
Higher Oak
on behalf of Mrs Alex Bould
Bat Mitigation Statement



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V1	10/07/2017	Draft	A. Logan <i>MSc BSc (Hons) MCIEEM</i>	H. Fearn <i>MSc MCIEEM</i>
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1 INTRODUCTION

- 1.1.1 The purpose of this mitigation statement is to outline recommendations for bat mitigation measures in relation to the proposed redevelopment of the barn / outbuildings at Higher Oak, Oak Road, Wrexham.
- 1.1.2 The proposal will see the barn converted to provide living accommodation; the eastern end of the barn will be converted into accommodation for an elderly member of the family, while the western end will be converted to provide specialist facilities for the benefit of the owner's daughter, who has a serious and rare illness.
- 1.1.3 Bat surveys undertaken in 2016 identified the presence of a brown long-eared *Plecotus auritus* roost. The roost was considered likely to be a maternity roost based on numbers of bats (a maximum of 15 brown long-eared bats were observed) and timing of surveys. As such, suitable mitigation for roosting bats must be provided as part of the redevelopment proposals and a development licence will be required from Natural Resources Wales (NRW) on receipt of planning permission.

2 BARN & HABITAT DESCRIPTION

2.1 Higher Oak Barn

- 2.1.1 The barn is located across a small private courtyard from the residential house at Higher Oak, Oak Road, Bowling Bank, Wrexham LL13 9RG. The original parts of the barn are thought to date back approximately 300 years but have been extended and added to over time.
- 2.1.2 The main section of the barn is a two storey brick built structure with traditional slate roof. Internally the barn is divided by brick walls and the roof structure is open with exposed timbers. Ivy *Hedera helix* growing over the external rear elevation wall and roof structure has grown through the roof slates in parts. The barn offers numerous crevices suitable for roosting bats.
- 2.1.3 More recently the barn has been used primarily for storage, but in 2016 structural defects became apparent and an engineer's survey and report (May 2016¹) identified that urgent repairs were required to return the barn to a satisfactory structural condition.
- 2.1.4 In September 2016 a partial collapse of an external wall occurred; bricks from the upper wall above a doorway falling into the adjacent courtyard / garden area. A further structural survey was undertaken and this concluded that this collapse had resulted from ongoing roof spread where the eaves wall plate had pushed out and in turn pushed the outer skin of brickwork below the eaves. From a structural viewpoint and with continuation of movement, repairs were recommended immediately from a Health and Safety perspective.
- 2.1.5 Structural repairs were undertaken in December 2016 under a European Protected Species (EPS) licence issued by Natural Resources Wales (NRW). Sections of the outer wall were taken down and rebuilt and the wooden roof structure was braced. The barn is now considered to be structurally sound in the short to medium term, but is likely to further deteriorate over time if left in its current state.

2.2 Site and Surrounding Habitat

- 2.2.1 The barn sits within a domestic setting, located across a small private courtyard from the residential house. The gardens surrounding Higher Oak are formed by mature trees with the barn itself bordered by trees and dense vegetation on three sides (western, northern and eastern aspects). The close proximity of the surrounding trees allows bats the opportunity to emerge directly into adjacent vegetation.
- 2.2.2 The wider surrounding landscape (See **Figure 1**) supports mixed agricultural fields which are bordered by hedgerows and trees. The field boundaries provide a network of habitat connectivity linking with areas of scattered broad-leaved woodland. The River Clywedog is located approximately 370m south of Higher Oak which is flanked by bank-side trees. Both the Site (Higher Oak) and the surrounding landscape provide high quality habitats for bats (foraging and commuting).

¹ Huxtable Hodgson (2016) *Structural Inspection Report of Redundant Outbuilding at Higher Oak, Oak Road, Wrexham*.



Figure 2.1 - Photograph showing the location of the barn and surrounding habitats

3 SURVEY METHODOLOGY

3.1.1 Bat survey methods were based upon the standard specification detailed in the Bat Conservation Trust's *Bat Surveys - Good Practice Guidelines. 3rd Edition* (Collins, 2016²).

3.1 Preliminary Roost Assessment

3.1.1 The barn was subject to a Preliminary Roost Assessment (PRA) to identify the barn's potential to support bat roosts; the PRA incorporated both external and internal inspections and was undertaken on the 4th August 2016 by Mr A Logan BSc (Hons), MSc, MCIEEM an experienced and licensed ecologist (NRW bat licence registration number 670036:OTH:CSAB:2016).

3.1.2 In addition, the PRA looked at habitats within the Site and surrounding landscape and appraised these in terms of bat habitat for providing commuting and foraging opportunities.

3.2 Presence or Absence Surveys

3.2.1 Two dusk emergence surveys and a single dawn re-entry survey were completed in August and September 2016 to confirm presence or absence of bats and assess bat usage of the barn.

² Collins, J. (2016) Bat Conservation Trust's *Bat Surveys - Good Practice Guidelines. 3rd Edition*. Bat Conservation Trust, London.

