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Bat Scoping and Emergence Survey Report

Site Name

258 Singlewell Road

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Client

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About the Author

This report has been prepared by Nik Neale, a Consultant Ecologist at The Ecology Co-op. He has been involved with, and managed various bat emergence and activity surveys, reptile surveys, dormouse surveys, great crested newt eDNA surveys, bat scoping surveys, bat scoping reports and Preliminary Ecological Appraisals. As a Qualifying member of the Chartered Institute for Ecology and Environmental Management (CIEEM) he is bound by their code of professional conduct.

About the Reviewer

This report has been reviewed by Kate Priestman, who is a Principal Ecologist with over twenty years' experience. Kate has undertaken extensive survey work and reporting, encompassing a breadth of deliverables, and prepared European Protected Species licences for numerous schemes. As a Full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and a Chartered Environmentalist (CEnv), she is bound by CIEEM's code of professional conduct.



Report Summary

Purpose	The Ecology Co-op was commissioned by Mr Peter Chopra to undertake a bat scoping assessment and subsequent emergence survey at 258 Singlewell Road, further to a proposal regarding the conversion of an existing dwelling into two separate properties. Works will involve the construction of a two-storey rear extension, alteration of the roof including an increase in height, rooflights in each side of the roof slope and a dormer extension in each rear roof slope, a single-storey front extension alongside construction of vehicular access and hard paving of the front garden area.
Context	This site is situated within an urban location in Gravesend in North Kent. It comprises a detached two-storey house with a patio and garden area towards the east, which consists of mown amenity grassland. A driveway is present towards the west alongside a landscaped area consisting of a substrate of slate with planted shrubs. A bat scoping survey was undertaken that confirmed that the site had a 'low' suitability to support roosting bats. Based on the above assessment and in line with Bat Conservation Trust Guidelines, one bat emergence survey visit was carried out on 15th May 2025 to determine the presence of roosting bats and evaluate the conservation importance of the site for bats. The purpose of this survey work was to provide advice to inform a planning application for the conversion of the existing dwelling and the construction of a two-storey rear extension as described above.
Key findings	The building was assessed as having low suitability to support roosting bats with some slipped roof tiles, and where the edge of the apex on the rear elevation does not meet the timber. Habitat within the zone of influence of the proposals was considered to be of potential value to bats for foraging/commuting/dispersal purposes. This was deemed to have 'low' overall suitability for roosting bats. A subsequent single bat emergence survey identified that the building is not currently being used by roosting bats.
Interpretation	The survey indicates that roosting bats do not use the property. However, the features identified could be used on occasion by roosting bats.
Recommendations	As the proposed development involves the alteration of the roof and impacts identified potential roosting features, the destruction of the roost features that could potentially be used by bats cannot be avoided, and in the absence of mitigation, this could potentially result in harm to individual bats. It is recommended that the potential roosting features are demolished by hand under the supervision of a suitably qualified ecologist – if roosting bats are found, works will cease and the requirement for a European Protected Species (EPS) licence will be reviewed for the development to legally proceed.



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1 INTRODUCTION

1.1 Background

The client intends to submit a planning application for a proposed development that comprises the conversion of an existing dwelling into two separate properties. Works will involve the construction of a two-storey rear extension, alteration of the roof including an increase in height, rooflights in each side of the roof slope and a dormer extension in each rear roof slope, a single-storey front extension alongside construction of vehicular access and hard paving of the front garden area.

The site is located at 258 Singlewell Road, Gravesend, Kent, DA11 7RE. The central grid reference for the site is TQ 6481 7175 and Figure 1 illustrates the location of the property.

The Ecology Co-op undertook a bat scoping assessment of the property on 15th November 2024, during which a small number of features were identified that were suitable to support roosting bats. This report provides the findings from this bat scoping assessment, as well as a subsequent single bat emergence survey.



Figure 1. Aerial image showing the location of 258 Singlewell Road (outlined in red) Images produced courtesy of Google maps (map data ©2024 Google).



1.2 Purpose of the Report

The survey by The Ecology Co-op has sought to first establish if any potential roost features were present at 258 Singlewell Road in the location of proposed works which include the construction of a two-storey rear extension, and a single-storey front extension.

