

Bat Emergence Survey Report for Elm Tree, Langstone, Newport

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Executive summary

NewWays Ecology Ltd undertook an initial scoping assessment in March 2026. The building was assessed as having a 'Moderate potential' to support roosting bats, and no evidence of bats was found during the survey.

Based on the above assessment and in line with Bat Conservation Trust Guidelines, NewWays Ecology Ltd undertook two bat activity surveys at Elm Tree, Langstone which were carried out in May and June 2026. The purpose of this survey work was to determine presence or absence of roosting bats and provide advice to inform a planning application for the demolition of the house.

During the visit, no bats were witnessed emerging from the building. There was a moderate level of activity around the site. Common and soprano Pipistrelles utilised the garden for foraging and commuting during the surveys. Individual passes by noctules and lesser horseshoes were recorded.

The evidence gathered during the surveys suggests that during the time of the survey there are no bat roosts within the site. The planned demolition of the house **will not** result in the disturbance, modification and destruction of a bat roost.

A protected species mitigation licence will NOT be required from Natural Resources Wales.

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1. Introduction

1.1. Background

In relation to the proposed demolition and re-build of the house at Elm Tree, Langstone NewWays Ecology Ltd carried out a bat scoping assessment in March 2026 during which no evidence of bats was found but a moderate number features were identified that were suitable to support roosting bats within the building alongside good neighbouring habitat. The building was assessed as having moderate potential to support roosting bats.

This report presents the results of the bat activity surveys carried out in May and June 2026. These were led by Grace Scammell BSc Natural England Bat Licence (2025-85739-CL18-BAT). The grid reference for this site is ST390911.

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 works at the site.

This survey and report was carried out at the request of Mr. Jan Sniatecki of Elm Tree, Langstone.

1.2. Site description

The site is located at national grid reference ST390911 and consists of a brick and rendered detached bungalow with a clay tile roof within a mature garden. The site is situated on the eastern edge of the village of Langstone and is accessed off Caerlicken Lane. The boundaries are mature hedgerows and tree lines.

The site has good connectivity to the wider landscape hedgerow boundaries.

The location of the site is shown in Figure 1 and the building surveyed is shown in Figure 2.

