



Ecology Consultancy



Wings, Lidsey Road, Woodgate, Chichester

Bat Survey Report

Thakeham

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Summary of Key Findings

The Ecology Consultancy was commissioned by Thakeham to determine the status of bats and any likely constraints to development arising at, Wings, Lidsey Road, Woodgate, Chichester, PO20 3SU. Development plans include the demolition of the buildings on site and the construction of 81 new residential dwellings with associated access, parking and gardens, as well as a wildlife zone and open green space. The main findings are as follows:

- Preliminary Roost Assessments of a residential property (Building 1, hereon referred to as B1), a linked garage (Building 2, hereon referred to as B2), a garden shed (Building 3, hereon referred to as B3) and a Preliminary Ground Level Roost Assessment (PGLRA) of the trees on the site was carried out on 11 October 2019 by a bat licensed ecologist.
- B1 and B2 were assessed as having High suitability for roosting bats and B3 was assessed as having Low suitability for roosting bats. Of the nine trees on site, one (T7) was assessed as having Moderate suitability for roosting bats, three as having Low suitability and five as having Negligible suitability.
- In line with current guidelines (Collins, 2016) three dusk emergence surveys were undertaken on B1 and B2 on the 04 May, 18 May and 01 July 2020 and a single dusk emergence survey was undertaken on B3 on the 04 May 2020, in line with Bat Conservation Trust guidelines (Collins, 2016).
- Two dusk emergence surveys were also undertaken on the single oak tree (T7) on the 04 May and the 18 May 2020 with Moderate suitability to support roosting bats. No bats were recorded emerging from T7 during the surveys. A precautionary approach to felling is further recommended on T7 and any trees with Low suitability, as detailed in Section 5 of this report.
- B1 and B2 were confirmed to be an occasional roost for a low number of bats within the *Pipistrellus* genus. No bats were seen to emerge from B3 or T7.
- As the bat roosts within B1 and B2 will be directly impacted by the proposed works, the works will need to proceed under a licence from Natural England as detailed within Section 5 of this report.
- The buildings on site and T7 also had the potential to support nesting birds. Demolition of all buildings on site and the felling of T7 should take place outside nesting bird season i.e. September - February. If this is not possible then a nesting bird check should be undertaken within 24 hours of works commencing with any nests identified left *in situ* with a minimum 5m buffer until the chicks have fledged.

1 Introduction

BACKGROUND TO COMMISSION

- 1.1 The Ecology Consultancy was commissioned by Thakeham in October 2019, to assess the status of bats within buildings and trees at Wings, Lidsey Road, Woodgate, Chichester, PO20 3SU and any likely constraints to development. This assessment accompanies a Preliminary Ecological Appraisal carried out by The Ecology Consultancy in October 2019 (The Ecology Consultancy, 2019).
- 1.2 This report covers the results of the Preliminary Roost Assessment (PRA), Preliminary Ground Level Roost Assessment (PGLRA) and subsequent bat emergence surveys of Buildings 1, 2 and 3 (hereon referred to as B1, B2 and B3) and a single tree (T7) considered to have moderate suitability to support a bat roost.

SCOPE OF REPORT

- 1.3 The primary aims are, through a process of investigation and assessment, to determine if any bat roosts are present, what the type of roost may be, the species using them, their status and relative conservation importance and any likely impacts that could occur as a result of the proposals. Where impact is identified, appropriate mitigation and compensation measures are provided as supporting information to inform the planning application.
- 1.4 The assessment of a site for bats is based on the following sources of information, including that obtained from third parties and the results of surveys:
 - a desk study including:
 - a data search for bat records within a 2km radius of the site;
 - an assessment of the surrounding habitats for their likely importance to bats;
 - the presence of any protected areas cited for their bat populations; and
 - the location and status of any nearby European Protected Species Mitigation licensed sites for bats.
 - a Preliminary Roost Assessment comprising a detailed building inspection;
 - a Preliminary Ground Level Roost Assessment of any trees scheduled for removal or remedial works;
 - DNA analysis of bat droppings found; and
 - emergence and re-entry surveys.