Following the bat scoping assessment and in accordance with recommendations, a bat emergence survey was carried out by The Ecology Co-op on 15th May 2025 led by Dan Bennett, a Full member of the Chartered Institute of Ecology and Environmental Management and licensed bat surveyor.

The purpose of this survey work was to determine presence of roosting bats and where necessary prescribe further surveys and/or appropriate mitigation advice to inform the planning application for the proposed development at the site.

This survey and report were carried out at the request of Mr Peter Chopra.

2 LEGAL PROTECTION

Details of legislation and legal protection afforded to all species of British bats are given in Appendix 1.

The results of this survey will be used to determine the need for an appropriate mitigation strategy to ensure compliance with UK and EU wildlife legislation.

3 METHODOLOGY

The methodologies used for the surveys are in accordance with the bat survey guidelines produced by the Bat Conservation Trust¹. Where there has been any deviation from the guidelines due to any site-specific constraints or other circumstances, reasoning and justification has been provided.

3.1 Desk Study

A search of on-line mapping resources has been undertaken to characterise the local context of the site with respect to semi-natural habitats and linear features of value to foraging and commuting bats.

The MAGIC website resource (www.magic.gov.uk) has been used to identify the location of designated sites for nature conservation within 2km and European Protected Species (EPS) licences granted within a 1km radius of the survey site. Priority habitats and ancient woodland, upon the site and within the proposal's zone of influence, have also been identified due to their ecological value and potential to act as important foraging resources for bats.

Priority habitats and ancient woodland are classified as habitats of principal importance. Habitats of principal

¹ Collins, J.(ed.) (2023) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (4th edn). The Bat Conservation Trust, London..



importance are listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006², which places a duty on Local Planning Authorities to have due regard to biodiversity.

3.2 Field Survey

3.2.1 Roosting Potential

Bats can use a wide range of features for roosting purposes including loft spaces, cavity walls, loose tiles, mortice joints and cracks/gaps in a variety of built structures. They can also be found in trees with holes, splits, cracks, cavities, ivy and loose bark.

A detailed building inspection was carried out, looking for potential access points and Potential Roosting Features (PRFs) that bats could use and any evidence indicating the presence of bats using the building, such as rub marks, feeding remains, staining or droppings. This included a ground-based external inspection around the entirety of the property with the use of binoculars and internal inspection of PRFs with the use of a high-powered torch within enclosed loft spaces or roof voids or basements, where safe access was possible. A high-powered torch was used for the internal and external assessment.

The suitability of each feature, or group of features, to support roosting bats has been assessed as either negligible, low, moderate, or high, in accordance with best practice guidance¹ (see Table 1). Any evidence confirming the presence of bats was clearly recorded including photos and samples taken (e.g. droppings), where appropriate. Further surveys have been recommended in accordance with best practice guidance and the surveyor's professional judgement, where evidence of a bat roost or PRFs have been identified that would be adversely impacted by the proposal and where precautionary mitigation alone cannot ensure that bats would not be potentially disturbed or harmed.

Table 1. Guidelines for assessing suitability of structures (buildings and trees etc.) to support bat roosts.

Suitability	Description of roosting habitats
None	No habitat features on the structure likely to be used by any roosting bats at any time of year (i.e. a complete absence of crevices/suitable shelter at all ground/underground levels).
Negligible	A structure that does not have any obvious habitat features that are likely to be used by roosting bats. However, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.
Low	A structure that has one or more potential roosting features that could support individual roosting bats opportunistically. These features however lack the space, shelter or appropriate conditions, to support larger numbers of bats (such as a maternity roost).
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter and suitable conditions for roosting, but are unlikely to support a roost of high conservation significance.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potential for longer periods of time due to their size, shelter, protection and conditions.

² HM Government (2006). Natural Environment and Rural Communities Act 2006. Available online at: <https://www.legislation.gov.uk/ukpga/2006/16/section/41>.



