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Class II Bat Licence No. 2015-6768-CLS-CLS

Full Bat Survey Report

Orchard Cottage

Radnage Common Road
Radnage
High Wycombe
Buckinghamshire
HP14 4DH

Dr Stacey Dawn Waring
21-024-FBSR
March 2022

Signed: **Date: 03/03/2022**

1 Table of Contents

2 Executive Summary

Eaves Ecology was commissioned by Mr Matthew Roskill to carry out an updated roost assessment and subsequent activity surveys, on several buildings located at; Orchard Cottage, Radnage Common Road, Radnage, High Wycombe, Buckinghamshire, HP14 4DH. The main house within the site is located a grid reference SU 78893 96180. This was to support a planning application submitted to Buckinghamshire Council (Ref: 22/05524/FUL).

The updated roost assessments, activity surveys and report have been conducted and prepared by qualified, Natural England licensed, bat ecologist Dr Stacey Dawn Waring. This report gives details of the day time assessments conducted on the 26th July 2021 and 12th February 2022, along with a suite of night-time activity surveys (five dusk emergences and two dawn re-entry's) on three buildings conducted between 30th July and 5th September 2021.

Bats are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation contravening (Natural Habitats &c.) Regulations 2017, (which make it illegal to intentionally kill, injure or otherwise disturb bats, or to damage, destroy or obstruct access to a bat roost, whether bats are present or not). In some cases, if the proposed work will have a detrimental effect on bats or disturb or damage their roost then an EPS licence from Natural England has to be applied for.

Initial observations consider the local area to be good, as it provides a wide range of quality foraging habitats, with good connectivity, despite some fragmentation. All of these factors increase the potential for bats and their insect prey to use the area surrounding Orchard Cottage. However, the lack of water sources within a 2km radius of the site, reduces the likely population numbers the area can support.

The updated roost assessments at Orchard Cottage found evidence of bats during the internal inspections. A large number (>100) of bat droppings were found throughout the large, complex roof void of the Main House. The size, shape and number are suggestive of a small number of Brown Long-Eared Bats (*Plecotus auritus*), using the void to roost over a prolonged period of time. Bat droppings and feeding remains were also found in the Garage/Barn, which were indicative of a night roost/feeding perch. As evidence of bats was found (even if historical) and there were numerous potential bat access points, in three of the buildings on site (based on the Bat Surveys Good Practice Guidelines); further survey effort was required to determine if an EPS Licence will be required for works to proceed.

The details of the surveyor numbers, locations and equipment used for each of the three buildings requiring activity surveys can be found in this report. During all bat activity surveys there was a low to moderate level of bat activity, primarily using the gardens surrounding

Orchard Cottage to commute and forage. At least five species, including; Common Pipistrelle (*Pipistrellus pipistrellus),* Soprano Pipistrelle (*Pipistrellus pygmaeus),* Noctule (*Nyctalus Noctule),* Brown Long-Eared (*Plecotus auritus*) and Myotis (*Myotis spp.)* were recorded flying in and around the gardens surrounding Orchard Cottage (See Tables 3, 4 and 5).

A maximum of three bats, from two species were confirmed to be using two of the buildings at Orchard Cottage as a day roost. These bats were recorded using three different roost access points (Figures 61, 62 and 63), two located in the main house and one in the Garage/Barn. The surveys also showed that the Garage/Barn is also used as a night roost/feeding perch by the same two species.

Consequently, Orchard Cottage is confirmed to be a current and active day roost and night roost/feeding perch for individuals of the following two species of bats: Common Pipistrelle (*Pipistrellus pipistrellus)* and Brown Long-Eared (*Plecotus auritus*). Combined with the large, complex roof void and the gaps present which could allow access to the cavity wall space, there is also a high potential for the building to be used as a hibernation roost.

Taking this information into account it is concluded that the planned works, will result in the disturbance/destruction of a confirmed bat roost, and without mitigation could negatively impact local populations. **As a result an EPS Licence is required for works to proceed legally and to ensure the continued safety of the local population.**

3 Introduction

Eaves Ecology was commissioned by Mr Matthew Roskill to carry out updated roost assessments and bat activity surveys on several buildings located at; Orchard Cottage, Radnage Common Road, Radnage, High Wycombe, Buckinghamshire, HP14 4DH.

A Preliminary Ecological Appraisal and Preliminary Roost Assessment was conducted by Bernwood Ecology on the 12th July 2021, the results of which can be found in a separate report dated 23rd August 2021 (Ref: Roskill-OC-21.001).

Eaves Ecology was then commissioned to conduct the required night-time activity surveys. Prior to these surveys commencing, a scoping survey of the buildings was conducted (26th July 2021) to determine surveyor locations. A second inspection of the buildings was conducted on 12th February 2022, following the finalisation of the proposed development plans, which included additional structures. This report describes these building inspections as 'updated roost assessments' and should be used in addition to the original report prepared by Bernwood Ecology.

The updated roost assessments, activity surveys and report have been conducted and prepared by qualified, Natural England licensed, bat ecologist Dr Stacey Dawn Waring ACIEEM. This report gives details of the day time assessments conducted on the 26th July 2021 and 12th February 2022, along with a suite of seven night-time activity surveys (dusk emergences and dawn re-entry's) conducted between 30th July and 5th September 2021.

3.1 Objectives of the Survey and Report

The updated roost assessments and activity surveys are designed to provide information to:

- Identify the presence/likely absence of bats within the house and outbuildings,
- Estimate the size, species and status of any existing bat roost within the buildings,
- Determine the potential impacts on any bat roost from the proposed development schedule
- Establish whether mitigation or an EPS licence is required

The surveys and report writing were carried out in accordance with Bat Surveys: Good Practice Guidelines (Bat Conservation Trust, 2016).

3.2 Surveyor Information

The updated roost assessments survey and report were completed by Dr Stacey Dawn Waring who has held a Class II Bat Licence (No. 2015-6768-CLS-CLS) for 9 years and is an associate member of CIEEM. She has 10 years' experience of carrying out research for the University of Reading, Reading and Bat Conservation Trust (4 years) and has worked with several ecological consultancies conducting bat surveys for 12 years, prior to establishing Eaves Ecology.

In addition up to three additional surveyors (listed below) were present on all three of the bat activity surveys conducted:

- **Anthony Wells** – Is a skilled ecologist with ten years' experience conducting ecological surveys; In particular bat activity surveys. He has a good knowledge of a wide variety of bat species, bat calls and detectors. Anthony has attended several accredited courses on conducting bat surveys and is currently working towards his Class II Bat Licence
- **Raven Herald** – Has been conducting bat activity surveys since 2014. She has attended recognised training courses and currently works as a freelance bat surveyor for several companies across the south of England.
- **Robert Brittain** - has been surveying bats for seven years with various ecological consultancies and has received training in surveying techniques, bat detector use, bat biology, identification, acoustic monitoring, echolocation analysis and netting. He is also a key member of the Berkshire Bat Rescue Group, with a large amount of experience in bat care and rehabilitation.

4 Legislation

All bats in the UK are protected under law and therefore thought must be given when demolition and/or planning is to be considered. The Wildlife and Countryside Act (WCA) 1981 (as amended), forms the key legislation protecting habitats and species in the UK. All UK bat species are fully protected under the 1981 Act through inclusion on Schedule 5. All bats are also listed under Schedule 2 of the Conservation of Habitats and Species Regulations 2017, which transcribes the EC Habitats Directive into UK law. In combination, this legislation makes it an offence to:

- Deliberately or recklessly take, injure or kill a bat;
- Deliberately or recklessly damage or destroy a place or structure used by bats for shelter or protection;
- Deliberately or recklessly obstruct access to a bat roost; or
- Deliberately or recklessly disturb bats while occupying a roost.

Bat roosts are protected under these laws whether the animals are present at the time of survey or not. A roost is defined as *'any structure or place which [a bat] uses for shelter or protection*'. As bats tend to reuse the same roosts, legal opinion is that a roost is protected whether or not bats are present at the time of survey.

The above is a summary of the relevant legislation and the original Acts and Schedules should be referred to for the precise wording.

Barbastelle Bats *Barbastella barbastellus*, Bechstein's Bat *Myotis bechsteinii,* Noctule *Nyctalus noctula*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Brown Long-eared Bat *Plecotus auritus*, Greater Horseshoe Bat *Rhinolophus ferrumequinum* and Lesser Horseshoe Bat *Rhinolophus hipposideros* are also listed as being species of principle importance to the conservation of biodiversity in England under Section 41 of the Natural Environment and Rural Communities Act 2006.

5 Background

5.1 Site Description

Orchard Cottage is located on the southern boundary of Radnage Common, approximately 700m south of the village of Radnage, 2.4km east of Stokenchurch village centre and 8km northwest of High Wycombe town centre (Figure 1). The main house within the site is located a grid reference SU 78893 96180.

Figure 1 – Showing site location of Orchard Cottage (courtesy of Google Earth)

The site is in a semi-rural area and the property is directly surrounded by large residential dwellings, gardens, paddocks, agricultural fields, amenity grassland, hedgerows and transitional woodland (Figure 1). Whilst, the property is located down a quiet lane, there are several busy

commuter roads within close proximity to the site, including; the A40 (Wycombe Road) 800m south and the M40 Motorway 2.4km west.

5.2 Site Description

The site consists of an early 20th Century (1900-1929) detached house and several outbuildings. Figure 2 shows the location of these buildings within the site, along with the numbers allocated to them for the purposes of this report.

1. Main House (Orchard Cottage)
2. Pool House
3. Coal Shed
4. Tractor Shed
5. Cattery A
6. Cattery B
7. Garage/Barn
8. Stables

Each of the buildings surveyed will be described briefly in the following sections.

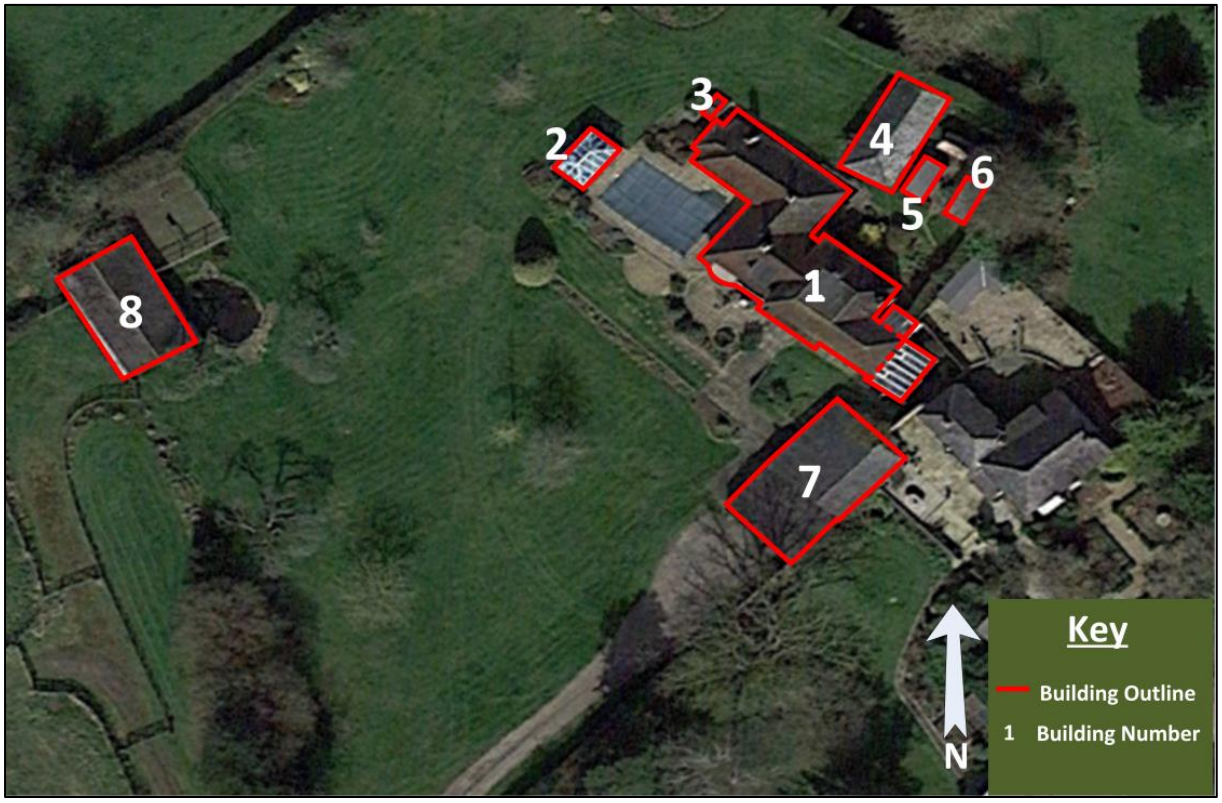

Figure 2 – Overview of the building locations within the site at Orchard Cottage

5.2.1 Building 1 – Main House

The main house (Orchard Cottage) consists of a large, detached, part two-storey/ part one-storey building. The property has been extended numerous times, since it was originally built and as such sits over several levels (Figures 3 to 5). Various construction methods have been utilised within Orchard Cottage. Consequently the walls have sections of; brick and stone solid wall, brick only solid wall and brick cavity wall construction (Figures 3 to 5). The roof consists

of a pitched (hipped) roof, consisting of timber rafters resting on the walls and a machine-made clay/concrete, tile covering. There are two single storey conservatories on the south-eastern corner of the building (Figures 2 and 4), which both have flat glass roofs. The property is in good condition and is currently occupied.

Figure 3 – Rear (south-western) elevation of Orchard Cottage showing single storey extensions

Figure 4 – Side (north-eastern) elevation of Orchard Cottage showing single storey extensions

Figure 5 – Side (north-western) elevation of Orchard Cottage showing external chimney

5.2.2 Building 2 – Pool House

The Pool House consists of a modern, small freestanding conservatory, constructed with a brick base and UPVC double glazed units (Figure 6).

Figure 6 – Side (north-eastern) elevation of the Pool House

5.2.3 Building 3 – Coal Shed

The Coal Shed is a very small, single storey structure consisting of brick solid walls with a pitched roof covered in machine-made concrete tiles (Figure 7). It is used primarily for storage and housing the pool pump machinery.

