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Bat Survey Report

of

**Lakehouse Farm Barns (B2 and B3),
Finchingfield Road, Hempstead, Essex CB10 2PR.**

Survey Commissioned by:	Humphreys Homes Ltd.
Project Number:	REP18041.2021
Report issued:	23 rd October 2021 (13 th October 2021 - Draft)
Date of surveys:	B3: 02/08/21, 19/08/21, 06/09/21 B2: 03/08/21, 18/08/21, 07/09/21. Remote monitoring: 5 nights (B2 and B3) - August 2021 (2018 Surveys in B2: 28/06/18, 11/07/18, 26/07/18)
Surveyors:	Odette Robson BSc (Hons) PhD MCIEEM; Mary Power BSc (Hons) MSc MCIEEM; Juliette Banwell; Ben Robson.

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Disclaimer

The findings detailed in this report are based on evidence from thorough survey, where every effort has been taken to provide an accurate assessment of the site at the time of the survey. No liability can be assumed for omissions or changes after the survey has taken place.

This report was instructed by Humphreys Homes, and following the brief agreed. Robson Ecology has made every effort to meet the client's brief.

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Where roosting bats are recorded, a Protected Species Licence may be required: Natural England (the licensing authority in England) require data from the most recent survey season to inform a licence application. Where a bat roost is not recorded, data will be valid for a maximum of 18 months from survey date.

The Report is not to be relied upon more than 12 months after its original date.

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1 Summary

Site:	Lakehouse Farm Barns (B2 and B3), Finchingfield Road, Hempstead, Essex CB10 2PR
Grid Reference	B2 - TL 66180 38097; B3 - TL 66158 38082
Report Commissioned by:	Humphreys Homes Ltd.
Date of Surveys:	Emergence surveys: 02/08/21(B3), 18/08/21(B2), 06/09/21(B3) Re-entry surveys: 03/08/21(B2), 19/08/21(B3), 07/09/21(B2). Static monitoring: 5 nights in B2 and B3 between 2 nd August and 7 th August 2021. (2018 surveys: 28th June; 26th July and 11th July 2018)

Considerations	Description	Timings, potential impacts and mitigation.
Survey results	2018: B2 Two dusk and a dawn survey in June and July, and 11 nights of static monitoring.	2018: Barn B2 only was surveyed: Two common pipistrelle day-roosts, a barbastelle day-roost, and a barbastelle night-roost, all used by individual bats, were recorded.
	2021: B2 and B3 Three dusk and three dawn surveys in August and September, in B2 and B3. 5-nights of static monitoring inside B2 and B3.	2021: Two Barns were surveyed - three dusk and/or dawn surveys per barn. Barn B2: Day-roosts for one barbastelle, two common pipistrelle, and one brown long-eared bat. Barn B3: Day-roosts for two barbastelle, one common pipistrelle, and two brown long-eared bat. Static-detector results supported the results of dusk/dawn surveys.
A full European Protected Species (EPS) Licence will need to be achieved prior to any works within any of the Barns. Breathable roofing membranes must NOT be used in any areas accessible to bats: Standard F1-type bitumen felt should be specified.		
Mitigation	Roost replacement.	Common pipistrelle, barbastelle and brown long-eared bat day/night/feeding roosts were recorded in both barns: All roosts would be impacted by the proposed conversion/renovation and change-of use, which would cause permanent loss of the roosts. An EPS licence application method statement would include sensitive construction/renovation works, timing constraints, replacement of roosting opportunities on completion of the conversion, mitigation bat boxes and a sensitive lighting strategy. Timing restrictions will apply for implementing the EPSL, to avoid times when bats are in torpor. Spring and autumn is recommended for works, however, as the roost is not a maternity roost, works can be carried out between April and October inclusive (following implementation of the EPSL). Replacement roost features (integral bat-tubes, modified weatherboarding, and external boxes) will be included within the renovated/converted houses, as compensation for the loss of the roosts in the barns.
Precautionary measures	Sensitive lighting.	Avoid directing light towards roost entry points, mitigation boxes, and to the north of the Barns (direction of flight on leaving the roost, which should remain as dark corridors).

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2 Introduction

2.1 Background

Robson Ecology Ltd was commissioned by Humphreys Homes Ltd to undertake bat activity surveys at two barns (B2 and B3) at Lakehouse Farm Barn, Finchingfield Road, Hempstead, Essex CB10 2PR. (Grid Reference: B2 - TL 66180 38097; B3 - TL 66158 38082).

Uttlesford District Council granted planning consent (planning reference: UTT/18/3481/FUL) on 12th April 2019 for change of use of three redundant agricultural buildings into three residential units. To inform the planning application, a Preliminary Roost Assessment (PRA) was carried out by Essex Mammal Surveys (EMS) in June 2018, which identified evidence of roosting bats within B2 and recommended further nocturnal surveys to establish the roosting status of B2. Emergence and re-entry surveys were carried out on B2 only, during July and August 2018 (Robson Ecology, 2018). Surveys of B1 and B3 were not carried out as part of the original planning application, due to changes in the application boundary during the preparation of plans for planning.

Further bat surveys were instructed in July 2021 to inform a revised planning application involving barns B2 and B3 only: Surveys were designed to identify the status of roosting bats of the two barns, since the 2018 surveys of B2 were out of date, and B3 had not been previously surveyed.

All species of bats are strictly protected under European and UK legislation (Conservation of Habitats and Species Regulations 2017, and the Wildlife and Countryside Act, 1981). Four UK species are also listed under Annex II of the Habitats Directive (including the barbastelle).

Seven species; barbastelle *Barbastella barbastellus*, noctule *Nyctalus noctula*, brown long-eared *Plecotus auritus*, soprano pipistrelle *Pipistrellus pygmaeus*, greater horseshoe *Rhinolophus ferrumequinum*, lesser horseshoe *Rhinolophus hipposideros* and Bechstein's bat *Myotis bechsteini* are all Species of Principal Importance in England (SPIE) - formerly UK Biodiversity Action Plan Priority (BAP).