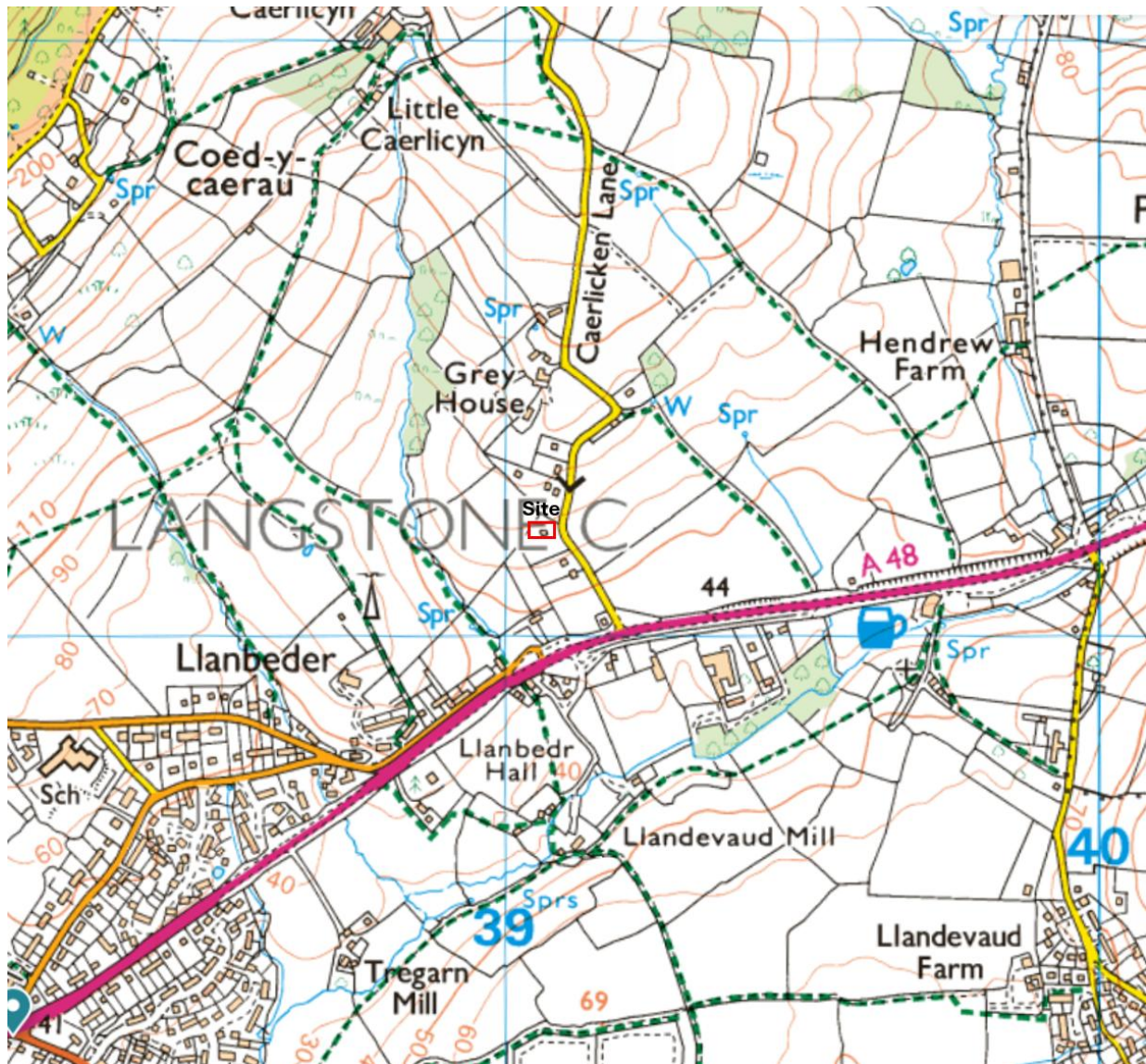


Figure 1: Site location. Contains Ordnance Survey data © Crown copyright and database right 2026



Figure 2: Buildings surveyed

The site is predominately mature lawned garden with ornamental shrub planting with vegetated boundaries. The site is accessed off Caerlicken Lane. The site is situated on the eastern edge of the village of Langstone, Newport. The site is surrounded by mixed pasture with scattered rural residential properties and their associated gardens to the north and south. The wider habitat is mixed pastoral with large areas of mixed woodland forming part of Wentwood Forest to the north. The site has good connectivity to the surrounding landscape due to the hedgerow boundaries.

Roosting potential locally is high due to numerous older buildings and mixed woodland areas.



Figure 3: Habitat surrounding the site

1.3. Development proposals

The proposed development includes the demolition of the bungalow and construction of a new dwelling. At the time of survey no plans were available.

1.4. Legal Protection

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

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

2. Methodology

2.1. Desk Survey

Within 10km of the site the following sites are designated for important bat assemblages:

- Wye Valley and Forest of Dean Bat sites SAC – Mwynglodffa Myndd Bach SSSI – 9.6km NE

SEWBREC provided 4 records of bats within a 1 km radius of the site, recorded between 2004 and 2024, for common pipistrelle, soprano pipistrelle, and brown long-eared. The closest recorded roost is 600m west of the site for brown long-eareds.

An absence of records does not mean that a particular species is not present, merely that it has not been recorded. Many species records are not obtainable from the sources utilised and therefore there may be further undetected records for such species on the study site or in the local area.

The following roof nesting birds are recorded within 1km of the site:

Species
Starling
Swift
Peregrine
Black Redstart
House Martin
House Sparrow
Great tit
Blue tit
Pied wagtail
Lesser black-backed gull
Swallow
Herring gull
Wren
Jackdaw

2.2. Scoping survey

The initial survey was undertaken on 2nd March 2026 by Grace Scammell BSc on behalf of NewWays Ecology Ltd. The survey covered the house, as shown in Figure 2.