Figure 7 – Side (north-western) elevation of the Coal Shed

5.2.4 Building 4 – Tractor Shed

The Tractor Shed consists of a modern, single storey building, constructed with solid breeze-block walls and pitched roof with a slate tile covering. It has single-glazing windows and full height double doors.

Figure 8 – Front (north-western) elevation of the Tractor Shed

5.2.5 Building 5 and 6 – Catteries (A & B)

The two old cattery buildings consist of single storey, modern timber framed structures, with flat bitumen felt roofs (Figure 9). There is a small enclosed area at one end and a large 'run' at the other. The 'run' area consists of a timber frame with a wire mesh covering. Both buildings are the same in structure and dimension.

Figure 9 – side elevation of the two cattery buildings located at the rear of Orchard Cottage

5.2.6 Building 7 – Garage/Barn

Building 7 is a traditional timber-framed barn, resting over two levels, currently being used as a garage and for storage (Figures 10 and 11). Despite a thorough search, the age of the building has been difficult to determine. The building can be split into two distinct zones. The southern-most section of the building is a more recent addition and consists of modern roofing timbers and weatherboarding. However, the section closest to the house has much older timber trusses (19th century) that may be original or could have been re-purposed. The walls over the entirety of the building consist of single-skin timber weatherboarding.

The barn is considered an open structure due to the large openings on the south-western and north-western elevations. The roof is pitched with a gabled, slate tiled roof on the northern-most section and a low-pitched, sloping bitumen felt roof on the newer southern section.

Figure 10 – older section (north-western elevation) of the Garage/Barn with slate tiled roof

Figure 11 – newer section (south-western elevation) of the Garage/Barn with bitumen felt roof

5.2.7 Building 8 – Stables

The stables consist of a modern building (early 2000's) with concrete breeze-block walls and single-skin timber weatherboarding on the exterior (Figure 12 and 13). The south western aspect of the building is completely open. The roof consists of a pitched (gabled), timber frame with slate tiles on top of a reinforced plastic underlay. There is a chicken coop on the north-western elevation (Figure 12)

Figure 12 – south-western elevation of the stables, open to the environment

Figure 13 – rear (north-eastern elevation) of the stables with weatherboarding

5.3 Development proposals

The plans for works to be conducted have been submitted, via planning application, to Buckinghamshire Council (Ref: 22/05524/FUL). The plans include the erection of part single storey/part first floor side extension with alterations and partial demolition of garage and lower ground extension to garage.

The preliminary bat roost assessment and subsequent activity surveys were required to identify the likelihood of bats using the building and how they may be impacted by the proposed development of Orchard Cottage.

(Detailed objectives can be seen in Section 3.1 of this report)

6 Methods

6.1 Desktop Survey

The MAGIC website resource (www.magic.gov.uk) was used to identify the location of designated sites for nature conservation and EPS licences granted in relation to the survey site.

A search of on-line mapping resources was undertaken to identify the location of any features of potential ecological interest, including; connectivity to woodland, pasture, parks, farmland and waterbodies in the local and wider landscape around the site. The connectivity of the site to ecological features, buildings, and other semi-natural habitats, such as grassland and heathland; were then assessed for how they might impact the habitat suitability, for local bat populations and their insect prey.

6.2 Daytime assessment

The buildings' suitability for roosting bats was assessed by examining structural features. Structural features that may influence the suitability of a building to support roosting bats include the presence of a roof void, the presence of access points into the building (including gaps beneath barge boards, weatherboarding, soffits and fascias, gaps under lead flashing, gaps within masonry and under loose roof coverings, gaps between tenon and mortise joints), the complexity and size of any roof void and daytime light levels in the roof void.

The buildings' suitability for roosting bats was also assessed by examining the surrounding habitat. Important habitat features surrounding the structure which may influence roost potential include whether the structure is in a semi-rural or parkland location, its proximity to a significant linear habitat features such as a watercourse, mature hedgerow, wooded lane or an area of woodland.

Taking account of these architectural and habitat features, the buildings were then assigned a level of roost suitability based the criteria given in the Bat Conservation Trust's Bat Surveys: Good Practice Guidelines (Hundt, 2016) and professional judgement. The primary objective of this exercise was to identify the need for further detailed bat surveys later in the year, or alternatively to obtain sufficient information that would dismiss the need for further assessment.

The updated roost assessments were undertaken by Dr Stacey Dawn Waring (NE licensed ecologist) on the 26th July 2021 and 12th February 2022. A systematic internal inspection of the building was conducted using a high-powered torch to illuminate all areas thought to be suitable for roosting bats. All surfaces were also surveyed for signs of bat presence. An external search around the perimeter of the buildings was conducted and any possible access points i.e.

gaps and crevices were noted and surveyed with the high powered torch and ladder as required.

Features of potential value to bats surveyed for included:

- Construction of the Building – Soffits, loft space, tiles/slates, lead flashings etc;
- Building Condition – structure of roof and walls;
- Internal conditions – Microclimate stability, drafts etc;
- Access points – potential entry and exit points for bats;
- Roosting points – cracks and crevices, between underlay and roofing tiles/slates;

Field signs that would indicate the presence of bats were also searched for. These included:

- Bat droppings that are dry and do not putrefy, but can crumble away to dust;
- Feeding remains (particularly butterfly and moth wings);
- Evidence of urine and/or oily staining around possible roost entrances;
- Presence of areas cleared of cobwebs;
- Where a breathable roofing membrane has been fitted staining on the membrane may suggest use by bats;
- Odour can sometimes suggest the present of bats;
- Squeaking and chattering can reveal bats roosting between the tiles and roofing underlay.

6.3 Night Activity Surveys

The list below details the activity surveys required for each of the three buildings that need further investigation:

- Building 1 – Main House: 3 x Activity Surveys with 4x surveyors for each survey
- Building 7 – Garage/Barn: 3x Activity Surveys with 2x surveyors for each survey
- Building 8 – The Stables: 1x Activity Survey with 2x surveyors for the single survey

All of the activity surveys required above were conducted between the dates of 30th July 2021 and 5th September 2021, a time of year when active bats are most likely to be found and maternity roost/satellite roost should be present. Conditions were good for all bat surveys (specific details in Sections 7.3.1, 7.3.3, and 7.3.5) with warm, dry weather and any bats present are very likely to be active.

Emergence surveys began 15 minutes before sunset and finished one and a half hours after sunset. Dawn re-entry surveys began two hours before sunrise and finished 15 minutes after sunrise. If bats were observed emerging or re-entering the property within 15 minutes of the survey ending, the survey was continued for another 30 minutes.

Between two and four surveyors were present (locations shown in Figures 55, 57 and 59) and Echo Meter Touch 2 Pro (full spectrum) detectors were used during all seven activity surveys. The surveyors all had radios, so they could communicate the flight paths of bats, to help prevent

false emergences being recorded. Recordings were analysed on Kaleidoscope Pro ultrasound analysis software to facilitate species identification.

During six of the seven activity surveys, infra-red (IR), night-vision cameras were also used, in addition to the surveyors. They were used to complement and confirm the observations of the surveyors (not replace them). These cameras were focused on areas of the roof that had more complex features and would be harder to see as the survey progressed. The videos were then watched back following the survey and used to confirm bat emergences recorded by the surveyors.

The cameras used during these surveys were of a professional standard (2x Sony AX100 4K night vision cameras), each was on a tripod and lit with two 96-infra red LED lamps.

7 Results

During the updated roost assessments and prior to each activity survey, all accessible areas around the building, were examined for droppings and evidence of bats. However, it should be noted it is not always possible to identify bat presence through external inspections; as poor weather conditions may have washed away droppings which were deposited on exposed surfaces.

7.1 Desktop Survey

7.1.1 Designated Sites

The property is located within the Chilterns Area of Outstanding Natural Beauty and whilst Orchard Cottage does not lie within the Risk Zones of any SSSI sites, there are several within the local area. Orchard Cottage is also in the local vicinity of a land-based Statutory Designations, Special Areas of Conservation (SAC). A full list of these can be found in Table 1.

Data from the DEFRA MAGIC Map shows at least **three** applications for a Protected Species Licence for bats, within roughly a 2km radius of the site.

Table 1– Location of land-based statutory designations within the local area of Orchard Cottage

Statutory Designation	Name of Area	Distance from Site (km)	Direction from Site
AONB	Chiltern Hills	0km	Surrounding
SSSI	Butlers Hangings	2.8km	E
SSSI	Naphill Common	4.4km	ENE
SSSI	Bradenham Woods, Park Wood and The Coppice	4.6km	NE
SSSI	Lodge Hill	3.2km	N
SSSI	Aston Rowant Woods	2.5km	NW
SSSI + SAC	Aston Rowant	4.4km	W
SSSI	Chinoor Chalk Pits	4.7km	NNW
SSSI	Wormsley Chalk Banks	5.0km	W

7.1.2 Surrounding Habitats

Orchard Cottage, lies within a semi-rural area, with the majority of surrounding land consisting of agricultural land, pasture fields and paddocks, amenity green spaces and recreational grounds (see Figure 1). A large proportion of the fields, gardens and green spaces in the local area, have hedgerows/trees running along their borders.

In terms of Priority Habitats, there are a number of areas of woodland and parkland within close proximity of the site, including; Lydalls Farm (200m south-west), Hilltop Farm (650m south), and Wheelershill Wood (1.2m north-west) which contain areas of Deciduous Woodland (Priority Habitat).

There are also numerous areas containing both Deciduous Woodland (Priority Habitat) and Ancient and Semi-Natural Woodland including; Homefield Shaw (500m north-east), Meadal's Shaw (750m north), Bottom Wood (600m south), Beacons Bottom (700m south-west), Pophley's Wood (800m north-west), Saunder's Wood (800m south-west) and East Wood (1km south-west).

An unusual feature of the local area is the number of Traditional Orchards (Priority Habitats) recorded in the local area. These can be found at; Orchard Cottage (20m west), The Farmhouse (20m south), Ashridge Farm (170m east) and Walnut Tree Farm (570m south-west).

In addition to the wood and parkland features in the local vicinity, there are a low number of water bodies including; Small pond within the site boundary (20m south-west), Radnage House Stables Pond (760m east), Walnut Tree Farm Pond (600m southwest) and some small ornamental ponds at Pophley's (830 north-west).

All of the above mentioned habitats increase the areas ability to support bats and their insect prey.

7.1.3 Habitat Suitability for Bats

The site is in close proximity of a high number of habitats, suitable for bats to use for foraging, commuting and roosting. The hedgerows and scattered woodland that link a large percentage of these areas, also increases the suitability for bats and their insect prey. The connectivity between local habitats is very good; however, there is some fragmentation when it comes to the wider landscape. The A40, which is a busy commuter road, is just 800m south and the M40 Motorway 2.4km west of the property. Both of these major roads run parallel (north-west to south-east) and act as a barrier for bats wanting to access habitats to the south and west.

The most likely habitat features to reduce the suitability of the local landscape for bats; is the lack of water sources. There are no large bodies of water within a 2km radius of the site and the nearest River is 4km to the south-east (River Wye).

The majority of these factors increase the potential for bats and their insect prey to use the area surrounding Orchard Cottage, and the quality and quantity of habitats raises the potential population numbers and the number of species likely to be present. However, whilst the local landscape provides a wide range of quality foraging habitats, with good connectivity, the lack of water sources will have an impact on the both bats and their insect prey.

Due to this the habitat suitability of the surrounding area for bats is deemed to be good.

7.2 Daytime Assessments

The main house and outbuildings at Orchard Cottage were inspected on three separate occasions. The preliminary roost assessment conducted by Bernwood Ecology (12th July 2021) and the follow-up inspection by Eaves Ecology (26th July 2021), found the following bat roost potential ratings, for the buildings on site at Orchard Cottage (Table 2);

Table 2– Bat roost potential ratings found by the two initial assessments of buildings at Orchard Cottage

Building No.	**Building Name**	**Bat Roost Potential (Bernwood Ecology)**	**Bat Roost Potential (Eaves Ecology)**
1	Main House	Confirmed	Confirmed
2	Pool House	Negligible	Negligible
3	Coal Shed	Negligible	Negligible
4	Tractor Shed	Low	Negligible
5	Cattery A	N/A	Negligible
6	Cattery B	N/A	Negligible
7	Garage/Barn	Confirmed	Confirmed
8	Stables	Low	Low

As a result of buildings 2, 3, 5 and 6 being deemed to have negligible potential for bats, they will not be discussed further in this report. Details of the preliminary roost assessment findings of these buildings can be found in the previously submitted report (Ref: Roskill-OC-21.001).

The findings of the two internal inspections conducted by Eaves Ecology (26th July 2021 and 12th February 2022) can be found in the following sections.

7.2.1 Building 1 - Main House

The main house at Orchard Cottage has two distinct roof voids (Figure 14), although it must be noted access can be obtained to both via a single loft hatch.

