brown long eared bat may have been present without registering on the bat detectors used during the activity survey.
- 2.5 The recording system employed by Anabats can only respond to the signal with the highest intensity at any time. As the signal from some bat species (such as common pipistrelles) will nearly always be more intense than that of other bat species (such as myotis bats), it is possible that some bat signals were not recorded. As a result, some bat activity may have been under-recorded.
- 2.6 The identification of bats in the genus *Myotis* to species level based on recorded echolocations is not always possible<sup>6</sup> with a high degree of confidence. This is due to the similarity and overlap in characteristics between Myotid bats and the calls they make, together with the ability of these bats to emit different calls in different habitats and situations. Techniques are being developed to assist with the identification of these bats from recordings, such as the use of ‘slope’ in the Anlook programme designed for use with Anabat CF detectors. Comparison of slope between Myotid and a library of known calls was used to assist with identification.
- 2.7 Based on the survey history at the site (GS Ecology 2016) it was felt that based on current BCT guidance, that two surveys were sufficient to assess roost presence and activity.

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<sup>6</sup> BCT guidelines identify that *Myotis* bats can only be identified with a low degree of confidence to species level, as set out in section 6.4.3 of the guidelines.

### 3.0 RESULTS

#### Activity/Emergence Surveys

- 3.1 During the surveys, at least five species were seen/detected using the site (or in close proximity to it). These were: common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*P. pygmaeus*), noctule (*Nyctalus noctule*), serotine (*Eptesicus serotinus*) and a Myotis (*Myotis sp.*) species. Species identifications were completed in Anlook W (and/or Kaleidoscope Pro) against a known library of bat calls. Results are described below and detailed in Figures 6 and 7 (Appendix 2).
- 3.2 On the 30<sup>th</sup> May 2020, during the dusk survey the first record was at 20:20 (soprano pipistrelle), and the last at 22:16 (common pipistrelle). Throughout the survey period, overall bat activity was low, with common and soprano pipistrelle dominating activity and were detected on both sides of the property. There was greater activity to the rear of the property. These were regular passes by single individuals of both species, with some foraging occurring throughout the survey period. Very low numbers (1-2) were active in the rear garden area for the duration of the survey, with soprano pipistrelles being slightly more numerous. A single emergence event of a soprano pipistrelle was recorded from the right-hand side dormer window (Figure 6) at 21:24. No other emergence events were recorded.
- 3.3 A single noctule was also detected commuting over the rear of the site at 21:32. A single myotis pass and a single serotine pass were detected to the front of the property. None of these species were detected roosting in the property.
- 3.4 On the 19<sup>th</sup> of June 2020, the first bat (common pipistrelle) was detected at 21:37 over the rear garden. The last bat was recorded (common pipistrelle) at 22:36. The overall pattern of activity and species diversity recorded, was similar to the first survey, with more pipistrelle bat activity to the rear and front of the property.
- 3.5 This time, no emergence events were recorded. Single myotis and limited noctule passes were recorded but there were no records of serotine bats. Soprano pipistrelles were the most numerous and active species throughout the survey. No other roost locations were recorded during the survey.



- 3.6 In summary, only a single emergence event was recorded for a soprano pipistrelle. No other roosts were identified on the property. Based on the combined results of this survey and the PEA, the property is most likely to be currently being used as a day roost by low numbers of soprano pipistrelle bats.
- 3.7 There is local activity of at least five species of bat which commute/forage in close proximity to the house, mainly in the garden areas. The collective results of the previous building inspection and activity/emergence surveys suggest the property currently supports a day roost of low numbers of soprano pipistrelles.

## 4.0 DISCUSSION & IMPLICATIONS FOR DEVELOPMENT

### *Legislation*

- 4.1 Bats are European Protected species, protected via The Conservation of Species and Habitats Regulations (2017) and also the Wildlife and Countryside Act 1981 (as amended). These make it illegal to kill, injure, capture or disturb bats; or to obstruct access to, damage or destroy bat roosts. A bat roost is interpreted as "any structure or place used for shelter or protection" whether or not bats are present at the time.
- 4.2 Penalties on conviction - the maximum fine is £5,000 per incident or per bat, up to six months in prison, and forfeiture of items used to commit the offence, e.g. vehicles, plant, machinery. Further details on the protection afforded to bats and their roosts are given in Appendix 1.