Personnel

3.2.2 Surveys have been undertaken by suitably qualified and experienced ecologists;

- Mr A Logan BSc (Hons), MSc, MCIEEM.
- Mrs U Maginn MSc (Hons), MCIEEM; and,
- Miss C Baldock Mres, ACIEEM.

Survey Equipment

3.2.3 Technical Equipment utilised by the survey team during the field surveys include:

- Head and torches (utilising white light and red light filters);
- A combination of Titley Electronics Anabat SD1 and SD2 bat detectors;
- Analook (Titley Electronics) and Kaleidoscope Pro (Wildlife Acoustics Ltd.) software;

Table 3.1 Survey details, dusk emergence and dawn re-entry surveys

Date	Surise / Sunset Times	Surevy Type Start Time / End Tme	Weather Condition
18/08/2016	06:02 / 20:40	20:15 – 21:50	18°C, dry, c.80% cloud cover, light breeze.
01/09/2016	06:27 / 20:07	19:52 – 21:48	18°C, dry at the start but very light rain towards end, c.80% cloud cover, light breeze.
16/09/2016	06:44 / 19:31	04:42 – 06:45	14°C, dry at the start inetrmitant light/moderate showers, full coud cover, light breeze.

Survey Constraints

- 3.2.4 The barn was fully accessible (with the second floor reached by two internal staircases) with care and therefore no survey constraints were identified in relation to the RRA.
- 3.2.5 Weather conditions for the surveys conducted on the 1st September and 16th September were not optimal, with rain encountered during at least part of the survey. Rain on the evening of the 1st September was light and started towards the end of the survey period and no significant constraints were experienced. Showers encountered during the dawn survey were not forecast and commenced shortly after arrival at site, survey objectives were therefore altered to try and ascertain further information on how bats were using the interior of the barn.
- 3.2.6 The only other constraint was restricted access to the rear (north) of the barn due to dense vegetation ground cover; open access points here could have resulted in some emergence flights being missed. However, internal counts within the barn are thought to give a good indication as to the numbers of bats present.
- 3.2.7 Overall, it is considered that sufficient information was obtained to inform an assessment of potential impacts and design an adequate mitigation strategy.

4 SURVEY RESULTS

4.1 Preliminary Roost Assessment

4.1.1 A small number of bat droppings were found scattered throughout the majority of the first floor area of the barn (Areas A – D in **Figure 4.1**) and several moth wings were also present (indicative of feeding remains). The ground floor areas were being used for storage which made detailed visual inspection in these areas more difficult. More evidence of roosting bats was found within the section of the barn at the far eastern end (Area E) which is separated by an internal structural wall from the main section of the barn. A concentration of bat droppings of differing ages was found on top of stored materials in Area E indicating regular use by bats.