3.2.2 Hibernation Potential

The structure and its associated features were assessed for its suitability to be used by hibernating bats. The assessment was carried out in accordance with guidelines produced by BatAbility³ and the bat survey guidelines produced by the Bat Conservation Trust¹. To determine the potential for features to support hibernating bats the following aspects were considered:

- the suitability of features to support roosting bats or to allow access for roosting bats;
- the temperature and humidity conditions likely to be present within the feature during the winter period and the suitability in this respect for it to be used by bats for hibernating;
- the surrounding habitat, in terms of its potential for use by bats outside of the hibernation period for commuting and/or foraging purposes; and
- the presence of known roosts within the structure/tree, or adjacent structures/trees, or surrounding area during the active season.

The potential for use by hibernating bats for each feature, or group of features was assessed as either negligible, low, moderate, or high, in accordance with best practice. Further surveys are recommended where appropriate, considering the feasibility of a hibernation survey for certain PRFs.

3.2.3 Foraging and Commuting Potential

The habitats surrounding the site and within the wider landscape were broadly assessed for their potential to support foraging and commuting bats, and were categorised as negligible, low, moderate or high potential suitability in line with published guidance¹.

3.2.4 Emergence Survey

A single bat emergence survey was undertaken on the 15th May 2025 using the methodology set out in the best practice guidelines prepared by the Bat Conservation Trust.

The survey focused upon the eastern elevation where a slipped tile was present upon the roof face, and a small section of missing pugging. The western elevation was also focused upon where hanging tiles upon the dormer windows were present. The description of potential roosting features are listed in Table 2.

The surveyor recorded any bat activity on or around the potential roosting entry/exit features identified during the scoping survey, using a full spectrum handheld bat detector to identify species through call frequencies. The bat calls were logged and recorded as sonograms for later confirmation of species where necessary.

The following equipment was used to support this survey:

- 2 x Echometer Touch 2 Pro detector with Android recording devices
- 2 x NightFox Whisker night vision cameras.

The darkest points from each camera are shown in Figures 2 & 3. Figure 4 shows the positions of both the surveyors and cameras.

³ Middleton. N. (2019). *Assessing Sites for Hibernation Potential. A Practical Approach, including a Proposed Method & Supporting Notes. Version' Draft/V2.2019.* BatAbility.