### *Overview*

- 4.3 The evidence from the surveys completed suggest that the house is currently being used by very low numbers of soprano pipistrelles as a day roost, and the demolition works to the house would result in the disturbance/loss of the roost. The local vicinity around the site is also active with these species, in addition to common pipistrelle, noctule, serotine and myotis species of bats. As such, secondary disturbance impacts, such as lighting should also be considered. Foraging/commuting behaviour was recorded in the gardens to the rear of the building and along the entrance driveway and gardens to the sides of the house.
- 4.4 Planning proposals involve the demolition of the existing house, and as such the roost(s) will be directly impacted and will result in the destruction/disturbance of bat roosts, which has the potential to cause disturbance/harm to roosting bats. Works can therefore not legally commence without appropriate mitigation provided under a European Protected Species Mitigation (EPSM) Licence or a Bat Mitigation Class Licence (BMCL). An EPSM application to Natural England will take at least 30 working days to be processed once submitted and a BMCL will take 10 working days to process. Neither can be submitted until planning permission has been granted.
- 4.5 The current surveys were undertaken in the same time period as the previous (2016) surveys. Whilst the current surveys have only identified a day roost for the soprano

pipistrelles and the previous surveys identified the maternity roost for the same species; the same roosting and potential roosting features still persist in the property. The species in question is known to ‘roost switch’<sup>78</sup>, and therefore maternity roosts can exist in locations for several seasons, then disappear, only to return a year or more later. Therefore, based on the current assessment, it would be difficult to rule out future use of the previously identified roost areas, as a maternity roost.

- 4.6 Based on the current and past assessments of species and roost types present, and the nature of the works, our recommendation would be to apply for an EPSM, and maternity roosts are not covered under the BMCL. Applications should be made to Natural England at least four months in advance of commencing works that would impact the roost(s). Licences can be issued for a maximum period of 5 years.

#### *Mitigation*

- 4.7 A detailed mitigation statement will be prepared as part of the EPSM licence application. In light of current and previous survey findings, brief mitigation guidelines are however provided below:

#### *Timing*

- 1) Works to the roof should be conducted at an appropriate time of year to minimise any risk of bats being present during proposed work. As best practice, works directly affecting the roof should ideally be conducted during the Spring (March-April) or Autumn (late September-early November) to avoid periods when bats are likely to be present within the building and when they are least vulnerable, i.e. outside periods of breeding and hibernation. However, works under licence can be undertaken at other times (avoiding periods of sustained low temperatures), as approved under a licence and always under the supervision of a bat licensed ecologist.

#### *Replacement roosting opportunity*

- 2) The new dwelling should seek to provide a maternity roost area for soprano pipistrelles (e.g. integrated maternity roost box<sup>9</sup>) on a similar aspect to the existing property. The roost replacement should be on a like-for-like basis, as advised in the

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<sup>7</sup> <https://www.ingentaconnect.com/content/miiz/actac/2007/00000009/00000002/art00018>

<sup>8</sup> <http://www.sekj.org/PDF/anzf45/anzf45-503.pdf>

<sup>9</sup> <http://www.habibat.co.uk/category/bat-boxes/habibat-maternity-roost-box>

Bat Mitigation Guidelines. Detailed mitigation would be confirmed as part of the EPSM application. Additionally, the house should also incorporate external features, such as a minimum of 4 ‘access tiles’ (e.g. clay roofing tiles (tudor bat tiles<sup>10</sup> or bat access slates<sup>11</sup>), on different aspects to compensate for the loss and enhance roosting habitat for crevice dwelling bats. The exact type and locations will be confirmed as part of the EPSM.

#### *Materials*

- 3) The new roof areas of the property should be lined with bitumen Type 1F membrane and not a breathable membrane where bat access is provided, due to the risk of bat entanglement<sup>12</sup>. The use of bitumen still complies with building regulations<sup>13</sup>. Full details would be set out in a method statement under an EPSM/BMCL Licence. Natural England will not issue BMCL / EPSM licenses for properties where a breathable membrane is used.