4.1.2 Evidence of roosting bats as identified during the PRA is shown on **Figure 4.1**.

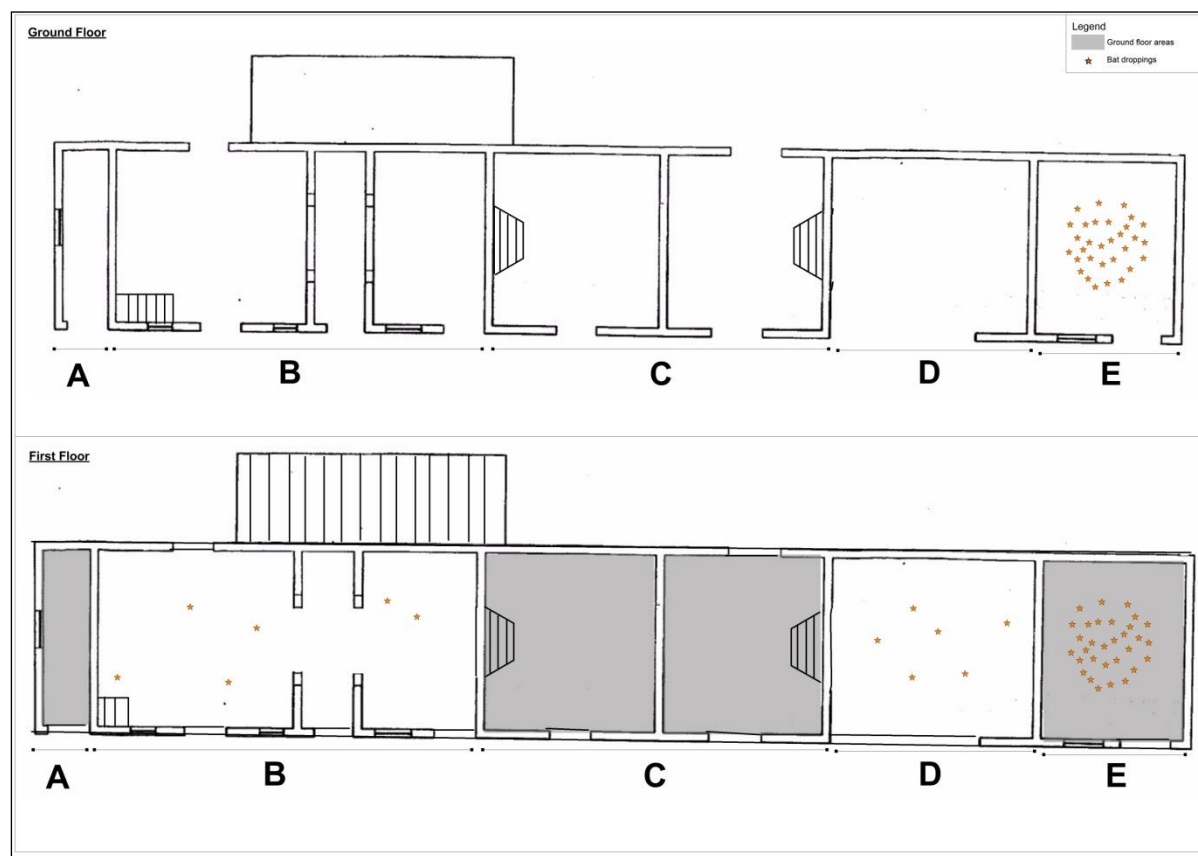


Figure 4.1 Preliminary Roost Assessment

4.2 Presence or Absence Surveys

4.2.1 Two evening dusk emergence surveys and a single dawn re-entry survey were undertaken to confirm roost presence, characterise roost type and ascertain access points and flight-lines.

4.2.2 During the dawn survey (16th September 2016), rain started to fall at the outset of the survey (with light/moderate showers throughout) and bats were observed inside the barn from commencement. It was decided that the surveyors would take up two positions within the barn to try to determine roost features and bat use within the barn structure.

- 4.2.3 The survey results are summarised in Table 4.1 below. The table should be read in conjunction with **Figure 4.2** (samples of sonograms are presented in **Appendix 1**).

Table 4.1 Summary of Presence or Absence Survey Results

Date	Survey Type	Surveyor Observations	
		Surveyor 1	Surveyor 2
18/08/2016	Dusk emergence	First bat (soprano pipistrelle) activity was recorded at 20:44 (approximately 4 minutes after sunset). A single soprano pipistrelle was then observed continuously foraging between the residential house and the barn between 20:45 and 21:05. Individual bats (soprano pipistrelle and occasional common pipistrelle) were seen and / or recorded intermittently including foraging activity for the duration of the evening survey. No bats were observed emerging from the barn.	First bat activity was recorded at 20:54 common pipistrelle and 20:55 soprano pipistrelle. Both bats were seen flying over the the barn. Occasional bat passes were noted throughout the course of the survey. At 21:05 a single bat (likely a brown long-eared bat) was seen, but not recorded, emerging from a window on the eastern front wall of the barn (see Figure 4.2). The bat emerged directly into the trees and vegetation adjacent to the barn. This was repeated two minutes later when two more bats were seen emerging from the same point. At this point an investigation of the barn found a maximum of 9 bats flying within the eastern end of the barn (Area E). A further 2 bats were seen flying within the adjacent room (Area D). A maximum total of 15 brown long-eared bats were recorded within or emerging from the barn.
01/09/2016	Dusk emergence	First bat (soprano pipistrelle) activity was recorded at 20:15 (approximately 23 minutes after sunset). Individual bats (soprano pipistrelle and occasional common pipistrelle) were seen and / or recorded	Brown long-eared bats were observed flying within the barn (Area E) from 20:13 onwards. From around 21:17 approximately 10 brown-long-eared bats were seen to emerge from the same

Date	Survey Type	Surveyor Observations	
		Surveyor 1	Surveyor 2
		intermittently including foraging activity for the duration of the evening survey. A noctule bat was also recored but not seen at 21:39. No bats were observed emerging from the barn.	window as the initial survey but several individuals also remained within the barn for the duration of the survey.
16/09/2016	Dawn re-entry	Two brown long-eared bats were seen flying around the barn (Area D, indicated by the orange arrows on Figure 4.2) briefly on arrival but had disappeared prior to the start of the survey at 04:42. No bat activity was observed throughout the survey.	Several brown long-eared bats were observed flying intermittently within the barn (eastern end of barn (Area E), indicated by purple arrows on Figure 4.2) until 05:00. No further activity bat activity recored after 05:00.