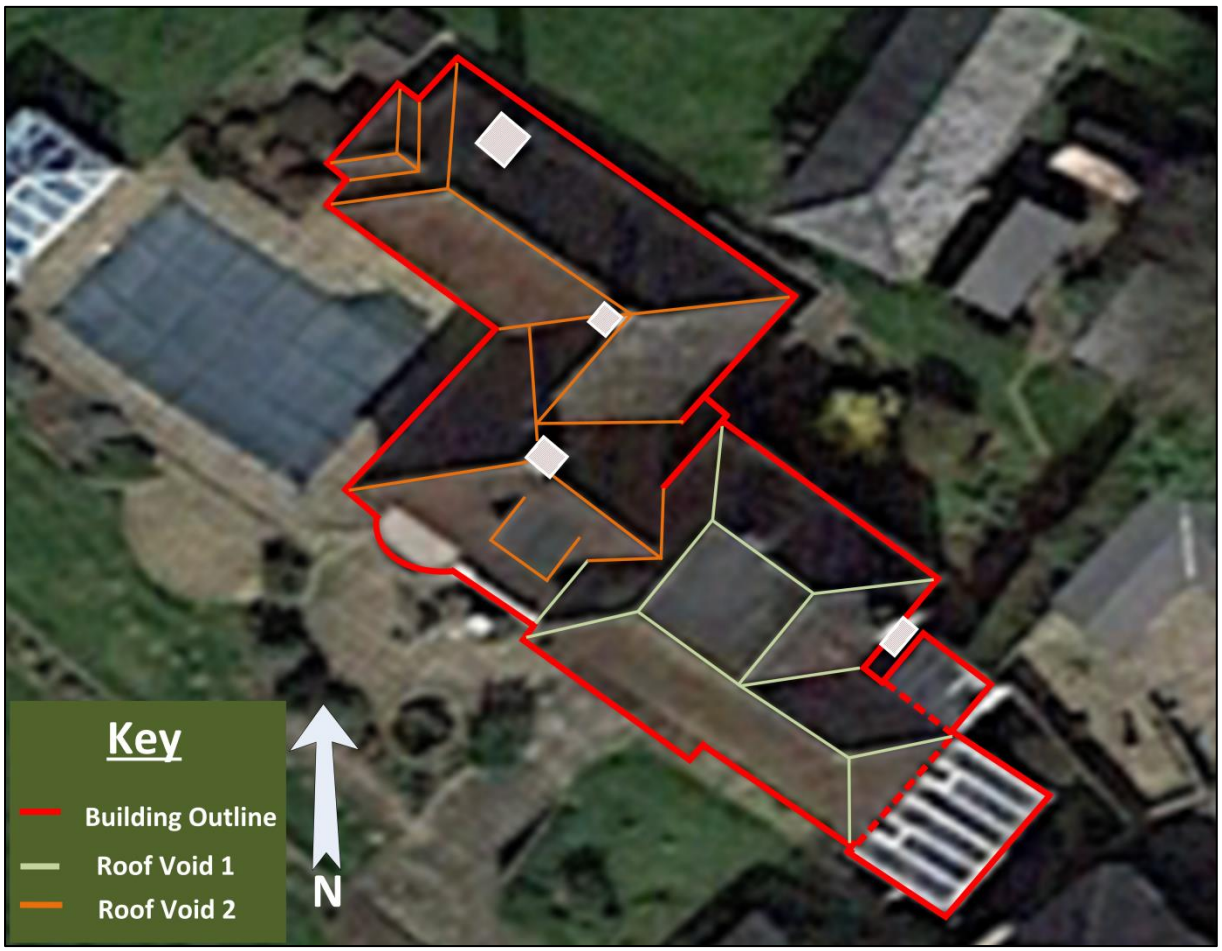

Figure 14 – Diagram showing the location of the two roofs present at Orchard Cottage

7.2.1.1 Internal Features - Roof Void 1

Roof Void 1 was located at the eastern end of the house (Figure 14). The roof was of moderate size, with the void approx. 1.5m high at the ridge throughout the two areas (Figure 15). The central portion of the roof void had an area of flat roof, which was boarded on the underside (Figure 16), this was well sealed, with no gaps between the boards. The old section of roof was still present in void 1, which will increase the number of different microclimates found within the roof; providing bats with more options for roosting throughout the seasons.

The modern timber rafters and trusses were in good condition, with no gaps or joints that could be utilised by bats (Figures 14 and 15). The underlay beneath the primary roof covering (Figures 15 and 17) consisted of a Type 1F bitumen felt, which was in fair condition. However, there were some areas where the overlaps were sagging (Figure 17) and light could be seen entering around parts of the eaves.

Widely scattered bat droppings consistent with brown long-eared bats were present throughout the entirety of the void, though there were no concentrated collections. There was also evidence of large rodent and mouse droppings, particularly under the flat-roof section.

Figure 15 – showing roof void 1, with previous section of roof and boarded section

Figure 16 – showing underside of the flat roof section with sarking boards and pitch sealant

Figure 17 – showing sagging areas of bitumen felt underlay

7.2.1.2 Internal Features - Roof Void 2

Roof void 2 is located at the western end of the property (Figure 14). This part of the roof was much more complex, with varying heights and sections. All of these factors increase the chances the roof void will provide a suitable microclimate for roosting bats.

The section closest to void 1 was approx. 2.5m high at the ridge (Figure 18). This area was partitioned off due to the dormer that occupied part of the roof void. This area had a chimney stack present. The brickwork and mortar was in good condition with no sections missing. Previous hipped sections of roof, were also visible throughout this section of the roof (Figure 19).

Figure 18 – showing hipped section, chimney and bitumen underlay

Figure 19 – showing previous sections of roof as the building has been extended

Continuing through the roof, the second section was approximately 2m high at the ridge (Figure 20). The chimney in this section had been rendered; however, this was in poor condition with the render peeling in many areas (Figure 21). There were also signs of water ingress suggestions gaps around where the chimney passed through the roof.

Figure 20 – showing one of the extended sections with rendered chimney in poor condition

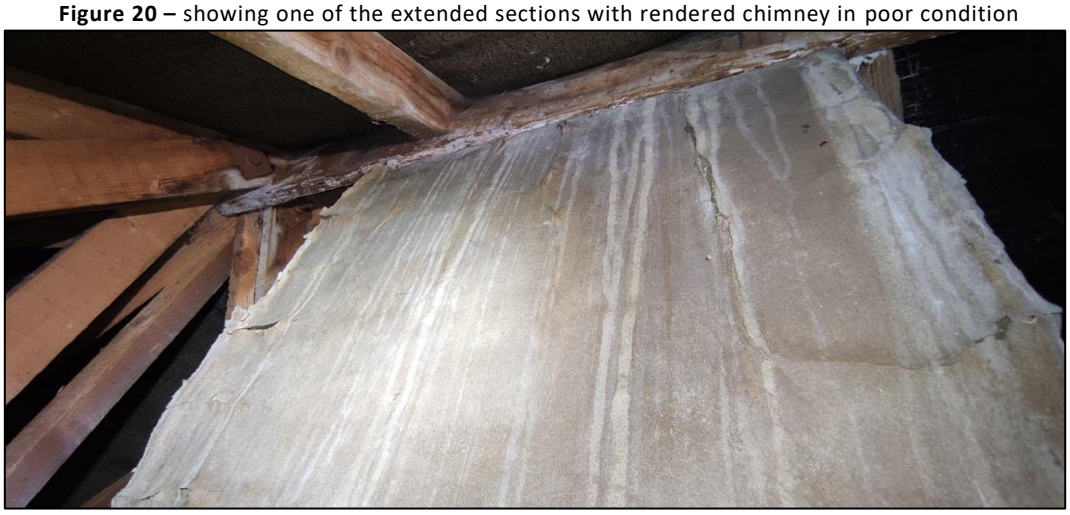

Figure 21 – Close up of flaking render on chimney stack and signs of water damage

The western most section of the roof void was smaller, being approx. 1.5m high throughout (Figure 22). There was also a brick chimney in this section (Figure 23), which was in good condition, although some light could be seen entering around the exit point.

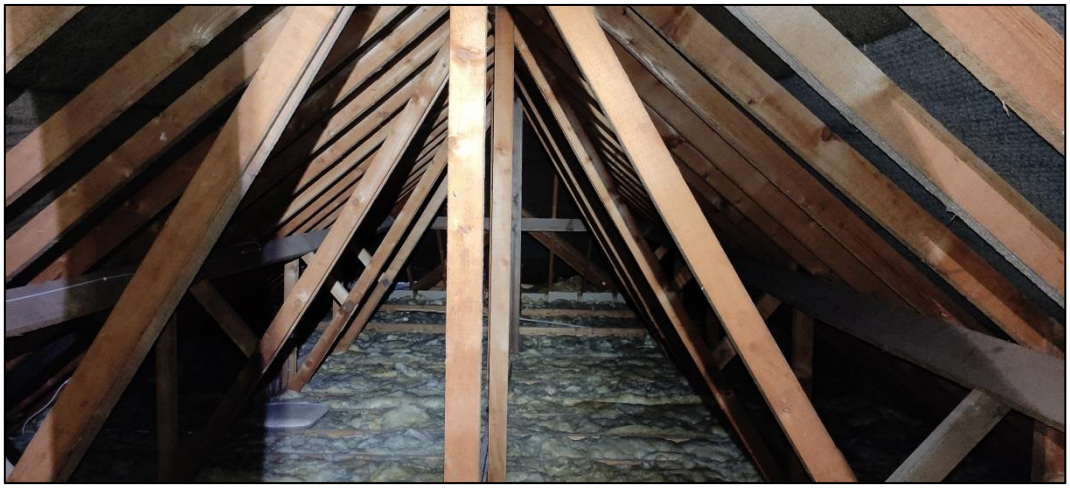

Figure 22 – showing western-most section of the roof void with low height

Figure 23 – chimney stack in the western-most section of the roof void

Throughout all the sections of void 2, modern timber rafters and trusses had been used. These were in all in good condition, with no gaps or joints that could be utilised by bats (Figures 18 to 23). The underlay beneath the primary roof covering (Figures 18, 20 and 22) consisted of a Type 1F bitumen felt, which was in good condition. However, there were some areas where the overlaps were sagging (Figure 17) and there were holes, exposing the underside of the roof tiles.

Scattered droppings consistent in size and shape with brown long-eared bat were observed across all sections of void 2 (Figures 24 and 25), with some areas of concentrated droppings under the ridge board (>100 droppings in total). Whilst no heavy concentrations were found to suggest large numbers of bats, the appearance of the droppings found (estimated age and deposition), would suggest that low numbers of bats have been using the property for a prolonged period of time.

Figure 24 – scattered bat droppings throughout roof void 2

Figure 25 – more concentrated area of bat droppings close to a chimney stack

A single brown long-eared bat was observed roosting at the far western end of void 2 (Figure 26), where the rafters and hip beams meet the ridge board. During the preliminary roost assessment by Bernwood Ecology, this bat was determined to be an adult male in breeding condition.

Figure 26 – brown long-eared bat roosting at a hipped section of roof trusses

During the initial inspection (26th July 2021) of Building 1 – Main House, a large number (>100) of bat droppings and a single bat were found, throughout the two roof voids. It should be noted that the bat was not seen during the inspection in February 2022; however, this does not prove absence. The size, shape and number are suggestive of Brown Long-Eared Bat (*Plecotus auritus*) species, using the void to roost over a prolonged period of time.

7.2.1.3 External Features

The external features of Orchard Cottage were also examined for signs described in section 6.2. The roof, windowsills, exposed features around the windows and walls were inspected for any evidence of bat droppings or staining.

The primary roof covering consisted of machine-made, tiles over the entirety of the house (Figures 2, 3, 27 and 28). The primary roof covering was in fair condition as the tiles were flaking and crumbling (Figure 21) across large areas of the roof. Whilst the majority of tiles were tightly fitting (Figures 2, 3, 20 and 21), there were several areas where tiles were missing, lifted and displaced.

Figure 27 – roof showing machine-made, concrete tiles, chimney and hip bonnet tiles

Figure 28 – image showing machine-made clay tiles, hopped sections, valleys and chimneys

The ridge consisted of half round tiles (Figures 27 and 28) which were all present, although the mortar along the ridges was missing in several areas (Figure 29), which could provide bats access to both the internal roof voids. The chimneys were in good condition with no visible gaps in the brick-work or mortar that could be utilised by bats. The lead flashing around the bases of the chimneys was in good condition although lifted in some areas (Figure 30).

The eaves were sealed around the entirety of the building (Figure 31), which prevented potential access to the batten space and roof voids, via this route. However, there were a few further areas that appeared to have potential for use by bats, including; the valleys and hip

bonnets, lifted lead flashing on the flat roof section and the hanging tiles on the sides of the dormer window.

Figure 29 – image showing missing mortar and gap between ridge and chimney

Figure 30 – image showing lifted tiles and lead flashing missing around chimney stack

Figure 31– showing sealed eaves around the building

During the preliminary bat roost assessment of Orchard Cottage, evidence of bats was found, in the form of a large (>100) number of droppings throughout the two roof voids. There are also several areas that could be utilised by bats, for either roosting or accessing other areas of the building to roost. Consequently, Building 1 is confirmed to be a day roost for bats.

7.2.2 Building 4 – Tractor Shed

7.2.2.1 Internal Features

Building 4 is a large single-storey, breeze-block, solid walled shed used for storage (Figures 8, 32 and 33). The single-skin, solid wall construction provides very little insulation for the interior space. Internally, the building is one large void, with no enclosed roof space, that could be used by roosting bats. The interior is well lit, due to the four large windows located across the southern, eastern and western elevations (Figures 32 -35). The windows are all metal framed, single glazed units, which provide little insulation and in addition to the gaps around the timber double doors; increase air movement throughout the building.

The roof structure is constructed from modern timber rafters and trusses. These were in all in good condition, with no gaps or joints that could be utilised by bats (Figures 32 to 33). The underlay beneath the primary roof covering (Figure 33) consisted of Type 1F bitumen felt, which was in very good condition, with no sagging areas, tears or missing sections.

The well-lit nature of the interior space, increased air movement between the internal and external environments and exhaust fumes from the storage of regularly used farm equipment (Figure 32), will reduce the building's suitability to support roosting bats.

During the internal inspection of the Tractor Shed, no evidence of bats was found.

Figure 32– showing large internal void, with no separate roof void and farm equipment

Figure 33– showing internal light levels, modern timber trusses and single glazed windows

7.2.2.2 External Features

The external walls of the Tractor shed consisted of concrete breeze-blocks on the southern, western and eastern elevations (Figures 8, 34 and 35). On the northern elevation there was timber weatherboarding on the upper half of the external surface (Figure 36). The timber weatherboarding consisted of modern machine-sawn planks, which were all tightly fitting with no gaps between them that could be utilised by bats (Figure 36). No mortar was present at the verges on the northern gable end. As a result there were some small gaps (<5mm), between the uppermost weatherboards and the slates on the roof. The size of these gaps, low height of the roof (<2m) and the presence of a fence and trees within 1.5m of any potential access points (Figures 34 and 35), severely reduce the potential for use by bats: this is due to a greatly increased risk of predation for any bats using this area.