2.2 Site Survey Methods

Surveys comprised dusk emergence and dawn re-entry surveys, with three surveyors covering each barn, and a 5-day period of monitoring through deployment of static bat detectors inside both barns.

The survey methodology followed standard techniques and guidance, as recommended by Natural England and the Bat Conservation Trust: Bat Surveys for Professional Ecologists: Best Practice Guidelines (Collins, 2016).

2.3 Proposed Development

It is proposed to convert the two barns (B2 and B3) to detached residential dwellings. Access to the new properties will be from the existing road to the east. The barns are currently dis-used, empty, and falling into disrepair but were originally used for agricultural purposes. The location, barn numbering, and context within the wider landscape is shown in Figure 2.1 and Figure 2.2.

Figure 2.1: Site location and barn numbering.

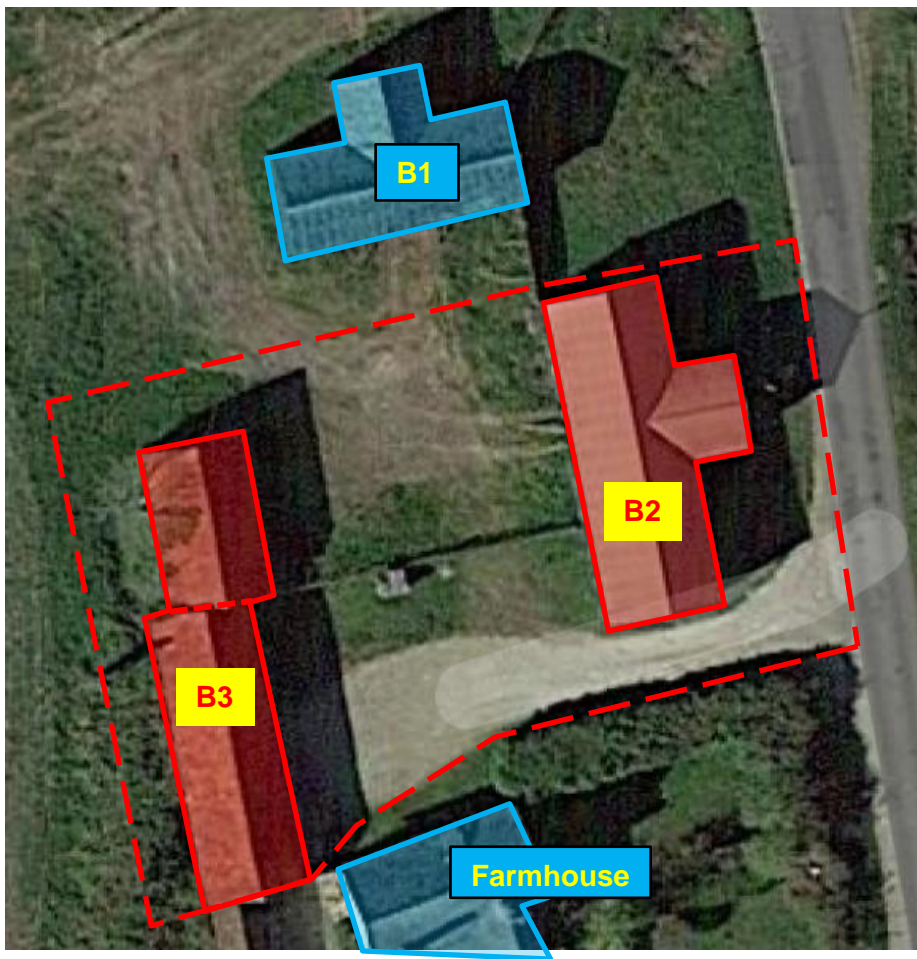


Figure 2.2: Site context in the wider landscape



2.4 Surveyor Details

Surveys were undertaken by:

2.4.1 Six Surveys:

- Odette Robson BSc (Hons) PhD MCIEEM; a full member of the Chartered Institute of Ecology & Environmental Management (CIEEM) and licensed by Natural England (Licence ref: CL18:2015 10940-CLS-CLS) to survey for bats (Level 2).
- Ben Robson, an experienced ecology assistant in his 3rd season of bat surveys.

2.4.2 Four Surveys:

- Juliette Banwell – a professional ecologist with 18 years of bat survey experience and licensed by Natural England (Licence ref: CL17:2021-54643-CLS-CLS) to survey for bats (Level 1).

2.4.3 Two Surveys:

- Mary Power BSc (Hons) MSc MCIEEM; licensed by Natural England (Licence ref: CL18: 2015 12111-CLS-CLS) to survey for bats (Level 2).

2.5 Site Context and Local Habitats

The site lies approximately 2.5km to the east of the village of Hempstead in north Essex, and approximately 3km to the south-west of Haverhill in Suffolk.

The barns surveyed were part of a group of buildings (barns and a farmhouse), associated with the former Lakehouse Farm, along an infrequently-used lane and surrounded on all sides by arable land. A large woodland (Hempstead Wood) lies approximately 100m to the north of the barns (Figure 2.2).

The nearest significant water body marked on available maps was a small reservoir approximately 700m to the east.

The wider landscape was predominantly arable, with small pockets of woodland.

3 Bat Survey Results

3.1 Desk Study Results

3.1.1 Status of bats in Essex and the UK

The following data are taken from Mammals of Essex (Dobson and Tansley, 2014), Essex Biodiversity Action Plan (BAP) and Bat Conservation Trust (BCT) web-based information of population trends (www.bats.org.uk).

Four bat species were recorded regularly during the surveys: Common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, barbastelle *Barbastella barbastellus*, and brown long-eared *Plecotus auritus*.

The most common and widespread bats in Essex are the common and soprano pipistrelle, which reflects national trends, however, in recent years a decline in numbers has been noted in many areas (DEFRA/Essex BAP). A specific objective of the Essex BAP is to maintain existing populations and range of pipistrelles.

After pipistrelle bats, brown long-eared bats are the most widespread species in Essex, and nationally they are found throughout the UK but have declined due to changing agricultural practices, insecticide use in roof voids, and barn conversions. This species is common in suitable, rural areas of Essex.

