Activity Survey for Bats

Location: Cottage Farm, Whiston

Author: Helen Staton

September 2018

Notice to Readers

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Executive Summary

Absolute Ecology was commissioned to undertake a bat survey for the bat roost potential at a site known as Cottage Farm, Whiston Eaves Lane, Whiston. This report has been prepared with due consideration for various best-practice guidance and methodologies including those of the Chartered Institute of Ecology and Environmental Management (CIEEM (2012), BS 42020, and the Bat Conservation Trust Best Practice 3rd Edition 2016.

The site comprises a large detached, redundant barn which is solid stone in construction with a pitched tiled roof. It has been proposed the barn will be converted into residential accommodation (proposal plan shown in section 8.0). A building inspection was undertaken 21st July 2018 followed by three activity surveys as summarised below;

- Survey 1 – dusk emergence 13/08/2018
- Survey 2 – dawn re-entry 27/08/2018
- Survey 3 – dusk emergence 06/09/2018

Two species of bats were recorded roosting within the stone barn. A peak count of six common pipistrelle (*Pipistrellus pipistrellus*) and six brown long-eared (*Plecotus auritus*) – including one juvenile, bats were recorded roosting internally and within the stone walls.

The results of the three bat activity surveys, which were conducted during the optimum survey period, has confirmed the presence of bats within the barn. The surveys have confirmed that the barn is in use as a maternity roost for brown long-eared and a summer day roost for common pipistrelle bats. Therefore, it is considered that all effort has been made to establish what negative impacts will occur to roosting bats, and these have been identified in section 4.

Application for an EPS licence from Natural England shall be required for the proposed renovation of the building, which should provide a comprehensive mitigation strategy for potential loss of maternity roost for brown long-eared and a summer day roosts for a low number of common pipistrelle bats. Some consideration of appropriate measures within such a mitigation strategy are provided in section 5.

Swallows (*Hirundo rustica*) were recorded nesting onsite and measures will need to be in place to avoid disturbing this species during the nesting season.

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1. Introduction

Site Description

Absolute Ecology was commissioned to undertake a bat survey for the bat roost potential at a site known as Cottage Farm, Whiston Eaves Lane, Whiston, Staffordshire. Grid ref: SK04544665.

Figure 1: Site location indicated by red pin.



Proposed Works

Proposals have been made to convert the redundant barn into residential accommodation. See section 8.0 for proposal plan.

Best Practice Guidance

The scope of this Survey has been determined in line with the proportional approach to ecological survey, assessment and subsequent recommendations for avoidance and mitigation of impacts, which is encouraged in the emerging 'BS 42020: Biodiversity – Code of practice for planning and development'. This report has been prepared with du consideration for various best-practice guidance and methodologies including those of the Chartered Institute of Ecology and Environmental Management (CIEEM (2012)1,the emerging BS 42020 and the Bat conservation Trust Best Practice 2016.

Aims of the Survey

The aims of the Preliminary Roost Assessment and presence/absence activity surveys is to provide an ecological evaluation of the following species within the proposed application area:

Bats
• Probability of bats and their roost sites being present at the proposed redevelopment site.
• To assess the roost status.
• To assess suitable food resources and habitat requirements.
• If a roost site is found, to provide an impact assessment.

Table 1. Aims of survey in relation to bats.

A bat roost is interpreted as 'any structure or place, which any wild bat uses for shelter or protection'. Bats tend to show a high fidelity to roosts. Subsequently, legal opinion regards a roost to be protected whether or not the bats are present at the time. There are many types of roost used by temperate bats during their annual cycle: Any structures found having evidence of bats will be further evaluated to assess which of the following roost categories may be present onsite (if any):

Status	Description
Maternity / Nursery Roost	*used by breeding bats, where pups are born and raised to independence (Anecdotal evidence may support this prospect despite sub-optimal survey period).*
Hibernation Site	*where bats may be found during the winter. (This is assessed within the context of this report).*
Daytime Summer Roost	*used by males and/or non-breeding females (Seasonal limitations prevent robust analysis of this).*
Night Roost	*where bats rest between feeding bouts during the night but are rarely present during the day.*

Feeding Roost	*where bats temporarily utilize feeding perches and stations to eat an item of prey.*
Transitional (or Swarming) Site	*where bats may be present during the spring or autumn (This can not be assessed within the context of this report).*

Table 2. Bat roost status definitions

Birds
• Establish if birds are using the site.
• Locate nest sites, if present.
• Assess what types of activities were shown within the redevelopment site.
• Assess suitable food resources and habitat requirements.
• Provide an impact assessment, if nests are found.

Table 3. Aims of survey in relation to birds.

Barn Owl (*Tyto alba)*
• Establish presence onsite.
• Establish potential nest sites (PNS).
• Locate any active roost sites (ARS).
• Locate any temporary roost sites (TRS)
• Assess potential feeding and dispersal habitats (PFH)
• Provide an impact assessment, should barn owl(s) be present

Table 4. Aims of survey in relation to Barn Owl.

Assessment also considers potential effects on valued ecological receptors (VERs) and zones of influence (ZoI) during pre and post development, both onsite and off- site. The term Zone of Influence is used to describe the geographic extent of potential impacts of a proposed development. Should a likely significance of negative impacts be identified, further surveys, mitigation and enhancement measures will then be determined accordingly; to prevent, offset or reduce the degree of impact that may occur should development commence.