The building was assessed for its potential to support bats or bat roosts according to industry standard guidelines (Collins, 2023). This involves a consideration of various factors including:

- Light levels
- Temperature regime and protection from weather
- Access to the interior of the building or to other suitable roost sites
- Potential roost sites

- Building construction
- Habitat context

Based on these factors, an assessment was made of whether the building might support bats, and the type and number of roosts that might be present. The building was assigned a roost potential category (Collins, 2023) according to the criteria outlined in Table 1 below, based on the results of the assessment.

Table 1: Guidelines for assessing the potential suitability of buildings/structures for roosting bats

Category	Category description
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A building or structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A building or structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only).
High	A building or 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 potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Known roost	Building or structure currently supporting bats (based on presence of bats, or evidence of use such as droppings, carcasses etc.).

A detailed inspection was made of the exterior and interior of the building for any evidence of bat use, such as live or dead bats, droppings, scratch marks, staining and prey remains (e.g. moth or butterfly wings), and in some cases the absence of cobwebs. Large quantities of cobwebs in roof voids or at access points tend to be suggestive of no bat use, although this evidence is not conclusive.

Features identified as possible bat access points or potential roosting locations were thoroughly searched where possible, using powerful torches, binoculars and an endoscope to facilitate the process. Ladders were available to enable more detailed inspection of cracks and crevices as far as access allowed.

2.3. Limitations of scoping surveys

Surveys were carried out at an optimal time of year. Any survey for bat species can only be a series of snapshots in time. Bats are very mobile with complex social structures and utilise multiple roost sites during the year. The implications of this are that surveyors must make informed assumptions based on observations, recorded data, local information, and a detailed knowledge of the species.

2.4. Activity surveys

Two activity surveys were undertaken on the 14th May and 4th June 2026. The surveys were led by Grace Scammell BSc. Ms. Scammell is an experienced ecologist and specialises Phase 1 Habitat Surveys and commercial survey work in Wales and England. Ms. Scammell has been involved in commercial bat surveys since 2010– Natural England bat license. All surveys were carried out in appropriate

weather conditions using the methodology set out in the best practice guidelines prepared by the Bat Conservation Trust and CIEEM.

The survey focused upon the features of interest on the external faces of the property, with a particular focus upon the potential bat entry/exit points, such as the apexes, fascia boards and gaps in the roof. The surveyors positioned themselves accordingly, at an appropriate vantage point in view of these interest features, and the locations of these are indicated in Figure 4. The dusk emergence survey commenced approximately 30 minutes before sunset and lasted approximately 2 hours, the optimum time for bats to emerge from a roost, in order to record any bats that may emerge from the building.

The surveyors recorded any bat activity on or around the potential roosting entry/exit features identified during the scoping survey, using full spectrum real time handheld bat detectors (Batlogger Elekton M1 and M2, and BatScanner Elekton) to identify species through call frequencies.

Two Night Vision Aids (NVA) -Nightfox Whisker IR camera- were also set up to provide additional surveillance points of the building.

All bat passes were noted, and all bats identified to species level where possible. Echolocation calls were recorded by the detectors in-built sound cards and subsequently analysed using BatExplorer software which facilitates species identification. Where possible additional notes on size, flight height, type of flight (such as commuting, foraging, fast or slow) and direction of flight were also recorded.

For pipistrelle species the following criteria, based on measurements of peak frequency, were used to classify calls:

- Common Pipistrelle ≥ 42 kHz and < 49 kHz
- Soprano Pipistrelle > 51 kHz
- Nathusius' Pipistrelle < 39 kHz
- Common/Soprano pipistrelle ≥ 49 kHz and < 51 kHz
- Common/Nathusius' Pipistrelle ≥ 39 kHz and < 42 kHz

In addition, calls by bat species of the *myotis* genus were not identified to species level. Bats in this genus cannot reliably be separated on calls alone due to the overlap in call characteristics between the species. Calls from this species group have been identified as 'myotis sp.'. This is also true for grey long-eared bats and brown long-eared bats. Calls from this species group have been identified as 'long-eared bat sp.'.