- 4.2.4 On arrival at site (approximately 30 minutes before sunset) on the 1st September 2016 for a dusk survey, the barn was entered and four bats were observed flying around the first floor area of Area D. This was notably darker than the rest of the barn due the lack of external windows or doorways. No other bat activity was observed within the barn prior to the commencement of the emergence surveys. The emergence observations would then indicate that pre-emergence flight concentrates in Area E (See **Figure 4.2**).
- 4.2.5 In total a maximum of 15 brown long-eared bats were observed within or emerging from the barn, although it is acknowledged that there are difficulties in establishing a true size of a population using any roost. Summer maternity roosts of brown long-eared bats usually comprise between 10 and 20 individuals (up to 50) (Bat Conservation Trust³).
- 4.2.6 Emerging bats were seen to leave through an open window aperture (i.e. where just a wooden frame was present) located high up on the front wall at the eastern end of the barn (See **Figure 4.2** and **Photo 8, Appendix 2**). The emergence point is located within approximately 1-2m of adjacent vegetation and this end of the barn is partially sheltered by tree canopy (which results in this area getting darker earlier than the surrounds) allowing the brown long-eared bats to emerge directly into a sheltered trees / woodland.
- 4.2.7 Bat activity observed during the Presence or Absence surveys is illustrated on **Figure 4.2**

³ Bat Conservation Trust (2010). *Brown long-eared Plecotus auritus*.