Should bats be present onsite, then a European Protected Species (EPS) development license issued by Natural England (NE) may be required prior to any works taking place. If required, further presence/absence survey should be undertaken and a mitigation strategy be implemented with Natural England and the Local Planning Authority. Should no further surveying effort be considered, then the PEA report will include full justification and evaluation.

2. Methods

Summary of Survey Methods

All bat species resident in the UK have been recorded using trees, buildings and built structures, e.g. bridges, at some time during the year (Bat Conservation Trust, 3rd edition 2016). The buildings were inspected externally and internally, where access was available, for signs of bat activity. These typically include bat presence, droppings, feeding remains, urine stains and grease marks. Notes were made on the following in accordance with the guidelines published by the BCT (3rd edition 2016) for the surveying of buildings and built structures:

- Type and age of building
- Type of construction
- Presence of potential roost features, e.g. hanging tiles, raised tiles, roof voids
- Information or evidence of work having been undertaken that could affect use of the structure by bats
- Amount and location of evidence of bats such as presence of live or dead bats, droppings, grease marks, urine stains, characteristic smell of bats.

The activity survey was performed in accordance with the guidelines published by the BCT (3rd edition 2016) for carrying out dusk and dawn activity surveys:

- Determine the presence/absence of species, i.e. the species present in a given area
- Determine the intensity of bat activity both spatially and temporally
- Determine the type of activity, most usually foraging (by feeding buzzes); commuting (by high directional pass rates); mating (by mating social calls)
- Find roosts by tracking back bat flight paths or observing dawn flight activity at roosts.

Where feasible, given the amount of evidence collected, any structures with evidence of bats have been evaluated to assess which of the following categories they fall into, if any (BCT, 3rd edition 2016):

- Maternity or Nursery Roost – used by breeding bats, where babies are born and raised to independence
- Hibernation Site – where bats may be found during the winter
- Daytime Summer Roost – used by males and/or non-breeding females
- Night Roost – where bats rest between feeding bouts during the night but are rarely present during the day
- Feeding Roost – where bats temporarily hang up to eat an item of prey
- Transitional (or Swarming) Site – where bats may be present during the spring or autumn.

In the absence of any evidence, trees and structures have been assigned a rating of suitability from negligible to high potential for supporting bats. The rating is based on the location of the structure in the surrounding landscape, the number and type of features suitable for use by bats and the surveyor's experience. For example, a structure with a high level of regular disturbance and few opportunities for access by bats that is in a highly urbanised area with few or no mature trees, parkland, woodland or wetland would have negligible potential. Conversely, a pre-20th-century or early 20th-century building with many features suitable for use by bats close to good foraging habitat would have high potential.

Survey methodology also utilized a number of passive monitoring techniques including an infra-red night-vision camera (XLT Bushnell Trophy CamTM: USA) to qualitatively record any evidence of bat activity inside the building during surveying periods. Further equipment included a NVMT-12x24 night vision scope (Yukon: USA), a SeeSnake 2 video endoscope, a GPS eTrex Venture HC, a hand net and a CB2 Clubman Deluxe high-power lamp with filter.

Pre-Survey Data Search

Ecological data searches were conducted to establish whether any notable, protected bat or bird species have been recorded within a 1-km radius of the proposed development area. Furthermore, a desktop study of the area using online resources was undertaken independently to corroborate the current overview of the site and its importance in the landscape. A number of electronic sources were consulted, including www.magic.gov.uk, www.naturalengland.org.uk and Google Earth.

Surveyor Information

Surveyor 1

Helen Staton – BSc (Hons) ACIEEM, Natural England Bat Survey Class Licence Registration Number: 2015-14490-CLS-CLS. Helen has been working for ecological consultancies for over seven years and has held a Level 1 bat licence for 5 years. Helen is an experienced bat surveyor with competency in activity surveys, dawn and dusk bat roost assessments, daytime surveys for bat field signs, assessments of trees as potential bat roosts and the production of reports providing advice on best practice, mitigation and compensation works relating to bats as may be required.

Surveyor 2

Laura Kershaw– BSc (Hons), Natural England Bat Survey Class Licence Registration Number: 2015-14818-CLS-CLS. Laura has been working for ecological consultancies for over nine years and has held a Level 1 bat licence for 3 years. Laura is an experienced bat surveyor with competency in activity surveys, dawn and dusk bat roost assessments, daytime surveys for bat field signs, assessments of trees as potential bat roosts and the production of reports providing advice on best practice, mitigation and compensation works relating to bats as may be required.

Field Surveys

Habitat Survey

A Preliminary Roost Assessment appraisal was conducted on the 25/06/2018 by Helen Staton.

Roost Surveys

Equipment used to aid the survey included low and high-powered torches, ladders, binoculars and an endoscope.

A scoping survey was undertaken on 31/07/2018 and an updated on each survey visit. Such scoping exercises can be undertaken throughout the year. Other than when assessing trees, environmental factors such as the weather do not have an impact upon the overall assessment survey results (see Table 5).

Table 5. Annual survey optimality for bats.