#### *Alternative/enhancement roosting opportunities*

- 4) In addition, at least one maternity bat box<sup>14</sup> (or similar for pipistrelles) should be erected around the site (e.g. on mature trees to the rear) and one day roost box<sup>15</sup>, providing alternative roosting opportunities for pipistrelle species whilst construction is underway. The bat boxes will be sited in a tree, best positioned at a height of between 4 to 6 metres. These boxes should be retained in location once all building works are complete, and thus provide an overall enhancement.

#### *Specified supervised work*

- 5) A suitably qualified and licensed ecologist should oversee any licensed works and the removal of any roof tiles, ridge tiles, hanging tiles and boarding from the existing property.

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<sup>10</sup> <http://www.tudorrooftiles.co.uk/?content=bats>

<sup>11</sup> <http://www.habibat.co.uk/category/bat-access-tiles/habibat-access-slate>

<sup>12</sup> <http://www.batsandbrms.co.uk>

<sup>13</sup> [http://www.bats.org.uk/pages/breathable\\_roof\\_membranes.html](http://www.bats.org.uk/pages/breathable_roof_membranes.html)

<sup>14</sup> <https://www.nhbs.com/improved-roost-maternity-bat-box>

<sup>15</sup> <https://www.nestbox.co.uk/products/crevice-bat-box>

*Tool Box Talk*

- 6) Builders will be made aware of the possible presence of bats, and the legal protection afforded to them, and made to work with caution when removing any tiles. Tiles must be lifted vertically and removed by hand. Should any bats be found workers must cease work immediately and unless present onsite, advice must be sought from a suitably qualified and licensed ecologist.

*Lighting*

- 7) Bats clearly use the site for commuting and foraging and therefore outdoor lighting used within the new development must be at an absolute minimum, and where used, be 'bat friendly'. Lights should be at a low level and angled down or have baffles to prevent unnecessary light spilling into the surrounding area which could disturb bats, especially along tree lines. Security and timed lights should be at a low level and set to be on for as short a time as possible. A summary from the latest Guidance Note (08/18)<sup>16</sup> 'Bats and artificial lighting in the UK' is provided in Appendix 4 of this report. Brown long-eared bats are very light sensitive. Lighting around the new and existing properties should comply with the above guidance (and that given in Appendix 4). Full details would be set out as part of the licence application (in a lighting plan). It is recognised there is pre-existing security lighting on the property, and lighting on the extended property should be compliant with current guidance.

*Tree works*

- 4.7 Whilst the felling of trees should be avoided, crown reduction and pruning works to trees around the property maybe required. It is recommended that any tree surgery is undertaken by an arboriculturist with knowledge of bats and the legal protection afforded to them. Trees may require a potential roost assessment if any are to be removed.
- 4.8 The sections of any tree that are removed should be left on the ground overnight (for at least 24hrs), in the unlikely event that a bat may be present, allowing it time to escape. Where possible, the felled wood should be retained on site in habitat piles. These works should be overseen by a licensed bat worker, in light of the potential

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<sup>16</sup> <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>

need for additional tree removal/surgery work that has not been covered by this report.

#### *Enhancements*

- 4.9 In line with local and national policy (NPPF 2019<sup>17</sup>), the new development should seek to provide biodiversity enhancements. The following suggestions would enhance the site for wildlife.
- 4.10 A guide to bat friendly gardening is provided in Appendix 4. Any landscaping plan should take account of this guidance. Furthermore, areas of the amenity grass could be replaced with a species rich turf e.g. Wildflower Native Enriched Turf or Species Rich Lawn Turf to enhance diversity within the grassland sward (which will in turn attract insects, birds and bats)<sup>18</sup>.

## **5.0 CONCLUSION**

- 5.1 The house currently supports low numbers of soprano pipistrelle bats under roof slates/tiles. It also has the potential (based on previous survey data) to support a maternity roost for the same species. Mitigation measures, as outlined in this report, are advised to be detailed in a Method Statement and carried out under a European Protected Species Mitigation (EPSM). This is advised in order to avoid committing an offence and to safeguard the viability of local bat populations.
- 5.2 No further surveys are needed to inform the planning application. An additional building inspection maybe required as part of any licence application, as these must have been completed within three months of submitting the licence application to Natural England.

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<sup>17</sup> <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

<sup>18</sup> <http://www.wildflowerturf.co.uk/Products/species-rich-lawn-turf.aspx>

## 6.0 REFERENCES

GS Ecology (2016) Ecological Assessment: Wishanger Cottage, Frensham, Surrey, GU10 2QQ.