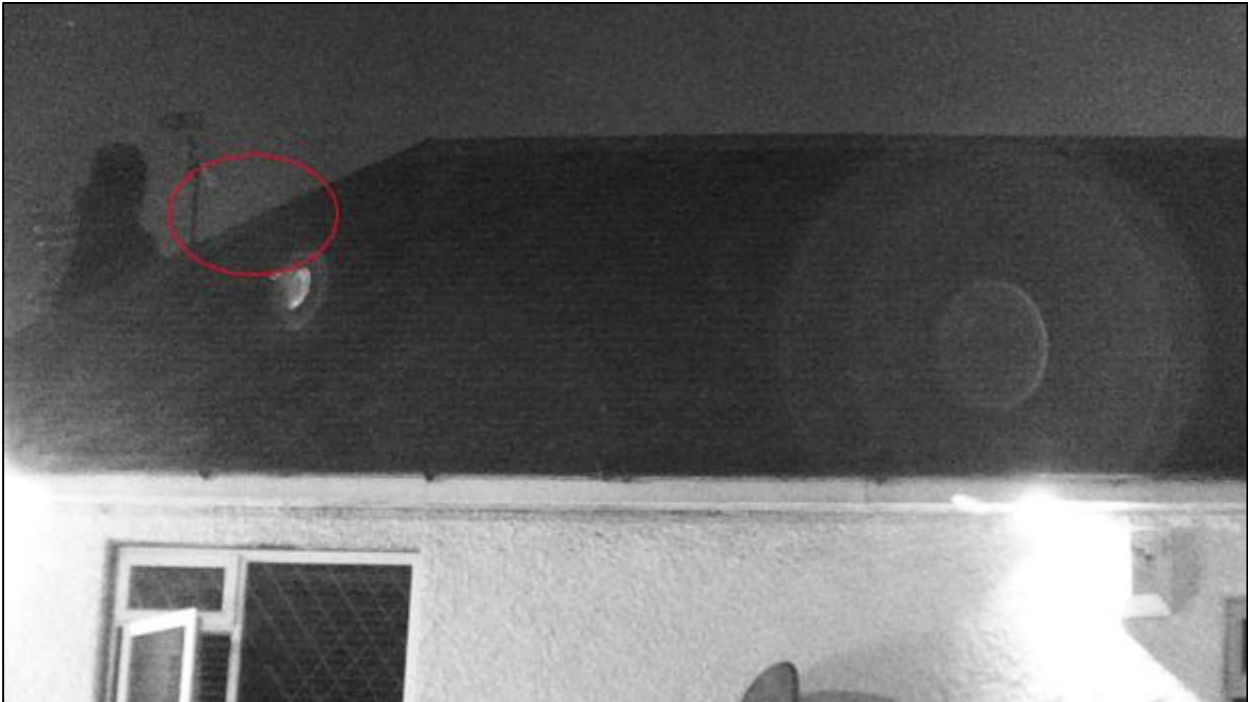


Figure 2. The darkest point from the camera facing the eastern elevation, small section of missing pugging (highlighted with red circle).



Figure 3. The darkest point from the camera facing the eastern elevation, gap where soffit box does not meet the timber frame (highlighted with red circle). This feature was obstructed by the exterior lighting for the camera, however the surveyor did not note any emergences from this location during the survey.