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Inspection of hibernation roosts – semi-optimal survey period			Limited activity – sub-optimal for surveys	Summer roost emergence & re-entry surveys – optimal survey period					Limited activity – sub-optimal survey period	Inspection of hibernation roosts – semi-optimal survey period	
Internal roost surveys are possible/trees are best surveyed during winter											

The survey focused predominantly on the buildings which is to be re/developed with additional effort being given to the rear elevations of the main residential dwelling, within the zone of influence. The external inspection incorporated visual assessment with the use of binoculars, torch, endoscope and ladders in full daylight to ascertain the following:

- Potential ingression points cracks, raised roof tiles
- Any anecdotal evidence of bats, i.e. droppings, grease marks, feeding remains.
- Any evidence of birds, i.e. nest material, droppings.

The external inspection incorporated visual assessment with the use of torch, endoscope and ladders to ascertain the following:

- To locate potential roost/nest sites.
- To listen for any bats and birds.
- To examine floors, walls and structural elements for anecdotal evidence, i.e. droppings, urine stains, corpses and feeding remains.

Bat dropping analysis

Bat droppings collected during the internal roost assessment were collected and sent to Professor Robin Allaby, School of life Sciences in association with Warwick University for DNA analysis.

Activity Surveys

Bat ultrasound data was gathered using a number of heterodyne (Batbox Duet and SSF Bat2) and real-time recording devices (Wildlife Acoustics Echo Meter EM3, Elekon Batlogger & Bat Corder EcooB). Real-time recordings were subsequently analysed using Bat Explorer software. Cannon night shot plus, with IR LED Illuminators to capture and record continues bat activity.

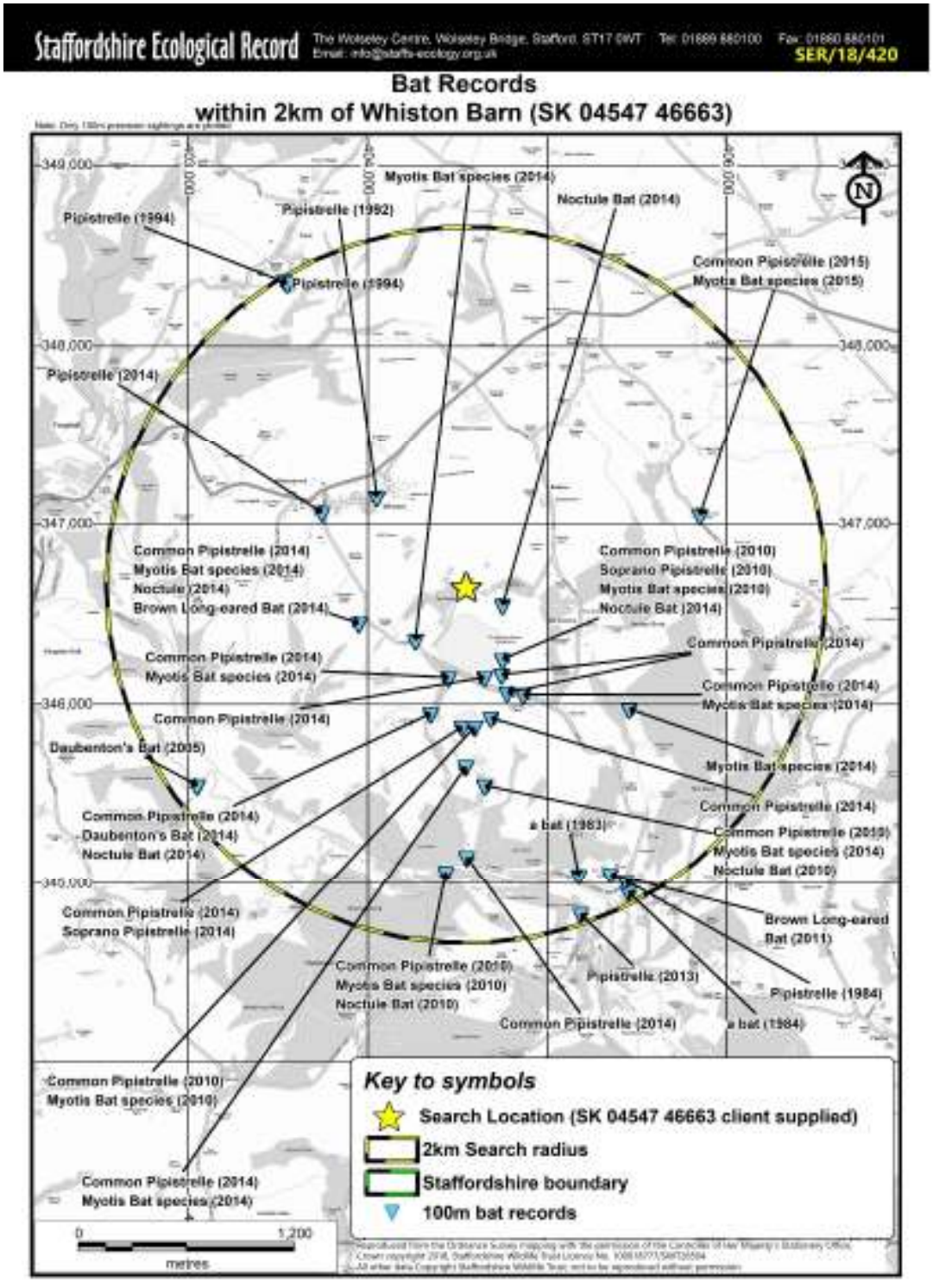
All surveys were carried out during optimal weather conditions and period for bat activity.