Bat Conservation Trust (2012) Bat Surveys – Good Practice Guidelines. Bat Conservation Trust, London.

Bat Conservation Trust (2011) Statement on the impact and design of artificial light on bats.

Mitchell-Jones, J. (2004) Bat Mitigation Guidelines. Natural England.

Mitchell-Jones, A.J. and McLeish, A.P. (2004) Bat Workers Manual. JNCC

Wychwood Environmental (2020) Preliminary Ecological Assessment: Wishanger Cottage, Frensham, Surrey, GU10 2QQ.

## APPENDIX 1 – Legislation, Policy & Licensing

### *Bats*

All bat species in the UK are included in Schedule II of the Conservation of Habitats and Species Regulations 2018 which transpose Annex II of the Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora (“EC Habitats Directive”) which defines European protected species of animals. All species of British bat are fully protected under the Wildlife and Countryside Act 1981 (as amended) through inclusion in Schedule V.

Bat species are afforded further protection by the Countryside and Rights of Way (CROW) Act 2000; and the Natural Environment and Rural Communities Act 2006.

Under the above legislation it is an offence to:

- kill, injure or take an individual;
- possess any part of an individual either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by these species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb these species whilst using any place of shelter or protection; or
- deliberate disturbance in such a way as to be likely to impair their ability to:
  - survive, to breed or reproduce, or to rear or nurture their young; or
  - in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
  - to affect significantly the local distribution or abundance of the species to which they belong;
- keep (possess), transport, sell or exchange, or offer for sale or exchange, any live or dead bat, or any part of, or anything derived from a bat.

It is also an offence to set and use articles capable of catching, injuring or killing bats (for example a trap or poison), or knowingly cause or permit such an action. In the case all species of British bat there is also protection under *Schedule 6 of The Wildlife and Countryside Act 1981* (as amended) relating specifically to trapping and direct pursuit of these species.

### *Penalties on conviction*

The maximum fine is £5,000 per incident or per bat (some roosts contain several hundred bats), up to six months in prison, and forfeiture of items used to commit the offence, e.g. vehicles, plant, machinery.

### *Licensing*

A European Protected Species Mitigation (EPSM) Licence or a Bat Mitigation Class Licence (BMCL) in relation to bats is required from Natural England for any work that would result in an otherwise unlawful activity (e.g. damage to a bat roost). A BMCL permits activities resulting in the disturbance and/or capture of certain species of bats and/or damage or destruction of roosts of low conservation significance. A license can only be issued to permit otherwise prohibited acts if Natural England are satisfied that all of the following three tests are met:

- The proposal is for ‘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’;
- There is no satisfactory alternative; and,
- The action authorised by the license will not be detrimental to the maintenance of bat populations at a favourable conservation status in their natural range.

A bat roost is defined by the Bat Conservation Trust publication *Bat Surveys for Professional Ecologists— Good Practice Guidelines 3rd Edition* as “*the resting place of a bat*”<sup>19</sup>. Generally however, the word roost is interpreted as “*any structure or place, which any wild bat uses for shelter or protection.*”

Bats tend to re-use the same roosts; therefore legal opinion is guided by recent case law precedents, that a roost is protected whether or not the bats are present at the time. This can include for summer roosts, used for breeding; or winter roosts, used for hibernating.

<sup>19</sup> Collins J (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn) (published by Bat Conservation Trust, London)