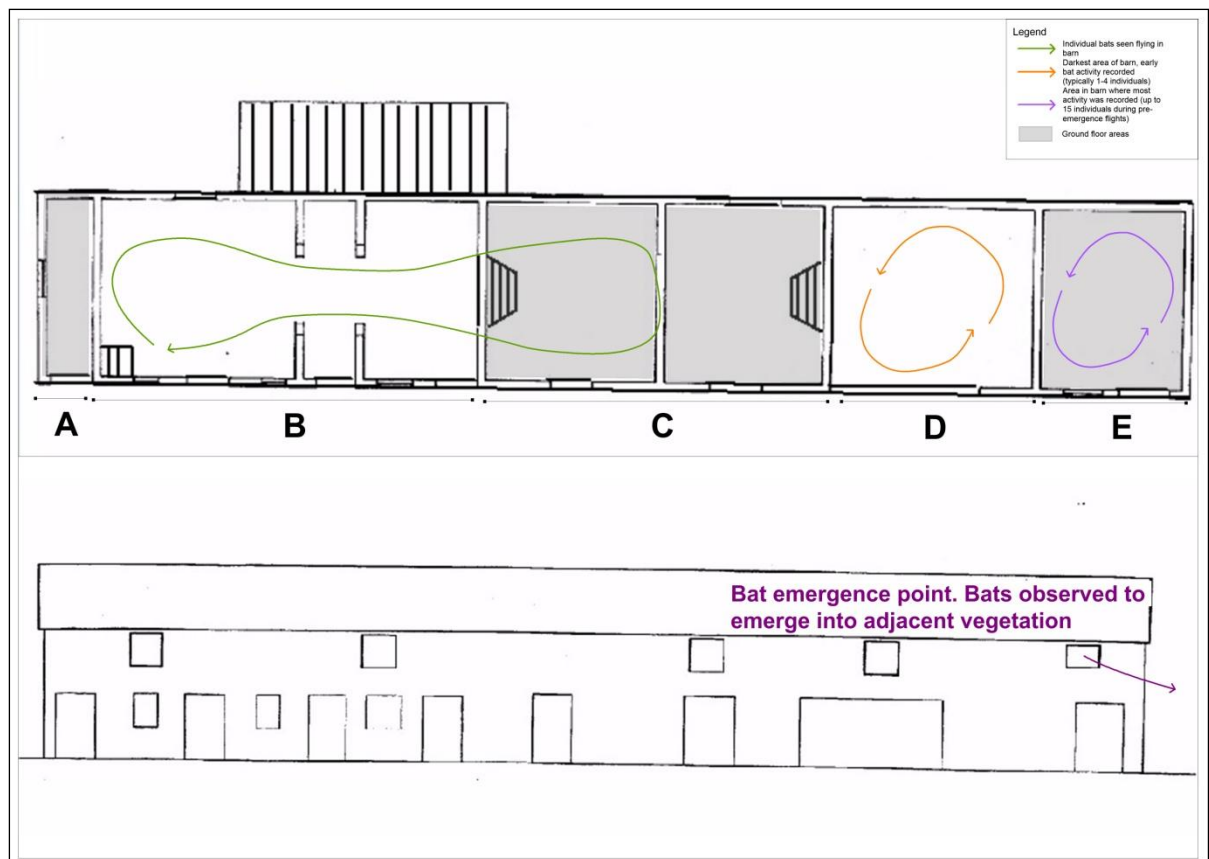


Figure 4.2 Presence or Absence Surveys

4.3 Interpretation / evaluation of survey results:

- 4.3.1 The surveys have confirmed a brown long-eared bat roost; probably a maternity roost (based on numbers of bats and timing of surveys). A maximum of 15 brown long-eared bats were observed within the barn.
- 4.3.2 The majority of the evidence (droppings and bat activity) was concentrated at the eastern end of the barn (mostly in Area E but also Area D). However, bat activity is likely to occur throughout the entire barn structure which is open throughout (with the exception of an internal structural wall between Area D and E), as evidenced by scattered bat droppings.
- 4.3.3 Early pre-emergence flight was noted in Area D, which is notably darker, earlier than the rest of the barn, but then activity appeared to move to Area E where the majority of activity was recorded prior to emergence. Bats were observed passing between Area D and E through cavities above the internal dividing structural wall. Observations would indicate that bats were most likely roosting within crevices along the ridge of the roof structure in Area E or above the dividing wall between D and E.
- 4.3.4 Emergence was observed from a window located high on the front elevation of the barn at the eastern end of the barn (Area E). The location of the emergence / access point is shown in **Figure 4.2 (Photo 8)** with emergence flight observed directly into adjacent vegetation.

5 RATIONALE FOR THE PROPOSED WORK

- 5.1.1 The barn at Higher Oak is currently in a poor state of repair and was recently subject to emergency structural repairs (December 2016). It currently represents a wasted resource in this location and is used mostly for storage. Although currently safe, this will not remain the case without further remedial work. If the barn is left in its current condition, it will in the medium – long term require further structural repairs or will otherwise risk the safety of the residents at Higher Oak. If it continues to deteriorate, the barn is also likely to become less attractive as a bat roost.
- 5.1.2 There is a need to provide accommodation and facilities for an elderly relative, and a young child (daughter of the owners) who has a serious and rare illness. Both are dependant and the conversion of the barn (to provide specialist facilities that cannot be accommodated in the main dwelling) is the preferred option to meet their needs.
- 5.1.3 It is proposed that a section of the converted barn will be retained as a brown long-eared bat roost or 'bat loft'. The bat loft will be located at the eastern end of the barn where bats are thought to be currently roosting and where the majority of pre-emergence flight was recorded. The bat loft will be large enough to allow pre-emergence flight and an access point will be located in the same or similar position allowing existing flight lines to be maintained.

6 MITIGATION AND COMPENSATION

- 6.1.1 The following mitigation measures are proposed in order to maintain the continuity of a bat roost at the site and to ensure that permanent and similar roost features are retained as part of the barn conversion.
- 6.1.2 The purpose of the mitigation statement is to provide a sufficient amount of information for the Local Planning Authority and their ecological advisers to determine whether '*favourable conservation of the species*' can be maintained. However, it should be emphasised that the granting of Planning Approval does not absolve the applicant/agents, present or any future owner of the existing property from obtaining a NRW licence in respect to where a European Protected Species (all UK bats) may be affected by development.

6.1 Roost Provision within Converted Barn - Bat Loft

- 6.1.1 The proposed bat loft will be 3.7m long x 1.6m wide, the bat loft will have a minimum height of 1.3m at the eaves rising to 2.4m at the highest point. The size of the bat loft is considered to provide a sufficient volume of unobstructed flying space for brown long-eared bats.
- 6.1.2 The raised roof within the bat loft will be constructed using the original timbers and lined with a Bitumen type 1F felt membrane with a hessian matrix. Should it be necessary to use any new timber, these will be untreated rough sawn. If wood timber treatments required, only those on the approved list of 'Bat roost and Timber products' must be used.
- 6.1.3 The interior of the bat loft will be enhanced for bats through the installation of features, including bat boxes on walls, and by creating crevices along the ridge beam which will provide opportunities for crevice dwelling species such as pipistrelle and brown long-eared bats.
- 6.1.4 The bat loft is located at the eastern end of the barn conversion and will incorporate an emergence point which is located at the same or similar height and position as is being used at current roost; this will allow existing emergence flight lines to be retained. Trees near to the emergence point will be retained maintaining direct flight paths into existing adjacent foraging habitats, including tree lines bordering Higher Oak. The small extent of habitat loss to the front of the barns is unlikely to affect the bat activity (based on flight activity recorded during the 2016 surveys) but additional tree planting will be planted, if required following post construction monitoring.
- 6.1.5 An access hatch will be created into the bat loft to allow future monitoring.
- 6.1.6 Lighting will be such that the roost is not illuminated; likewise nearby commuting or foraging habitat will remain unlit.