Figure 4: Site plan, showing the positions of surveyors (purple dots) on the survey



Figure 4: Still from NVA



Figure 5: Still from NVA

2.5. Limitations of emergence surveys

In accordance with best practice guidelines, two survey were undertaken, and all survey visits were undertaken in accordance with best practice guidelines, 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 viewed with caution.

3. Results

3.1. Scoping survey

The building at Elm Tree is a brick and rendered bungalow dating from the 1950's with a pitched tile roof and bay windows.

The external survey identified:

Potential Level	Justification of Assessment
Moderate potential	Brick and rendered bungalow with pitched tile roof and undercroft at western end. Walls in moderate condition- some areas of missing pointing. Roof in moderate condition with no slipped, missing tiles but some raised areas. Ridge tiles in good condition. No chimneys Eaves and fascias in poor condition –gaps to the wall and gaps in soffit boxes with points of rot. Windows and door are modern uPVC and in good condition. No evidence of bats No evidence of nesting birds found.

Internal Survey

Potential Level	Justification of Assessment
Moderate Potential	Loft accessed via hatch. Modern sawn timber roof trusses with bitumen felt. Partially boarded out. Fibreglass insulation present Max height of loft 2m at pitch. Internal walls are in good condition. Window present so high light levels. Water ingress around chimney. Some points of light ingress on wall tops. Cobwebs present.

Overall building potential level	Moderate
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Photo 1 – Garden surrounding site



Photo 2 – Loft structure



Photo 3- Window in loft space



Photo 4- Internal gable walls



Photo 5: Chimney stack with water ingress



Photo 6: Points of rot on soffits



Photo 7: Access points into fascias



Photo 8: South face of house



Photo 9: West face of house with undercroft



Photo 10: Interior of undercroft



Photo 11: Undercroft access



Photo 12: West face



Photo 13: west facing soffits



Photo 14: North side of house



Photo 15: North side of house



Photo 16: East side of house

3.1.3 Assessment of Bat Roost Potential

The building was assessed as having moderate potential to host crevice roosting bats with negligible suitability to host maternity of hibernation roosts.

Places where bats could potentially roost include:

- Wall tops
- Wall structure
- Roof structure
- Roof void

In summary, the PRA confirmed that the building has moderate potential to host roosting bats.

3.2. Bat activity surveys

3.1.1. Survey conditions

The dates, times, weather conditions, temperature and personnel for each survey visit is presented in Table 1 below:

Table 1

Date	Survey start/end time	Temp (°C), weather conditions	Surveyors
14/5/26	Start: 2035 End: 2210 Sunset: 2055	Max temp: 13°C Min temp: 11°C Wind: 0 BFS Cloud: 20%	Grace Scammell BSc (Surveyor 1) Sophie Lunn (Surveyor 2) Rose Lloyd (Surveyor 3)
4/6/26	Start: 2050 End: 2245 Sunset: 2122	Max temp: 14°C Min temp: 12°C Wind: 1 BFS Cloud: 5%	Grace Scammell BSc (Surveyor 1) Hamish Lawson (Surveyor 2) Alice Lawson (Surveyor 3)

3.2.2. Bat activity results

14th May 2026

General bat activity levels during the dusk emergence survey were moderate comprising observations and recordings of the following species: common and soprano pipistrelle. A single pass by a noctule was recorded.

The first bat recorded during the survey, 1 minutes post sunset (2056), was a common pipistrelle recorded by surveyor1 commuted to the garden from the north. After this time there was a moderate level of foraging and commuting activity from common pipistrelles recorded by all

surveyors around the site. The first pass by a soprano pipistrelle was recorded at 2102 by surveyor 2 foraging along the southern boundary. After these times there was a moderate amount for foraging activity around the site from soprano pipistrelles within the garden.