The primary roof covering consists of slate tiles, which are all flat and tightly fitting. The hips on the southern end of the roof and the ridge are fitted with angled ridge tiles, which are all present and in good condition. There are some small sections of missing mortar along the ridge that could provide shelter for a single crevice dwelling bat (Figure 37). However, further inspection with a high-powered torch and monocular lens revealed that the crevice only extended back approximately 5cm. Consequently, any bat using this space to roost, would be exposed to the changing external environment and the increased risk of predation. The eaves on the southern, western and eastern elevations all had boxed soffits (Figures 34, 35 and 37), which were in good condition with no gaps. It should be noted that there is the possibility, the soffits contain asbestos, so these should be assessed by a qualified professional before any works commence.

Figure 34 – showing large double doors, slate roof and single glazed windows

Figure 35– showing breeze-block construction and proximity to fence and trees

Figure 36– showing tightly fitting weatherboarding and proximity to trees

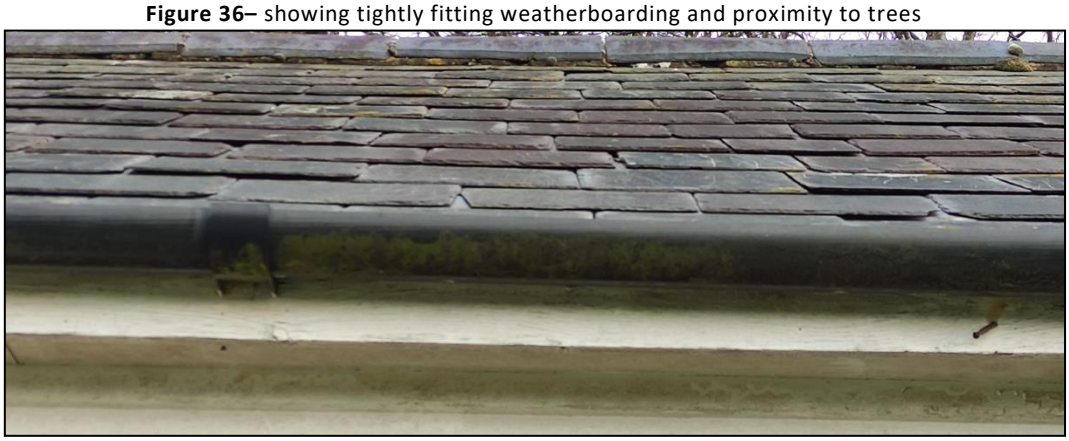

Figure 37– gap at the ridge only extends 5cm so is exposed to external environment

During the assessment of the Tractor Shed, no evidence of bats was found during the internal or external inspection. There are very few gaps present that could be utilised by bats and those that are accessible are subject to a greatly increased risk of predation. Consequently, the boat roost potential for Building 4 is deemed to be Negligible.

7.2.3 Building 7 – Garage/Barn

7.2.3.1 Internal Features

Building 7 is a traditional timber-framed barn, with a modern timber extension on the southern end (Figures 10, 11, 38 and 39) currently used as a garage and storage for the domestic heating oil tank and fire wood. It is difficult to determine the age of the building as most of the roofing timbers and walls appear to be fairly recent (20th century), however, there are older truss beams (likely 19th century) that may be original or could have been re-purposed.

The single-skin, timber weatherboarding on all enclosed walls (Figures 38 – 40), has numerous gaps throughout the building. Consequently it provides very little insulation for the interior space. Internally, the building is one large void, with no enclosed roof space, that could be used by roosting bats. The interior is well lit, due to the open wall on the southern-most elevation (Figures 11 and 38) and the large opening on the western elevation, where the barn doors would once have been (Figures 10 and 39). The open nature of the barn results in continuous air movement throughout the building.

The original roof structure is constructed from natural, hand-hewn timber rafters and trusses. The complex wooden beam structure is exposed, along with the underside of the wooden sarking boards that support the slate tiles (Figures 38 and 39). The hand-hewn timbers in the northern section of the barn have numerous rustic mortice joints, notches (Figure 40) and holes; many of which could provide roosting opportunities for crevice-dwelling bats.

Figure 38 – showing hand-hewn timbers and holes in weatherboarding

Figure 39 – showing light levels and open sides around the barn

Figure 40 – showing notches in the hand-hewn timbers that could be utilised by bats

The well-lit nature of the interior space, increased air movement between the internal and external environments and strong fumes from the oil storage tank, will reduce the building's suitability to support roosting bats using the exposed main void

During the internal inspection of the Building 7 a small number of bat droppings (30>20) and feeding remains were found. The majority of the bat droppings were found under the ridge at the northern-most end of the barn (Figure 41) alongside scattered feeding remains, consisting of large moth and butterfly wings (Figures 42 and 43). There were also a smaller number of scattered droppings in the modern extension at the southern end of the barn. These were located on the vehicles parked under the garage roof (Figure 44).

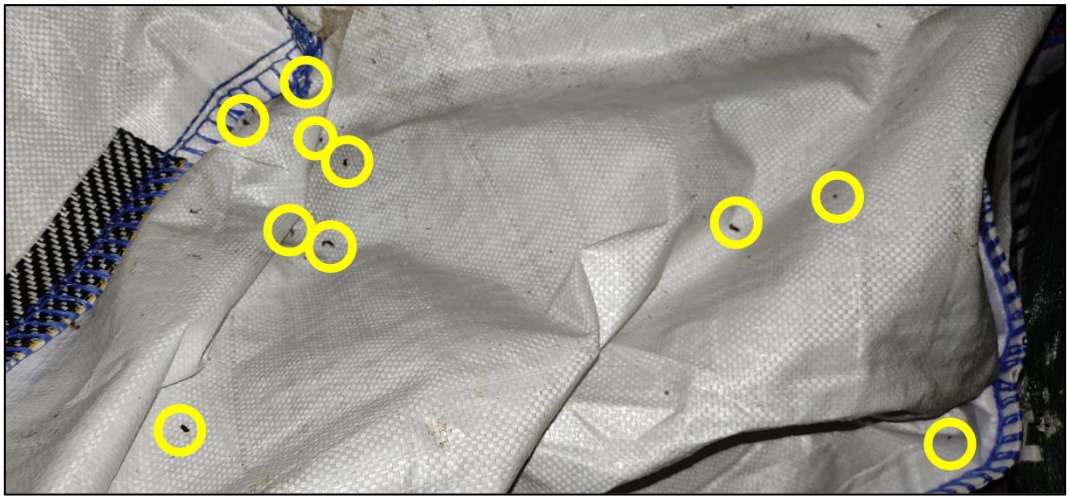

Figure 41 – showing bat droppings (circled) at the northern end of the barn

Figure 42 – showing feeding remains (circled) from butterflies and moths

Figure 43 – close-up of a bat dropping and feeding remains

Figure 44 – bat droppings found at the southern end of the barn

During the internal inspection of the Building 7 – Garage/Barn, evidence of bats was found in the form of a low number of droppings scattered throughout the building. The majority of the droppings were located under the ridge at the northern end, along with feeding remains in the form of moth and butterfly wings. The bat evidence found was suggestive of Brown Long-Eared and Pipistrelle bats using the building as a night roost.

7.2.3.2 External Features

Externally, the original section of the barn at the northern end has an asymmetrical pitched (gabled) roof, with a slate covering (Figures 45 – 47). The smaller section of roof crosses into the neighbouring garden (Figures 47 and 48); which sits at a higher level and gives a clear view of the roofs condition. Externally, the slates appear to be fixed directly onto the sarking boards below, meaning there is no batten space that could be utilised by crevice-dwelling bats. There was only one gap across the pitched section of the roof, which provided some roosting potential for bats. This was located close to the ridge, on the eastern elevation; where a missing slate resulted in a gap providing access under the ridge tiles (Figure 48). There were also numerous gaps along the verges of the pitched roof, where the weatherboarding and slates did not meet. However, as the weatherboarding was a single layer, these gaps led directly into the internal void.

The sloped flat roof on the southern end of the Barn, consisted of bitumen roofing felt fixed directly onto the sarking boards (Figures 45 and 46). The felt covering was in good condition, with no lifted sections and no obvious gaps that could e utilised by bats. There are numerous potential entry/ exit points for bats around the exterior of Building 7, including; open walls, gaps in the weatherboarding, gaps at the verges and eaves and potentially at the ridge tile.

Figure 45 – showing open end used as a garage and weatherboarding on the exterior

Figure 46 – showing open area where doors would have been and sloping bitumen roof

Figure 47 – showing side of barn in neighbour's garden, with higher floor level

Figure 48 – gap where missing slate meets the ridge tiles

7.2.4 Building 8 – Stables

7.2.4.1 Internal Features

As with the other two outbuildings inspected during the updated roost assessments; internally Building 8 consists of a single large void, with no separate roof void that could be used by bats. The internal space was partitioned into four sections, by two timber walls that extended to just above eaves level (Figure 49). Chicken wire was fitted between the roof and top of the timber partitions (Figures 49 and 50), which would prevent bats being able to fly along the length of the building. The two gable ends were constructed of a single-skin, breeze-block walls to the eaves level with single-skin weatherboarding panels on the upper sections (Figure 51).

The roof structure is constructed from modern timber rafters and trusses. These were in all in good condition, with no gaps or joints that could be utilised by bats (Figures 49 to 51). The underlay beneath the primary roof covering (Figure 33) consisted of reinforced plastic sheeting, which was in very good condition, with no sagging areas, tears or missing sections.

The well-lit nature of the interior space, increased air movement between the internal and external environments and constant usage for the storage of regularly used equipment, will reduce the building's suitability to support roosting bats. No evidence of use by bats was observed.

Figure 49 – Showing timber walls partitioning the interior of the stables

Figure 50 – showing chicken wire over the gaps above timber partitions

Figure 50 – showing breeze-block walls with timber weatherboarding with gaps throughout

7.2.4.2 External Features

Building 8 is a modern stable block (Figure 51) located in the western corner of the site. The external walls are constructed from concrete blocks with wooden panel cladding on the exterior. The south western aspect of the building is completely open, allowing a large amount of light and air to enter. The roof is pitched with slate tiles on top of a plastic underlay; the tiles are in good condition with no obvious gaps suitable for use by bats. The external walls are covered with timber weatherboarding, which in general is very tightly fitting (Figure 53). However, there are gaps at the gable ends of the building, especially noted along the verges which may be suitable for roosting or accessing the batten space under the slate tile covering.

Figure 51 – showing open sided nature of the stable block and slate roof

Figure 52 – showing slate tiles and weatherboarding covering the external walls

Figure 53 – showing tightly fitting weatherboarding found on majority of the building

7.3 Bat Activity Surveys

The following sections provide the results for each of the buildings surveyed in turn. The first section will present surveyor locations, survey dates, weather conditions, and a summary of the results for each of the surveys conducted. The second section for each building will then present the surveyor locations, detailed results and diagrams showing any emergence points and primary flight paths seen to be used by bats.

The positioning of the surveyors for all surveys ensured a good view of all elevations was achieved and features with roosting potential were observed. The IR cameras were positioned so they covered areas that would be more difficult to observe as it got darker, in order to support the findings of the surveyors. Potential features were determined from the daytime assessments and professional judgement upon viewing the building, prior to the first survey beginning. The rural nature of the property means there is no street lighting near to the house. As a result there is no light pollution to disturb foraging/commuting bats.

7.3.1 Building 1- Main House - Activity Survey Overview

Three surveyors and one IR camera (as described in Section 6.3) were used for all three activity surveys; the positions of which are indicated in Figure 55.

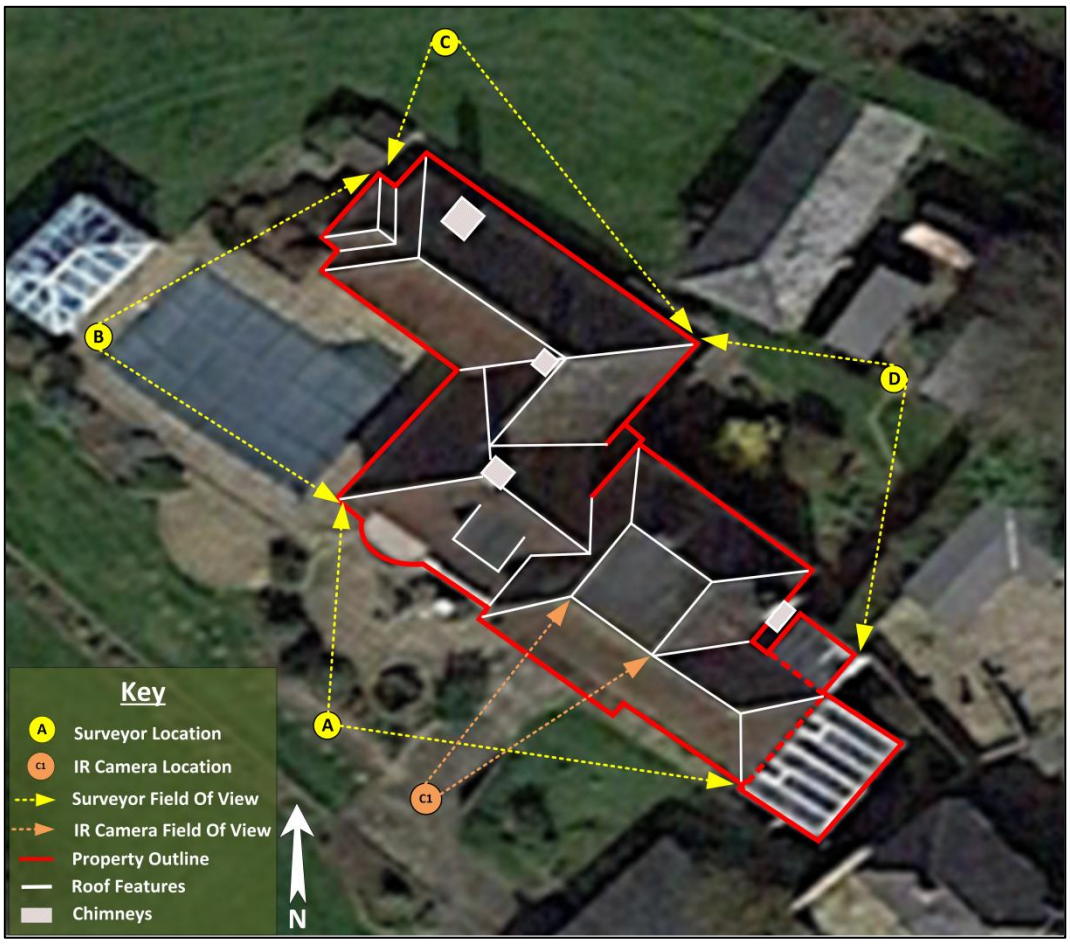

Figure 55 – Surveyor and Camera locations at Building 1 – Main House during the three activity surveys

7.3.1.1 Survey 1(Dusk) - 30th July 2021

Sunset Time - 20:55

Weather conditions were good for the survey (dry, 17^{0}C, with a gentle breeze of 9mph towards the east (#3 on the Beaufort scale), 77% humidity and ~50% cloud cover at 20:35). Any bats present are likely to be active.