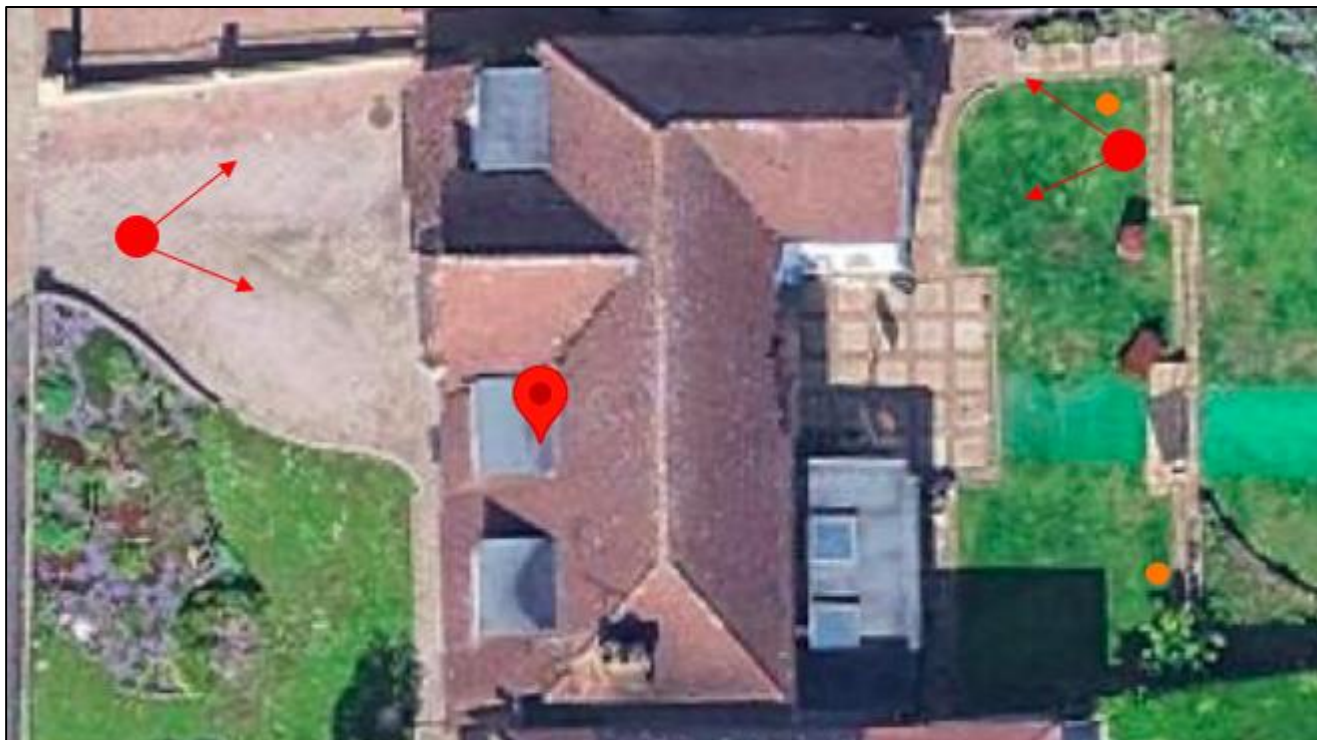


Figure 4. An aerial image of the site, showing the positions of surveyors (red dots) and two night-vision cameras (orange dots) with arrows illustrating an approximate field of view. Images produced courtesy of Google maps (map data ©2024 Google).

3.2.5 Other Protected and/or Notable Species

Any birds identified, or evidence of nesting birds discovered during the site visit, were recorded. Special attention was paid to notable species such as red-listed Birds of Conservation Concern⁴ and those species afforded special protection on Schedule 1 of the Wildlife and Countryside Act (1981), such as barn owl *Tyto alba* and swallow *Hirundo rustica*.

Whilst this survey has focussed on bats and no specific searches were made with respect to other protected/notable species, any evidence of such species that was encountered during the site visit was also recorded.

3.3 Limitations to Surveys

In accordance with best practice guidelines, each survey visit was undertaken during the peak period in bat activity and during good weather conditions. The results presented here are therefore considered to be an accurate representation of the general use of the property by roosting bats.

Nevertheless, bats can 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. These surveys record the emergence of bats at the time of the survey visits and therefore only provide a snapshot of bat roosting activity at the site at that time. Bats may be present at other times and the results should therefore be

⁴ Stanbury, A., Eaton, M., Aebischer, N., Balmer, N., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). Birds of Conservation Concern 5: the status of bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man. *British Birds* 114, pp 723-747..



viewed with caution.

Due to the location of the chimney on the southern elevation, this could not be viewed in its entirety as to do so would have meant entering the neighbour's garden. The chimney could be viewed from the front elevation and an assessment has been made from here.

4 RESULTS

4.1 Desk Study and Granted EPS Licences

There are no designated sites within 2km of the site that include bats as a designated feature within the zone of influence of the site. There is no priority habitat adjacent or in close proximity to the site. The closest area of ancient and semi-natural woodland is located approximately 1.9km south east of the site.

There are no EPS licences granted for mitigation projects concerning bats within 1km of the site. There are no EPS licences granted for mitigation projects regarding any other protected species within 2km of the site. The closest EPS licence regarding bats is approximately 3.3km south west of the site and concerns brown long-eared *Plecotus auritus* (2018-34833-EPS-MIT).

4.2 Site Context and Surrounding Habitats

This site is located in an urban location in Gravesend, Kent. The surrounding area is primarily built-up urban environments, some trees are present within garden areas and a block of trees is present beyond the north west boundary of the site. The close surrounding habitats are considered to be of low value for common bat species.

The site supports a single building and front and rear garden areas. The building sits within a garden space comprising mown lawn areas, artificial turf, an area of patio and hardstanding, and occasional shrubs.

4.3 Inspection for Bats

4.3.1 Roost Potential

This detached dwelling has a pebbledash facade on all aspects, with a clay peg tiled roof that is accessible by a single void space. No features were identified from the interior or exterior that could potentially allow entry into the enclosed loft space. The exterior of the building had a limited number of features including slipped tiles, gaps in the rear apex, and hanging tiles. Table 2 describes the PRFs assessed during this survey.