At 2128 there was a single pass by a noctule commuting high over the site from W to E.

No emergences were recorded.



Figure 6: Survey 1 results

4th June 2026

General bat activity levels during the dusk emergence survey were moderate comprising observations and recordings of the following species: common and soprano pipistrelles. A single pass by lesser horseshoes was recorded.

The first bat recorded during the survey, 18 minutes post sunset (2140), was a soprano pipistrelle recorded by surveyors 1 foraging within the garden. After this time there was a low level of foraging and commuting activity from soprano pipistrelles recorded by all surveyors around the site. The first pass by a common pipistrelle was recorded at 2141 by surveyor 3 foraging within the trees on the western edge of the site. After this time there was a moderate level for foraging activity around the site from common pipistrelles.

At 2206 there was a single commuting pass by a lesser horseshoe recorded by surveyor 3 on the western boundary of the site.

No emergences were recorded.



Figure 7: Survey 2 results

4. Evaluation

All species of bat present in the UK receive full protection under The Conservation of Habitats and Species Regulations 2010, and the Wildlife and Countryside Act 1981 (as amended).

The site is located 9.6km from the nearest Wye Valley and Forest of Dean Bat SAC Site – Mwynglodffa Myndd Bach SSSI which is notified for its hibernation roost of lesser horseshoe bats.

Because of the nature and small size of the project, it is considered that there will be no impacts upon summer breeding, swarming or hibernating lesser or greater horseshoe bat sites, and surveys show a negligible level of foraging behaviour by these species around the site. **The proposed development will have no impacts on the status of the Wye Valley and Forest of Dean Bat SAC Sites**

The initial bat building assessment in March 2026 recorded no evidence of bats within the building and the building was considered to have moderate potential to support crevice roosting bats therefore two activity surveys were recommended to ascertain whether bats are currently roosting within the building.

The bat activity surveys were carried out by NewWays Ecology Ltd in May and June 2026 and **showed no emergence** from the building and a moderate level of foraging activity by common and soprano pipistrelles was recorded around the site.

5. Conclusion and recommendations

5.1 Conclusion

The site is not a bat roost. The proposals are for the demolition of the house and construction of a new dwelling. The proposed works are likely to have negligible impact on bats at both a site and local level.

A protected species mitigation licence will NOT be required from Natural Resources Wales.

5.2 Recommendations

Nocturnal Lighting Measures

Linear features such as rows of trees and hedges are important for commuting activity in bats and the hedgerow at the boundary of the site will likely offer foraging opportunities to the local bat population. Therefore, the insensitive use of external lighting within the proposed development could have a negative impact upon bats using the site for foraging and commuting activity.

As suitable bat habitat occurs within the nearby surrounding environment, a low-level lighting scheme should be implemented during and after construction to avoid indirect disturbance to bats and other nocturnal animal species that may exploit local habitats. Measures must be taken to ensure nocturnal animals are safeguarded from inappropriate use of light and noise throughout the hours of night during the construction period, as well as to protect important commuting corridors for bats.

Any external lighting installed as part of the development must be used in accordance with Guidance Note 08/23: Bats and Artificial Lighting.

Sensitive lighting strategy measures during the construction period are as follows:

- Works must not be carried out after dusk and must not commence until after dawn.
- Generators and machinery that emit significant noise levels must not be left to run after dusk.
- LED lighting sources must be used, which generally have a narrower and more directional beam.
- Light spill must be controlled and if lighting is required at night, hooded shields must be fitted to prevent spill onto nearby habitats that are likely to support wildlife, including nearby trees and hedgerows.
- Lighting must not be directed towards any bat or bird compensation features.