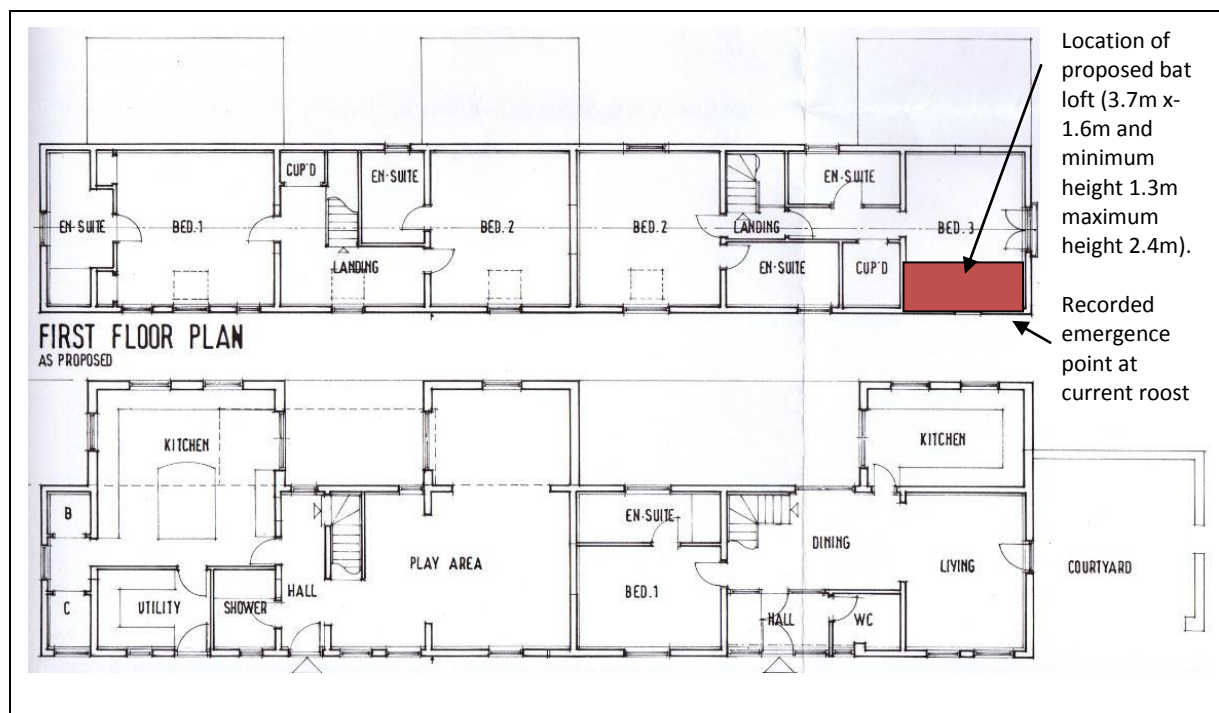


Figure 6.1 – Location of proposed bat loft within converted barn

6.2 Timing of Works and Proposed Mitigation Measures

Timing

- 6.2.1 The barn conversion works will only commence on receipt of an EPS licence issued by NRW. Subject to planning approval and successfully obtaining an EPS licence, it is proposed that the works to convert the barn will commence in winter 2017/18, timed for when bats are least likely to be present within the barn. However, the soft demolition works will be mindful that individual bats may still be present and will only be undertaken during periods of favourable weather (dry and when evening temperatures are expected to be above 8°C).
- 6.2.2 Creating the bat loft will be undertaken as one of the first actions, the intention is to provide a functional roost that can be used by bats by late April / May 2018 (i.e. by the time bats return to their maternity / summer roosts). The bat loft will be sealed and self-contained, preventing bats accessing other parts of the barn conversion from their roost.

Pre-commencement

- 6.2.3 All those involved with licensable works during the proposed re-development will be inducted through a 'tool box talk'. This will include the legislation relating to bats; measures that will be used to protect them; good working practices; licensable activities and what to do should bats be found. This information will be provided by the named ecologist before any licensable works commence on site and a written log of all actions maintained.
- 6.2.4 Before works start, a bat box will be fixed to a mature tree or suitable structure close to the barn. The bat box will be a minimum of 4 m above ground level.

Soft Demolition

- 6.2.5 It is highly unlikely that bats will willingly abandon the existing barn despite an alternative being in place. It may be that the roost will disperse naturally over winter, however brown long-eared bats often use a roost throughout the year although not necessarily in the same numbers as in summer.
- 6.2.6 Due to the nature of the existing barn and its current state of disrepair (with multiple potential access and entry points), it is not feasible to exclude bats from the building prior to works commencing. Therefore procedures will be put in place to dissuade the colony from using the original roost by way of gradually removing roof slates and making the building less attractive over a period of several days. This operation is to be undertaken only when an NRW EPS licence has been approved and will be conducted outside of the breeding season and also avoiding cold periods (i.e. evening temperatures below 5°C). The licensee, or their accredited agent, will be present throughout these procedures.
- 6.2.7 The roof structure of the barn will be removed by soft demolition; the roof (or sections of roof) will be stripped of slates in stages (over several days), making the roof structure gradually less attractive for bats. The objective of the soft demolition is to encourage bats, if still present, to move away from the structure of their own will. A bat box will be fixed to a mature tree or suitable structure close to the barn as an alternative roost location. The process is detailed below (several days will be allowed to lapse between each activity (1, 2 and 3):
1. A check will be made of the barn area for bat presence - providing bats are absent, slates at the western end of the barn (Area A & B, **Figure 4.1**) area will be removed;
 2. A follow up check for bat presence - providing bats are absent, slates in central section of the barn (Area C) will be removed;
 3. Final check for bat presence - providing bats are absent, slates at the eastern end of the barn section of the barn (Area D & E) will be removed.
- 6.2.8 Roof slates will carefully be removed by hand, adopting a systematic method, commencing at the ridge and working down towards the eaves. Barge boards and external timbers will be removed by hand. Throughout the process, checks will continually be made for the presence of bats.
- 6.2.9 Where bats are encountered during supervised works and capture is require, the named ecologist (as named on the EPS licence) or their accredited agent(s) will capture the bat with gloved hands or a hand net, place the bat in a drawn-string cloth bag and then taken and placed in the pre-installed bat box.