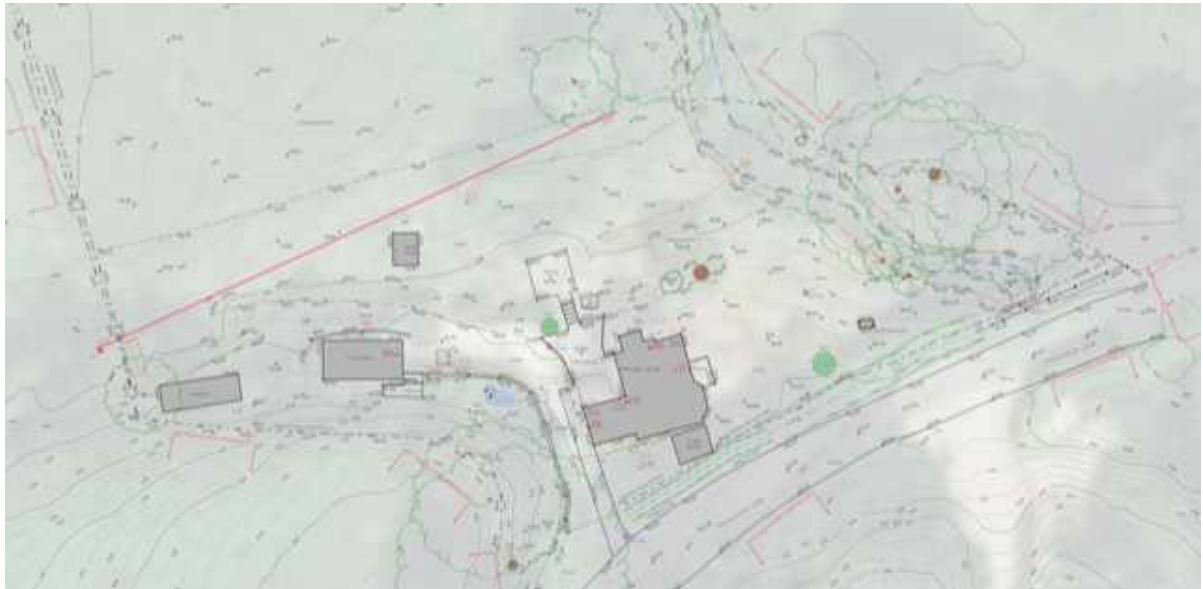


Figure 3 – Architectural plan for the site with Wishanger Cottage to the centre of the site.

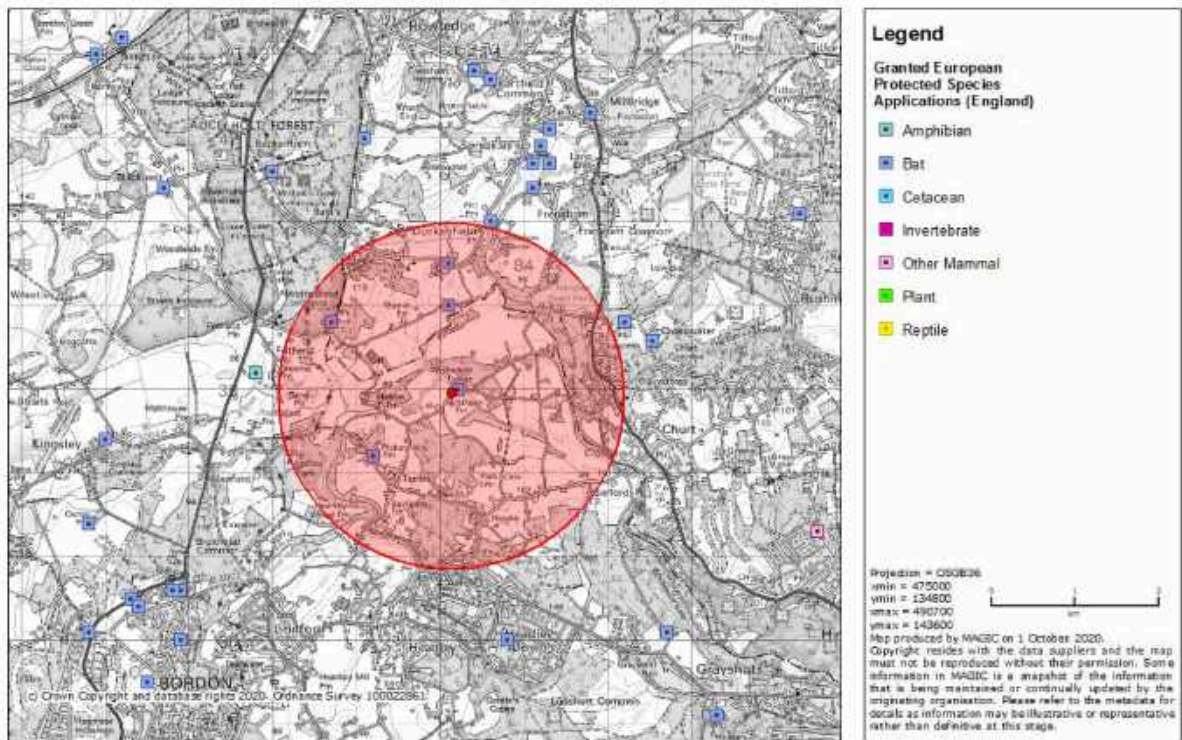


Figure 4 – Magic map showing the locations of known bat roosts on EPSM approvals from Natural England. Red spot showing location of Wishanger Cottage. Source: <https://magic.defra.gov.uk/MagicMap.aspx>