Table 6. Abiotic variables during survey 1: Dusk Emergence			
Date: 13/08/2018 **Sunset: 20:40**			
Temp Start	20 °C	**Cloud Cover Start**	20%
Temp Finish	19 °C	**Cloud Cover Finish**	20%
Wind Speed Average	Nil <10 mph	**Precipitation**	Nil
Table 7: Abiotic variables during survey 2: Dawn re-entry			
Date: 27/08/2018 **Sunrise: 06:11**			
Temp Start	12 °C	**Cloud Cover Start**	5%
Temp Finish	11 °C	**Cloud Cover Finish**	5%
Wind Speed Average	<10 mph	**Precipitation**	Nil
Table 8. Abiotic variables during survey 3: Dusk Emergence			
Date: 06/09/2018 **Sunset: 19:46**			
Temp Start	10 °C	**Cloud Cover Start**	0%
Temp Finish	10 °C	**Cloud Cover Finish**	10%
Wind Speed Average	<5 mph	**Precipitation**	Nil

3. Results

Pre-Survey Data Search

Staffordshire Ecological Record (SER) was commissioned to undertake a desk study within 2km of the site to search for bat records.



Field Surveys

Habitat Description

The survey area is situated in predominantly rural location to the south east of the village of Whiston. The site is immediately bounded by agricultural fields to the north, east and west. To the south of the building is an area of broadleaved, deciduous and mixed woodland which bounds the north side of a disused quarry, Moneystone Quarry. The site and surrounding area are considered to be of high value for foraging/roosting/commuting bats, offering a variety of habitat types which would attract a range of bat species to the area.

Roost Surveys

External

The barn is solid stone in construction, two-storey with a pitched tiled roof, estimated to be at least 150 years old. The barn is currently redundant although was a former agricultural building. All doors and windows have been boarded up with wooden boards, for security. The external stonework is sandstone and is in a reasonable condition although has not been re-pointed resulting in crevices between stone blocks. There are vertical ventilation slits across the walls which protrude into the stonework creating potential roosting features. The roof appears original to the building and is tiled with a number of slipped/missing tiles noted. The hip tiles on the roof verges are stone with several gaps noted beneath creating potential roosting features. On the west gable end is a single storey extension which has a part dilapidated roof.

Internal

Internally the building is divided over two floors. The ground floor room is dark and sealed with all windows boarded up. There are two rooms on the ground floor connected via an open doorway. The internal stone works differs to the external sandstone ‘covering’. Internally the stonework is sandstone although of rougher smaller bocks which are well sealed with a lot of the pointing intact. Minimal crevices were noted across the internal walls. The first floor is accessed via an open hatch and is open plan with a part diving wall. The roof is not lined and the tiles are exposed, original lining has come away. The roof is in queen post design and has been part replaced in the past as the timbers, particularly the ‘A frame’, are modern sawn. Centrally within the building is some evidence of past fire damage. Scattered across the floor are bat droppings including a large cluster to the eastern end. The cluster, of approx. 100 droppings, is located

directly beneath the ridge of the roof and droppings are indicative in shape and size of brown long-eared and *Myotis* species. The remaining droppings (approx. 200) are scattered across the first floor with feeding remnants included, butterfly/moth wings. Droppings are a mixture of fresh and old. The first floor is well lit with daylight protruding in via open ventilation slits and via the west gable end where an open doorway leads into the roof area of the single storey extension. As the roof is part dilapidated, daylight was seen to enter via this access point.

Overall, the presence of fresh bat droppings, including a cluster of droppings, indicates the presence of roosting bats within the building. A large number of potential roosting features were identified across the roof and within the stonework.

Bat droppings analysis

Bat droppings collected internally from the first floor, were confirmed to be those of brown long-eared bats as shown on Figure 2;

Figure 2: Bat Dropping Analysis results

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EcoWarwicker
Ecological Forensics

23 August 18

Re: Identification Results for Helen Staton, Absolute Ecology

Job number 12482, received 09 August 2018
Sample labelled: Cottage Farm, Whiston, Collected 31/07/2018
PCR amplification successful. DNA sequence:
ATGTTTCAACATTCGAAAGTCCCACCCTCTCATAAAAATTATCAATGATTCATTCATTG
ACTTACCTGCTCCCTCAAATATTTCATCATGGTGAAACTTTGGGTCTCTTCTAGGTAT
TGCCTAGCACTAC

Phylogenetic analysis identification: *Plecotus auritus*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

Professor Robin Allaby
School of Life Sciences,
Gibbet Hill Campus,
University of Warwick,
Coventry CV4 7AL
Tel: 02476575059
Fax: 02476574500
Email: r.g.allaby@warwick.ac.uk

Activity Surveys

Figure 3: Surveyor locations (two surveyors per survey) indicated by the yellow stars



Table 9: Dusk activity survey – 13/08/2018 – Sunset 20:40

Time	Species (common name)	Species (*Scientific name*)	Observed behaviour
21:00	common pipistrelle	*Pipistrellus pipistrellus*	**Emerged** from east gable end
21:03	common pipistrelle	*Pipistrellus pipistrellus*	**Emerged** from west gable end
21:05	Common pipistrelle	*Pipistrellus pipistrellus*	**Emerged** from east gable end
21:15	Brown long-eared	*Plecotus auritus*	**Emerged** from west gable end
21:17	Noctule	*Nyctalus noctula*	Commuting
21:21	Brown long-eared	*Plecotus auritus*	**Emerged** from west gable end
21:23	Common pipistrelle	*Pipistrellus pipistrellus*	**Emerged** from east gable end
21:23	Common pipistrelle	*Pipistrellus pipistrellus*	**Emerged** from west gable end
21:38	Brown long-eared	*Plecotus auritus*	**Emerged** from west gable end
21:44	Common pipistrelle	*Pipistrellus pipistrellus*	**Emerged** from roof on the north side
Common pipistrelle, brown long-eared foraging until the end of the survey at 22:20			

Internal

Throughout the survey, regular checks were made internally. At the start of the survey at 20:30, five brown long-eared bats were recorded foraging within the building using the ground floor and first floor areas. At 20:45 a juvenile brown long-eared bat was recorded perched up, clinging onto an adult. They were situated along the ridge towards the eastern end of the building. At the end of the survey at 22:15, four brown long eared bats were seen flying within the ground floor rooms.