Table 2. Assessment of PRFs

Building section	Description of features	Assessment of suitability
258 Singlewell Road - interior	The loft void is composed of an L-shaped ridge which has had an extension towards the north-east. The loft void is between 1.75m and 2m high, other approximate dimensions are shown in Figure 3.	Low bat roost suitability



Building section	Description of features	Assessment of suitability
	The void space is described as cluttered with timber frame purlins and horizontal struts for support. The intrusion of external light is not noticed within the loft void apart from on the eastern elevation where a soffit box grill can be seen. No evidence of bats was found within the loft void during the survey.	
258 Singlewell Road - exterior	Rear (eastern) elevation; slipped tile is present on this elevation (Photograph 1 & 3) which could provide a suitable crevice feature for bats, the pugging is intact on the majority of this elevation apart from a small section where the ridge tiles meet the roof tiles (Photograph 2). Soffit boxes are well sealed with no features. There is a single gap present on the apex of where the tile does not meet the timber frame (Photograph 4). Side (northern) elevation; no features were noted on this elevation (Photograph 12). Front (western) elevation; hanging tiles on the dormer windows have gaps that provide a feature for crevice dwelling bats (Photograph 6). A missing roof tile is present however this is discounted as a feature as half of the tile remains in the roof and therefore a crevice space between the tiles and lining is not present (Photograph 7). Side (southern) elevation; no features were noted on this elevation, although the base of the chimney could not be viewed entirely (Photograph 13).	Low bat roost suitability





Figure 5. Loft void and approximate dimensions at 258 Singlewell Road.

Overall, the bat roost suitability at this site is assessed as ‘low’, considering the condition of the building and its context within the surrounding environment. The lack of hedgerows and tree-lines approaching the building used by bats for commuting and navigation may also reduce the potential for bats establishing roosts at this site.

4.3.2 Hibernation Potential

The features described above have low potential for hibernating bats. The building is in use all year round and is centrally heated, therefore the interior loft space is likely to fluctuate in temperature and not remain stable for hibernating bats. However, the presence of hibernating bats including pipistrelle species using any of the crevice features described above for hibernation cannot be discounted.

4.4 Bat Emergence Surveys

4.4.1 Survey Conditions

The dates, times, weather conditions, temperatures and personnel for each survey visit are presented in Table 3 below:

Table 3. Details of surveys undertaken, timings weather conditions and personnel.

Date	Survey start time/end time	Temp. degrees centigrade, weather conditions throughout survey	Surveyors
15 th May 2025	Start time: 20:29 Sunset: 20:44 End time: 22:14	Max/min temp: 11–13°C. 80% cloud cover and light breeze (BF1), dry.	Nik Neale Emily Davies

4.4.2 Bat Emergence Results

The following descriptions summarise the emergence survey results from the building.

15th May 2025

General bat activity was very low. A single noctule *Nyctalus noctula* bat was the first recorded at 20:59, this was a brief faint call and so was likely a bat in the distance commuting. Following on from this a distant common pipistrelle *Pipistrellus pipistrellus* bat was recorded at 21:15. A second distant noctule bat was recorded at 21:29. A commuting soprano pipistrelle *P. pygmaeus* bat was recorded at 21:35 and the final bat was a distant noctule recorded at 22:05. No bats were seen during the survey and the majority of calls were recorded faintly indicating distant bats.



4.5 Photographs



Photograph 1. Overview of the rear elevation.



Photograph 2. Missing pugging from below the ridge tile on the left side of the rear elevation as highlighted in red.



Photograph 3. Missing tile from the roof on the left side of the rear elevation as highlighted in red.



Photograph 4. Gap present where tile does not meet the timber frame on the right side of the rear elevation as highlighted in red.



Photograph 5. Overview of the front elevation.



Photograph 6. Gaps present on the hanging tiles of the dormer window on the front elevation as highlighted in red.



Photograph 7. Missing tile from the roof on the right side of the front elevation as highlighted in red, feature discounted as the stub of tile can be seen with binoculars.



Photograph 8. Internal loft void.



Photograph 9. Internal loft void.



Photograph 10. Internal loft void.





Photograph 11. Internal loft void.



Photograph 12. Side (northern) elevation.

Photograph 13. Side (southern) elevation, note chimney that could not be fully viewed.

5 IMPACT ASSESSMENT AND MITIGATION RECOMMENDATIONS

5.1 Interpretation of Findings

The combined findings from the scoping assessment and single emergence survey indicate that roosting bats do not routinely use the building.

