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**Bat Survey Report (preliminary day-time survey):
Oxenhurst Farm,
Off Back Lane,
Newton-in-Bowland,
BB7 3EE**

OS grid reference:
SD 67454 51879

Commissioned-by:
Marilyn Shorrocks/Gateley Vinden

Survey Date: day-time - 25/8/22, dusk - 1/9/22

Report Date: 9/9/22

Table of Contents

1. Summary	page 3
2. Introduction	page 4
3. Bats and the law	page 7
4. Survey	page 9
5. Limitations of the Survey	page 10
6. Findings	page 11
7. Conclusions/Discussion	page 18
8. Recommendations	page 19
9. References	page 19
Appendix 1 - Angela Graham's Experience	page 21
Appendix 2 - Example sonograms recorded at dusk emergence survey	page 23
Appendix 3 - Criteria used in assessing risk of roosting (in the absence of obvious evidence of roosting)	page 25
Appendix 4 - Recommendations for further survey work when the findings of the preliminary survey were negative	page 27
Appendix 5 - Natural England requirements for roof lining materials	page 28

1. Summary.

(This summary should be read in conjunction with the conclusions and recommendations.)

The roof of this traditional, stone farm-house has been fire-damaged and needs replacing.

The property is in a rural location of high quality bat feeding-habitat.

There was limited access to view the loft due to the presence of stored items, but no evidence was seen to suggest a typical loft-dwelling species of bat has been present.

On the whole, the roof of this building is in good condition; or has been well sealed-by temporary weather-proofing. There is access available however between layers of the structure of the roof of a rear lean-to element; from beneath and where roof-tiles are damaged. There is open access for bats to enter this area in flight, which provides access to the back door of the house. There are also gaps into walls in this area. I consider there to be a risk of a bat or bats hibernating in this area.

Otherwise bat access appears to be limited to the rear wall-head, where there is also evidence of nesting by birds.

Such potential access can be used by the pipistrelle bat, which often leaves no signs in the loft, preferring to roost in wall-cavities and between roofing materials.

Especially because of the high risk location, at the day-time survey I assessed the risk of some use by bats to be at least moderate, probably high.

Good Practice Guidelines suggest even low risk buildings should have a bat activity survey (emergence at dusk or to return-to-roost at dawn) when the findings of the initial survey were negative. Those at moderate risk should have two. Those at high risk should have three.

When multiple activity surveys are required, it is acceptable to undertake one in September, but any others should then take place between May and August inclusive to accord with good practice.

The dusk emergence survey confirmed roosting by a single common pipistrelle bat. It emerged from the rear eaves. It was likely to have been roosting within the stone wall or at the wall-head, but if access is available between roof tiles and underfelt bats will also roost in that situation.

A licence from Natural England is required if the proposed work will damage or destroy a roosting site, or bats will be disturbed by the work.

As a bat could be present at the time of the work, and there's a possibility of roosting between the tiles and underfelt, I think a licence is necessary to allow for disturbance of bats and destruction of a roost to take place if necessary, within the law.

For small numbers of up to 3 common species a Low Impact Licence is satisfactory. The turn-around for granting of the licence once the application has been acknowledged by Natural England is 10 working days. Any necessary consents must be in place and the start date for the work must be known.

However, Natural England will not issue a licence on the strength of one bat activity survey because the use of buildings by bats over the course of the season can vary. In this case at least one more will be necessary. This cannot now be undertaken until May 2023. Conditions for bat activity must be favourable at the time, which is dependent on the weather conditions.

The need for additional bat activity survey work next year also eliminates any risk of encountering hibernating bats if the re-roofing were to be started during the winter months.

Where possible, Natural England expect the roost to be recreated in-situ. An appropriate gap will be needed to allow bats access to the wall-head. Access to the cavity wall should be maintained if currently present, and access between underfelt and tiles should be recreated if it was found to exist, at the time of deconstruction. Care is needed with roof lining material however. The only lining materials appropriate in association with a bat roost are traditional Type 1F BS 8747:2007 (bitumastic felt) or a non-bitumen coated roofing membrane (NBCRM) with a test certificate approved by Natural England.

The bat consultant must provide a tool-box-talk to the contractors as a condition of the licence, be present as the roof is removed from the vicinity of the rear eaves; and must confirm bat access has been recreated as intended. Natural England approve of the provision of roosting 'enhancements', which in this case can easily be made via bat boxes in nearby trees.

It must be borne in mind that birds' nests are legally protected throughout the nesting process.

A second bat activity survey should be undertaken in favourable weather conditions in May 2023. This would usually be a return-to-roost-at-dawn survey but dawn temperatures can be quite unfavourable in May so a second dusk emergence survey may be acceptable.

A decision will then be made as to whether the licence can be applied-for without a third bat activity survey.

2. Introduction

I was asked to assess the importance of this grade-2-listed property to bats prior to re-roofing, following a chimney fire. Incidentally I comment on any issues discovered with respect to other protected/priority/invasive species and species of conservation concern.