Survey 1 summary

- Brown long-eared – 2 x bats emerged from the west gable end and at least five recorded internally. Roost size: 6 minimum including 1 juvenile.
- Common pipistrelle – 6 x bats emerged from the east gable end, west gable and roof.

Table 10: Dawn re-entry – 27/08/2018 – sunrise 06:11

Time	Species (common name)	Species (*Scientific name*)	Observed behaviour
04:43	Common pipistrelle	*Pipistrellus pipistrellus*	Heard not seen – foraging
04:50	Common pipistrelle	*Pipistrellus pipistrellus*	Heard not seen - foraging
05:05	Common pipistrelle	*Pipistrellus pipistrellus*	Foraging around the building
05:24	Brown long-eared	*Plecotus auritus*	**Re-entered** via the west gable end
05:26	Brown long-eared	*Plecotus auritus*	**Re-entered** via the west gable end
05:30	Brown long-eared	*Plecotus auritus*	**Re-entered** via the west gable end

Internal

No internal checks possible as the barn was locked – owners away.

Survey 2 summary

- Brown long-eared – 3 x bats re-entered al via a hole in the wall on the west gable end
- Common pipistrelle – no bats recorded re-entering

Table 11: Dusk emergence – 06/09/2018 – sunset 19:46

Time	Species (common name)	Species (*Scientific name*)	Observed behaviour
20:23	Noctule	*Nyctalus noctula*	Commuting
20:25	Common pipistrelle	*Pipistrellus pipistrellus*	Foraging around the southern side of the barn
20:27	Common pipistrelle	*Pipistrellus pipistrellus*	Foraging around the southern side of the barn
20:33	Brown long-eared	*Plecotus auritus*	Foraging around the southern side of the building
20:49	Common pipistrelle	*Pipistrellus pipistrellus*	Foraging
20:52	Common pipistrelle	*Pipistrellus pipistrellus*	Foraging around the north side of the barn
21:10	Brown long-eared	*Plecotus auritus*	Foraging around the southern side of the barn
21:23	Brown long-eared	*Plecotus auritus*	Foraging
21:29	Common pipistrelle	*Pipistrellus pipstrellus*	Heard not seen

Internal

Throughout the survey, regular checks were made internally. No bats were recorded inside the barn.

Survey 3 summary

- No bats were recorded emerging from the barn. Common pipistrelle and brown long-eared bats were recorded foraging.

Summary

Two species of bats are roosting within the building - peak count of six brown long-eared including one juvenile indicating the presence of a small maternity roost, and a peak count of six common pipistrelle indicating the presence of a summer day roost (maternity roosts for this species tend to be much larger). Photographic plates shown below;

Photograph 1 – View of the west gable end with access/roosting points for common pipistrelle and brown long-eared highlighted - brown long eared dawn re-entry point noted



Photograph 2: Internal view of the first floor



Photograph 3: Cluster of bat droppings towards the east gable end



Photograph 4: View of the north elevation



Photograph 5: View of the south elevation



4. Assessment

Constraints on Survey Information

All activity surveys were carried out during August/early September 2018. Two surveys were conducted within August. This period is considered as being an optimal survey period in order to evaluate the presence or absence of bats.

Constraints on Equipment Used

No constraints were present with regards to the equipment used during the scoping effort (i.e. bat detectors, endoscope, ladders and high powered binoculars).

Potential Impacts of Development

Roosts

A cluster of bat droppings were found internally on the first floor, and scattered droppings were recorded throughout. These were confirmed to be brown long-eared. Brown long-eared and common pipistrelle bats were recorded emerging and re-entering during the activity surveys. It is considered that all effort has been made to establish what negative impacts will occur to roosting bats, and these have been identified below.

Short-term impacts: Disturbance Annexe [High Negative]
Without mitigation including sensitive timing of works, the short-term impact to bats would be the potential for individuals / group(s) of bats to be disturbed, killed or injured during construction work throughout the year.

Long-term impacts: Roost modification [High Negative]
Potential long term loss of a summer roosts for a brown long-eared (peak count of six) and common pipistrelle bats (peak count six).

Long-term impacts: Roost loss [High Negative]
The long-term impact of loss of roosts upon bat populations is poorly understood and difficult to study. There is variation of impact depending on species of bat, whereby some species are more sensitive to disturbance than other species. Thus the impact of roost loss for the local populations of common pipistrelle and brown long-eared bats is deemed more severe should the development continue without mitigation. Both species are considered common and widespread, although have declined in Britain due

to changing land use, including the conversion of barns and other buildings, which have resulted in the loss of suitable feeding and roosting habitats.