5.1.1 Hibernation Potential

258 Singlewell Road is assessed as having low hibernation potential for bats. The features that could be used for hibernation include hanging tiles which it would be impossible to fully investigate bat use over the winter period without dismantling the features, and hence potentially destroying a bat roost. Therefore, in this instance no further surveys for winter roost potential are recommended. Instead, mitigation must be implemented to reflect the risk that bats may be use this building for hibernating during the winter. This must include timing the works to the building between in the period between mid-March and the end of October to avoid disturbing bats that could be in hibernation.

5.1.2 Foraging and Commuting Suitability

The site's overall foraging and commuting suitability is assessed as low due to the lack of hedgerows and tree lines that are approaching the site and the lack of these within the surrounding environment. Bat activity surveys are not recommended in this instance as it can be assumed that the surrounding area has low numbers of common bat species.

5.2 Precautionary Approach

As no bats have been identified emerging from or entering roosts during the survey, it is considered highly unlikely that the features identified in the bat scoping survey are regularly used by roosting bats. However, the highly



transitory nature of many bat species means that it is not possible to completely dismiss this possibility as the potentially suitable features may be used infrequently. As a precautionary measure, the following mitigation should be put in place:

- in advance of demolition/building works, the features should be inspected by a qualified ecologist for the presence of bats. In the unlikely event that bats or evidence of bats are found at this stage, the potential for impacts and need for EPS licencing will be reassessed;
- the identified potential roost features shall be subject to hand stripping prior to demolition.

5.3 Potential Impacts

The proposed development requires modification of the existing building. Since the surveys have demonstrated that the roost features do not routinely support roosting bats, this impact is not considered to be significant beyond local level.

5.4 Other Protected and/or Notable Species

Since the site comprises entirely building and is surrounded by paved ground, the risk of impacts on reptiles, amphibians, badgers, or any other protected/notable species is considered negligible in this case and no other surveys are considered necessary.

5.5 Conclusions

The proposed development will impact upon potential roost features identified. The proposed mitigation measures outlined above will ensure that individual bats will not be harmed during the construction.

If any bats or other protected species are found during the development, work should be stopped immediately, and an ecologist must be contacted for advice.

Should you need any further advice on the information provided above, please do not hesitate to contact The Ecology Co-op.



APPENDIX 1 – LEGISLATION AND POLICY

All species of British bat are fully protected under the Wildlife and Countryside Act 1981 as amended through inclusion in Schedule V. All bat species in the UK are also included in Schedule II of the Habitats Regulations 2017 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.

Bat species are afforded further protection by 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.

The Habitats Directive and Habitats Regulations provide for the derogation from these prohibitions for specific reasons provided certain conditions are met. An EPS licensing regime allows operations that would otherwise be unlawful acts to be carried out lawfully. In England, Natural England is the licensing Authority and, in order to grant a license, ensures that three statutory conditions (sometimes referred to as the 'three derogation tests') are met:

- a licence can be granted for the purposes of "preserving public health or safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment" (Regulation 53 (2) (e));
- a licence can only be granted if "there are no satisfactory alternatives" to the proposed action;
- a licence shall not be granted unless the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

A bat roost is defined 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 all summer roosts, used for breeding, resting or sheltering and all winter roosts used for hibernating.



APPENDIX 2 – EXAMPLES OF REPLACEMENT BAT ROOSTING FEATURES



Figure 1. Left to right, the 2F, 2FN and the 1FS bat boxes produced by Schwegler. These and other brands are available at many on-line wildlife stores. These are constructed of ‘woodcrete’ (a mixture of cement and woodchip) and are designed to be durable and replicate the stable thermal properties of trees and buildings. They may be attached to trees or buildings.



Figure 2. Examples of integral bespoke bat roosting features that may be incorporated into buildings during construction/renovation. From left to right: an example of bat access tile into loft space; the 2FR bat tube; and an example of 2FR bat tubes installed into a house wall in a series of three. Other brands and designs are available.