During the first evening emergence survey (30th July 2021), the first bat (Soprano Pipistrelle) was recorded 15 minutes after sunset; flying from the trees along the northern boundary of the site, over the house to the front gardens. During this first survey a single bat was observed emerging from the main house at Orchard Cottage. The bat was a Brown Long-Eared bat (*Plecotus auritus*), which is consistent with the individual bat seen during the preliminary and updated roost assessments. Whilst the bat was seen roosting at the western end of the building during the day, the exit point is located at the flat roof section on the eastern-most section of the property

During the first dusk emergence survey there was a low level of bat activity throughout. At least three bat species were recorded using the garden around Orchard Cottage for commuting and/or foraging, including; Common Pipistrelle (*Pipistrellus* pipistrellus), Brown Long-Eared bat (*Plecotus auritus*) and Myotis (*Myotis spp.*).

7.3.1.2 Survey 2 (Dusk) – 14th August 2021

Sunset Time - 20:22

Weather conditions were good for the survey (dry, 20^{0}C with a light breeze of 6mph towards the east (#2 on the Beaufort scale), 73% humidity and ~40% cloud cover at 20:00). Any bats present are likely to be active.

During the second emergence survey (14th August 2021), the first bat recorded was again a Common Pipistrelle; once again flying from the trees on the northern boundary of the site, ten minutes after sunset. During this survey, a single Brown Long-Eared bat was again observed emerging from the eastern-end of the house, along with a Common Pipistrelle bat emerging from Building 7 (Garage/Barn). In general there was a higher, more constant level of bat activity, throughout the second emergence survey of the house. Three species were once again recorded using the gardens for commuting and foraging, including;; Common Pipistrelle (*Pipistrellus* pipistrellus), Brown Long-Eared bat (*Plecotus* auritus) and Soprano Pipistrelle (*Pipistrellus* pygmaeus).

The majority of the increased bats recorded, during the second survey, were observed using the treeline that runs along the northern boundary of the site. Due to the small amount of time between sunset and these bats being observed, it suggests they may be roosting in the trees or the property located just 30m northeast of the main house.

7.3.1.3 Survey 3 (Dawn) – 28th August 2021

Sunrise Time - 06:07

Weather conditions were good for the survey (dry, 14^{0}C with a light breeze of 4mph towards the south (#2 on the Beaufort scale), 94% humidity and ~20% cloud cover at 04:25). Any bats present are likely to be active.

The third survey consisted of a dawn re-entry survey (28th August 2021). The first bat recorded was once again, a Common Pipistrelle, recorded 1 hour and 14 minutes before sunrise. The only bat re-entry occurred 16 minutes before sunrise, with a Common Pipistrelle entering the Garage/Barn via the double door opening on the north-western elevation (Point 2 on Figure 56). The roosting point of this bat was confirmed through IR cameras during the activity surveys on Building 7 (Garage/Barn), as the apex of the northern gable end (Point 3 on Figure 58). During this survey no bats were seen returning to Building 1- Main House to roost.

During the final activity survey, there was a much lower level of bat activity around the house and gardens at Orchard Cottage; with only two species of bat being recorded using the gardens surrounding Orchard Cottage, for commuting and/or foraging. However, a large owl, of unidentified species, was witnessed flying from the woods and close to the roof at around the time, we would have expected to see an increase in bat activity. The presence of a predator in the area may have prevented some bats returning to roost at Orchard Cottage that morning.

7.3.2 Building 1 – Main House - Detailed Activity Survey Results

The full results of the three activity surveys on Building 1 – Main House at Orchard Cottage, are detailed in Table 3. Figure 56 shows the emergence/re-entry points and main flight paths used by bats during the three activity surveys at Orchard Cottage.

Table 3 – Full results of the three activity surveys conducted at the Main House, Orchard Cottage.

Date	Surveyor	Time	Species [1]	Comments[2]
30/7/2021	**A**	21:10	C. Pip	Commuting – flew from trees behind Surveyor D, over House and Surveyor A
		21:17	C. Pip	Commuting – flew from trees behind Surveyor D, over House and Surveyor A
		21:12	C. Pip	Commuting – Flew over barn towards Surveyor A then south
		21:25	Long-Eared	Emerged from flat section of roof (Point 1 on Figure 56) and flew to barn
		21:31	Long-Eared	Commuting – flew from bushes in front of house, past Surveyor A and over barn
		21:35	Myotis [3] – (Natterer's)	Commuting - Heard not seen
		21:49	Long-Eared	Foraging – flew over barn towards Surveyor D and around flat section of roof
	B	21:34	Myotis [3] – (Natterer's)	Commuting - Heard not seen
		21:37	C. Pip	Commuting - Heard not seen
		21:46	C. Pip	Foraging - Heard not seen
		21:40	C. Pip	Foraging - Heard not seen
		21:45	C. Pip	Foraging - Heard not seen
		21:50	Long-Eared	Foraging from Surveyor C and over the swimming pool to garden
	C	21:12	C. Pip	Foraging - Heard not seen
		21:13	C. Pip	Foraging - Heard not seen
		21:17	C. Pip	Foraging - Heard not seen
		21:20	C. Pip	Foraging - Heard not seen
		21:22	C. Pip	Foraging - Heard not seen
		21:25	C. Pip	Foraging along treeline to north of house
		21:27	C. Pip	2x bats foraging between treeline to north of house and the gardens around Surveyor C
		21:29	Long-Eared	Commuting – flew from Surveyor D between house and outbuildings, then into treeline to north
		21:36	Myotis [3] – (Natterer's)	Foraging - Heard not seen
		21:36	C. Pip	Foraging – Heard not seen
		21:38	C. Pip	Foraging - Heard not seen
		21:47	C. Pip	Commuting – flew from Surveyor D between house and outbuildings, then into treeline to north
		21:50	Long-Eared	Foraging around taller section of house, with flat roof
	D	21:10	C. Pip	Commuting – flew from trees behind Surveyor D and over House
		21:17	C. Pip	Commuting – flew from trees behind Surveyor D and over House
		21:26	C. Pip	Foraging – Heard not seen (very brief)
		21:30	Long-Eared	Foraging – flew from neighbours garden to the east and between house and outbuildings, towards Surveyor D
		21:35	C. Pip	Foraging – Heard not seen (very brief)
		21:49	Long-Eared	Foraging – flew from front of house, towards Surveyor D and around flat section of roof
14/8/2021	**A**	20:37	C. Pip	Emerged from the door area of Building 7 – Garage/Barn (See Point 2 on Figure 56) and then flew south
		20:48	C. Pip	Commuting – flew from trees behind Surveyor D, over conservatory and Surveyor A
		20:50	C. Pip	Foraging along hedgerow along driveway, Surveyor A and towards Surveyor B
		20:55	Long-Eared	Emerged from flat section of roof (Point 1 on Figure 56) and flew to barn
		21:01	C. Pip	Foraging over lawn area of gardens
		21:04	Long-Eared	Commuting – Flew over barn towards Surveyor A's face and then south
		21:09	Long-Eared	Foraging along hedgerow along driveway
		21:12	C. Pip	Foraging around Surveyor A and barn
		21:17	C. Pip	Foraging – Heard not seen
		21:32	C. Pip	Foraging along hedgerow along driveway, over Surveyor A and into door area of barn
		21:35	Long-Eared	Foraging around barn and tiered garden area
		21:47	C. Pip	Foraging - Heard not seen (Constant passes for 5 minutes)
		21:57	S. Pip	Foraging – Heard not seen
	B	20:38	C. Pip	Commuting – Heard not seen (distant call)
		20:55	Long-Eared	Emerged from flat section of roof (Point 1 on Figure 56) and flew to Surveyor A

		21:10	C. Pip	Foraging flew from front garden, behind Surveyor B
		21:12	C. Pip	Foraging between surveyor A and Surveyor B
		21:18	C. Pip	Foraging – Heard not seen (distant call)
		21:20	C. Pip	Commuting – Heard not seen (distant call)
		21:22	C. Pip	Foraging – Heard not seen (distant call)
		21:25	C. Pip	Foraging back and forth along treeline between Surveyor D & Surveyor C
		21:37	C. Pip	Foraging – Heard not seen
		21:44	Long-Eared	Commuting – from tiered front garden towards trees towards north
		21:50	Long-Eared	Commuting – Heard not seen
		21:53	C. Pip	Foraging – Heard not seen (very brief)
	C	20:30	C. Pip	Foraging – Heard not seen
		20:32	C. Pip	Foraging – Heard not seen
		20:33	C. Pip	Foraging – Heard not seen
		20:34	C. Pip	Foraging between treeline to north of house and the gardens around Surveyor C
		20:41	C. Pip	Foraging along treeline to north of house
		20:49	C. Pip	Foraging around garden near Surveyor C
		21:01	C. Pip	Foraging – Heard not seen
		21:11	C. Pip	Foraging flew from behind Surveyor B, between outbuildings and house towards surveyor D
		21:18	C. Pip	Foraging – Heard not seen
		21:22	Long-Eared	Foraging – Heard not seen
		21:25	C. Pip	Foraging back and forth along treeline between Surveyor D & Surveyor C
		21:36	C. Pip	Foraging – Heard not seen (very brief call)
		21:38	C. Pip	Foraging – Heard not seen
		21:43	C. Pip	Foraging around garden near Surveyor C
		21:45	C. Pip	Foraging along treeline to north of house
		21:54	C. Pip	Foraging around garden near Surveyor C
		21:57	S. Pip	Foraging around garden near Surveyor C
	D	20:45	C. Pip	Commuting – flew from trees behind Surveyor D, over House and Surveyor A
		20:47	C. Pip	Commuting – flew from trees behind Surveyor D, over House and Surveyor A
		21:11	C. Pip	Foraging from Surveyor C between house and outbuildings towards Surveyor D
		21:26	C. Pip	Foraging back and forth along treeline between Surveyor D & Surveyor C
		21:30	C. Pip	Commuting – flew straight over house near dormer (south to north)
		21:39	C. Pip	Foraging – Heard not seen
		21:40	Long-Eared	Foraging along trees to east of Surveyor D
		21:47	C. Pip	Foraging along hedgerow near conservatory
		21:54	C. Pip	Foraging – Heard not seen
28/8/2021	**A**	05:18	C. Pip	Foraging above Surveyor A and barn
		05:51	C. Pip	Re-entry into barn via the door area on the western side (point 2 on Figure 56)
	B	04:53	C. Pip	Foraging around front gardens (briefly)
		05:02	Owl	Large owl flew from behind Surveyor C and very close to roof at rear
		05:50	C. Pip	Foraging around the front garden, before heading towards Surveyor A
	C	05:27	Long-eared	Foraging along treeline to the north
		05:29	C. Pip	Foraging between trees and garden near Surveyor C
		05:31	C. Pip	Commuting – flew from garden towards treeline at north (east to west)
		05:34	Long-eared	Commuting – flew from garden towards treeline at north (east to west)
		05:34	C. Pip	Commuting – flew from garden towards treeline at north (east to west)
		05:50	C. Pip	Foraging – heard not seen (very brief)
	D	-	-	- No bats seen or heard during this survey

[1] Unless noted otherwise, only a single bat was seen and/or heard at any given time

[2] Comments in green are emergence and re-entry records for neighbouring properties.

[3] Myotis bats are very difficult to distinguish through echolocation alone. Species noted are based on call analysis, flight behaviour and physical characteristics observed. However, the species noted is only an educated assumption and cannot be guaranteed without visual identification or DNA analysis.