Long-term impacts: Fragmentation and isolation annexe [Low potential]

No impacts on adjacent habitats. All trees/hedgerows onsite are to be retained, maintaining linear features used by commuting and foraging bats.

Legislation and Policy Guidance

Unlike many smaller mammals, bats have low fecundity with a long and complex life cycle, which is played out over a large spatial landscape. Bats show a strong fidelity to different types of roosts throughout their annual cycle i.e. hibernacula, maternity, bachelor, satellite roosts and feeding perches. Linear features within the landscape such as hedgerows and tree lines are often used by bats for commuting, predator avoidance and foraging. Bats are highly social animals and loss of a single habitat alone can have a serious impact on populations. The status of many bat populations is tentative, being based on relatively few records and are highly susceptible to habitat loss and fragmentation. As such bats are given protected consideration within the following legislation and policy guidelines:

Policy guidelines

PAS 2010	The published 'PAS 2010' 'Planning to halt the loss of biodiversity' which is the government's new policy aimed at all authorities and developers involved in the planning process in the UK to halt biodiversity decline by 2010 and deliver net biodiversity gains as part of the green infrastructure provisions.
National Planning Policy Framework, Section 11:	The recently published framework in 2012, replaces the previous Planning Policy Statement 9. Section 11: Conserving and enhancing the natural environment, reaffirms the Governments commitment to maintaining green belt protections and preventing urban sprawl, retains the protection of designated sites and preserves wildlife, aims to improve the quality of the natural environment, and halt declines in species and habitats, protects and enhances biodiversity and promotes wildlife corridors.
Article 10 of the EC Habitats Directive:	The published Article requires government to develop features such as 'stepping stones' on the landscape, such as clusters of ponds, tracts of rough grassland or scrubland and vegetated railway line embankments.
Wildlife and Countryside Act 1981:	All species of bat are fully protected under the Wildlife and Countryside Act 1981, the European Conservation (Natural Habitats etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000. This legislation makes it illegal to possess or control any live or dead specimens, to damage, destroy or obstruct access to any structure or place used for shelter, protection or breeding, and to intentionally disturb a bat while it is occupying a structure or place which it uses for that purpose.
Conservation of Habitats and Species Regulations (2010)	The Conservation of Habitats and Species Regulations 2010 consolidate all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994, in respect of England and Wales. It is an offence to possess, sell or offer, or transport for sale any European species of bat or any part derived from such a species. These Regulations also remove the 'incidental result defence'. In other words, it is no longer a defence to show that the killing, capture or disturbance of a species covered by the Regulations or the destruction or damage of their breeding sites or resting places was the incidental and unavoidable result of a lawful activity. Natural England can grant European Protected Species (EPS) licences in respect of development to permit activities that would otherwise be unlawful.

Natural Environment and Rural Communities Act (2006)	Under Section 40 of the Natural Environment and Rural Communities Act (2006), public bodies, including Local and Regional Planning Authorities, have a duty to 'have regard' to the conservation of biodiversity in England when carrying out their normal functions, which includes consideration of planning applications. In compliance with Section 41 of the Act, the Secretary of State has published a list of species considered to be of principal importance for conserving biodiversity in England. This is known as The England Biodiversity List, all of which make up the UK BAP Priority Species. Regional Planning Bodies and Local Planning Authorities will use it to identify the species that should be afforded priority to maintain, restore and enhance species and habitats.
Bird legislation	Most resident nesting birds are protected under the Wildlife and Countryside Act 1981, which protects birds, nests, eggs and nestling's. Some rarer species, such as barn owls, are afforded extra protection.

Please note: If bat species are present at the site, the purpose of this report will only summarize the potential requirements for a bat mitigation package or project. A separate mitigation report or project will include the necessary compensation measures to maintain the conservation status of a European Protected Species.

5. Recommendations and Mitigation

Further Surveys

It is considered that a reasonable amount of survey effort has been applied, thus no further surveys are required. However, further surveys would be considered necessary if no redevelopment has commenced within two years of this report.

Mitigation Measures

Application for an EPS licence from Natural England shall be required, which should provide a comprehensive mitigation strategy for potential loss of a small maternity roost for brown long-eared (peak count of 6 including one juvenile) and a low number of common pipistrelle bats (<6),

The brown long eared bats are roosting internally within the ridge of the roof and the western gable end. The common pipistrelle bats are roosting externally within the stonework (eastern and western gable end and within the roof).

Proposals and licensable works

The whole of the building will be converted into residential accommodation. Therefore, a Natural England European Protected Species Licence will be required which will pertain to the loss of brown long –eared maternity roost and common pipistrelle summer day roost.

Mitigation

A mitigation strategy will need to be devised to maintain the population status of both species onsite and likely mitigation will include the following:

Time avoidance measures – re-roofing of the single storey section and all internal works will need to be carried out under the supervision of a qualified bat ecologist, when bats are least likely to be present. Should any bats be inadvertently discovered during this, or any other works then all work must cease immediately until further consultation is made. If necessary, the use of standard capture and exclusion methods may be deployed to prevent harm to any bats found, which may then be relocated to a suitable safe area should natural dispersal not occur. Thus the EPS licence application should detail a suitable receptor site, in the event that bats may be discovered.