In addition to the above, when selecting appropriate external lighting, the following specifications should be taken into consideration:

- Any external lighting incorporated into the proposed development should be LED luminaires due to their sharp cut-off, lower intensity, good colour rendition and dimming capability. •

- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used

Biodiversity Enhancement Prescriptions

Bats

One bat box will be affixed to a mature tree located within the site boundary, using either Schwegler 1FF box (or similar) or Schwegler 2F box (or similar), both of which are known to be used by a variety of bats including *Nyctalus*, *Pipistrellus*, *Myotis* and *Plecotus* species. Furthermore, these woodcrete-built bat boxes have been proven to be more successful as bat mitigation than traditional timber-built bat boxes.

The following considerations must be given when selecting the position of bat the box on site:

- The chosen placement is of a robust nature, reducing possibility of the bat box falling to the ground which could cause damage to the box, loss of a roost, or disturbance, injury or death to bats.
- The area is absent of ivy cover. This is important, as there is risk that in time, ivy will grow over the box and cause it to become blocked at the entrance. It is further recommended that climbing plants are not allowed to grow up towards the bat box as this may eventually block entry.
- The surroundings are free from obstruction, allowing for a more direct flight path into the bat box.
- The location is safely accessible, should the bat box need to be repaired, replaced or monitored by bat-licensed personnel.
- The position of the bat box ensures it is located away from main access doors in order to minimise potential disturbance to roosting bats.
- The bat box shall be installed a minimum of 2.5 m above ground and positioned to ensure that it will receive direct sunlight for at least part of day, in a south, east or south-east facing direction. They must not face north or north-east.

Note: Once a bat box is occupied, it is an offence to disturb any bat when it is roosting, or to kill, injure or handle a bat without the appropriate licence granted by Natural Resources Wales. If a sick or injured bat is found, the local Wildlife Trust or bat group should be contacted for further advice. If maintenance of the bat box is required, a suitably licensed bat worker or local bat group must be consulted.

References

Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition)*
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Natural England (1995) *Sylvan House Barn SSSI notification*

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UK Government. 2017. *Conservation of Habitats and Species Regulations*

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 2010.

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 of 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.

A European Protected Species Mitigation License (EPSM) is required from Natural Resources Wales for any work that would result in an otherwise unlawful activity (e.g. damage to a bat roost). 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 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 bespoke bat roosting features



The 2FE shelter produced by Schwegler. This is designed to be attached to the external wall of a building and provides a shelter for crevice dwelling bats.

Suitable bat box products to be installed integral to the walling of the new sections include:

- Segovia Build-in Woodstone bat box
- Schwegler 2FR Bat Tube



Bat tiles or slates to be installed to provide access into roof space – an example below



Crevice dwelling bat species often exploit gaps in or under fascias, soffits and bargeboards, to gain entry into buildings. If these features are being removed, replaced or made inaccessible to bats during the development work and bats are known to be using these features, then compensation within the new fascia, soffit or bargeboard should be implemented. This can be as simple as cutting holes in the new soffit box or bargeboard. The holes must be located next to the wall of the building as bats often require a surface (often a wall) to land on before crawling through the access. Examples of this are shown below:



Appendix 3 – Artificial lighting and wildlife

Interim Guidance: Recommendations to help minimise the impact of artificial lighting – produced by The Bat Conservation Trust.

Wherever human habitation spreads, so does artificial lighting. This increase in lighting has been shown to have an adverse effect on our native wildlife, particularly on those species that have evolved to be active during the hours of darkness. Consequently, development needs to carefully consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. When the impacts on different species groups are reviewed, the solutions proposed have commonalities that form the basis of good practice. These are outlined in the following document.

Overview of impacts

Invertebrates

Artificial light significantly disrupts natural patterns of light and dark, disturbing invertebrate feeding, breeding and movement, which may reduce and fragment populations. Some invertebrates, such as moths, are attracted to artificial lights at night. It is estimated that as many as a third of flying insects that are attracted to external lights will die as a result of their encounter. Insects can become disoriented and exhausted making them more susceptible to predation. In addition, the polarisation of light by shiny surfaces attracts insects, particularly egg laying females away from water. Reflected light has the potential to attract pollinators and impact on their populations, predators and pollination rates. Many invertebrates natural rhythms depend upon day-night and seasonal and lunar changes which can be adversely affected by artificial lighting levels.