- 1.5 The elements listed above comprise the individual parts of the process that underlie the assessment. If, at preliminary assessment, the buildings and or trees do not provide any potential for a roost, the assessment can be stopped at this stage. If potential for a roost is identified, a suite of emergence/re-entry surveys will be required to confirm presence or likely absence, to determine the species present, and to characterise any roosts located. In cases where no roosts are identified or suspected during these surveys, the assessment can be halted at that stage. Where roosts are found to be present then an evaluation of the conservation value of the species concerned is made and the impacts of the development identified and addressed.
- 1.6 The surveys cover all structures and trees within the planning application site boundary (hereon referred to as 'the site') as indicated on the plan provided by the client (Thakeham, 2019).
- 1.7 This assessment has been prepared with reference to best practice guidance published by the Bat Conservation Trust (Collins, 2016) and as detailed in BSI Standards Publication 42020:2013 *Biodiversity – Code of Practice for Biodiversity and Development* (British Standards Institution, 2013) and BSI 8956:2015 *Surveying for Bats in Trees and Woodland* (British Standards Institution, 2015).
- 1.8 This report provides supporting information in the appendices with a georeferenced map of the survey results in Appendix 1, cross referenced photographs in Appendix 2 and raw survey data in Appendix 3.

SITE CONTEXT AND STATUS

- 1.9 The proposed development site is located in an urban area in the area of Woodgate, north Bognor Regis. It is 0.22 hectares (ha) in size and is located at Ordnance Survey National Grid reference SU 93760 04139. The site is comprised of a residential building with linked garage, shed, hardstanding, and garden with scattered trees and hedgerows.
- 1.10 The site is bordered to the north by pasture and a railway line, to the east by Lidsey Road, to the south by residential properties and associated gardens and to the west by nurseries and arable land. The wider area supports open space suitable for bats, including tree lined arable fields.

DEVELOPMENT PROPOSALS

- 1.11 Proposals for the site include the demolition of all existing buildings and the construction of 81 new residential dwellings with associated access, parking and gardens, as well as a wildlife zone and open green space (MH Architects, 2020).

RELEVANT LEGISLATION AND PLANNING POLICY

1.12 The following key pieces of nature conservation legislation are relevant to this assessment, with a more detailed description of this legislation provided in Appendix 4:

- The Conservation of Habitats and Species Regulations 2017 (as amended);
- The Wildlife and Countryside Act 1981 (as amended); and
- Natural Environment and Rural Communities Act 2006.

1.13 The actions that could result in an offence occurring under the above legislation include: the disturbance of bats within a roost; loss or damage of a roost; blocking a roost entrance; or modification of a roost. If development proposals are likely to result in an offence then a European Protected Species Mitigation (EPSM) licence must be obtained from Natural England prior to works to provide a derogation from the legislation. Alternatively, where no more than three low conservation significance roosts are present and are used by low numbers of bats of no more than three of the (qualifying) species that EPSM licences are most commonly applied for, it may be possible to register the site under the Bat Mitigation Class Licence (BMCL) scheme. No like for like bat compensation is required for the majority of the species covered by BMCL.

1.14 The National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2019) requires local authorities to avoid and minimise impacts on biodiversity and to provide net gains in biodiversity when taking planning decisions. In addition, in England, under Section 40 of the Natural Environment and Rural Communities Act 2006, all public bodies are required to have regard to biodiversity conservation when carrying out their functions. This is commonly referred to as the 'biodiversity duty'.

1.15 Other planning policies at local level which are of relevance to this development include: The Arun Local Plan (Arun District Council, 2011).

2 Methodology

DESK STUDY

- 2.1 A desk study was conducted to obtain data relating to bats within a 2km radius of the site, as made available by the Sussex Biodiversity Record Centre (SxBRC).
- 2.2 Additional contextual information was compiled from publicly available data sources:
- MAGIC (<http://www.magic.gov.uk>) – the Government’s on-line mapping service. Information was sought concerning: the presence of ancient semi-natural woodland (ASNW); statutory designated nature conservation sites¹; and extant or historic European Protected Species Mitigation licences for bats; and
 - Ordnance Survey mapping and publicly available aerial photography to determine any features such as: running and standing water; woodland; tree lines; hedgerows; railway corridors; and the surrounding landscape uses.