The barbastelle is a nationally scarce species and is one of only four UK bats which are listed under Annex II of the Habitats Directive. This species is rare in Essex, although there are scattered records (Dobson and Tansley 2014).

3.2 Building Preliminary Roost Assessment

The buildings were surveyed externally and internally during a daytime inspection carried out on 6th June 2018, by John Dobson (EMS, 2018). Barn B2 and B3 were assessed by Odette Robson on 2nd August 2021, as detailed below:

3.2.1 Barn B2

Timber framed barn with newer replacement stud walls and weatherboarding added over the original frame. Single-sheet profiled-tin roof with no internal lining or voids. Scattered pipistrelle and medium-sized bat droppings throughout, which were of a variety of ages: Some fresh (from the current active season), some several years old. Small accumulations of approximately 20 droppings in three areas: On a ledge at the base of the stud walls – eastern wall, southern gable and Midstrey (eastern wall). Weatherboarding was generally well-sealed on the eastern and western walls, with minimal warping or gaps below the boards which bats could access. The three gable ends all had numerous gaps at slipped or damaged boards which provided potential access/egress points for bats. The door on the western elevation was in poor repair, with the lower section missing and the upper part damaged and with a large number of gaps between boards (Plate 3.1).

Plate 3.1: Western elevation of B2 – (Photo: 07/09/21 – O. Robson)



Plate 3.2: Western elevation of B2 – (Photo: 07/09/21 – O. Robson)



Plate 3.3: Barn (B2) – internal. (Photo: 03/08/21 – O. Robson)



3.2.2 Barn B3

Barn 3 was two adjoined buildings with an opening internally between the two parts. The southern part was further subdivided into three, with internal walls to eaves height only (flight access between all sections below the ridge). B3 had a short brick plinth with stud walls above (frequent gaps and crevices at mortise joints), and externally clad in timber weather-boards, many of which had gaps/damage, and/or warped/lifting. Gables were weather-boarded to the apex. The two sections were slightly off-set and different heights exposing a partial gable at the join (circled in Plate 3.4). Many of the roof tiles were slipped and missing/damaged. No internal roof void or lining: Tiles were laid directly onto roof timbers.

Scattered bat droppings were present throughout: Beneath the ridge – approximately 40 medium-sized (brown long-eared and barbastelle), and approximately 10 pipistrelle-sized dropping. Feeding remains (moth wings) and brown long-eared bat droppings (approximately 10) in the northern section of B3.

Plate 3.4: Eastern elevation of B3 (two parts, internally joined) - (Photo: 02/08/21 – O. Robson)



3.3 Bat Activity Survey

All nocturnal surveys were conducted in optimal weather conditions (mild, dry, little wind). Emergence surveys started approximately 20 minutes before sunset and continued for approximately 1.75 hours after sunset. Dawn re-entry surveys started 1.75 hours prior to sunrise and finished 15 minutes after sunrise, or when light levels became too high.

Equipment used included full spectrum Echo Meter Touch 2/Pro 2 bat detector/recorders and an SM4Bat-ZC static detector. Infra-red torches and camcorder (Canon XA11) and Sionyx night-vision cameras were deployed. Direct observation was also used to record bat activity on the site.

Table 3.1: Weather conditions and timings of surveys

Date	Survey Type	Sunset or Sunrise Time	Temp.	Wind	Cloud cover
2 nd August 2021	Dusk Survey (20:30hrs – 22:30)	Sunset: 20:48hrs	13°C	Beaufort 2-3	80%
3 rd August 2021	Dawn Survey (03:35hrs – 05:35)	Sunrise: 05:21hrs	12°C	Beaufort 2	90%
18 th August 2021	Dusk Survey (20:00hrs – 21:55)	Sunset: 20:17hrs	18-17°C	Beaufort 2-3	100%
19 th August 2021	Dawn Survey (04:10hrs – 06:00)	Sunrise: 05:48hrs	15°C	Beaufort 2-3	100%
6 th September 2021	Dusk Survey (19:20 – 21:20hrs)	Sunset: 19:35hrs	22-20°C	Beaufort 2-1	20%
7 th September 2021	Dawn Survey (04:40 – 06:35hrs)	Sunrise: 06:19hrs	14°C	Beaufort 2	20%

The level of general foraging activity within the barns and commuting activity around the barns was moderate to low, with most activity being single passes, or brief foraging periods (inside and outside) from pipistrelle bats. Roosting bats were recorded on all surveys (common pipistrelle, brown long-eared and barbastelle) in both barns. An overview of each survey is detailed below:

3.3.1 Dusk Survey 2nd August 2021 (B3: Three surveyors: OR, JB and BR)

Pre-survey internal inspection: 1 x barbastelle roosting in a crevice/mortise hole on the western internal wall (Appendix B, Plate 6) – moved to ridge beam during the survey; 1 x barbastelle roosting at the ridge-beam in the north section of B3 (Appendix B, Plate 7), with a collection of approximately 20 droppings beneath, suggesting occasional roosting at this location; 1 x brown long-eared bat roosting at the ridge beam to the north of the northern section of B3 – internal flight during the survey, and a collection of yellow underwing moth wings and droppings (10) suggest an occasionally used feeding perch and day-roost.

The first bat recorded outside the barn was a common pipistrelle foraging to the north of B3 at 23 minutes after sunset.

The brown long-eared roosting inside B3 became active at 30 minutes after sunset, with internal flight below the ridge beam inside B3 for most of the survey, leaving the barn over an hour after sunset.

Sporadic foraging outside the barn was mainly to the north of B3 (inside, and to the south of, B1). No foraging or commuting was recorded to the south of B3.

3.3.2 Dawn Survey 3rd August 2021 (B2: Three surveyors: OR, JB, and BR)

There was no prolonged foraging inside B2 for the duration of the surveys.

A single barbastelle returned to roost on the eastern wall between two wall support beams at 58 minutes before sunrise (Appendix 3, Plate 8).