**Figure 5** – Surveyor and / or camera locations (purple dots) across the two surveys.



**Figure 6** – Summary of pipistrelle foraging/commuting pathways (blue) and myotis yellow. The other two species were heard passing over the site, rather than active within it.



**Figure 7** – Locations of the day roost identified in 2020 (red) and the previously identified maternity roost in 2016 (pink).



**Figure 8** – View from one of the survey positions.

**APPENDIX 3 – Images of the site (from PEA report).**



**Photo 1** – The north and east facing elevations of Wishanger Cottage.



**Photo 2** – The west facing elevation and driveway at Wishanger Cottage.



**Photo 3** – The slate main roof and tiled extension roof.



**Photo 4** – The area of the soprano pipistrelle roost upon the north facing gable recorded during 2016.



**Photo 5** – Confined void above the extension on Wishanger Cottage.



**Photo 6** – Confined roof void within the main house.

#### APPENDIX 4 – Lighting guidance - the impact of artificial light on bats.

The following basic set of guidelines is summarized from the latest Guidance Note (08/18)<sup>20</sup> provides a concise checklist of points to consider with any lighting scheme:

- *Use professional lighting design engineers to model and predict light spill so that it can be avoided.*
- *Reduce light levels to the minimum necessary to meet legal and safety requirements.*
- *Reduce horizontal and upward/downward light spillage to the minimum achievable. The use of cowling, masks, louvers etc. and limiting the height of lighting columns may be important depending on the design of the lighting units. No bare bulbs. Lighting should only light the target area.*
- *Use non-reflective surfaces within the area to be lit to minimise indirect (reflected) spillage of light. The use of planting or other structures to add screening.*
- *Reduce the duration of lighting. The use of lighting ‘curfews’ can also be helpful - especially in the vicinity of bats roosts. For example, the emergence of bats, typically within the hour after sunset, may be disrupted (delayed) by raised light levels and this may result in a loss of feeding opportunities.*
- *Consider the type of light to be used and whether a different type or design may reduce potential impacts on bats and other wildlife. Narrow spectrum lighting with minimal UV emission should be used.*
- *Use ‘screen planting’ to limit light spill into dark areas.*
- *Use narrow spectrum light sources to lower the range of species affected by lighting, as research has shown that spectral composition does impact biodiversity.*
- *Use light sources that emit minimal ultra-violet light*
- *Avoid white and blue wavelengths of the light spectrum to reduce insect attraction and where white light sources are required in order to manage the blue short wave length content they should be of a warm / neutral colour temperature <4,200 kelvin.*

For more details, please refer to:

<https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>

[http://www.bats.org.uk/pages/bats\\_and\\_lighting.html](http://www.bats.org.uk/pages/bats_and_lighting.html)

<http://www.batsandlighting.co.uk/index.html>

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<sup>20</sup> <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>

## APPENDIX 5 – Gardening for bats.

**GARDENING FOR BATS**

**All sixteen species of bats in the UK eat insects, and need a good supply of these from spring through to the autumn. By growing flowers attractive to a range of insects, our gardens can become important feeding stations for bats, birds and other wildlife.**

**Many plants depend on insects**

We grow flowers in our gardens for our own enjoyment. But colour and perfume are really the plants' way of advertising themselves to insects. Sweet nectar and protein-rich pollen are bait to encourage insects to visit. In return, pollen is carried from one flower to another on their bodies so the flowers are fertilised.

**Bats need insects**

Flying uses a lot of energy, so bats have huge appetites. All our UK bats eat insects. Five species, including the long-eared bat, prefer moths, but most bats rely more heavily on flies as food than any other insect group. Especially important are craneflies, and a range of midge families and their relatives. Pipistrelles, the bats most likely to visit your garden, depend on catching very large numbers of tiny insects, some of which are pests.