APPENDIX 3 – REDUCING IMPACTS OF ARTIFICIAL LIGHT

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

Guidelines issued by the Bat Conservation Trust⁵ should be referred to when designing the lighting scheme. Note that lighting designs in very sensitive areas should be created with consultation from an ecologist and using up-to-date bat activity data where possible. The guidance contains techniques that can be used on all sites, whether a small domestic project or larger mixed-use, commercial or infrastructure development. This includes the following measures:

Avoid lighting key habitats and features altogether

There is no legal duty requiring any place to be lit. British Standards and other policy documents allow for deviation from their own guidance where there are significant ecological/environmental reasons for doing so. It is acknowledged that in certain situations lighting is critical in maintaining safety, such as some industrial sites with 24-hour operation; however, in the public realm, while lighting can increase the perception of safety and security, measurable benefits can be subjective. Consequently, lighting design should be flexible and be able to fully consider the presence of protected species.

Apply mitigation methods to reduce lighting to agreed limits in other sensitive locations – lighting design considerations

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

- dark buffers, illuminance limits and zonation;
- sensitive site configuration, whereby the location, orientation and height of newly built structures and hard standing can have a considerable impact on light spill;
- consideration of the design of the light and fittings, whereby the spread of light is minimised ensuring that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Consideration should be given to the height of lighting columns. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light-spill or require more columns. Column height should be carefully considered to balance task and mitigation measures. Consider no lighting solutions where possible such as white lining, good signage, and LED cats eyes. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to

⁵ Bat Conservation Trust and Institute for Lighting Professionals (2018) Guidance note 8. Bats and Artificial Lighting. <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>



- provide any necessary illumination at other times;
- screening, whereby light spill can be successfully screened through soft landscaping and the installation of walls, fences and bunding;
- glazing treatments, whereby glazing should be restricted or redesigned wherever the ecologist and lighting professional determine there is a likely significant effect upon key bat habitat and features;
- creation of alternative valuable bat habitat on site, whereby additional or alternative bat flightpaths, commuting habitat or foraging habitat could result in appropriate compensation for any such habitat being lost to the development;
- dimming and part-night lighting. Depending on the pattern of bat activity across the key features identified on site it may be appropriate for an element of on-site lighting to be controlled either diurnally, seasonally or according to human activity. A control management system can be used to dim (typically to 25% or less) or turn off groups of lights when not in use.

Demonstrate compliance with illuminance limits and buffers

- *Design and pre-planning phase*; it may be necessary to demonstrate that the proposed lighting will comply with any agreed light-limitation or screening measures set as a result of your ecologist's recommendations and evaluation. This is especially likely to be requested if planning permission is required.
- *Baseline and post-completion light monitoring surveys*; baseline, pre-development lighting surveys may be useful where existing on or off-site lighting is suspected to be acting on key habitats and features and so may prevent the agreed or modelled illuminance limits being achieved.
- *Post-construction/operational phase compliance-checking*; as a condition of planning, post-completion lighting surveys by a suitably qualified person should be undertaken and a report produced for the local planning authority to confirm compliance. Any form of non-compliance must be clearly reported, and remedial measures outlined. Ongoing monitoring may be necessary, especially for systems with automated lighting/dimming or physical screening solutions.

Lighting Fixture Specifications

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

- lighting spectra: peak wavelength >550nm
- colour temperature: <2700k (warm)
- reduction in light intensity
- minimal uv emitted
- upward light ratio of 0% and good optical control.

Further reading:

Buglife (2011) A review of the impact of artificial light on invertebrates.

Royal Commission on Environmental Pollution (2009) Artificial light in the environment. HMSO, London. Available at: <https://www.gov.uk/government/publications/artificial-light-in-the-environment>



Rich, C., Longcore, T., Eds. (2005) *Ecological Consequences of Artificial Night Lighting*. Island Press. ISBN 9781559631297.

CPRE (2014) *Shedding Light: A survey of local authority approaches to lighting in England*. Available at: <http://www.cpre.org.uk/resources/countryside/dark-skies/item/3608-shedding-light>

Planning Practice Guidance guidance (2014) *When is light pollution relevant to planning?* Available at: <https://www.gov.uk/guidance/light-pollution>

Institution of Lighting Professionals (2021) *Guidance Notes for the Reduction of Obtrusive Light GN01:2011*. Available at: <https://www.theilp.org.uk/resources/free-resources/>

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