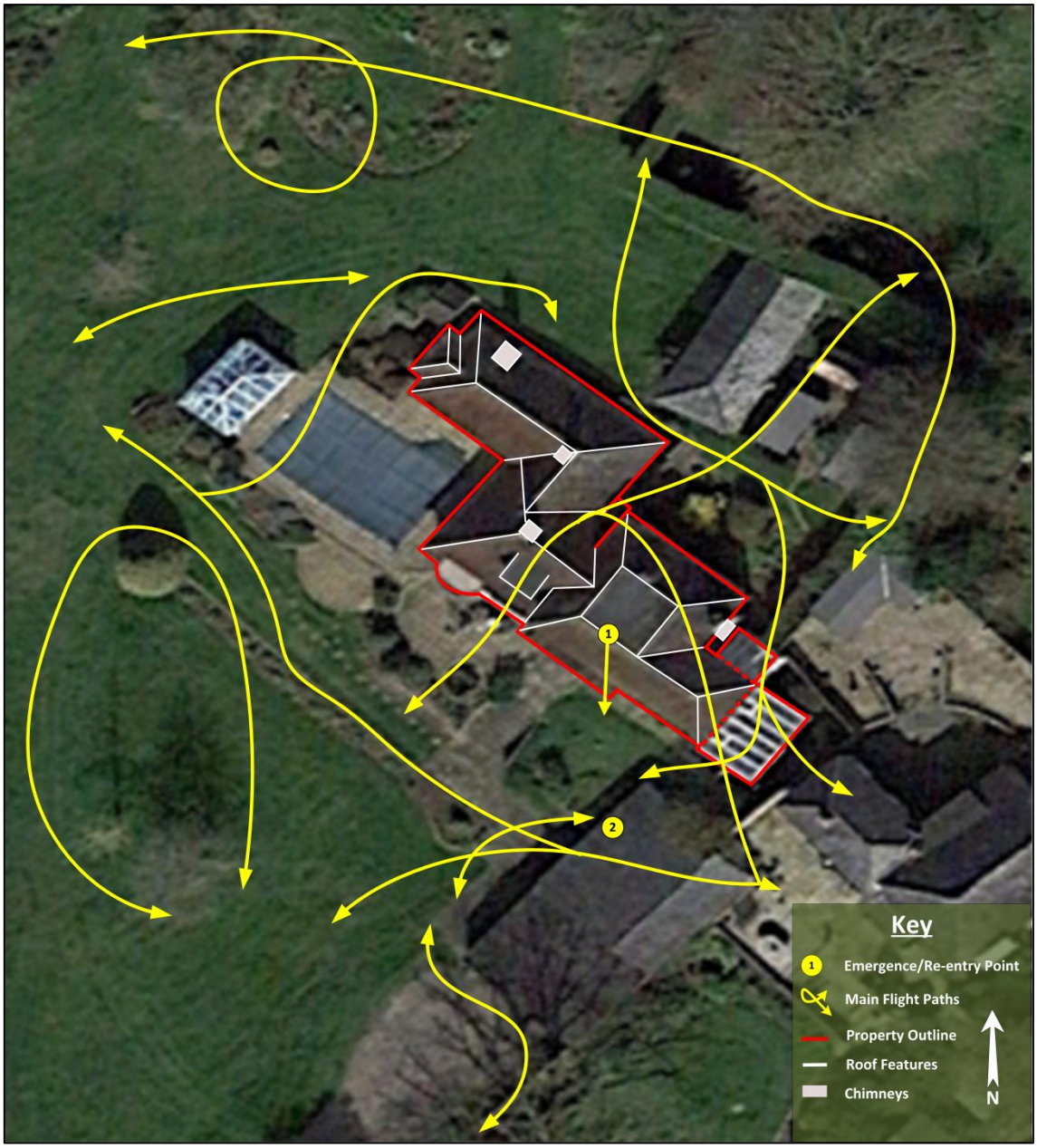

Figure 56– Emergence points (circled) mentioned in Table 3 and Main flight paths used by bats observed during the three activity surveys on Building 1 – Main House

7.3.3 Building 7 - Garage/Barn - Activity Survey Overview

Three surveyors and two IR cameras (as described in Section 6.3) were used for all three activity surveys; the positioning of which are shown in Figure 57.

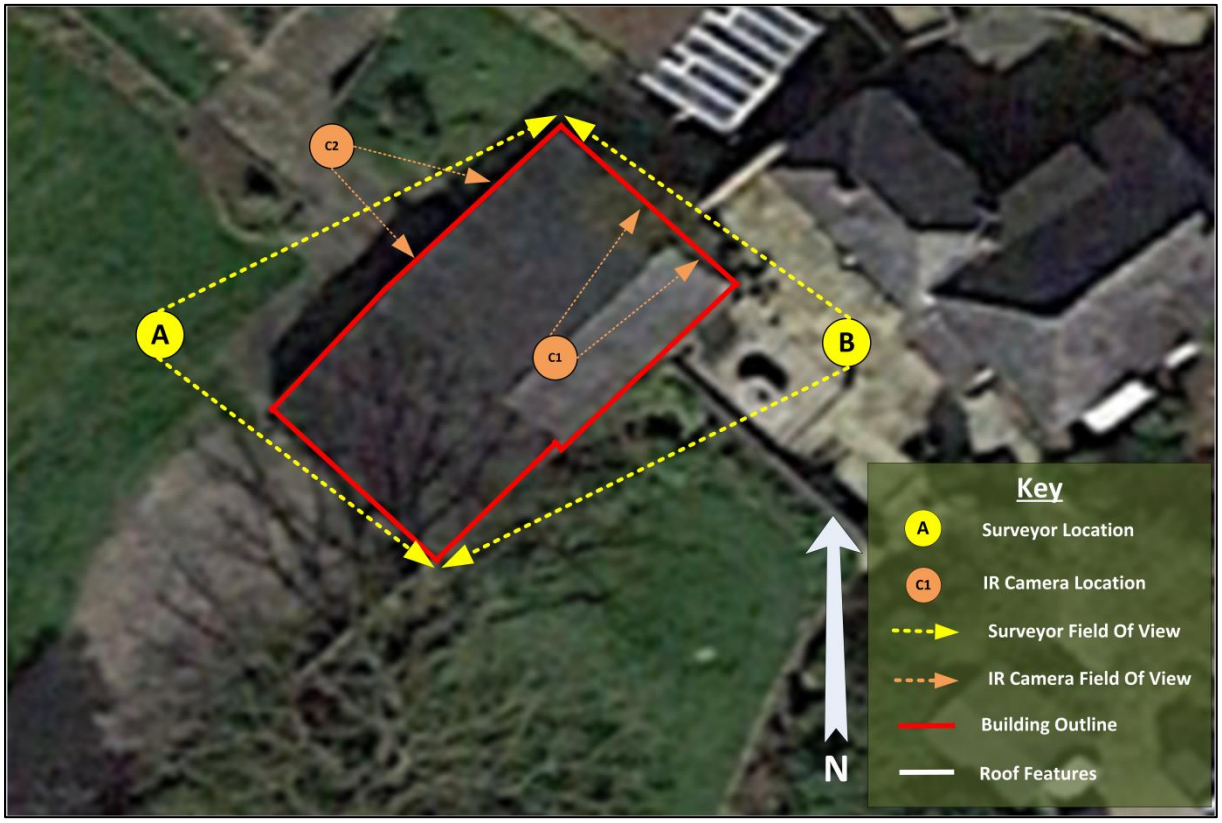

Figure 57 – Surveyor and Camera locations at Building 7 – Garage/Barn during the three activity surveys

7.3.3.1 Survey 1 (Dusk) – 6th August 2021

Sunset Time - 20:39

Weather conditions were good for the survey (dry, 21^{0}C, light breeze of 6mph towards the northeast (#2 on the Beaufort scale), 88% humidity and ~20% cloud cover at 20:20). Any bats present are likely to be active.

During the first evening emergence survey (6th August 2021), the first bat (Common Pipistrelle) was recorded nine minutes after sunset; emerging from behind a timber board at the apex of the northern gable end of the barn (see Point 3 on Figure 58). In total, two bats of two species were observed emerging from two buildings at Orchard Cottage. The two species recorded using Orchard Cottage as a roost were; a Common Pipistrelle (*Pipistrellus* pipistrellus) using Building 7 (Garage/Barn) and a Brown Long-Eared bat (*Plecotus auritus*) using the Main House. During the first activity survey on Building 7, there were also four Common Pipistrelles recorded emerging from the neighbouring property (Point 4 on Figure 58). Overall there was low level of bat activity throughout the survey, with at least three species, including; Common Pipistrelle (*Pipistrellus* pipistrellus), Brown Long-Eared bat (*Plecotus* auritus) and Noctule

(*Nyctalus noctula*) recorded using the garden around Orchard Cottage for commuting and/or foraging.

7.3.3.2 Survey 2 (Dusk) – 21st August 2021

Sunset Time - 20:10

Weather conditions were good for the survey (dry, 20^{0}C with a light breeze of 6mph towards north (#2 on the Beaufort scale), 83% humidity and ~70% cloud cover at 19:50). Any bats present are likely to be active.

During the second emergence survey (21st August 2021), the first bat recorded was the same as the first survey on Building 7; a Common Pipistrelle, emerging from behind a timber board at the apex of the northern gable end of the barn (see Point 3 on Figure 58), nine minutes after sunset. Whilst the same two species were recorded using the Garage/Barn and main house for roosting, an additional bat was observed emerging from the main house. A Common Pipistrelle was recorded emerging from the roof tiles at the south-east corner of the Building 1 (Point 5 on Figure 58). The IR cameras also captured a Brown Long-Eared bat using Building 7 as a night roost/feeding perch.

As with the previous survey, bats were observed emerging from the neighbouring property (The Farmhouse). During the second survey five Common Pipistrelles were observed emerging from roof tiles close to the chimney (Point 4 on Figure 58). The same three species were observed using the gardens around Orchard Cottage for foraging/commuting during the first and second surveys.

7.3.3.3 Survey 3 (Dawn) – 5th September 2021

Sunrise Time - 06:19

Weather conditions were good for the survey (dry, 14^{0}C with a light breeze of 4mph towards the southwest (#2 on the Beaufort Scale), 94% humidity and ~30% cloud cover at 04:20). Any bats present are likely to be active.

The third survey consisted of a dawn re-entry survey (11th September 2021). The first bat recorded was a Common Pipistrelle, recorded 45 minutes before sunrise. The first bat re-entry occurred 25 minutes before sunrise, with a Brown Long-Eared bat entering the section of flat roof on the main house (Point 1 on Figure 56). In total two bats from two species were recorded returning to two different locations around Orchard Cottage. Five Common Pipistrelles were also seen re-entering the neighbouring house close to the chimney (Point 5 on Figure 58).

The level of bat activity was much lower during this survey, than the previous two, with only two species being recorded using the gardens at Orchard Cottage for foraging/commuting.

7.3.4 Building 7 – Garage/Barn - Detailed Activity Survey Results

The full results of the three activity surveys are detailed in Table 4. Figure 58 shows the emergence/re-entry points and main flight paths used by bats during the three activity surveys of Building 7 (Garage/Barn) at Orchard Cottage.

Table 4 – Full results of the three activity surveys conducted at the Garage/Barn, Orchard Cottage.

Date	Surveyor	Time	Species [1]	Comments [2]
6/8/2021	**A**	20:48	C. Pip	Emerged from barn door area (Point 3 on Figure 58) – Internal IR Camera showed roosting location as apex on northern gable wall (Figure 59)
		20:51	Noctule	Commuting high over site (east to west)
		20:56	C. Pip	2 x bats commuting – flew from Surveyor B, over barn to Surveyor A
		21:07	Long-Eared	Emerged from flat roof section of main house (Point 1 on Figure 56)
		21:11	C. Pip	Foraging between Surveyor A and pool
		21:16	C. Pip	Foraging - Heard not seen
		21:18	Long-eared	Foraging in and out of barn for five minutes
		21:22	C. Pip	Foraging - Heard not seen
		21:34	C. Pip	Foraging – Heard not seen
		21:36	Long-eared	Foraging – between Surveyor A and the pool
	B	20:51	Noctule	Commuting high over site (east to west)
		20:54	C. Pip	2x bats emerged from neighbours house near chimney (Point 4 Figure 58)
		20:58	C. Pip	2x bats emerged from neighbours house near chimney (Point 4 Figure 58)
		21:07	Long-Eared	Emerged from flat roof section of main house (Point 1 on Figure 56)
		21:13	C. Pip	Foraging – Heard not seen
		21:22	Long-Eared	Foraging, flew from Surveyor A over barn and towards trees in neighbours garden
		21:23	C. Pip	Foraging in neighbours garden between Surveyor B and trees
		21:32	C. Pip	Foraging in neighbours garden between Surveyor B and trees
		21:35	C. Pip	Foraging – Heard not seen, faint call
		21:44	C. Pip	Foraging – along hedge between houses towards trees to north
21/8/2021	**A**	20:29	C. Pip	Emerged from barn door area (Point 3 on Figure 58) – Internal IR Camera showed roosting location as apex on northern gable wall (Figure 59)
		20:35	Noctule	Commuting high over site (east to west)
		20:45	Long-eared	Emerged from flat roof section of main house (Point 1 on Figure 56)
		20:46	C. Pip	Emerged from Building 1 - Main House roof tiles (see Point 5 on Figure 58)
		20:59	Long-eared	Foraging back & forth along tiered garden between Surveyor A and pool
		21:05	C. Pip	Foraging between neighbours garden and Orchard Cottage garden
		21:06 – 21:19	C. Pip	3-4x bats foraging around the garden for 15 minutes
		21:45	Long-eared	Foraging over hedgerow running along driveway
	B	20:35	Noctule	Commuting high over site (east to west)
		20:40	C. Pip	Emerged from neighbours house near chimney (Point 4 Figure 58)
		20:44	C. Pip	Emerged from neighbours house near chimney (Point 4 Figure 58)
		20:45	Long-eared	Emerged from flat roof section of main house (Point 1 on Figure 56)
		20:46	C. Pip	Emerged from Building 1 - Main House roof tiles (see Point 5 on Figure 58)
		20:50	Long-eared	Foraging, flew from direction of road, around garden and towards hedgerow along driveway
		20:59	Long-eared	Foraging, flew from Surveyor A over barn towards road
		21:00	C. Pip	Foraging around neighbours garden and around barn
		21:08	C. Pip	3x bats emerged from neighbours house near chimney (Point 4 on Figure 58)
		21:10 – 21:28	C. Pip	5-6x bats foraging and social calling constantly around neighbours garden and trees, then flew towards hedgerow along Orchard Cottage driveway
		21:49	C. Pip	Foraging – Heard not seen
		21:50	Long-eared	Foraging between Surveyor B and trees at southern end of neighbours garden
5/9/2021	**A**	05:34	C. Pip	Social Calling – Heard Not Seen

		05:44	Long-eared	Re-entry after brief period circling tiles near flat section of roof (point 1 on Figure 56)
		06:03	C. Pip	2x bats re-entered after 5 bats circling neighbours house near chimney (Point 4 on Figure 58)
		06:05	C. Pip	3x bats re-entered after circling neighbours house near chimney (Point 4 on Figure 58)
		06:11	C. Pip	Bat returned to the barn via open door area, witnessed bat returning to apex on gable end (Point 3 on Figure 58)
	B	05:50	Long-eared	Foraging in neighbours garden before heading towards roof
		05:54	Long-eared	Re-entry after brief period circling tiles near flat section of roof (point 1 on Figure 56)
		06:03	C. Pip	2x bats re-entered after 5 bats circling neighbours house near chimney (Point 4 on Figure 58)
		06:05	C. Pip	3x bats re-entered after circling neighbours house near chimney (Point 4 on Figure 58)

[1] Unless noted otherwise, only a single bat was seen and/or heard at any given time
[2] Comments in green are emergence and re-entry records for neighbouring properties.
[3] Myotis bats are very difficult to distinguish through echolocation alone. Species noted are based on call analysis, flight behaviour and physical characteristics observed. However, the species noted is only an educated assumption and cannot be guaranteed without visual identification or DNA analysis.