**Flower shape and insect tongues**

Flowers with long narrow petal tubes, such as evening primrose and honeysuckle, are visited by moths and butterflies. Only their long tongues can reach deep down to the hidden nectar. Short-tongued insects include many families of flies and some moths. They can only reach nectar in flowers with short florets. By planting a mixture of flowering plants, vegetables, trees and shrubs, you can encourage a diversity of insects to drop in and refuel.

**Follow these general rules**

- ? Plant flowers varying not only in colour and fragrance, but also in shape.
- ? Daisies and daisy-like flowers are open with a mass of shallow florets.
- ? Pale flowers are more easily seen in poor light.
- ? Single flowers have more nectar than double varieties
- ? Native wild flowers or those closely related are most useful
- ? Flowers with landing platforms and short florets such as daisy or carrot family attract many insects.
- ? Many flowering vegetables such as beans and courgettes are also good for insects.

**Plant trees and shrubs**

These are important in providing

- food for insect larvae
- food for adult insects
- shelter for flying insects

- roosting opportunities for bats.

In a small garden, choose trees that can be coppiced – cut down to the ground every few years - to allow new shoots to spring from the base. Young shoots and leaves will support leaf-eating insects, even if they do not produce flowers. Hawthorn and elder are useful small trees.

**Create a wet area**

A pond, a marshy area, even a half-tub made into a mini-pond can attract insects. Many of the tiny flies favoured by bats start life in water as aquatic larvae.

**Say NO to insecticides**

Chemical pesticides kill natural predators and so may do more harm than good. They reduce bats' insect prey, and surviving insects carry traces of poison.

**Encourage natural predators**

Hoverflies, wasps, ladybirds, lacewings, ground beetles and centipedes are the gardener's friends. As natural predators they help keep the balance, eating many pests.

- ? Allow some weeds to grow to provide ground cover for natural predators
- ? Grow favourites of hoverflies and other predators close to the flowers and vegetables that tend to become infested.
- ? Leave hollow-stemmed plants to overwinter as shelter for ladybirds.
- ? Leave heaps of dead leaves and brushwood undisturbed for hedgehogs.
- ? Most garden birds are effective predators. Provide them with regular food and water.

**Prevent a CATastrophe**

Many bats and other small mammals fall prey to Britain's most dangerous four-legged predator, the domestic cat. Cats do not need to stay out all night. Bring your cat in an hour before sunset so bats can emerge undisturbed.

(Send for our special leaflet on cats and bats.)

The Bat Conservation Trust, 15 Cloisters House  
8 Battersea Park Road, London SW8 4BG  
Tel 0845 1300 228 Fax 020 7627 2628  
[enquiries@bats.org.uk](mailto:enquiries@bats.org.uk) [www.bats.org.uk](http://www.bats.org.uk)  
Registered Charity no 1012361 Company limited by guarantee, registered in England no 271282

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### Gardening for bats

Aim at having flowers in bloom through the year, including both annuals and herbaceous perennials.

Below are some suggestions, but this is by no means an exhaustive list. See what grows well in YOUR garden, and what seems most attractive to insects. Flowering times are approximate, varying in different areas. Regular dead-heading extends flowering period in many flowers. A=annual, HA=hardy annual, HHA=half-hardy annual, P=perennial, W=wild flower,