BAT SURVEYS

Personnel

- 2.3 The PRA and PGLRA surveys were led by Rosie McLaughlin BSc (Hons) MSc MCIEEM, a Principal Ecologist with over six years commercial bat survey experience (Natural England Level 4 Class Licence, 2019-41253-CLS-CLS). Rosie acts as accredited agent on Natural England European Protected Species Mitigation (EPSM) licences for bats and Bat Mitigation Class Licences (BMCLs).
- 2.4 Rosie was assisted by Jessica Lewis, an Assistant Ecologist with over two years commercial bat survey experience.
- 2.5 The emergence surveys were led by Clara Gonzalez-Hernandez BSc (Hons), GradCIEEM a Senior Ecologist with five years’ commercial survey experience (Natural England Level 2 Class Licence, 2018-36241-CLS-CLS). Clara was assisted by Francesca West BSc (Hons) MRes GradCIEEM a Senior Ecologist with over six years commercial bat survey experience, Gareth James BSc Qual CIEEM an Assistant Ecologist with three years commercial bat survey experience, Oliver Grice-Jackson BSc (Hons) a Senior Ecologist with over five years commercial, Robin Searle BSc (Hons) MSc ACIEEM an Ecologist with over six years commercial bat survey experience, Jessica Lewis BSc (Hons) MSc an Ecologist with over three years commercial bat survey

¹ Statutory designations include Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR).

experience, Alex Bishop BSc (Hons) Grad CIEEM an Assistant Ecologist with over three years commercial bat survey experience, Sophie Bracken BSc (Hons) MRes Grad CIEEM an Ecologist with over four years commercial bat survey experience, Viola Zanetta BSc (Hons) MSc ACIEEM an Ecologist with over six years commercial bat survey experience and Kathy Halsall BSc (Hons) MSc a Senior Ecologist with five years commercial bat survey experience (Natural England Level 3 class Licence, 2017-27953-CLS-CLS).

Equipment

2.6 The surveys listed below made use of some or all the following equipment:

- an extendable ladder;
- a video endoscope;
- a handheld LED torch;
- a high-powered torch for illuminating features at height;
- close focussing binoculars;
- bat dropping (DNA) collection kit;
- Bat Box Duet, frequency division and heterodyne detector;
- Canon XA30 Infrared video camera and 500w IR light;
- Elekon Bat Scanner, frequency division detector;
- Elekon bat logger M, full spectrum detector;
- FLIR Thermal imaging camera T1020; and
- Anabat Express, Zero Crossing Analysis (ZCA) detector.

Aims and Objectives

2.7 The aim of the survey methodologies outlined below is to establish the presence/likely absence of bat roosts within the trees and buildings within the site boundary. Once presence has been established the secondary aim is to obtain sufficient information to characterise the type of roost according to criteria set out in the current guidelines (Collins, 2016). This includes determining the function/s of the site by bats for maternity or hibernation roosts, transitional roosts, foraging and commuting. The gathered information is then used to inform an assessment of the potential impacts of the development proposals and to devise an appropriate and proportionate mitigation strategy.

Field surveys

- 2.8 The survey methodologies below follow best practice guidelines (Mitchell-Jones & McLeish, 2004; Collins, 2016; The British Standards Institution, 2015). A standard recording form was completed for each building within the site boundary and for each tree that is likely to be impacted by the proposals. This included recording the main structural features and layout, any potential access points and roost features and photographs. The criteria used as a framework to assess the suitability for structures or trees to support roosting bats are provided in Appendix 5. This section provides methodologies for the primary survey types used to assess the status of bats at a site, depending on the particulars of the site and the commission, not all of these survey types may be carried out.