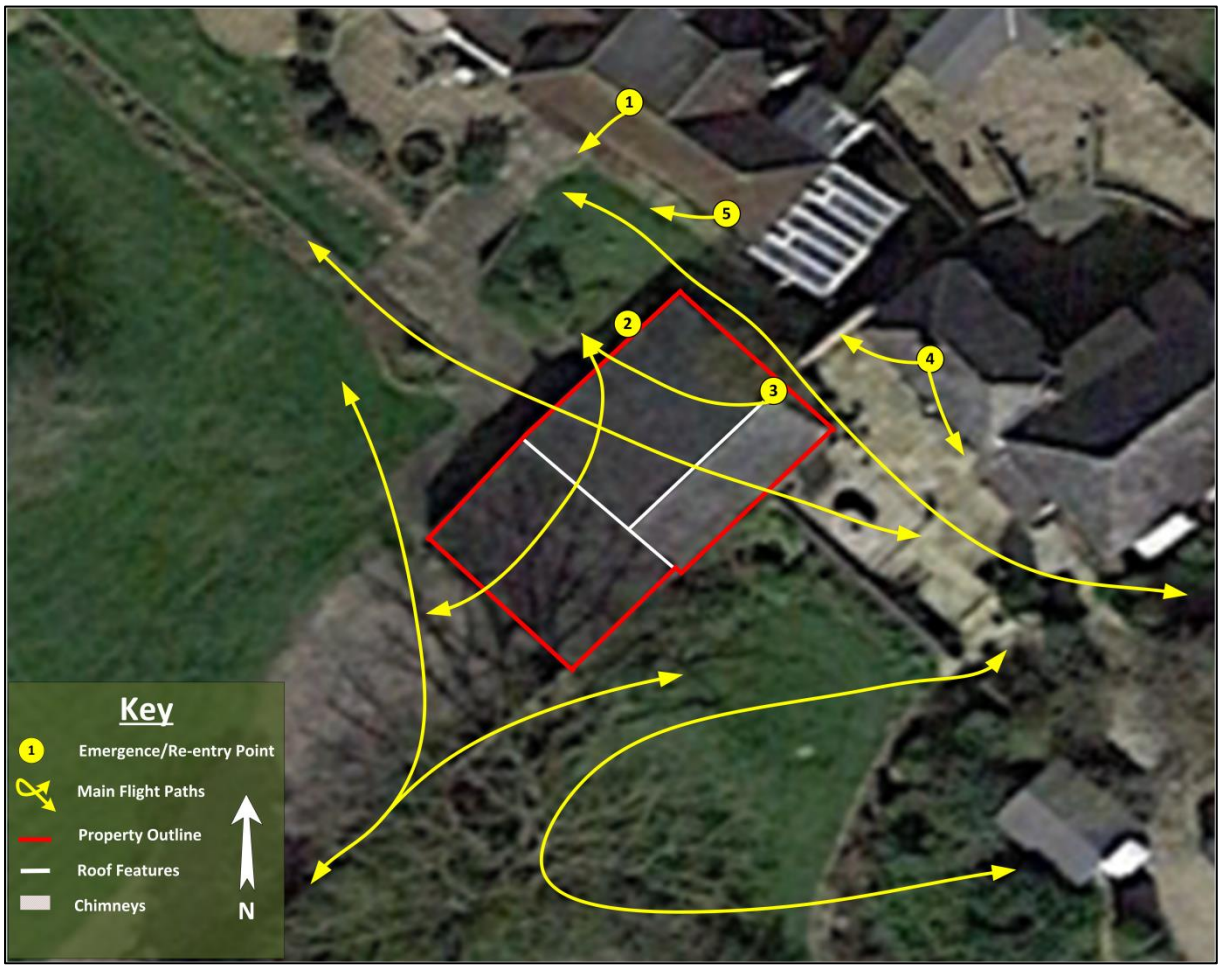

Figure 58– Emergence points (circled) mentioned in Table 4 and Main flight paths used by bats observed during the three activity surveys on the Building 7 - Garage/Barn

7.3.5 Building 8 – Stables - Activity Survey Overview

Two surveyors (as described in Section 6.3) were used for the single activity survey on the stables; the positions of which are indicated in Figure 59.

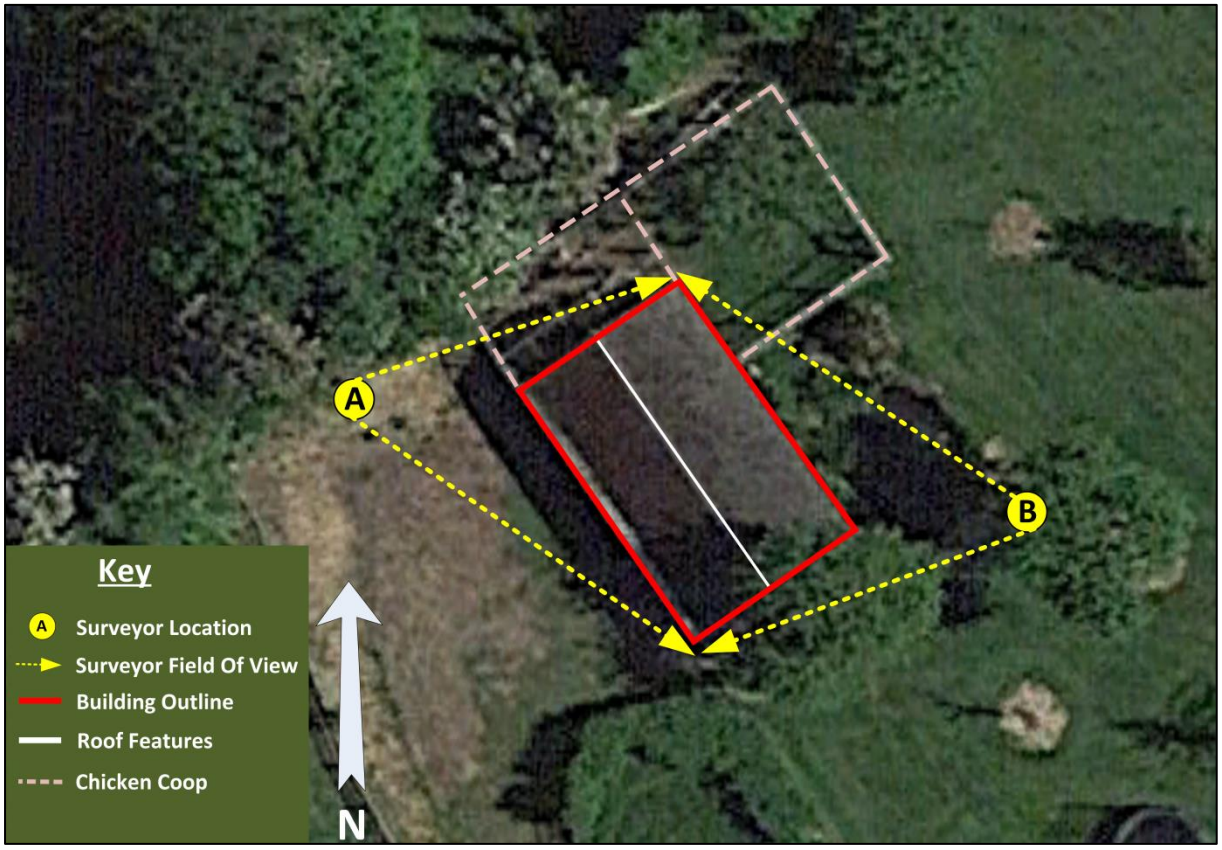

Figure 59 – Surveyor locations at Building 8 – The Stables during the single activity survey

7.3.5.1 Survey1 (Dusk) – 20th August 2021

Sunset Time - 20:11

Weather conditions were good for the survey (dry, 20^{0}C, light breeze of 9mph towards the north-east (#3 on the Beaufort Scale), 53% humidity and ~70% cloud cover at 19:50). Any bats present are likely to be active.

During the single evening emergence survey (20th August 2021), the first bat (Common Pipistrelle) was recorded four minutes after sunset; flying south along the hedgerow on the western boundary of Orchard Cottages site. No bats were seen emerging from or flying inside the stables during the survey. However, four species including; Common Pipistrelle (*Pipistrellus* pipistrellus), Brown Long-Eared bat (*Plecotus auritus*), Noctule (*Nyctalus Noctule)* and Myotis (*Myotis spp.)* were recorded flying in and around the gardens surrounding Orchard Cottage.

During the single bat activity survey there was a low level of bat activity throughout the survey, with the majority of bats using the hedgerows around the site boundary for commuting and foraging.

7.3.6 Building 8 – Stables - Detailed Activity Survey Results

The full results of the single bat activity survey are detailed in Table 5. Figure 60 shows the emergence/re-entry points and main flight paths used by bats during the activity survey conducted on Building 8 - Stables at Orchard Cottage.

Table 5 – Full results of the single activity surveys conducted at the Stables, Orchard Cottage.

Date	Surveyor	Time	Species [1]	Comments[2]
11/8/21	**A**	20:15	C. Pip	Foraging south along hedgerow to the side (northwest) of stables
		20:20	C. Pip	2x bats foraging south along hedgerow to the side (northwest) of stables – 5mins
		20:26	Noctule	Commuting high over site (east to west)
		20:31	C. Pip	2x bats foraging back and forth between hedgerow (NW) and Chicken coop
		20:36	C. Pip	Foraging back and forth between hedgerow (NW) and Chicken coop
		20:46	Long-Eared	Foraging south along hedgerow to the side (northwest) of stables
		20:50	C. Pip	Foraging south along hedgerow to the side (northwest) of stables
		20:53	C. Pip	Foraging from west to east along ridge of the stables
		20:54	C. Pip	Foraging from west to east along ridge of the stables
		20:59	C. Pip	Foraging from sheep pasture behind Surveyor A, towards hedgerow NW of stables
		21:01	Long-Eared	Foraging from hedgerow (NW), over Surveyor A toward sheep field (SW)
		21:06	C. Pip	Foraging - Heard not seen
		21:22	C. Pip	Commuting - Heard not seen
	B	20:26	Noctule	Commuting high over site (east to west)
		20:33	C. Pip	Foraging - Heard not seen (very brief call)
		20:40	C. Pip	Foraging over pond next to the Stables
		20:50	C. Pip	Foraging between the pond and chicken coop next to the Stables
		20:57	C. Pip	Foraging between the pond and chicken coop next to the Stables
		21:08	C. Pip	Foraging between Surveyor B and pond next to the Stables
		21:11	Long-Eared	Commuting from SW over pond and Surveyor B, towards NE
		21:30	C. Pip	Foraging – Heard not seen
		21:36	Myotis[3] (Natterer's)	Foraging over pond next to the Stables
		21:39	Myotis[3] (Natterer's)	Foraging around fruit trees next to Surveyor B
		21:40	C. Pip	Foraging – Heard Not Seen
		21:48	Myotis[3] (Natterer's)	Foraging over pond next to the Stables

1 Unless noted otherwise, only a single bat was seen and/or heard at any given time

2 Comments in green are emergence and re-entry records for neighbouring properties.

3 Myotis bats are very difficult to distinguish through echolocation alone. Species noted are based on call analysis, flight behaviour and physical characteristics observed. However, the species noted is only an educated assumption and cannot be guaranteed without visual identification or DNA analysis.

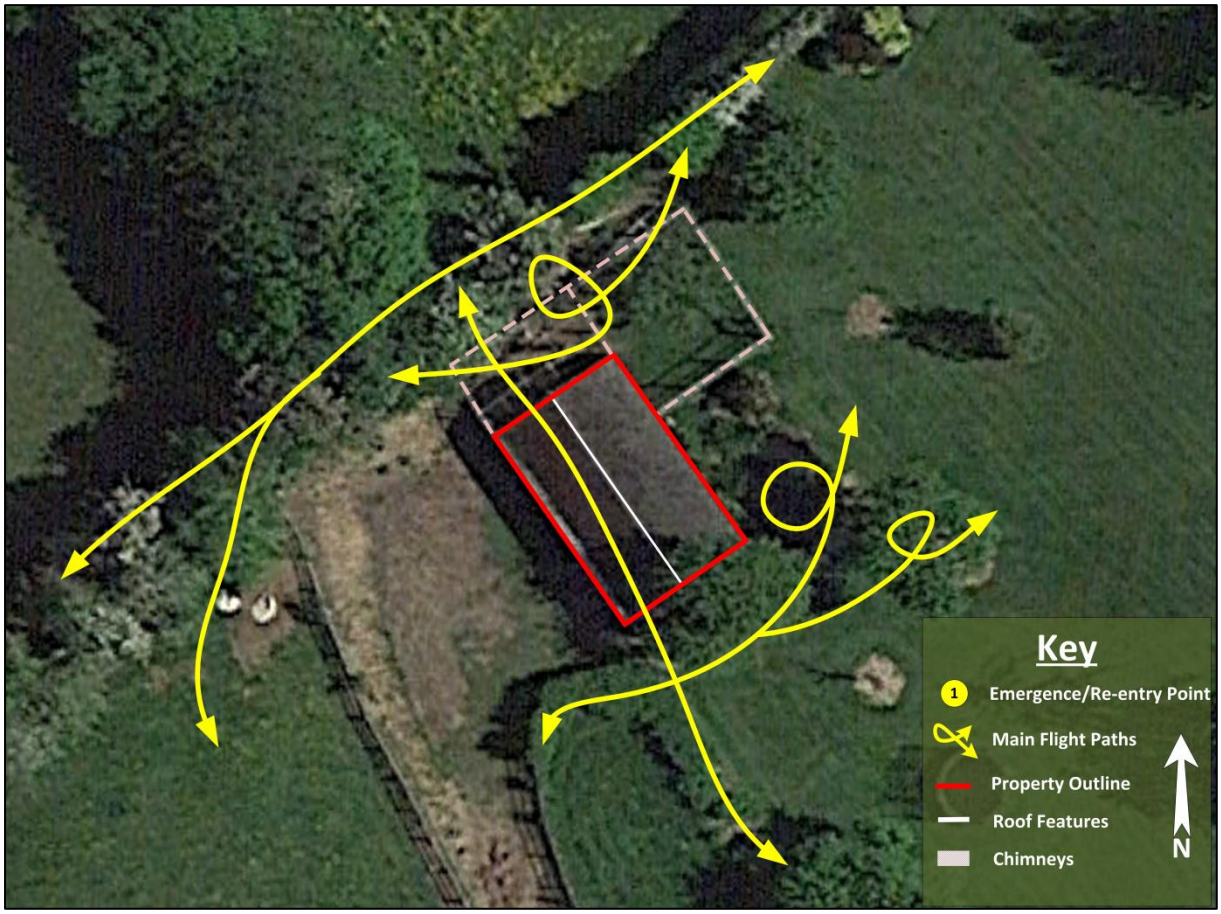

Figure 60– Emergence points (circled) mentioned in Table 5 and Main flight paths used by bats observed during the three activity surveys on Building 8- Stables at Orchard Cottage

7.4 Complete Summary of Bat Activity Surveys

During the three bat activity surveys there was a low-moderate level of bat activity in the garden surrounding Orchard Cottage. Bats were recorded primarily using the gardens surrounding Orchard Cottage to commute and forage. Whilst foraging was witnessed, this seemed a secondary function for the flight paths, as none of the bats recorded seemed to spend an extended period of time in the gardens. At least five species, including; Common Pipistrelle (*Pipistrellus pipistrellus),* Soprano Pipistrelle (*Pipistrellus pygmaeus),* Noctule (*Nyctalus Noctule),* Brown Long-Eared (*Plecotus auritus*) and Myotis (*Myotis spp.)* were recorded flying in and around the gardens surrounding Orchard Cottage (See Tables 3, 4 and 5).