A single brown long-eared bat returned to roost at 24 minutes before sunrise on the eastern wall (internally) at eaves height – a crevice behind the wall-plate beam.

Externally, common pipistrelle foraging activity was recorded to the western side of the barn. Barbastelle passes were recorded between 90 minutes and 58 minutes before sunrise. The barbastelle that roosted in the barn arrived from the north, passing the surveyor on the north-eastern elevation.

3.3.3 Dusk Survey 18th August 2021 (B2: Three surveyors: OR, MP, and BR)

A single common pipistrelle emerged at 13 minutes past sunset from the stud-wall crevice inside the barn and flew internally for two minutes before leaving via the main (west) door.

A second common pipistrelle emerged at 32 minutes after sunset and foraged internally before leaving through a damaged weatherboard (SW elevation) at eaves height at 35 minutes after sunset and heading north.

A single common pipistrelle entered the barn (at the main door) at 34 minutes after sunset and foraged briefly before leaving through the main door. No further foraging was recorded inside the barn for the duration of the survey.

Externally, there were a small number of barbastelle and common pipistrelle passes. The earliest barbastelle pass was to the west of B2, at 61 minutes after sunset. No prolonged foraging activity externally.

3.3.4 Dawn Survey 19th August 2021 (B3: Three surveyors: OR, MP, and BR)

Two barbastelle bats entered B3 at the gable-join between the two parts of B3 (Plate 3.4 and Appendix B, Plate 4), at 48 minutes before sunrise. The bats foraged internally (mainly in the northern part of B3) for 5 minutes before roosting in internal crevices/ridge after investigating several potential crevices, mainly in the northern part of B3.

Barbastelles bats were recorded foraging around the trees in the Farmhouse Garden, to the south of B3, from 83 minutes before sunrise until the bats entered B3 to roost.

Externally, bat activity was limited to brief common pipistrelle foraging early in the survey. The last bat recorded was at 37 minutes before sunrise (common pipistrelle, foraging near B2).

3.3.5 Dusk Survey 6th September 2021 (B2: Three surveyors: OR, JB, and BR)

Two common pipistrelles emerged from cervices inside the barn at 10 minutes after sunset and foraged internally: One left B2 after 13 minutes of foraging through gaps above the main door (western elevation). The other common pipistrelle returned to roost in a crevice on the stud wall to the north of the main door, on the western elevation, at 43 minutes after sunset after 33 minutes of constant internal foraging.

A brown long-eared bat emerged and roosted at the ridge, with sporadic periods of flight below the ridge. This bat left the barn at 81 minutes after sunset.

A *Myotis* spp. entered the barn at 90 minutes after sunset – leaving through the western main door after four brief passes.

Externally, regular common pipistrelle foraging and social calling was recorded. Occasional passes from barbastelle and soprano pipistrelles. Most activity was to the west of B2.

3.3.6 Dawn Survey 7th September 2021 (B3: Three surveyors: OR, JB, and BR)

Two brown long-eared bats entered the barn at the gable-joins in the middle of B3 (Appendix B, Plate 4) and roosted at the ridge in the northern part of B3 (44 minutes and 39 minutes before sunrise). Twenty minutes prior to entry, brief brown long-eared foraging was recorded in the Farmhouse garden to the south of the barn.

A common pipistrelle returned to roost on the south-facing weather-board in the middle of B3, following pre-roosting behaviour and investigation of the southern gable-end close to the Farmhouse (which was not subsequently used for roosting).

Externally, regular common pipistrelle foraging and occasional barbastelle passes were recorded, all to the south of the barns, in the garden of the Farmhouse.

3.3.7 Internal Static Detector Results

SM4BAT-ZC (Wildlife Acoustics) static recorders were left in the B2 and B3 for 5 nights between 2nd August and 7th August 2021.

Four bat species were recorded during the static recording period: Common pipistrelle and barbastelle passes were recorded on all nights in both B2 and B3; soprano pipistrelle passes were recorded on three nights in B2 and all five nights in B3; a Myotis bat was recorded in B2 on one night.

B2: On three of the five recording nights, common pipistrelle bats were recorded within 20 minutes of sunset – indicative of roosting bats leaving the barn at typical pipistrelle emergence time. On three nights, barbastelle bats were recorded within 40 minutes of sunset – likely to have been roosting bats: Barbastelle emergence time is typically later than pipistrelle bats.

B3: The timings of the first barbastelle recordings suggest likely roosting bats (on three of the five nights) which corresponds to the emergence and re-entry survey results (Table 4.2).

4 Conclusions

4.1 Survey Result Summary:

The weather conditions during all surveys were optimal and any bats present would have been active during these surveys. In 2018, surveys covered the optimal survey season (June and July). In 2021, the surveys started late in the season, covering the peak survey season (two surveys in August), and one survey in September, which is beyond peak season, but within the survey season timings recommended in Guidelines (Collins, 2017). The 2018 survey covered the maternity season, however, the 2021 surveys started in early August, when maternity roosts had started to disperse. There was no evidence in either barn to suggest maternity roosting (e.g., large accumulations of droppings), and given the nature of both barns (no roof or wall lining, or other crevices that could conceal droppings), there is a high level of confidence that the correct roosting status has been established.

Roosting bats were recorded in B2 and B3 on all surveys (common pipistrelle, brown long-eared, and barbastelle bats – Tables 4.1 and 4.2).

It is likely that the barns are regularly used as a day roost by small numbers of individual barbastelle, brown long-eared, and pipistrelle bats, on an occasional basis, with bats possibly

moving regularly between the two barns, and other buildings within the farm complex. There was no evidence of more frequent use of the barns, or a roost of more significant conservation status, such as a maternity roost: Only low numbers of bat-droppings were recorded inside the barns, and no enclosed crevices which could conceal larger numbers of dropping (roofs not lined). The barns had very low potential for use as a hibernation roost, due to exposed nature, poor insulation, and unstable and sub-optimal thermal conditions and humidity.