This is a traditional stone farm house:



Front (south-east) and south-west-side/rear elevations

To the north-east it is linked by a cottage to a large, converted barn:



Fig. 1. Outline of property shown in red

It is in a rural location, immediately adjacent to woodland and with good habitat links into the wider countryside:

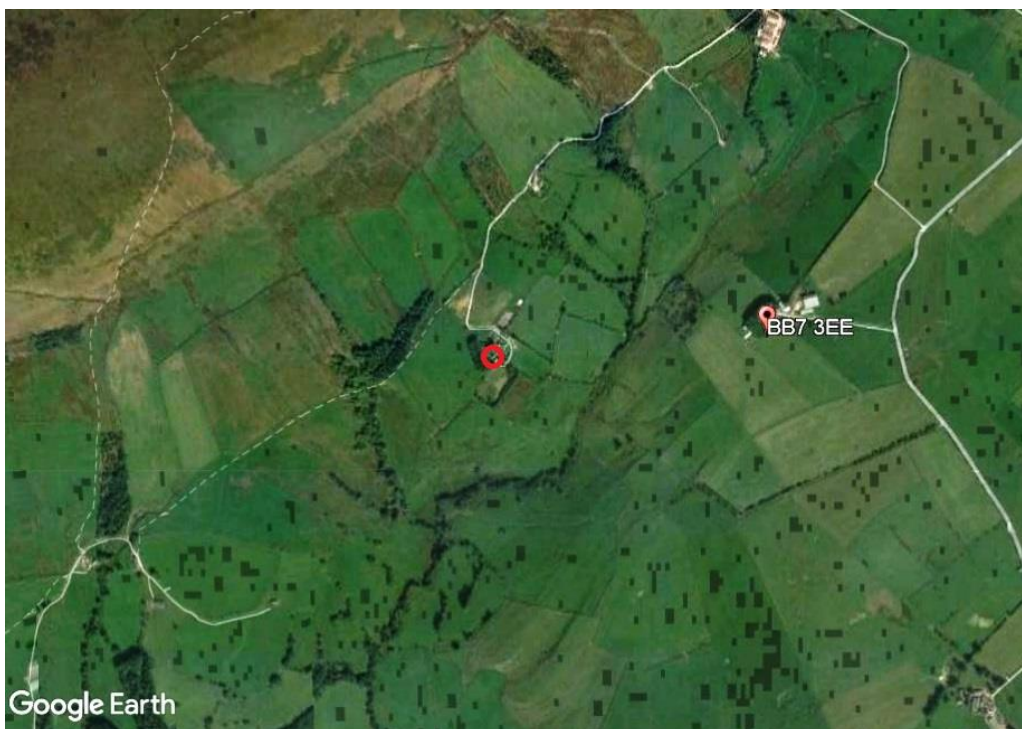


Fig. 2. Location of property indicated by red circle

There are two tributaries of the River Hodder within 300m. The River Hodder is about 1.5kms away.

The pipistrelle bat (2 species: *Pipistrellus pipistrellus* - the common pipistrelle, and *Pipistrellus pygmaeus* - the soprano pipistrelle) is common and widespread in the general area.

Roosts of these species can occur in any building that provides suitable roosting crevices, with the risk of bat presence increased by close proximity to good bat feeding habitat and commuting routes; for example tree-lines, hedges, woodland, scrub and water courses and bodies. The bats use different roosts at different times of year, sometimes singly and sometimes in large groups of females with dependent young. They can move frequently and unpredictably between the roost sites known to them. The majority of house-holders with a roost of this species are unaware of it.

In summer females gather together each with their single off-spring in, sometimes large, maternity colony groups. Disturbance can cause the abandonment of babies (pups). In autumn when the young are independent, females visit males to mate. In winter the bats hibernate and rousing from hibernation - a slow process - can result in a depletion of fat reserves that may compromise the bats' ability to survive the winter. Females become pregnant in spring when their food (insects) becomes available again.

Pipistrelle bats in particular are extremely small, weighing about 5g (the weight of a 2p coin) so need only the smallest of gaps in order to enter to roost; often making use of external features and wall cavities without leaving signs in the loft/interior.

A data search from Lancashire Environmental Records Centre discovered the nearest bat record to be of a roost of Natterer's (*Myotis nattereri*) about 1km way, with a hibernation site about 2kms away. There was a roost record for whiskered (*Myotis mystacinus*) about 2kms away. Daubenton's (*Myotis daubentonii*) had been recorded at the same location. Also around 2kms away had been recorded common and soprano pipistrelle, brown long-eared (*Plecotus auritus*) - the species most likely to leave evidence of roosting within barns and lofts, and noctule (*Nyctalus noctula*).

A search of DEFRA's Magic database discovered no bat European Protected Species licences have been granted within 2kms.

Bats also roost in tree cavities, and individual bats may roost in minor defects including underneath raised bark and in dense ivy.

Breeding birds.

Buildings generally can be used by birds of conservation concern (1), such as the house sparrow (*Passer domesticus*), house martin (*Delichon urbicum*), swift (*Apus apus*) and starling (*Sturnus vulgaris*). The house sparrow and starling are both listed in Section 41 of the Natural Environment and Rural Communities Act (NERC) as species "of principal importance for the purpose of conserving biodiversity".

3. Bats and the Law

All British bats and their roosts are legally protected under the Wildlife and Countryside Act of 1981 (as amended) and the EC Habitats Directive of 1994 as implemented by the Conservation of Habitats and Species Regulations 2017.

Where a development will destroy a bat roost, a Low Impact Class Licence or a European Protected Species Licence (Mitigation Licence) is required before the roost can be interfered with in any way. The former applies in cases where only small numbers of common species of bat are using the building within certain parameters. It usually takes approximately 2 weeks for these licences to be issued, whereas the turn-around time for a full European Protected Species Licence is approximately 7 weeks once the application has been submitted. Any licence issued is a legally binding document.

Licences can only be issued providing planning permission has been granted, where applicable.

When a roost is found, both the bat consultant and the planners have to apply the "three tests" required by Natural England. Essentially these are:

- That the development is necessary for the purpose of "preserving public health or public safety or other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequence of primary importance for the environment";
- That there is "no satisfactory alternative";
- That 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".

N.b. The way in which the necessity is assessed includes whether the client has an alternative that it would be reasonable to expect them to adopt.

Necessary mitigation and compensation measures to ensure the favourable conservation status of bats will be maintained, would include appropriate timing and methodology for the work, including details of how the bats will be provided-for in the long term.