It is not always easy to disentangle the effects of lighting on moths from other impacts of urbanisation.

However, it is known that UV and green and blue light, which have short wavelengths and high frequencies, are seen by most insects and are highly attractive to them. Where a light source has a UV component, male moths in particular will be drawn to it. Most light-induced changes in physiology and behaviour are likely to be detrimental. They discern it to be 'light', so they do not fly to feed or mate.

Birds

There are several aspects of changes to bird behaviour to take into account. The phenomenon of robins and other birds singing by the light of a street light or other external lighting installations is well known, and research has shown that singing did not have a significant effect on the bird's body mass regulation.

However, it was felt that the continual lack of sleep was likely to be detrimental to the birds' survival and could disrupt the long-term circadian rhythm that dictates the onset of the breeding season³. Many species of bird migrate at night and there are well-documented cases of the mass mortality of nocturnal migrating birds as they strike tall lit buildings. Other UK bird species that are particularly sensitive to artificial lighting are long-eared owls, black-tailed godwit and stone curlew.

Mammals

A number of our British mammals are nocturnal and have adapted their lifestyle so that they are active in the dark in order to avoid predators. Artificial illumination of the areas in which these mammals are active and foraging is likely to be disturbing to their normal activities and their foraging areas could be lost in this way. It is thought that the most pronounced effect is likely to be on small mammals due to their need to avoid predators. However, this in itself has a knock-on effect on those predators.

The detrimental effect of artificial lighting is most clearly seen in bats. Our resident bat species have all suffered dramatic reductions in their numbers in the past century. Light falling on a bat roost exit point, regardless of species, will at least delay bats from emerging, which shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed. At worst, the bats may feel compelled to abandon the roost. Bats are faithful to their roosts over many years and disturbance of this sort can have a significant effect on the future of the colony. It is likely to be deemed a breach of the national and European legislation that protects British bats and their roosts.

In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats and their use of commuting routes. There are two aspects to this: one is the attraction that short wave length light (UV and blue light) has to a range of insects; the other is the presence of lit conditions.

As mentioned, many night-flying species of insect are attracted to lamps that emit short wavelength component. Studies have shown that, although noctules, serotines, pipistrelle and Leisler's bats, take advantage of the concentration of insects around white street lights as a source of prey, this behaviour

is not true for all bat species. The slower flying, broad-winged species, such as long-eared bats, barbastelle, greater and lesser horseshoe bats and the *Myotis* species (which include Brandt's, whiskered, Daubenton's, Natterer's and Bechstein's bats) generally avoid external lights.

Lighting can be particularly harmful if it illuminates important foraging habitats such as river corridors, woodland edges and hedgerows used by bats. Studies have shown that continuous lighting along roads creates barriers which some bat species cannot cross⁵. It is also known that insects are attracted to lit areas from further afield. This could result in adjacent habitats supporting reduced numbers of insects, causing a further impact on the ability of light-avoiding bats to feed.

These are just a few examples of the effects of artificial lighting on British wildlife, with migratory fish, amphibians, some flowering plants, a number of bird species, glow worms and a range of other invertebrates all exhibiting changes in their behaviour as a result of this unnatural lighting.

Recommendations

Survey and Planning

The potential impacts of obtrusive light on wildlife should be a routine consideration in the Environmental Impact Assessment (EIA) process. Risks should be eliminated or minimised wherever possible. Some locations are particularly sensitive to obtrusive light and lighting schemes in these areas should be carefully planned.

In August 2013, Planning Minister Nick Boles launched the new National Online Planning Guidance Resource aimed at providing clearer protection for our natural and historic environment. The guidance looks at when lighting pollution concerns should be considered and is covered within one of the online planning practice guides⁷. The guide provides an overview for planners with links to documents that aim to give planners an overview of the subject through the following discussion points:

6. When is obtrusive light / light pollution relevant to planning?
7. What factors should be considered when assessing whether a development proposal might have implications for obtrusive lighting / light pollution?
8. What factors are relevant when considering where light shines?
9. What factors are relevant when considering how much the light shines?
10. What factors are relevant when considering possible ecological impact?