Roosting bats recorded during the emergence/re-entry surveys are detailed in Tables 4.1 and 4.2 below:

Table 4.1: B2: Summary of emergence/re-entry recorded during activity surveys (2018 and 2021):

Survey Date	Roosting recorded in B2	Species and maximum numbers recorded in B2
28 th June 2018	1 common pipistrelle (day-roost) 1 barbastelle (night-roost)	2 x Common pipistrelle 1 x Barbastelle
11 th July 2018	1 pipistrelle returned to roost (day-roost)	
26 th July 2018	1 pipistrelle emerged (day-roost) 1 barbastelle emerged (day-roost)	
3 rd August 2021	1 barbastelle (day-roost) 1 brown long-eared bat (day-roost)	1 x Brown long-eared 1 x Barbastelle 2 x Common pipistrelle
18 th August 2021	2 common pipistrelle (day-roost)	
6 th September 2021	2 common pipistrelle (day-roost) 1 brown long-eared bat (day-roost and night-roost)	

Table 4.2: B3: Summary of emergence/re-entry recorded during activity surveys (2021):

Survey Date	Roosting recorded in B3	Species and maximum numbers recorded in B3
2 nd August 2021	1 brown long-eared (day-roost and feeding roost) 2 barbastelle (day-roost)	2 x Brown long-eared 2 x Barbastelle 1 x Common pipistrelle
19 th August 2021	2 barbastelle (day-roost)	
7 th September 2021	1 common pipistrelle (day-roost) 2 brown long-eared (day-roost)	

Entry/exit to B2 was through the door and eaves on the western elevation and southern gable end, via damaged weather-boarded walls and door. Roosting bats leaving B2, all headed north or north-east, towards the woodland as shown in Appendix C.

Entry/exit to the B3 was through damaged weather-boarding on the south-facing gable apex which is exposed where the two parts of B3 join (Plate 3.4 and Plate 4, Appendix B). Roosting bats leaving B3, all headed north or north-east, towards the woodland as shown in Appendix D.

4.2 Mitigation

A European Protected Species (EPS) Licence will be required before any construction/renovation works start on either B2 or B3. To achieve this, a mitigation strategy will be agreed with Natural England, which will include timing constraints and precautionary working methods to avoid impact to individual bats and to the roosting status of bats locally. Due to size and character of the roosts recorded, mitigation with bat boxes and/or integral bat-tubes is most appropriate. Pipistrelle bats are crevice-roosters and regularly use bat boxes, such as the Schwegler 2F (Appendix E). Barbastelle bats are also crevice dwellers, but larger in size: The Schwegler 1FF or a specially-designed 'Barbastelle Box' is most appropriate for this species. Brown long-eared bats are void and hole-dwellers. They readily fly within roof voids but are often found in crevices by day. Studies have shown that tree hollow-type boxes, providing a void in which bats can cluster, are favoured by brown long-eared bats. The Schwegler 2FN bat box that mimics holes in trees, the natural roosting sites, was used by this species in a research project carried out by the Vincent Wildlife Trust (McAney and Hanniffy, 2015).

Before works start, a Schwegler 1FF bat box will be located on a tree or barn wall (or pole if a suitably undisturbed wall or tree is not available): This box is initially to re-locate any bats found during a pre-start survey of the barns and sensitive destructive search or temporary exclusion of key features. The box should be retained, post construction, as additional enhancement.

On completion of the renovation/conversion, gaps (15-20mm) should be created under lifted weather-boarding. Breathable membranes must not be used in areas accessible to bats. Bat bricks or tubes (see Appendix E) should be installed on the renovated barns, as shown in Appendix F. Sensitive lighting will ensure that the route from the mitigation boxes/tubes to foraging grounds to the north is retained as a dark corridor.

This is deemed appropriate and proportional mitigation, providing roosting opportunities of equivalent type and value, appropriate to the species and roost types which would be impacted.

4.3 Derogation Tests

Conversion of the barns would result in permanent loss of day, night and feeding roosts used by three bat species. As such, an EPS licence will be required to proceed. There are three tests which Natural England address when deciding whether to grant an EPS licence:

1) *'The activity to be licensed must be for imperative reasons of overriding public interest or for public health and safety'*

A planning application has been approved for conversion of the barns. Due to intensification and changes in the agricultural industry, the barns are no longer required for their former farming purposes and are currently disused and redundant.

2) *'There must be no satisfactory alternative'*

Alternative options (retention/renovation of the barns for other purposes) were considered at the planning stage and found to be untenable.

An alternative use needs to be found to avoid the barns falling into disrepair and becoming a safety issue, or the historic value lost. With no useful function on a modern farm with large

machinery, the current use as agricultural buildings is no longer an option. Maintaining the barns in their current state is not sustainable without an alternative viable function being found for the buildings.

3) 'Favourable conservation status of the species must be maintained'

The mitigation and compensation strategy detailed within this document should enable the local conservation status of the species recorded at the site to be maintained. Pipistrelle and brown long-eared bat roosts are of 'low conservation significance' (single bats of common species), and the barbastelle roosts are of 'moderate conservation significance' (Mitchell-Jones, 2004 – see Table 5.1). Sensitive mitigation with roosting opportunities appropriate to the species must be provided. A detailed Method Statement, submitted to NE for an EPS licence, will include full details of methodology and supervision requirements to enable the roosts to be destroyed without harming bats. Natural England advocate a 'like-for-like' strategy such that any loss is mitigated by provision of habitat/roosting opportunities of equivalent type and value. Additionally, the Local Planning Authority has an obligation under the NPPF, to enhance habitat. Recommendations suggested within this report, if implemented, could enhance the site for bats post development.

Table 5.1: Conservation Status of roosts and corresponding mitigation requirements (taken from Bat Mitigation Guidelines; Mitchell-Jones 2004).