Planners are required by the Government to satisfy themselves before granting planning consent that it would be possible for a licence to be obtained if necessary. Accordingly they are obliged to apply the three tests before issuing consent. For this reason enough survey work has to have been undertaken that the planning authority can evaluate whether or not the three tests can be satisfied and what degree of compensation/enhancement is necessary. To avoid delays in obtaining consent it is in the client's best interest to find out sooner rather than later whether any bat roosting issues need to be addressed.

Natural England, the Government body responsible for administering the law relating to bats, have issued guidelines to planners on how to proceed with respect to bats

Outside the planning system, the onus is on developers/members of the public, to have sufficient investigations undertaken to satisfy themselves (and the authorities in the event of a subsequent investigation), that their actions are unlikely to be in contravention of bat legislation.

***N.b.* It should always be remembered that bats often roost in places not anticipated by a lay person, such as modern buildings, trees with cavities, and bridges. Some leave no signs in lofts, as they roost underneath external features such as roof slates, ridges, weather-boarding and cladding.**

In the case of a building, tree or other feature not already known to be a bat roost, if bats are found during the course of work, contractors are legally obliged to stop work and seek advice. This should be from an appropriately experienced and licenced bat ecologist.

Breeding birds.

The Wildlife and Countryside Act of 1981 gives protection to the nests of all wild birds whilst being built or in use, including by newly fledged birds that have not left the immediate vicinity of the nest. The bird nesting season is generally considered to be 1st March to 31st July for most species but can extend a number of weeks either side of this depending on the species concerned and weather conditions in that particular year. Natural England cite the nesting season as being 1st March to 31st August.

A consortium of organisations, via their report on "The population status of birds in the UK: Birds of Conservation Concern 5 (2021)" have listed species according to their conservation need based on red, amber, green basis, where red is of the highest conservation concern.

Additional Relevant Legislation and Policy.

Between 1995 and 2010 certain more vulnerable habitats and species were the subject of National or Local Biodiversity Action Plans. This strategy for the protection of biodiversity has been superseded by UK post-2010 Biodiversity Framework, which is largely now implemented at county level. Internationally The Convention on Biodiversity produced a Strategic Plan for Biodiversity 2011-2020. Further to this the EU Biodiversity Strategy was launched in 2011.

Section 41 of the Natural Environment and Rural Communities Act 2006 lists species "of principal importance for the purpose of conserving biodiversity". The list was up-dated in 2014 and includes the brown long-eared bat (*Plecotus auritus*), noctule (*Nyctalus noctula*) soprano pipistrelle (*Pipistrellus pygmaeus*) and 4 other bat species.

The National Planning Policy Framework of 2012 (2) states that "the planning system should contribute to and enhance the natural and local environment" by a number of means, including "minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks... ."

4. Survey

I made a daytime visit on **25/8/22** to undertake a preliminary survey of the building, assess its likely importance to bats and advise whether or not a precautionary approach or further survey work is needed.

Having been involved with bat survey work for 35 years and consultancy work for 26 years, it is always my objective to carry-out my work in a manner consistent with accepted Good Practice Guidelines (3) and consistent with the code of practice of the CIEEM. I hold Natural England Class Licences CL21 (Annex B) and 18. Amongst other things these cover me to apply for Low Impact Licences for clients and undertake bat survey work. I also have a CL29 Barn Owl Class Licence. My credentials are expanded-upon in Appendix 1.

As far as possible, I surveyed the building inside and out with the aid of surveyor's ladders, 2 million candle-power torch, camera with 6x optical zoom and binoculars (8x42). Head-torch, 10x 50 binoculars, fibrescope (6 and 13mm heads, extendable to 2m), camera with 18x zoom and mirrors were also available if needed.

I was looking for access to potential roosting places and evidence of their use, such as droppings and staining.

I also take into consideration the surrounding habitat and the range of bat species it appears likely to support, along with the quality of the habitat linkages with the wider area.

The survey was conducted with the needs of different species of bat over the seasons in mind.

Incidentally I comment on any relevant issues discovered with respect to bat feeding habitat and commuting routes, possibly including likely roosting sites nearby, as well as any relevant findings with respect to other protected/invasive species, biodiversity priority species and species of conservation concern.

I returned on **1/9/22** to carry out a dusk emergence survey.

I took up a fixed position to watch for bats leaving the building. See Fig 1 below. I had the use of a heterodyne "bat detector" (Batbox Duet) to help alert me to the presence of bats and to help me distinguish the species present. I also set-up a camcorder converted to work in infra-red light, plus 2 sources of infra-red light. The camcorder screen was within my range of vision to help alert me to bat activity as darkness fell.

In addition I placed Anabat Swift and Anabat Express detectors either end of the elevation being watched. See Fig 1 below. These record bat calls for analysis on computer later. They are extra tools for helping to confirm the species present.



Fig. 1.

Key: Building outlined in red. Approximate location of surveyor shown by red star, approximate locations of recording devices shown by yellow crosses. Approximate location of camcorder shown in orange. AS = Anabat Swift, AE = Anabat Express.

5. Limitations of the survey

This was a preliminary survey to discover whether there are obvious signs of use by bats and to assess potential for use. If potential exists, usually follow-up work is required at dusk or dawn, possibly at a more appropriate time of year. See Appendix 3.

There was limited access to move around and inspect the loft due to the presence of stored items.

It should be noted that droppings are the sign most frequently found, but they are often deposited in areas that cannot be easily visualised, if at all, and they can turn to powder quite quickly. They are usually soon washed and blown away from exposed external surfaces so evidence of use often doesn't last long and pipistrelle bats in particular can change roosts frequently. However an assessment has been made of potential bat roosting places associated with the exterior of the building.

Bat roosting potential was discovered at the day-time survey. Accordingly I returned to undertake a dusk emergence survey. As the only bat roosting potential

apparently available could be viewed by one surveyor, I undertook the survey alone, with the aid of a camcorder converted to function in infra-red light. This is still an experimental system so haven't yet obtained a spare battery for the camcorder. As it therefore only records for an hour, I started it recording 15 minutes after sunset to cover the main bat emergence period as darkness falls.