Preliminary Roost Assessment - Buildings

- 2.9 The survey comprised an external inspection of each building, involving a detailed search of all accessible architectural features for bat droppings, urine staining, scratch marks, staining around suitable crevices and feeding remains. Window panes and other external surfaces were visually checked for droppings or other secondary evidence. A high-powered torch was used to illuminate recesses and crevices at height and these were inspected using close focusing binoculars. This included external features, such as soffit boxes, roof tiles, hanging tiles, ridge areas and window casements. Any features that could potentially provide access into internal areas such as roof voids and cavity walls were noted.
- 2.10 During the internal inspection the surveyor worked through the roof voids of the building in logical progression searching each adjoining void in turn as well as all small storage areas such as dormer rooms and water towers. Within the roof voids all surfaces including floor areas were checked for discarded feeding remains and bat droppings. The beam from a high-powered torch was shone along the length of each individual rafter, where appropriate to the roof type, looking for bats, staining and droppings. The roofing material was also inspected for areas of overlapping materials, holes and potential access points into the ridge area. Any open water tanks were inspected for the presence of bat corpses.

DNA analysis

- 2.11 If present, a sample of different types of bat dropping, differentiated by size and morphology, may be collected by an ecologist with gloved hands and then placed into clean, dry, containers. These droppings are then sent for laboratory analysis within 48hrs of collection or stored in a dry, cool location for later dispatch.

Preliminary Ground Level Roost Assessment - Trees

- 2.12 Any trees that were within the site boundary and likely to be impacted by the proposals were inspected for any suitable features that could provide suitable roosting locations for bats, including: loose, flaking or folded bark; cracks and fissures in limbs; woodpecker holes; or any downward-facing crevices or holes in the limbs or trunks. They were also inspected for any signs indicating possible use by bats, such as tiny scratches, rub marks and staining around access points, bat droppings in around or below access points.

Emergence and Re-entry Surveys

- 2.13 A total of four surveyors were employed to allow clear views of all potential roost entry/exit points identified during the preliminary roost assessments. The dusk surveys commenced 15 minutes before sunset and continued for up to 120 minutes after sunset. The dawn survey commenced 120 minutes before sunrise and continued until fifteen minutes after. Each of the surveyors noted down details of any bat activity including; bat passes², species, numbers, location, emergence or re-entry, foraging and commuting, recording details to a data sheet and a map. The surveyors employed a combination of heterodyne bat detectors for aural ID in the field, and/or, full spectrum or zero crossing detectors for sound analysis post survey.
- 2.14 On some surveys, a video camera set to infrared (IR) mode may be employed to record any bat activity from or in close proximity to one or more potential roost features. The camera's IR ability is augmented by the use of a dedicated 500w IR lamp to provide a greater extent and level of illumination. The camera is paired with a static bat detector for assistance in post survey analysis.
- 2.15 To further augment the surveys a Thermal Imaging (TI) camera may be used to accurately count bats leaving a roost, identify a roost entrance point, or to aid in the detection of roosting bats in inaccessible voids or crevices.

Post-Survey Analysis

- 2.16 The audio recordings may be analysed post survey using one or more of the following software: Analook™ V3.3q., Bat Explorer™ or Kaleidoscope™, to confirm species identification and the timing of any passes. Any passes likely to have originated from one

² For the purposes of this assessment a bat pass is taken to be a series of individual registrations by an individual bat that are emitted in a short sequence and either heard or recorded as a bat passes the position of the surveyor or the detection envelope of the recorder that is employed.

of the myotis species were determined to genus level only due to the complexity of differentiating between these species.

- 2.17 If an IR camera was employed then the footage is later analysed by an ecologist, using VLC Media Player™ viewing in real time for the first 20 minutes after sunset and thereafter viewing footage based on the timing of any calls picked up by the paired bat detector. If a TI camera was used the FLIR Tools™ may be used to analyse the images post survey to count emerging bats or determine roost location.