Encountering Bats (at other times)

- 6.2.10 If a bat is discovered at other, unsupervised times, work will cease immediately, the named licensed ecologist or their accredited agent(s) will be called for advice. This advice will include leaving the bat in-situ and to wait for the named licensed ecologist or their accredited agent(s) to visit the site and move the bat. The bat should not be encouraged to fly and builders and contractors are explicitly forbidden from handling bats. Builders and contractors will be briefed on their responsibilities during the toolbox talk.
- 6.2.11 If any bat is injured, the bat will be immediately taken into care (as directed by Bat Workers Manual, s.7.3, pp. 64-66; 3rd ed., 2004⁴). In the extremely unlikely event that a torpid bat is discovered, it will

⁴ Mitchell-Jones, A.J., & McLeish A., P. Ed., (2004) Bat Workers Manual 3Rd Edition. JNCC.

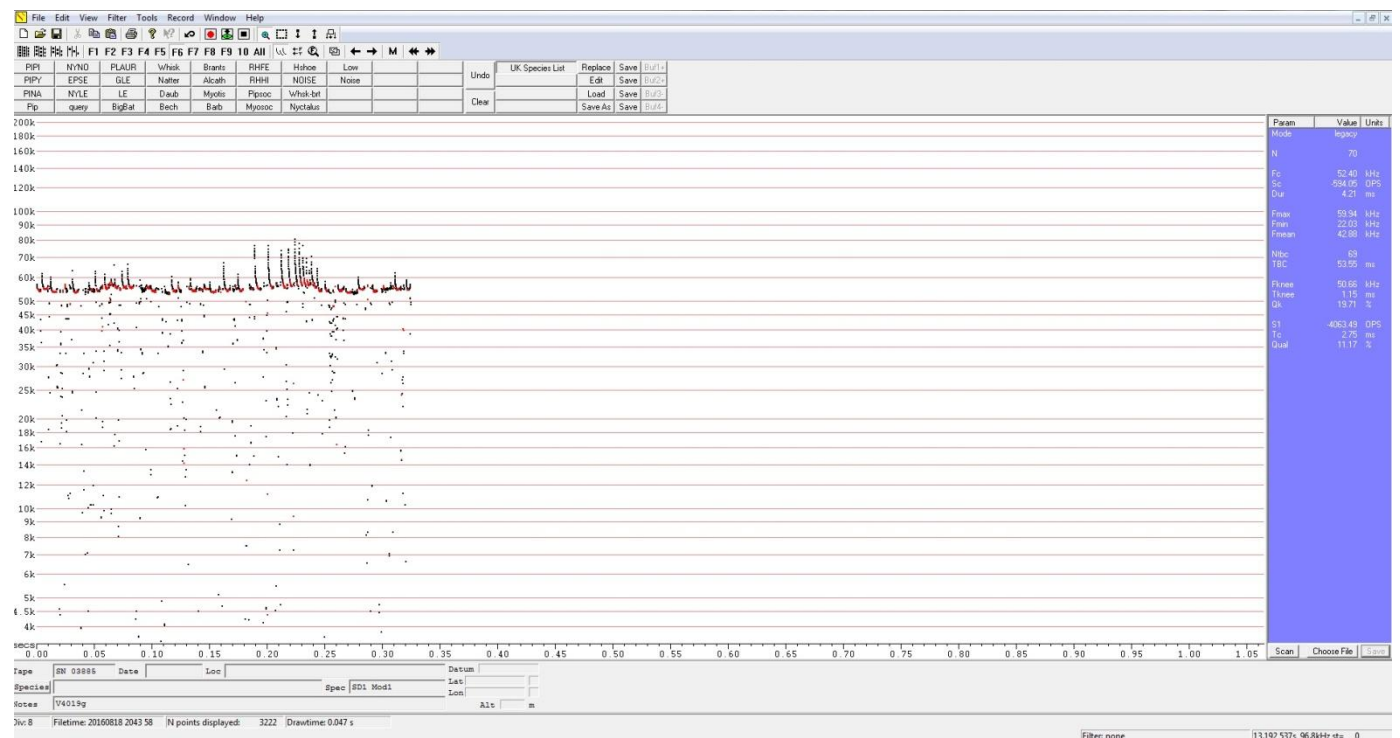
be taken temporarily into care and fed until such time when conditions are suitable and the bat will then be released at dusk at new bat loft.