There was some relatively minor bat roosting potential associated with the front pitch of the adjoining roof, which it would have been useful to watch at dusk, but access to the neighbouring garden to view it adequately was not available.

As bats often roost in crevices in winter, and are particularly hard to locate when hibernating, the report will highlight any areas that could be used by bats in winter without their presence necessarily being obvious

6. **Findings**

The property has a single loft.

The concrete tile roof still has the original beams and is lined with bitumastic felt.



Plate 1. North-east gable end

There is boarding below joists and insulation is absent:



Plate 2

There was limited access to view the loft, including the exposed (south-west-facing) gable end, due to the presence of stored items:



Plate 3. South-west and north-east gable ends

Bat access to the loft appeared to be limited, though the extent to which bats could enter at the eaves was uncertain:



Plate 4

There were plenty of cobwebs present but there were also the sorts of crevices between structures where bats could roost:



Plates 5 and 6.

A few mouse droppings were discovered:



Plate 7

A crush-test was performed to double-check that these were rodent not bat droppings.

No bat droppings were seen in accessible areas and there was no evidence to suggest use of the loft by a typical loft-dwelling species of bat such as the brown long-eared or Natterer's.

Externally, an area of damage to the rear roof has been weather-proofed. Apart from at the bottom corners of the lean-to element of the roof where tiles are damaged, the opportunities for bats to enter between roof-tiles are minimal:



Plate 8 and 9. Rear roof



Plate 10. Northern, bottom corner of rear roof

The back door is accessed via a covered area beneath the lean-to roof. There is bat access available between underfelt and boarding, at wall-heads and into cavities in the walls:



Plates 11 and 12

Otherwise the walls of the house are well-pointed.

There is however access for bats to the wall head via the rear fascia. This was hard to photograph, but can be appreciated in the photograph below, which shows a birds' nest on the wall-head:



Plate 13

No sign of bat droppings was seen on the house-wall, but individual droppings could have been missed.

At the front of the property the neighbouring roof is at a lower level, but is also in good condition:



Plate 14

There are a few small gaps present however:



Plate 15. Examples of potential bat access gaps illustrated in red

There was no access available to the garden of this property to inspect it at closer quarters.

Dusk emergence survey.

The main results of the dusk survey are shown in Table 1 below:

Table 1. Summary of surveys and significant findings

Date	Survey type	Time of survey	Sunset / sunrise time	Conditions °C/weather	Comments
1/9/22	dusk	19.45 to 21.30	20.01	13.7°C at start , clear, still 13.1°C at end	Single common pipistrelle emerged at 20.08 and flew roughly north along the building. See Fig. 4, Plate 16 and Appendix 2. Soprano pipistrelles were recorded from 20.15, with social calls from 20.16. Both species recorded intermittently with brief episodes of feeding activity. Social calls mainly from soprano pipistrelle. A *Myotis bat was recorded repeatedly from 20.43 to 20.49 and occasionally thereafter. At 20.24 a bat was seen flying south that wasn't heard on

					detector. As the brown long-eared echolocates very quietly so is hard to pick-up on detector, this could have been of that species.
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Survey type key: dusk = dusk emergence survey, dawn = dawn re-entry survey

*'Myotis' bats – bats of the genus *Myotis*, which includes the Daubenton's (*Myotis daubentonii*), whiskered (*Myotis mystacinus*) Brandt's (*Myotis brandtii*) and Natterer's (*Myotis nattereri*).



Fig. 1.

Key: Approximate flight-line of emergent bat indicated by red arrow.



Plate 16. Approximate bat emergence-point illustrated in red

7. Conclusions/Discussion

Appendix 3 gives an outline of the criteria used in assessing the level of risk of use by bats.

On the whole, the roof of this building is in good condition; or has been well sealed-by temporary weather-proofing. There is access available however between layers of the structure of the roof of the lean-to element; from beneath and where roof-tiles are damaged. There is open access for bats to enter this area in flight. There are also gaps into walls in this area. I consider there to be a risk of a bat or bats hibernating in this area.

Otherwise bat access appears to be limited to the rear wall-head, where there is also evidence of nesting by birds.

The property is in a high-risk location for roosting by multiple bat species.

There was no evidence in what could be seen of the loft to suggest the species most likely to leave evidence within a traditional roof-void such as this, have been present. Those species are brown long-eared, Natterer's, Brandt's and whiskered.

Access available at the rear wall-head however appeared typical of the sort of access used by the pipistrelle bat, which often leaves no signs in the loft, preferring to roost in wall-cavities and between roofing materials.

Especially because of the high risk location, I assessed the risk of some use by bats of the access at this wall head to be at least moderate, probably high.

Good Practice Guidelines suggest even low risk buildings should have a bat activity survey (emergence at dusk or to return-to-roost at dawn) when the findings of the initial survey were negative. Those at moderate risk should have two. Those at high risk should have three. See Appendix 4.

When multiple activity surveys are required, it is acceptable to undertake one in September, but any others should then take place between May and August inclusive to accord with good practice.

The dusk emergence survey confirmed roosting by a single common pipistrelle bat. It emerged from the rear eaves. It was likely to have been roosting within the stone wall or on the wall-head, but if access is available between roof tiles and underfelt bats will also roost in that situation.

A licence from Natural England is required if the work will damage or destroy a roosting site, or bats will be disturbed by the work.

As a bat could be present at the time of the work, and there's a possibility of roosting between the tiles and underfelt, I think a licence is necessary to allow for disturbance of bats and destruction of a roost to take place if necessary, within the law.