Roost Characterisation

- 2.18 The results from the preliminary roost assessments (including the PGLRA) and the emergence/-re-entry surveys are used to characterise any roosts that may be confirmed within the site. This follows standard criteria for roosts, classifying roost type³ as described in the Natural England bat EPSM licence application form. Also included are variables such as: species; abundance; likely use; and importance throughout the year.

Roost Characterisation

- 2.19 Roost characterisation is not possible from preliminary roost assessments (including the PGLRA) alone.

EVALUATION AND IMPACT ASSESSMENT

Evaluation

- 2.20 The conservation status of those species found to be roosting within the site or for which the site provides a measurable supporting function is drawn from published sources with the conservation significance of any roost provided according to accepted criteria⁴.
- 2.21 If emergence and re-entry surveys were carried out, then the foraging and commuting activity recorded during those surveys is summarised along with an outline interpretation of the function the site may provide for these activities.
- 2.22 The ecological importance of the site for bats has been assessed broadly following guidance issued by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) which ranks nature conservation importance according to a geographic scale of reference: international and European; national; regional; metropolitan, county vice-county or other local authority-wide area; local or of value at the site scale. The

³ Day, Night, Feeding Perch, Transitional, Satellite, Maternity, Hibernation, Foraging Area, Commuting Route, Swarming Site.

⁴ Figure 4. *Guidelines for proportionate mitigation*, the Bat Mitigation Guidelines (Mitchell-Jones & McLeish, 2004) which assigns conservation significance to different types of bat roost on a sliding scale from Low to High

following factors are considered when making this evaluation: nature conservation designations; rarity; vulnerability; distribution; and the conservation significance of any roosts.

Impact Assessment

- 2.23 An assessment is provided on the likely impacts of the development proposals on any bat roosts located within or immediately adjacent to the site boundary. This assessment is made with reference to Section 6⁵ of the Bat Mitigation Guidelines (Mitchell-Jones & McLeish, 2004) and Natural England's standing advice⁶ and includes a summary of the scale of impact according to roost type and development effect. This section considers types of construction impact to bats and their roosts including; disturbance, loss, modification and fragmentation in relation to duration and timing. For the site as a whole, a statement is made on the geographic scale at which impact is deemed to be significant, following CIEEM guidance (CIEEM, 2018).

DATA VALIDITY AND LIMITATIONS

- 2.24 It is important to note that even where data are held, a lack of records for a defined geographical area does not necessarily mean that there is a lack of ecological interest; the area may be simply under-recorded. Bats are highly mobile animals and can move roost sites both within and between years. Where surveys are not spread throughout the bat active season it is possible that they could miss roosts that are occupied earlier or later in the year. However, where undisturbed, evidence of bats inside a building is likely to be detectable throughout the year. The detection of small numbers of crevice dwelling species may remain problematic in some cases, such as where droppings accumulate within an inaccessible void.
- 2.25 A void is likely to be present above the swimming pool in Building 2. However, no access hatch was present to access the void.
- 2.26 The thermal imaging camera used for the third and final survey on the 01 July failed following video analysis. However, the use of the camera during the survey was as a visual aid rather than to cover an area of the building not covered by a surveyor. Therefore, all areas of the building, including the location of the previous roosts, were sufficiently covered by surveyors.

⁵ *Predicting the Impact of Development*, the Bat Mitigation Guidelines (Mitchell-Jones & McLeish, 2004), assigns scale of impact to the favourable conservation status of bats according to type and extent of construction effect

⁶ *Bats: surveys and mitigation for development projects*, first published 28 March 2015

- 2.27 Data from bat surveys should be considered to be valid for a period of 12 months, unless there are any gross changes to the buildings or other habitats within the site. Natural England require survey data to be from the last, or most recent, survey season (May to September inclusive) when applying for licences prior to the commencement of works.

3 Results

DESK STUDY

Data search

- 3.1 The data search returned 32 records of bats or bat roosts from 2009-2019, two extant EPSM licences and no designated sites within a 2km radius of the site. A summary of the most pertinent results is presented in Table 3.1 and Table 3.2 below.