Replacement of roosts – **Brown long-eared**: The brown long-eared roost and access points will be lost through the conversion of the building into residential accommodation. Mitigation

should consider the ecology of roof-void dwelling species that perform pre-emergent flight behaviour. BCT mitigation guidelines recommended retaining a clear roof void area ca. 75 cubic metres perform pre-emergent flight therefore the dedicated and bespoke loft void measuring at least 5 x 5 x 2.8m high should be allocated within the proposed development. The location of the loft is yet to be confirmed but it will be situated within the building.

The proposed bat-loft should be lined internally with traditional dark, black under-felt (ideally bitumastic Hessian). Any treatment of timbers should be carried out using chemicals approved by Natural England for use in bat roosts and should be considered within the subsequent method statement. Brown Long-eared bat is particularly susceptible to pesticides, especially their use in roofs where it often roosts on exposed timbers.

It is recommended that no insulation, skylights or solar panels should be included within the bat loft roof section that may influence the thermal gradient within the void. If possible, additional roosting features should be provided for loss of habitat for crevice-dwelling bats. As such, preliminary recommendations should also consider the installation of an internal bat box within this roof void Schwegler 1WQ summer and winter bat roost box

Schwegler 1WQ should ideally be installed to an interior gable- end wall to compensate for any loss of roost features. It features integrated insulation, ‘double wall system’ and Woodcrete PLUS construction to produce an ideal year-round roost for bat species within buildings. The interior is designed with different surface textures and areas with changing hanging depths, making it easy for different bat species to find ideal hanging places which correspond to their individual size and preferences.

Common pipistrelle: The common pipistrelle external roosts within the stone work will be lost as the ventilation slits will be opened and glazed to allow daylight into the residential accommodation. However, it is proposed that the ventilation slits towards the apex of each gable end should be retained and modified (where required) to create roosting features. The slit on the western gable end was identified to be in use as a common pipistrelle roost so does not need to be modified. The slit on the eastern gable end was not recorded to be in use by bats and should be modified to create a feature. This can be achieved by scraping away mortar within the slit to create a crevice.

One common pipistrelle bat was recorded roosting beneath roof tiles. Vented and modified ridge tiles should be incorporated into the roof to allow access into the bat loft (for brown long-eared and common pipistrelle) and to create external roosting features. Six modified tiles should be incorporated.

To enhance the site for roosting bats, 3 x Schwegler 2FN bat boxes should be installed on trees

which bound the south side of the site. A Schwegler 1FS bat box should also be installed within a suitable tree close to the building to be in use for any capture/exclusion during supervised works and to remain permanently post works as an additional bat roosting feature.

Site enhancements - It is encouraged that any landscaping relating to the proposed development should encompass native tree and shrub species to encourage foraging potential for species. No plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 should be planted during any landscaping within this development. For further details of Schedule 9 plants visit the Defra website: www.defra.gov.uk/wildlife-pets/non-native.
To further enhance the value of the site for roosting bats, bat boxes should be installed around the site, externally on buildings and trees where appropriate.

Lighting design - Any lighting design installed during pre and post development should be considered at an early stage. Light spill can affect the foraging and commuting strategy of many species and should be avoided onto nearby trees and hedges/shrubs and should not exceed 200 lumens (150 watts). Where possible, any security lighting should be on a timer setting and faced down to prevent spillage onto nearby habitats. Height of any lighting columns around the development should not exceed eight metres to further reduce any ecological impact of light pollution. Low-pressure sodium lamps (SOX) fitted with hoods are recommended to direct l light below the horizontal plane to minimize upward light spill.

Nesting birds

Swallows nests were recorded nesting within the building. This species is known to return to the same nest sites and the conversion of the building into a residential dwelling will result in the loss of nesting opportunities.

Re-roofing and internal renovation works should be carried out avoiding the nesting season which runs March – August. As the building is to be completely converted into residential accommodation, no suitable artificial nests locations will be present.

6. Summary

Evidence of bats was found during the daytime inspection. Common pipistrelle and brown long-eared bats were detected emerging & re-entering the building during the activity surveys. Therefore, it is considered that all effort has been made to establish what negative impacts will occur to roosting bats, and these have been identified in section 4.

Application for an EPS licence from Natural England shall be required for any works affecting the building, which should provide a comprehensive mitigation strategy for the loss of a small brown long-eared maternity roost and common pipistrelle summer day roost. Some consideration of appropriate measures within such a mitigation strategy are provided in section 5.

7. References

Bat Conservation Trust (2016). *Bat Surveys – Good Practice Guidelines*. Bat Conservation Trust: London.

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The Conservation (Natural Habitats, &c.) (Amendment) Regulations 2007. SI 2007/1843, London: HMSO.

Countryside and Rights of Way Act 2000 (c.37). London: HMSO.

UK Biodiversity Action Plan (2007). *UK List of Priority Species.* Joint Nature Conservation Committee. [Online]. Available at: http://www.ukbap.org.uk/NewPriorityList.aspx [accessed on 20th October 2010].