For small numbers of up to 3 common species a Low Impact Licence is satisfactory. The turn-around for granting of the licence once the application has been acknowledged by Natural England is 10 working days. Any necessary consents must be in place and the start date for the work must be known.

However, Natural England will not issue a licence on the strength of one bat activity survey because the use of buildings by bats over the course of the season can vary. In this case at least one more will be necessary. This cannot now be undertaken until May 2023. Conditions for bat activity must be favourable, which is dependent on the weather conditions.

The need for additional bat activity survey work next year also eliminates any risk of encountering hibernating bats if the re-roofing were to be started during the winter months.

Where possible, Natural England expect the roost to be recreated in-situ. An appropriate gap will be needed to allow bats access to the wall-head. Access to the cavity wall should be maintained if currently present, and access between underfelt and tiles should be recreated if it was found to exist, at the time of deconstruction. Care is needed with roof lining material however. Most non-woven roofing underlay (breathable membrane) can be lethal to bats, as they can get their claws entangled in the fibres and can't then release them again. The only lining materials appropriate in association with a bat roost are traditional Type 1F BS 8747:2007 (bitumastic felt) or a non-bitumen coated roofing membrane (NBCRM) with a test certificate approved by Natural England. See Appendix 5 for more information.

The bat consultant must provide a tool-box-talk to the contractors as a condition of the licence, be present as the roof is removed from the vicinity of the rear eaves; and must confirm bat access has been recreated as intended. Natural England approve the provision of 'enhancements', which in this case can easily be made via bat boxes in nearby trees.

It must be borne in mind that birds' nests are legally protected throughout the nesting process.

8. Recommendations

These recommendations should be read in conjunction with the conclusions above.

Have a second bat activity survey undertaken in favourable weather conditions in May 2023. This would usually be a return-to-roost-at-dawn survey but dawn temperatures can be quite unfavourable in May so a second dusk emergence survey may be acceptable.

A decision will then be made as to whether the licence can be applied-for without a third bat activity survey.

9. References

1. Eaton, M. A. et al (2015). Birds of Conservation Concern 5: the status of all regularly occurring birds in the UK, Channel Islands and Isle of Man. British Birds 114: 723-747.

2. Department for Communities and Local Government (2012). National Planning Policy Framework.
3. Ed. by Collins, J. (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines - Third Edition. Bat Conservation Trust.

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Appendix 1 - Angela Graham's Experience.

- I hold Natural England Class Licences CL21 (Annex B) - Registered Consultant 163 - and CL18 (CL18 (2015 11871 - CLS-CLS). CL21 covers me to apply for Low Impact Class Licences for clients - a more stream-lined system for quickly obtaining a licence from Natural England when a roost of a small number of common bat species will be impacted-upon by the development. CL18 covers me for survey/consultancy/scientific work. I have a supplementary licence to possess up to 10 live/dead bat specimens (20123429). I have a CL29 licence to disturb barn owls.
- I'm a member of The Chartered Institute of Ecology and Environmental Management.
- I undertake my work in accordance with the principles outlined in the Bat Conservation Trust's "Good Practice Guidelines".
- I have been involved in bat conservation for over 30 years, initially as a member of the South Lancashire Bat Group from its inception in 1987 and as a volunteer with the Nature Conservancy Council (NCC) - first licenced in 1989. Later, and for many years, I was Co-ordinator/Chair and Trainer for the South Lancashire Bat Group. I trained the people who currently run the group, one of whom has been a Trustee for the Bat Conservation Trust. I was a founder member of the Greater Manchester Bat Group in 2002 and ran the group for 4 years.
- Over the last 27 years I have done increasing numbers of bat surveys on a consultancy basis, firstly part-time then full time from December 2003.
- My experience in applying-for European Protected Species Licences with respect to bats spans over 20 years.
- From 2003 to 2008 I represented the bat groups of the north-west region at national bat worker meetings, hosted by the Bat Conservation Trust.

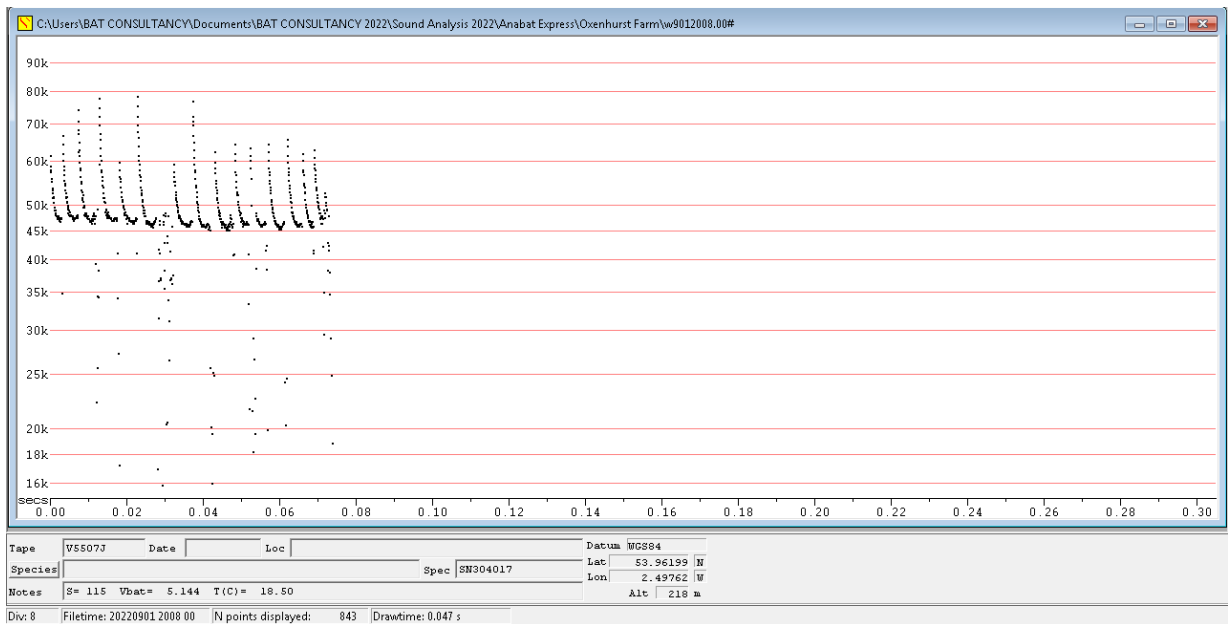
Other experience includes:

- Attending bat-worker conferences every year since 1988 (mainly England, some in Wales) plus additional symposia on specific topics such as mitigation and woodland bats.
- Helping with winter surveys of underground hibernation sites in Clwyd and north Lancashire.
- Participating in "Bat Detector Workshops" during the 1990s in different areas of the country, concerned with locating bat roosts and feeding sites/commuting routes.
- Sitting on local council "Wildlife Advisory Groups" (WAGs) in the Greater Manchester area from the early 1990s until around 2005.
- Helping local authorities and the Greater Manchester Ecology Unit formulate their Biodiversity Action Plans for bats.
- Administering the bat casework for English Nature (now Natural England) in the South Lancashire and Greater Manchester areas over 1998-2000.
- Assisting with research involving mist netting, harp trapping and radio-tracking.
- Continuing to attend courses run by recognised experts to ensure I stay up-to date both with respect to bat survey-work and conservation, and issues such as health and safety.
- Re-passing the Construction Site (CITB) Operatives test in June 2017.
- Contributing to the Bat Conservation Trust's survey standards guidelines.

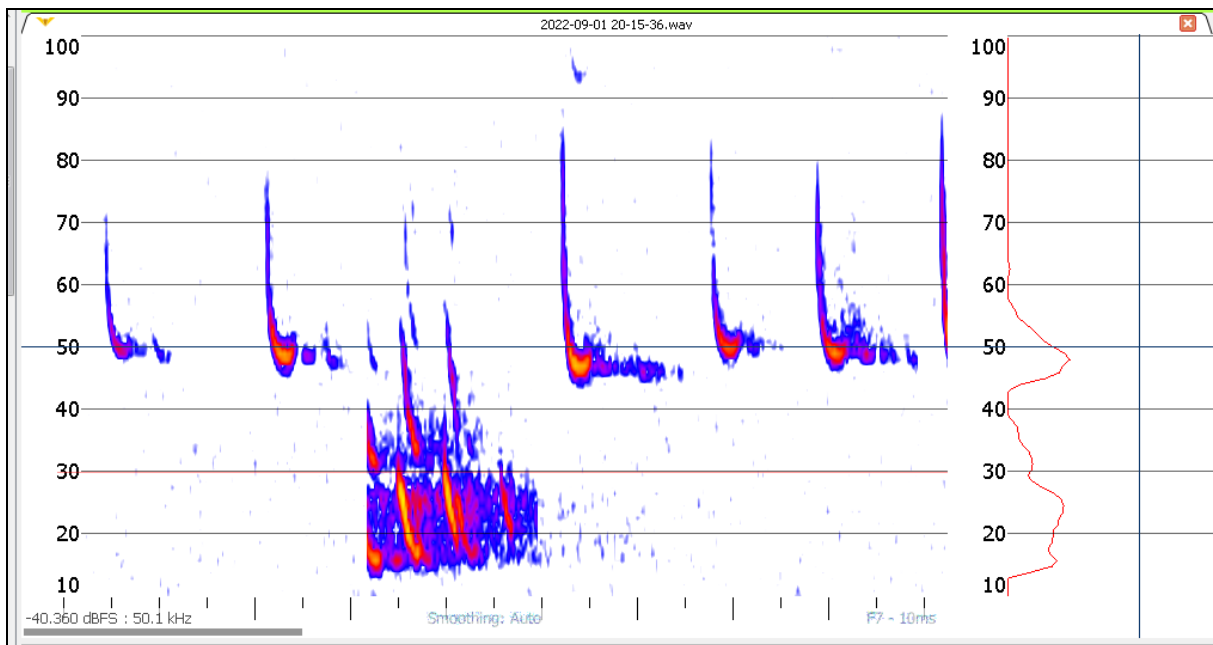
Other ecological experience includes:

- Bird watching for fun since 1982 with a general interest in wildlife, ecology and conservation for a similar period.
- Attending short courses and field training with respect to grasses, flowering plants, British mammals including water voles, reptiles and amphibians, non-native invasive plant species, Extended Phase 1 Habitat Surveying, National Vegetation Classification, Environmental Impact Assessment and use of GIS.
- Taking part in British Trust for Ornithology breeding bird surveys annually.
- A year-long sandwich placement assisting with badger research, including radio-tracking.
- Short periods of voluntary work with the Lancashire Wildlife Trust and Royal Society for Protection of Birds.