This can help planners reach the right design through the setting of appropriate conditions relating to performance and mitigation measures at the planning stage.

The Institution of Lighting Professionals (ILP) recommends that Local Planning Authorities specify internationally recognised environmental zones for exterior lighting control within their Development Plans. In instances lacking classification, it may be necessary to request a Baseline Lighting Assessment/Survey conducted by a Lighting Professional in order to inform the classification of areas, particularly for large-scale schemes and major infrastructure projects.

When assessing or commissioning projects that include the installation of lighting schemes, particularly those subject to the EIA process, the following should be considered and relayed to applicants:

- ***Ecological consultants should confirm the presence of any sensitive fauna and flora***, advising the lighting designers of bat routes and roosts and other areas of importance in order to ensure that reports correspond with each other.
- ***Ecological consultants should consider the need for quantitative lighting measurements***. In some instances it may be necessary for further lighting measurements to be taken. For example, outside an important bat roost. These should follow best practice guidance from the ILP and would ideally be conducted by a Lighting Professional.
- ***Where appropriate, professional lighting designers should be consulted*** to design and model appropriate installations that achieve the task but mitigate the impacts. This should be done at the earliest opportunity. Early decisions can play a key role in mitigating the impact from lighting.
- ***Reports submitted should outline the impacts of lighting in relation to ecology***, making clear reference to the ecological findings, highlighting any sensitive areas and detail proposed mitigation. Consideration should also be given to internal lighting where appropriate.
- ***Post –installation checks and sign off upon commissioning should be carried out*** by the lighting designer to ensure that the lighting installation has been installed in accordance with the design, that predictions were accurate and mitigation methods have been successful.

Principles and design considerations

Do not:

- ***Provide excessive lighting***. Use only the minimum amount of light needed for the task.
- ***directly illuminate bat roosts*** or important areas for nesting birds

Avoid

- ***Installing lighting in ecologically sensitive areas*** such as: near ponds, lakes, rivers, areas of high conservation value; sites supporting particularly light-sensitive species of conservation significance (e.g. glow worms, rare moths, slow-flying bats) and habitat used by protected species.
- ***Using reflective surfaces under lights***.

Do

- ***consider employing a competent lighting designer*** who will apply the principals of providing the right light, in the right place, at the right time and controlled by the right system.
- ***minimise the spread of light*** to at, or near horizontal and ensure 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.

- **consider 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.
- **consider no lighting solutions where possible** such as white lining, good signage and LED cats eyes. These options can also be effective. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times;
- **use temporary close-boarded fencing until vegetation matures,** to shield sensitive areas from lighting;
- **limit the times that lights are on to provide some dark periods.** The task being lit often varies, for example roads are less used after 23.00hrs and car parks are empty. A lighting designer can vary the lighting levels as the use of the area changes reducing lighting levels or perhaps even switching installations off after certain times. This use of adaptive lighting can tailor the installation to suit human health and safety as well as wildlife needs.

Technological specifications

Research from the Netherlands has shown that spectral composition does impact biodiversity.

- **Use narrow spectrum light sources** to lower the range of species affected by lighting.
- **Use light sources that emit minimal ultra-violet light**
- **Lights should peak higher than 550 nm**
- **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.

Further guidance on the spectral composition of artificial lighting will be made available following the publication of research from the Netherlands.

Further reading:

- A review of the impact of artificial light on invertebrates. Buglife. 2011
- Royal Commission on Environmental Pollution. 2009. Artificial light in the environment. London, HMSO
- The Ecological Consequences of Artificial Night Lighting" edited by Longcore and Rich
- Shedding Light: A survey of local authority approaches to lighting in England. CPRE 2014