Flowers for borders			
St John's Wort	<i>Hypericum</i>	P	March-
marigolds	<i>Calendula</i>	H/A	March – Oct.
aubretia	<i>A. deltoidea</i>	P	March-June
honesty	<i>Lunaria rediva</i>	HB	March
forget-me-not	<i>Myosotis sp.</i>	A/P	March - May
elephant ears	<i>Bergeria</i>	P	April
Wallflowers	<i>Erysimum</i>	B	April - June
Cranesbills	<i>Geranium sp.</i>	P	May – Sept.
Yarrow	<i>Achillea</i>	P	May -
Poppies	<i>Papaver sp.</i>	A	May - July
Dames violet	<i>Hesperis matronalis</i>	P	May - August
Red Valerian	<i>Centranthus ruber</i>	P	May – Sept.
Poached egg plant	<i>Limnanthes</i>	HA	June – Aug.
Knapweed	<i>Centaurea nigra</i>	P	June- Sept.
Phacelia		HA	June – Sept.
Ox-eye daisy	<i>Leucanthemum vulgare</i>	P	June – Aug.
Evening primrose	<i>Oenothera biennis</i>	B	June-Sept.
Candytuft	<i>Iberis umbellata</i>	HA	June – Sept.
Sweet William	<i>Dianthus barbatus</i>	B	June - July
Blanket flowers	<i>Gaillardia</i>	P	June -
Verbena	<i>V. bonariensis</i>	HHA	June – Oct.
Scabious	<i>Kneuria arvensis</i>	P	July-Aug.
Night-scented stock	<i>Matthiola bicolor</i>	HA	July-Aug
Pincushion flower	<i>Scabious sp.</i>	A/P	July – Sept.
Cherry pie	<i>Heliotrope</i>	HHA	July – Oct.
Mexican aster	<i>Cosmos sp.</i>	A/P	July – Oct.
Cone flower	<i>Rudbeckia sp.</i>	A/P	August-Nov.
Mallow	<i>lavatera sp.</i>	P	August-Oct.
Michaelmas daisy	<i>Aster sp.</i>	P	August-Sept.
Ice plant 'Pink lady'	<i>Sedum spectabile</i>	P	Sept.
Herbs – both leaves and flowers are fragrant			
Fennel	<i>Foeniculum vulgare</i>		July – Sept.
Bergamot	<i>Monarda didyma</i>		June - Sept
Sweet Cicely	<i>Myrrhis odorata</i>		April - June
Hyssop	<i>Hyssopus officinalis</i>		July - Sept
Feverfew	<i>Tanacetum parthenium</i>		June – Sept.
Borage	<i>Borago officinalis</i>		May – Sept.

Rosemary	<i>Rosemary officinalis</i>	March - May
Lemon balm	<i>Melissa officinalis</i>	
Coriander	<i>Copriannum sativum</i>	June - August
Lavenders	<i>Lavendula sp.</i>	
Marjoram	<i>Origanum sp.</i>	
Trees, shrubs and climbers important to insects		
Oak	<i>Quercus sp.</i>	large gardens only
Silver birch	<i>Betula pendula</i>	
Common alder	<i>Ainus glutinosa</i>	Suitable for coppicing
Hazel	<i>Corylus avellana</i>	Suitable for coppicing
Elder	<i>Sambucus nigra</i>	Small
Pussy willow	<i>Salix caprea</i>	Suitable for coppicing
Hawthorn	<i>Crataegus monogyna</i>	Suitable for coppicing
Honeysuckle	<i>Lonicera sp.</i>	grow a variety for succession.
Dog rose	<i>Rosa canina</i>	Climber
Bramble	<i>Rubus fruticosus</i>	Climber
Ivy	<i>hedera helix</i>	Climber
Buddleia	<i>Buddleia davidii</i>	shrub
Guelder rose	<i>Viburnum opulus</i>	shrub
Gorse	<i>Ulex sp.</i>	shrub
Plants for pond edges and marshy areas		
Purple loosestrife	<i>Lythrum salicaria</i>	W June – Aug.
Meadow sweet	<i>Filipendula ulmaria</i>	W June – Sept.
Lady's smock	<i>Cardamine pratensis</i>	W April - June
Water mint	<i>mentha aquatica</i>	W July – Sept.
Angelica	<i>Angelica sylvestris</i>	W July – Sept.
Hemp agrimony	<i>Eupatorium cannabinum</i>	W July – Sept.
Marsh marigold	<i>Caltha palustris</i>	W March – May
Creeping Jenny	<i>Lysimachia nummularia</i>	W May - August
Fringed water lily	<i>Nymphoides peltata</i>	W June – Sept.
Water forget-me-not	<i>Myosotis scorpioides</i>	W June – Sept.

Allow part of your lawn to grow long in summer and cut in autumn, removing the clippings. Avoid using fertilizers. Compost heaps are good producers of insects too.

*Add a seat to watch your garden come to life!*

Other sources include:

<https://www.buglife.org.uk/activities-for-you/wildlife-gardening>

<https://www.rspb.org.uk/birds-and-wildlife/advice/gardening-for-wildlife/creating-a-wildlife-friendly-garden/>

<https://www.rhs.org.uk/advice/design/design-with-plants/wildlife-friendly-garden-plants>

<https://www.wildlifetrusts.org/gardening>