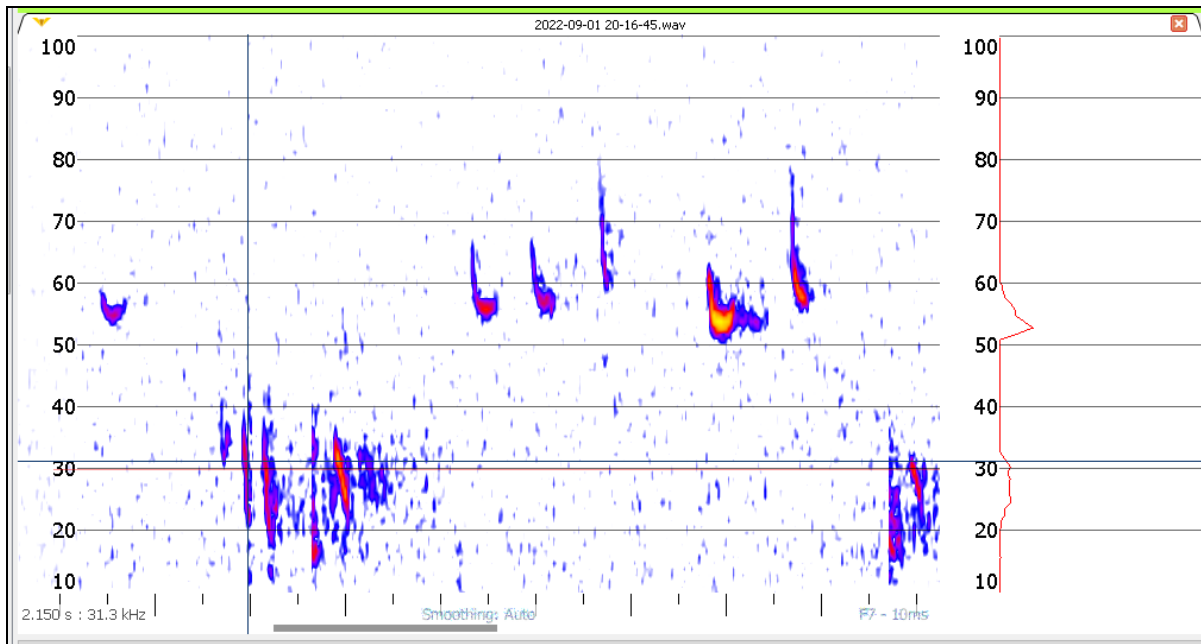
Appendix 2 - Example sonograms recorded at dusk emergence survey



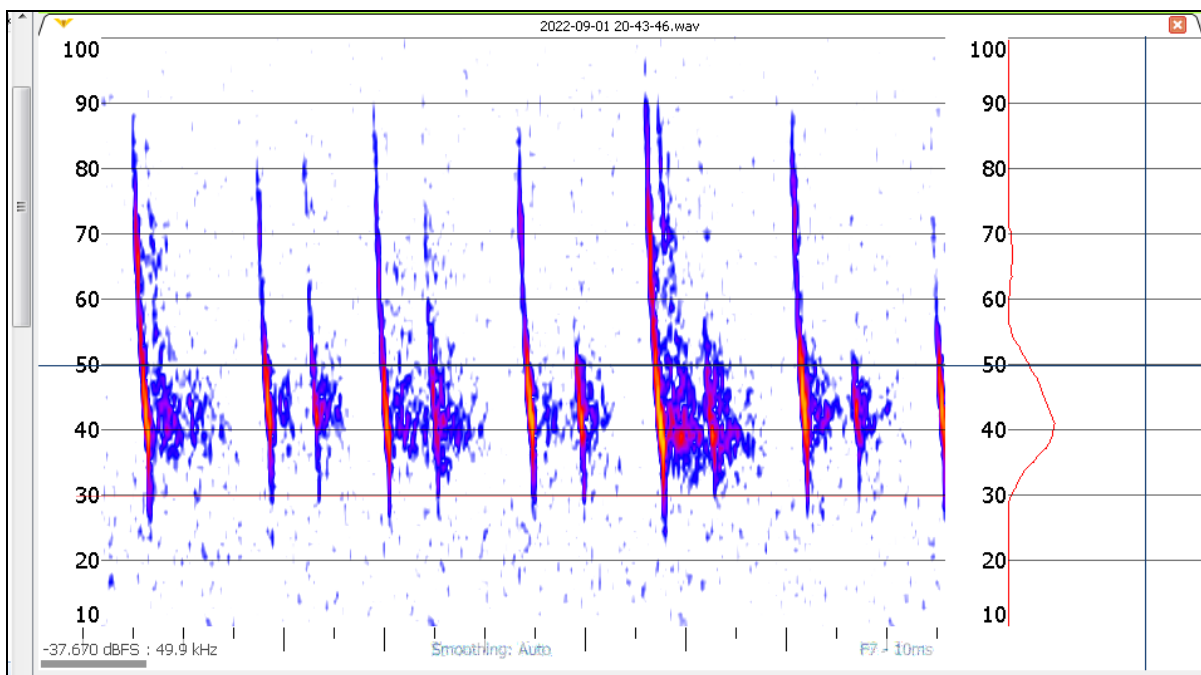
Common pipistrelle recorded on Anabat Express at 20.08



Common pipistrelle and social call 20.15



Soprano pipistrelles and social calls at 20.16



Myotis bat 20.43

*'Myotis' bats – bats of the genus *Myotis*, which includes the Daubenton's (*Myotis daubentonii*), whiskered (*Myotis mystacinus*) Brandt's (*Myotis brandtii*) and Natterer's (*Myotis nattereri*).

Appendix 3 - Personally-devised criteria used in assessing risk of roosting (in the absence of obvious evidence at the preliminary survey).

Risk of roosting	Definition	Suggested Action
Nil	Whole of structure/tree can be seen well enough to be sure there are no roosting opportunities.	No need to consider bats further unless development is delayed and potential roosting places might develop in time.
Minimal/negligible	All or most of structure/tree can be seen well enough to suggest there are few, if any, places suitable for roosting and the location does not provide easy access to potential feeding grounds.	Although roosting is thought to be unlikely and therefore the development is unlikely to impact on the favourable conservation status of bats, a precautionary approach should be taken in relevant areas at the time of the work. Further survey work needed only if development delayed.
Low	Whole of structure/tree can be seen well enough to know there are no more than a few openings that could be used by an individual bat or two and/or these provide access to the sorts of features that are likely to be suboptimal due to materials and/or conditions within (eg unstable temperature); and/or the location provides limited access to potential feeding grounds.	Although regular roosting is thought to be relatively unlikely and the development is unlikely to impact on the favourable conservation status of bats, a single survey at dusk or dawn in favourable weather conditions would be appropriate to accord with good practice. This would reduce the extent to which the judgement is based on speculation. If the findings were ambiguous e.g. possible bat emergence and/or considerable bat activity around the building, the survey would need repeating.
Moderate/medium	A small number of openings are present in an area of reasonable habitat, and at least some seem likely to provide access to good conditions for roosting bats, and/or a loft/hay-loft is present that appears to have good qualities for roosting but there were limitations to access or no evidence of bats was found at the time. Cellars may be assessed as potentially being suitable for hibernation in winter,	Further work is needed to better assess the abundance of bat activity in the vicinity and whether or not bats seem to make use of the roosting potential available. To accord with good practice a dusk emergence survey and a dawn return-to-roost survey will be necessary. A second inspection of the interior may also be necessary - if the survey was undertaken in winter for example. As the absence of bats on two occasions wouldn't guarantee absence at other