Planning mitigation and compensation | Key principles of mitigation

Low	Roost status	Mitigation/compensation requirement (depending on impact)
<p style="text-align: center;">Conservation significance</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">High</p>	<p>Feeding perches of common/rarer species</p> <p style="border: 1px solid red; padding: 2px;">Individual bats of common species</p> <p>Small numbers of common species. Not a maternity site</p>	<p>Flexibility over provision of bat-boxes, access to new buildings etc. No conditions about timing or monitoring</p>
	<p>Feeding perches of Annex II species</p> <p style="border: 1px solid red; padding: 2px;">Small numbers of rarer species. Not a maternity site</p>	<p>Provision of new roost facilities where possible. Need not be exactly like-for-like, but should be suitable, based on species' requirements. Minimal timing constraints or monitoring requirements</p>
	<p>Hibernation sites for small numbers of common/rarer species</p> <p>Maternity sites of common species</p>	<p>Timing constraints. More or less like-for-like replacement. Bats not to be left without a roost and must be given time to find the replacement. Monitoring for 2 years preferred.</p>
	<p>Maternity sites of rarer species</p> <p>Significant hibernation sites for rarer/rarest species or all species assemblages</p> <p>Sites meeting SSSI guidelines</p> <p>Maternity sites of rarest species</p>	<p>Timing constraints. Like-for-like replacement as a minimum. No destruction of former roost until replacement completed and usage demonstrated. Monitoring for at least 2 years.</p> <p>Oppose interference with existing roosts or seek improved roost provision. Timing constraints. No destruction of former roost until replacement completed and significant usage demonstrated. Monitoring for as long as possible.</p>

Figure 4. Guidelines for proportionate mitigation. The definition of common, rare and rarest species requires regional interpretation.

4.4 Lighting Considerations

Bats are sensitive to changes in lighting and require dark corridors for commuting, entry into, and egress from, roosts. Changes in external lighting outside roosts can delay emergence times, which can negatively impact bats through reducing foraging time.

External lighting around the site should be minimized to enable the bats to use the site, both during construction works, and on completion, if any new external lighting is proposed. This should include the following to protect bats. Guidance from the Institute of Lighting Professionals and the Bat Conservation Trust (IPL 2018; ILE 2012, BCT 2009) has been used to inform the following considerations:

- The site boundaries should be maintained as dark corridors. No lighting should be directed towards boundaries.
- LED luminaires should be used where possible (No UV elements: Metal halide, fluorescent sources should not be used).
- A warm white spectrum (ideally <2700Kelvin) should be used to reduce the blue light component.
- Peak wavelengths higher than 550nm should be used to avoid the component of light most disturbing to bats (Stone, 2012).
- Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.
- The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered (where this is feasible and meets safety standards).
- Column heights should be as low as functionally feasible to minimise light spill.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used (See ILP 2011).
- Luminaires should be mounted on the horizontal to avoid upward tilt.
- Any external security lighting should be set on motion-sensors - sensitive to large moving objects only, and short (<1 minute) timers.
- All external lighting should be kept to the minimal feasible level and be directed downward: Baffles, hoods or louvres can be used to reduce light spill and direct it only to where needed.
- Lighting should be appropriately directed to avoid illuminating the site boundaries, and all mitigation/enhancement bat boxes and bat roost features on the converted barns.
- Construction works should only be undertaken during daylight hours and task lighting should not be used during the construction phase.

5 References

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Appendix A: Static Detector Results

2021 Static Results:

Red text = barbastelle within 40 minutes of sunset/sunrise

Blue text = pipistrelle within 20 minutes of sunset/sunrise

Barn B2 – 2021

Date (2021)	First bat	Dusk	Last bat	Dawn	Spp.	Notes
2 nd August	CP – 20:53 Barb – 21:25	20:47	CP – 04:44 Barb – 04:19	05:24	CP, Barb	CP social calls
3 rd August	CP – 21:07 Barb – 21:18	20:45	CP – 03:59 Barb – 04:05	05:25	CP, Barb, <i>Myotis</i> spp.	CP social calls
4 th August	CP – 21:11 Barb -21:33	20:43	SP – 04:35 Barb – 23:27	05:27	CP, SP, Barb	CP social calls
5 th August	CP - 20:53 Barb – 21:06	20:41	CP – 03:38 Barb – 04:30	05:28	CP, SP, Barb	CP social calls
6 th August	CP – 20:50 Barb – 21:01	20:39	CP – 04:43 Barb -04:36	05:30	CP, SP, Barb	CP social calls

Barn B3 - 2021

Date (2021)	First bat	Dusk	Last bat	Dawn	Spp.	Notes
2 nd August	SP – 21:58 Barb – 04:37	20:47	Barb – 04:38	05:24	CP, SP, Barb	SP – social calls
3 rd August	SP – 21:24 Barb – 03:18	20:45	Barb – 04:04 SP – 03:41	05:25	CP, SP, Barb	SP – social calls
4 th August	Barb – 21:02 SP – 21:12	20:43	SP – 04:01 Barb – 04:01	05:27	CP, SP, Barb	SP – social calls
5 th August	Barb – 20:49 SP – 21:02	20:41	CP - 03:09 Barb - 02:03	05:28	CP, SP, Barb	SP – social calls
6 th August	Barb – 20:49 SP – 21:18	20:39	CP – 04:02 Barb – 21:04	05:30	CP, SP, Barb	SP – social calls

Appendix B: Roost Locations

Plate 1: 2018, B2: Barbastelle roost (Roost 2) (Photo: O Robson 28/06/18).



Plate 2: 2018, B2: Common pipistrelle roost (Roost 4) – 11.7.18 (Photo: O Robson 11/7/18).



Plate 3: 2018, B2: Common pipistrelle roost (Roost 3) – 26.7.18 (Photo: O Robson 26/07/18)



Plate 4: 2021: Access point into B3 – used by brown long-eared and barbastelle bats (Photo: O Robson 07/09/21).



Plate 5: 2021: Droppings accumulated below Pipistrelle roost in B2 - (Photo: O Robson 02/08/21).



Plate 6: 2021: Crevice on stud-wall used by roosting barbastelle on 02.08.21 - (Photo: O Robson 02/08/21).



Plate 7: 2021: Roosting barbastelle at ridge beam in B3 (northern part) on 02.08.21 - (Photo: O Robson 02/08/21).