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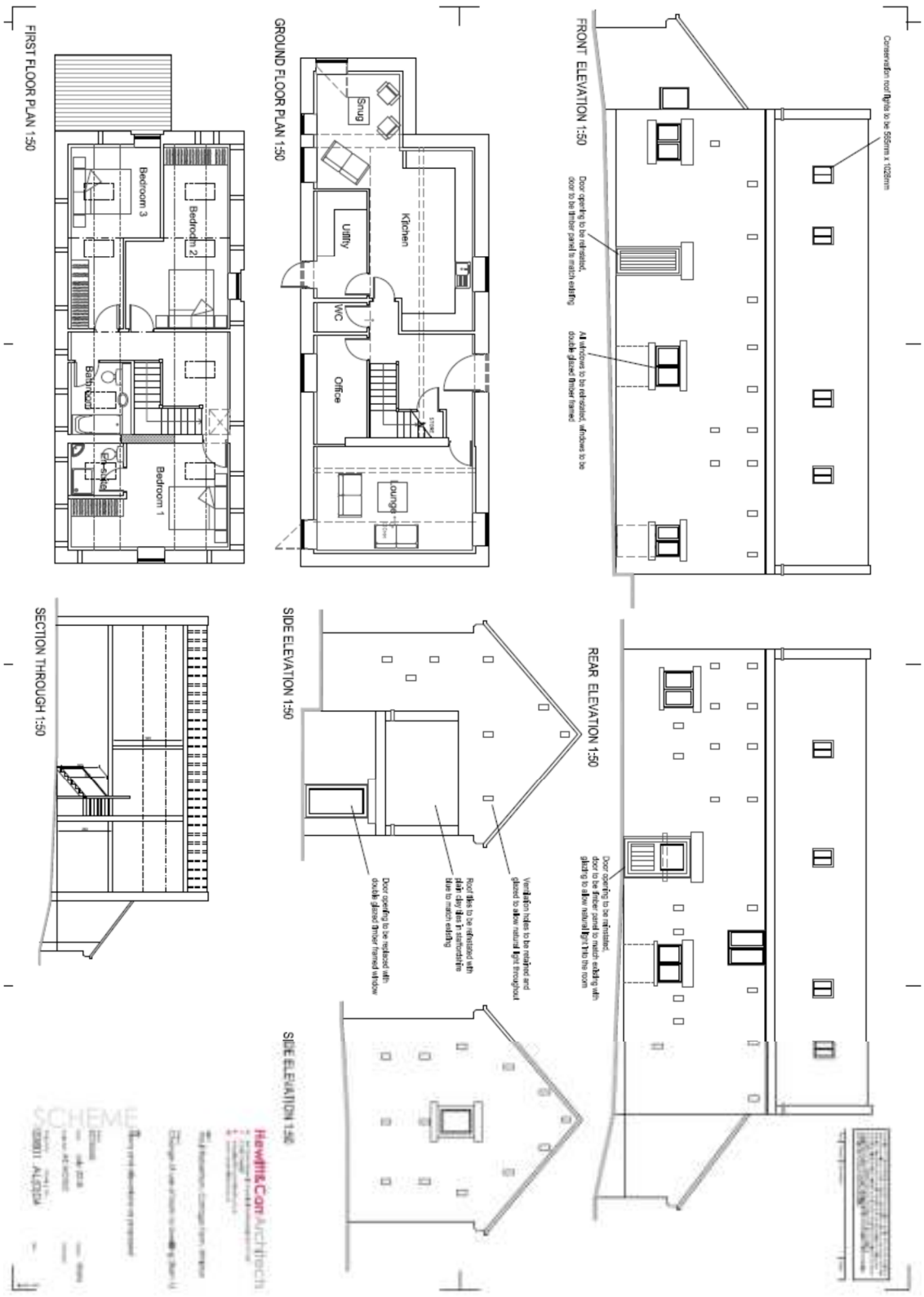
8. Figures

Proposal plan



Appendix 1 Annual cycle of a temperate bat

January **February** **March**



Jan: Bats spend most of the winter hibernating, a state of inactivity characterised by lower body temperature, slower breathing, and lower metabolic rate. **Feb:** Bats are still hibernating. They have little fat left to live off of now. They may leave the roost on warmer nights to find food and a drink of water. **March:** Bats may begin to emerge and signs of limited activity can be seen. There are small numbers feeding as it gets warmer. In bad weather, they may become torpid.

April **May** **June**



April: Bats have mainly come out of hibernation and are hungry and active, feeding on most nights. They may be moving between several roost sites. They may become torpid (cool and inactive) again when cold. **May:** Bats are fully active and feeding. Females start forming maternity colonies and looking for suitable nursery sites, such as buildings or trees. Males will roost on their own or in small groups. **June:** Female bats usually give birth to a single pup, which they feed on their milk. Young bats are very small (less than an inch) with thin, slightly grey fur. Adult bats will catch thousands of insects each in a night.

July **August** **September**



July: Mothers continue to suckle young. Some young are growing fast and almost full-size; others are still very small. At around three weeks old, young bats are sometimes found on the ground as they learn to fly. **Aug:** At six weeks old, the young bats begin to catch insects for themselves and no longer need their mothers' milk. The summer maternity colonies begin to disperse and bats may move to mating roosts. **Sept:** Mating season begins, with males of most species using special mating calls to attract females, which can include purrs, clicks, and buzzing. Bats are also concentrating on building up fat stores for the coming months.

Activity Survey for Bats



Oct: More mating is taking place, and building up fat reserves is becoming crucial to survive the winter season. Bats are seeking suitable hibernation sites, and beginning periods of torpor. **Nov:** Periods of torpor are lasting longer. Some begin hibernation, to save energy over the colder months, when insects are harder to find. They are using stored fat as fuel. **Dec:** Bats are hibernating. They may roost on their own or in small groups, often in cool, quiet places like disused buildings, old trees or caves, where they hopefully won't be disturbed. **(Source: Bat Conservation Trust).**