	but the conditions and/or location aren't optimal.	times, possibly including winter, some precautions would be needed at the time of the work and some roosting potential should be retained/re-created. In the case of cellars and equivalent, inspection in winter is necessary. Some work, for example pointing old stone walls, should be avoided in winter.
High	There is at least one feature that is typical of those favoured by bats for regular roosting and it/they provide access to abundant insect food on-site and/or via good links with the wider natural environment. The feature/s could be suitable for use by a maternity colony, either as a main or satellite roost, or by a territorial male in autumn in the case of pipistrelles, or by individuals or small numbers of bats at any time of year, including winter when hibernating.	The extent to which bats of different species make use of the potential available needs to be investigated by carrying-out at least 3 surveys at dusk and/or dawn spaced over the months of May to September inclusive, possibly extending into April or October if weather conditions are favourable. (Air temperature above 8°C and not more than light rain and/or gentle breeze. I generally plan to do surveys only when the forecast is for 10°C or above.) Maternity colonies have largely disbanded by September, but territorial male pipistrelles may be missed without a survey in September and a lot of smaller roosts are discovered at this time of year. As bats could hibernate unseen in winter and/or roost at other times not covered by the survey work, appropriate precautions would be needed at the time of the work along with maintenance of appropriate potential roosting places.
High - hibernation only	Cave-like places with stable conditions and high humidity, such as cellars can be used for hibernation in winter.	High-risk potential hibernation sites need at least 3 inspections spaced over the winter months as bats will move between sites depending on the weather conditions.

Appendix 4 - Recommendations for further survey work when the findings of the preliminary survey were negative.

Bat Conservation Trust

Table 7.3 Recommended minimum number of survey visits for presence/absence surveys to give confidence in a negative result for structures (also recommended for trees but unlikely to give confidence in a negative result).

Low roost suitability	Moderate roost suitability	High roost suitability
One survey visit. One dusk emergence or dawn re-entry survey ^a (structures). No further surveys required (trees).	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey. ^b	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. The third visit could be either dusk or dawn. ^b

^a Structures that have been categorised as low potential can be problematic and the number of surveys required should be judged on a case-by-case basis (see Section 5.2.9). If there is a possibility that quiet calling, late-emerging species are present then a dawn survey may be more appropriate providing weather conditions are suitable. In some cases, more than one survey may be needed, particularly where there are several buildings in the category.

^b Multiple survey visits should be spread out to sample as much of the recommended survey period (see Table 7.1) as possible; it is recommended surveys are spaced at least two weeks apart, preferably more. A dawn survey immediately after a dusk one is considered only one visit.

Taken from "Bat Surveys for Professional Ecologists: Good Practice Guidelines", 3rd Edition (2)

Table 7.1 Recommended timings for presence/absence surveys to give confidence in a negative result for structures (also recommended for trees but unlikely to give confidence in a negative result).

Low roost suitability	Moderate roost suitability	High roost suitability
May to August (structures) No further surveys required (trees)	May to September ^a with at least one of surveys between May and August ^b	May to September ^a with at least two of surveys between May and August ^b

September surveys are both weather- and location-dependent. Conditions may become more unsuitable in these months, particularly in more northerly latitudes, which may reduce the length of the survey season.

Multiple survey visits should be spread out to sample as much of the recommended survey period as possible; it is recommended that surveys are spaced at least two weeks apart, preferably more, unless there are specific ecological reasons for the surveys to be closer together (for example, a more accurate count of a maternity colony is required but it is likely that the colony will soon disperse). If there is potential for a maternity colony then consideration should be given to detectability. A survey on 31 August followed by a mid-September survey is unlikely to pick up a maternity colony. An ecologist should use their professional judgement to design the most appropriate survey regime.

Taken from "Bat Surveys for Professional Ecologists: Good Practice Guidelines", 3rd Edition (2)

Appendix 5 - Natural England requirements for roof lining materials

Condition 39 of the CL21 Bat Mitigation Class Licence (Low Impact) documentation reads:

“Should this licence require the use of roof membranes, Bitumen type 1F felt with a hessian matrix, or a non-bitumen coated roofing membrane (NBCRM) with a test certificate approved by Natural England, must be used.”

If it is proposed to use NBCRM in areas where it may come into contact with roosting bats the licence applicant must state the intention to use NBCRM.

A certificate must be included that proves the roofing membrane has passed a ‘snagging propensity test’.

A snagging propensity test checks that the membrane can stand the repeated snagging actions of roosting bats.

To pass, a membrane must show no change in the average number of loops per cm² as rotations are increased from 0 to 1000.

The certificate must state the following information:

- The organisation that has carried out the snagging propensity test (this must be an independent body to the manufacturer of the NBCRM itself).
- Declaration that the snagging propensity test followed the correct testing protocol.
- Declaration that the snagging test has been passed.

No certificate is needed for bitumen 1F felt that has a non-woven, short fibre construction.”