Over the course of the three activity surveys, a maximum two bats were seen emerging from Building 1 –Main House and a single bat was recorded using Building 7- Garage/Barn for roosting. Building 7 was also used as a night roost/feeding perch by two bats.

Consequently, Orchard Cottage is confirmed as a bat roost for individual bats from two different species; Common Pipistrelle and Brown Long-Eared.

8 Discussion

8.1 Assessment of the Bat Roost

During the initial assessment of Orchard Cottage, evidence of bats was found in the form of a number of droppings, scattered throughout the two linked roof voids of Building 1 – Main House (details in Section 7.2.1). Droppings and feeding remains were also found in Building 7 – Garage/Barn. In both cases, the size, shape and number were suggestive of suggestive of a small number of Brown Long-Eared Bats (*Plecotus auritus*) using the buildings over a prolonged period of time. During the suite of activity surveys, two species of bats were seen emerging from or entering the buildings within the site at Orchard Cottage.

Consequently, Orchard Cottage is confirmed as a day roost for an individual Brown Long-Eared bat (Main House) and two Common Pipistrelles (one in Main House and one in Garage/Barn). The surveys also confirmed the use of the garage/Barn as a night roost/feeding perch for a Brown Long-Eared bat and a Common Pipistrelle.

None of the other buildings on site, showed any evidence of currently being used by bats for roosting.

8.1.1 Confirmed Roosting Points for Bats

The evidence found during the preliminary bat assessment and subsequent activity surveys of Orchard Cottage have shown that a single male Brown Long-Eared bat is using the entirety of the Main House's roof void as a day roost, with the regular roosting location and access/exit point being at opposite ends of the building.

A single Common Pipistrelle was seen roosting in the batten space, under roof tiles on the south-eastern corner of the Main House; during a single activity survey.

A single Common Pipistrelle was confirmed to be using the apex of the northern gable end, in the Garage/Barn, as a day roost; as well as evidence of a Brown Long-Eared night roost/feeding perch in the same area.

8.1.2 Confirmed Access Points for Bat

During the activity surveys, three different roost access points were confirmed. An overview of these access points can be seen in Figure 58. The species seen using each area, is recorded in Tables 3 and 4. Photos of each access point are provided below for reference (Figures 61, 62 and 63)

Figure 61– Building 1 - Main House access points (circled) used by bats during the activity surveys at Orchard Cottage

Figure 62 – Door access to Building 7 – Garage/Barn (circled) used by bats during the activity surveys at Orchard Cottage

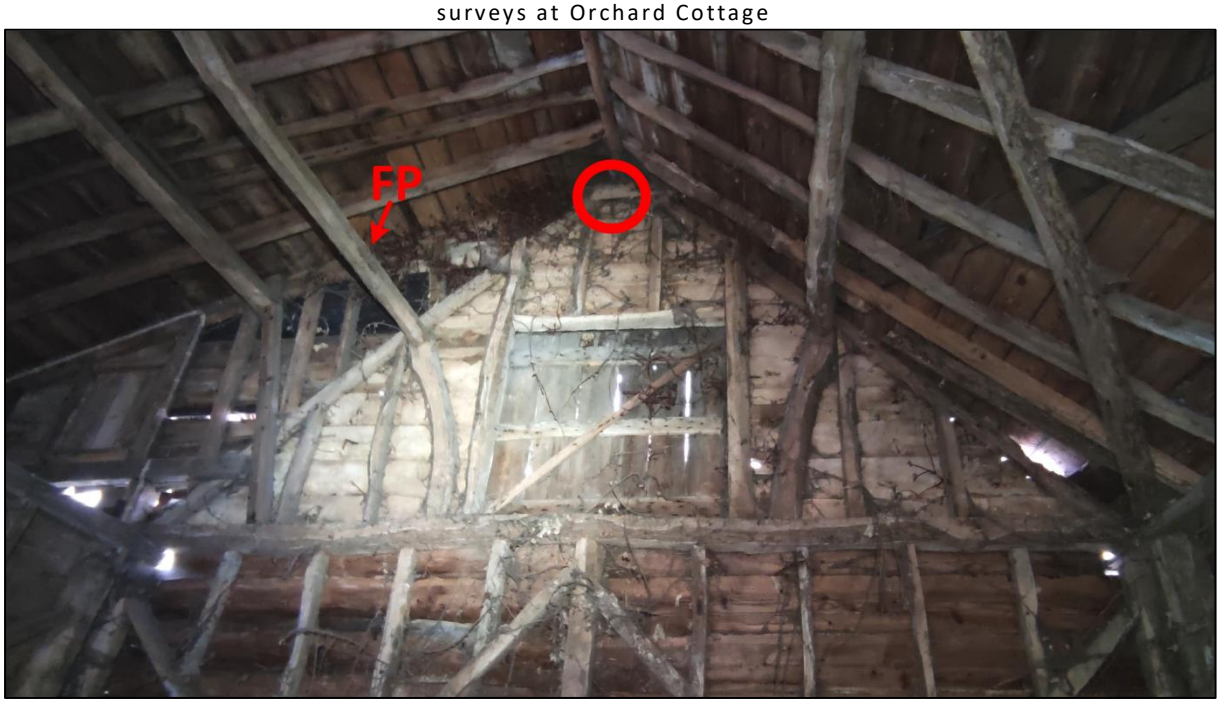

Figure 63 – Roost access and feeding perch in Building 7 – Garage/Barn (circled) used by bats during the activity surveys at Orchard Cottage

8.1.3 Potential Hibernation Roosts

It is always possible that a building could be used by hibernating bats and in this case it is considered more likely, due to the following factors:

- The direct evidence of individual bats found during the initial roost inspection and subsequent activity surveys;
- The complex nature of the roof voids, which will are free from disturbance and provide a range of stable microclimatic conditions, needed by hibernating bats to conserve energy;
- Numerous gaps in the roof, that could allow access to both the cavity wall space and the inaccessible batten space.

Due to the reasons stated here and throughout the report, it must be assumed that Orchard Cottage has high potential to support hibernating bats, either in the roof voids or the cavity walls.

8.1.4 Potential Impact of Proposed Works on Bats

The potential impacts are based on the development proposals at the time of writing. This impact assessment may need to be reviewed and amended as necessary, in light of any alterations to the development proposals.

8.1.5 Potential Direct Impacts

Direct impacts on bats and their roosts (breeding sites and resting places) may occur, through direct harm or disturbance as well as loss, damage and obstruction of access.

The planned works include the development of the existing dwelling and changes to the current roof configuration. During the full suite of surveys conducted, Orchard Cottage was confirmed to be a day roost for individual bats (<3) of two species. As such the works planned to be conducted will result in the disturbance/ potential destruction of day roosts (and potential hibernation roosts). Consequently, if the planned works proceed, in the absence of mitigation; it could lead to the permanent loss of a roost.

8.1.6 Potential Indirect Impacts

The rural nature of Orchard Cottage and its proximity to habitats that increase the likelihood of bats and their insect prey, increase the chances of the dwelling being investigated and utilised by bats; as a result the roof void of any extensions /new buildings on site, must only use Type 1F bitumen felt roofing underlay, to prevent future risks to the local bat population. This is because modern non-woven roofing membranes are known to pose an entanglement risk to bats, which can result in their death (Waring 2014).

8.1.7 Lighting

The site is in a rural area, on an unlit street. Consequently, the planned works should not increase the level of lighting surrounding the property or flight paths recorded, as increased light levels could negatively impact foraging and commuting bats.

8.1.8 Loss of Commuting Habitat

No Commuting habitat is due to be impacted under the current proposals.

8.1.9 Loss of Foraging/Feeding Grounds

No foraging habitat is due to be impacted under the current proposals.

8.2 Mitigation Proposals

As Orchard Cottage has been confirmed as an active bat roost, an EPS Licence must be obtained prior to works commencing in order to prevent the illegal destruction of a multi-species bat roost. This Licence will go into detail regarding the method statement and the mitigation required to carry out the works in a legal manner. Below are some points, which should be included in the Licence application.

- The planned works include changes to the existing roof voids and buildings. The confirmed day roosts for two species of bats were determined through these surveys, along with the high potential for hibernation roosts. Works should be avoided during the hibernation period as a precautionary measure. Unless, the roof void has been made unsuitable before the hibernation period begins. This can be done by removing sections of roof tiles, to destabilise the microclimate within the roof.
- Due to confirmed bat roosts in the property; in order to maintain the favourable conservation status and avoid long-term damage to local bat populations, a bat friendly underlay such as bitumen felt with a hessian reinforcement (Type 1F) felt or wooden sarking board will be used in the new swelling. Breathable membranes, which are harmful to bats, must not be used.
- The roof tiles will be soft stripped by hand, prior to demolition. A tool box talk should be given to the contractors on site prior to commencing work. This should explain how to safely soft strip tiles and other materials from the roof and the actions to undertake, should they come across a bat during works.

8.3 Constraints/limitations

Bats are difficult to locate in large structures, with many potential roosting areas, particularly in inaccessible areas such as large buildings, finding the exact roosting site can be difficult, especially male/single bat roosting sites.

Bats can have seasonal use of buildings and being so mobile may arrive and start using a site after it has been surveyed, or roost somewhere else during the period it was surveyed. Prior to the updated roost assessments seasonal weather conditions may have washed away external droppings.

9 Conclusions

Bats are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation contravening (Natural Habitats &c.) Regulations 2017, (which make it illegal to intentionally kill, injure or otherwise disturb bats, or to damage, destroy or obstruct access to a bat roost, whether bats are present or not). In some cases, if the proposed work will have a detrimental effect on bats or disturb or damage their roost then an EPS licence from Natural England has to be applied for.

Initial observations consider the local area to be good, as it provides a wide range of quality foraging habitats, with good connectivity, despite some fragmentation. All of these factors increase the potential for bats and their insect prey to use the area surrounding Orchard Cottage. However, the lack of water sources within a 2km radius of the site, reduces the likely population numbers the area can support.

The updated roost assessments at Orchard Cottage found evidence of bats during the internal inspections. A large number (>100) of bat droppings were found throughout the large, complex roof void of the Main House. The size, shape and number are suggestive of a small number of Brown Long-Eared Bats (*Plecotus auritus*), using the void to roost over a prolonged period of time. Bat droppings and feeding remains were also found in the Garage/Barn, which were indicative of a night roost/feeding perch. As evidence of bats was found (even if historical) and there were numerous potential bat access points, in three of the buildings on site (based on the Bat Surveys Good Practice Guidelines); further survey effort was required to determine if an EPS Licence will be required for works to proceed.

The details of the surveyor numbers, locations and equipment used for each of the three buildings requiring activity surveys can be found in this report. During all bat activity surveys there was a low to moderate level of bat activity, primarily using the gardens surrounding Orchard Cottage to commute and forage. At least five species, including; Common Pipistrelle (*Pipistrellus pipistrellus),* Soprano Pipistrelle (*Pipistrellus pygmaeus),* Noctule (*Nyctalus Noctule),*

Brown Long-Eared (*Plecotus auritus*) and Myotis (*Myotis spp.)* were recorded flying in and around the gardens surrounding Orchard Cottage (See Tables 3, 4 and 5).

A maximum of three bats, from two species were confirmed to be using two of the buildings at Orchard Cottage as a day roost. These bats were recorded using three different roost access points (Figures 61, 62 and 63), two located in the main house and one in the Garage/Barn. The surveys also showed that the Garage/Barn is also used as a night roost/feeding perch by the same two species.

Consequently, Orchard Cottage is confirmed to be a current and active day roost and night roost/feeding perch for individuals of the following two species of bats: Common Pipistrelle (*Pipistrellus pipistrellus)* and Brown Long-Eared (*Plecotus auritus*). Combined with the large, complex roof void and the gaps present which could allow access to the cavity wall space, there is also a high potential for the building to be used as a hibernation roost.

Taking this information into account it is concluded that the planned works, will result in the disturbance/destruction of a confirmed bat roost, and without mitigation could negatively impact local populations. **As a result an EPS Licence is required for works to proceed legally and to ensure the continued safety of the local population.**

10 References

Bat Surveys Good practice Guidelines – Bat Conservation Trust 2016

Bat Workers Manual – Mitchell-Jones & McLeish 2004

Bat Mitigation Guidelines – Natural England 2006

The Conservation and Habitat Regulations 2017

EngD Thesis 'The interactions of bats and breathable roofing membranes'– Dr Stacey D. Waring 2015