7 POST-DEVELOPMENT SAFEGUARDS

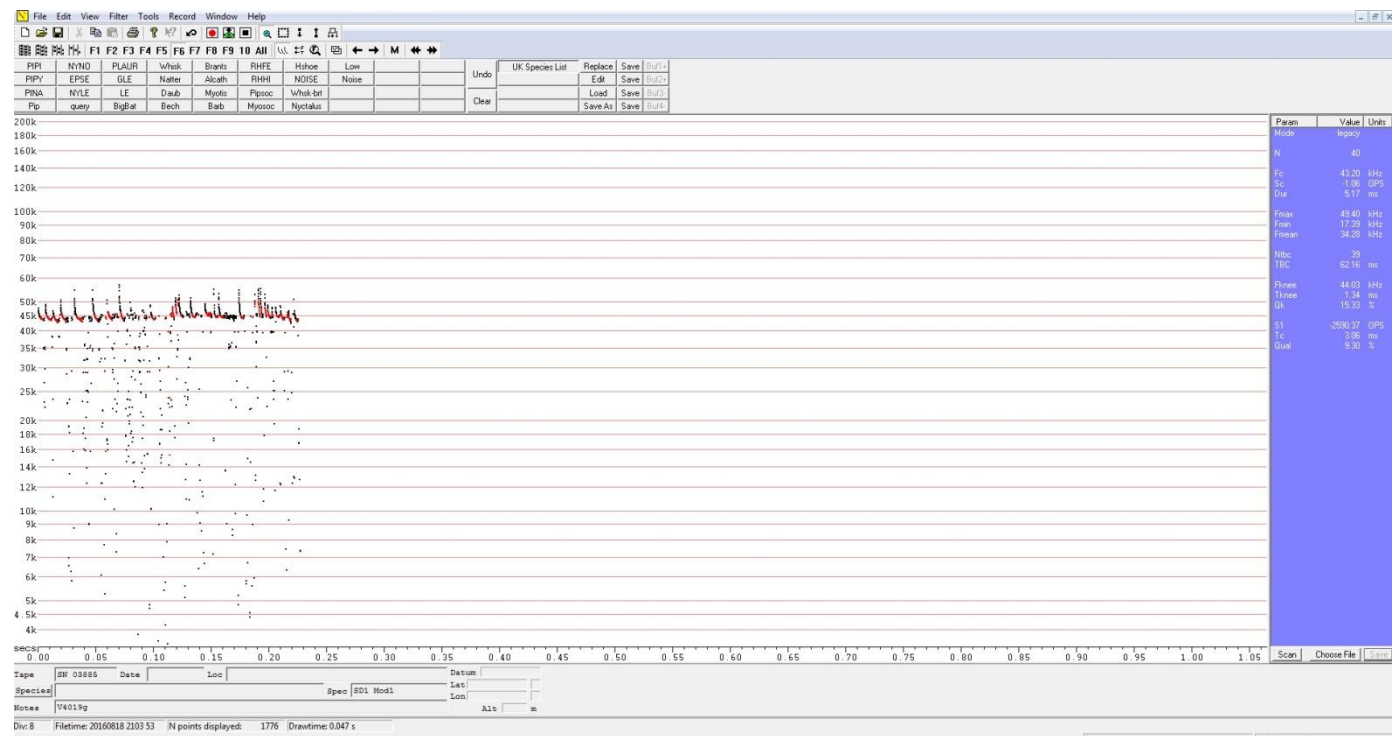
- 7.1.1 The roost is to be permanent and dedicated with maintenance requirements anticipated to be low.
- 7.1.2 On completion of the development, the bat loft will be inspected to ensure that the mitigation has been carried out as specified and accesses or flight routes have not been blocked or illuminated. Post construction monitoring will be undertaken as Conditioned by the EPS licence (likely to be a minimum two years post construction).
- 7.1.3 Monitoring of the new roost is to be included as a part of the licence conditions which will commence in the following breeding season after installation and will extend over the following two years.

Appendix 1 – Example Sonograms

Sample call of soprano pipistrelle



Sample call of common pipistrelle



Appendix 2 - Photographic Record



Photo 1 - Front elevation of Higher Oak Barn.



Photo 2 - Front elevation of Higher Oak Barn showing bowing at the top of the external wall beneath the eaves prior to structural repair works.



Photo 3 – Internal view looking across Area A – C.



Photo 4 - Internal view of Area D. This room was notably darker earlier than other areas of the barn lacking external windows and doors.



Photo 5 - Internal view of Area E. The majority of the bat activity / pre-emergence flight was observed in this area of the barn.



Photo 6 - Internal view of Area E. Used for storage.



Photo 7 – Bat droppings and moth wings on stored material in Area E.



Photo 8 –
External view of
the eastern end
of the barn. The
window high on
wall was the
observed
emergence
point.