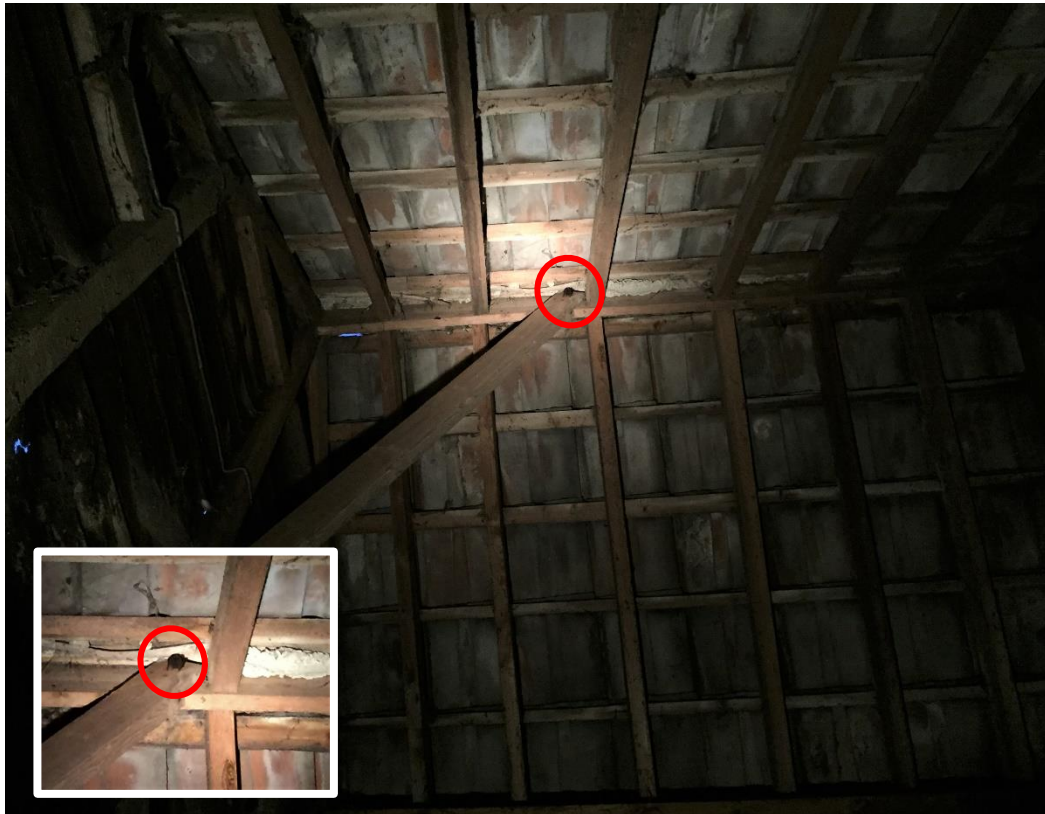


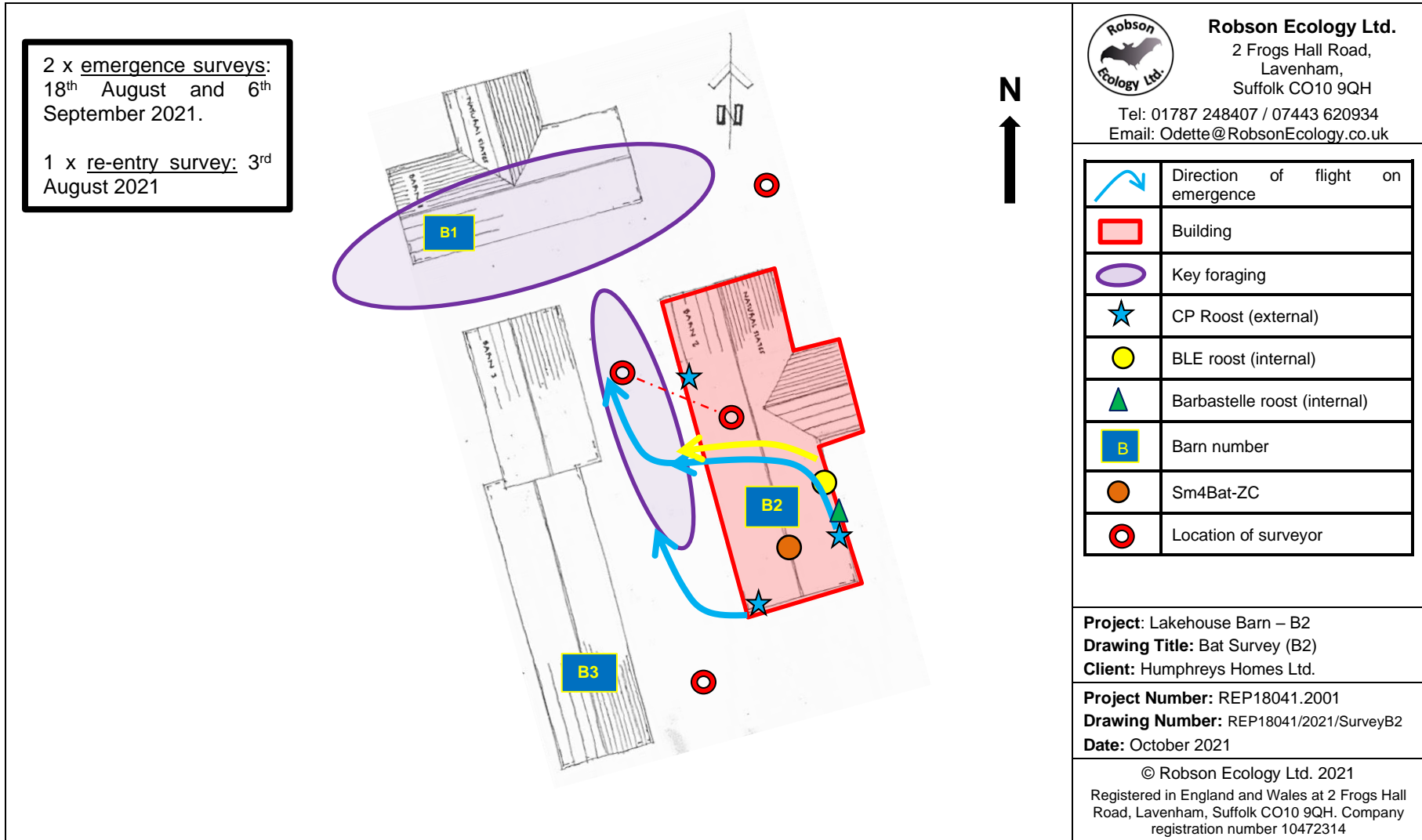
Plate 8: 2021: Roosting barbastelle in wall crevice in B2 (eastern wall) on 03.08.21 - (Photo: O Robson 03/08/21).



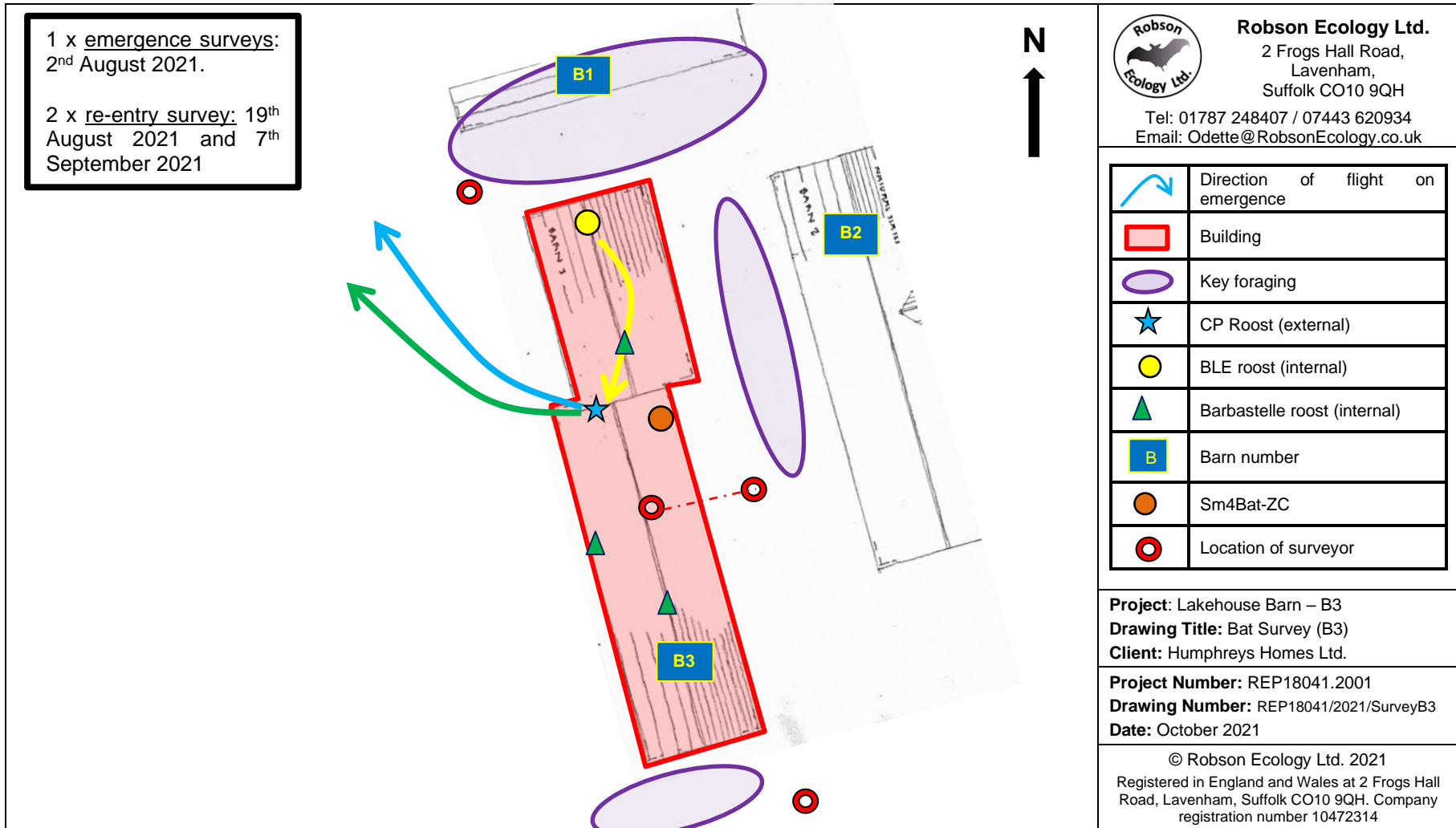
Appendix C: Specification of Bat Boxes and Bricks/tubes.

<p>Schwegler 1FF</p>  A black plastic bat box with a bat silhouette on the front, mounted on a tree trunk. It has a small entrance hole at the bottom.	<p>Barbastelle box or Vincent Pro Bat Box</p>  Three images of wooden bat boxes. One is a yellow box with a bat silhouette, another is a wooden box with a bat silhouette, and the third is a wooden box with a dark roof and a bat silhouette.
<p>Schwegler 2FN (for brown long-eared bats)</p>  A black plastic bat box with a bat silhouette on the front, hanging from a metal ring. It has a small entrance hole at the bottom.	<p>Schweler Bat Tube (1FR)</p>  Two images of a grey concrete bat tube. One shows the tube with a small entrance hole at the bottom, and the other shows the tube mounted on a yellow wall.
	<p>Integrated Eco Bat Box with Cavity Chamber</p>  A green plastic bat box with a bat silhouette on the front, mounted on a wooden wall. It has a small entrance hole at the bottom.

Appendix D: Flight direction; Roosts, Surveyor and Static Detector Locations – Barn B2 2021.



Appendix E: Flight direction; Roosts, Surveyor and Static Detector Locations – Barn B3 2021



Appendix F: Proposed Mitigation