Table 3.1: Summary of most pertinent data search results from the local environmental records centre

Species	Distance & Orientation	Date	Roost type	Notes
Common pipistrelle	1.6km SE	31/07/2016	Unspecified	Six bats emerging from building
Brown long-eared bat	1.8km S	14/07/2009	Unspecified	Bat droppings within loft

Table 3.2: Protected sites and bat EPSM licences within 3km of the site boundary

Receptor	Distance & Orientation	Notes
EPSM	1.8km NE	Current licence for the destruction of a resting place for common pipistrelle bats.
EPSM	1.8km S	Current licence for the destruction of a resting place for common pipistrelle bats.

Surrounding habitat

- 3.2 The site is bordered to the north by pasture and a railway line, to the east by Lidsey Road, to the south by residential properties and associated gardens and to the west by nurseries and arable land. The wider area supports open space suitable for bats, including tree lined arable fields.
- 3.3 While the site, itself, is relatively small it provides some connectivity between various larger areas with good roosting and foraging value for bats.

FIELD SURVEYS

Overview

- 3.4 The surveys have identified multiple features suitable for roosting bats on Buildings 1 and 2, including lifted/slipped/missing roof, ridge, hip and hanging tiles, and a low number of suitable roosting features for bats on Building 3, including lifted timbers.

- 3.5 Subsequent dusk emergence surveys recorded bats roosting within B1 and B2. No bats were recorded roosting within B3 or T7 during the emergence surveys. .

Weather Conditions

- 3.6 The preliminary roost assessments and ground level roost assessments were carried out in optimal weather conditions:
- 3.7 *PRA*: 14 October 2019, 16°C, light breeze (Beaufort 2), 8/8 okta⁷ cloud cover and light rain. The survey commenced at 12:00 and continued until 13:30.
- 3.8 *PGLRA*: 14 October 2019, 16°C, light breeze (Beaufort 2), 8/8 okta⁸ cloud cover and light rain. The survey commenced at 12:00 and continued until 13:30.
- 3.9 *Emergence Survey 1*: 4 May 2020, 14°C at the start, 11°C at the end, light breeze (Beaufort 2), 3/8 okta cloud cover and no rain. Sunset was at 20:30 and the survey commenced at 20:15 and continued until 22:00.
- 3.10 *Emergence Survey 2*: 18 May 2020, 13°C at the start, 11°C at the end, overcast, warm with a gentle breeze (Beaufort 2), 6/8 okta cloud cover and no rain. Sunset was at 20:50 and the survey commenced at 20:35 and continued until 22:20.
- 3.11 *Emergence Survey 3*: 01 July 2020, 18°C at the start, 18°C at the end, cloudy and warm with a gentle breeze (Beaufort 2), 3/8 okta cloud cover and no rain. Sunset was at 21:18 and the survey commenced at 21:03 and continued until 22:48.

Preliminary Roost Assessment - Buildings

- 3.12 The building inspection covered all of the buildings or structures within the site. Each building is detailed individually in Table 3.3, below, with a site plan provided in Appendix 1 and supporting photographs of key features in Appendix 2.

⁷ An okta is a unit of measurement for cloud cover, based on an estimate of how many eighths of the sky are obscured by cloud.

⁸ An okta is a unit of measurement for cloud cover, based on an estimate of how many eighths of the sky are obscured by cloud.

Table 3.3: Preliminary Roost Assessment results

Building number	Building description	Results (including DNA analysis)	Suitability (including hibernation)
1	Building 1 was a two-storey residential property with four main roof pitches; two running east-west with two similar sized sections extending north. The roof was covered with clay roof and ridge tiles and the upper storey of the building was covered with clay hanging tiles. Internally, one large roof void was present linking all three roof pitches. The void was approximately 4m in height to the apex and lined with bitumen roofing felt. Cavity walls were present.	No evidence of bats was recorded but multiple suitable roosting features were recorded on the building including lifted roof, ridge and hanging tiles. No droppings were found and, therefore, no analysis was undertaken.	High suitability for roosting bats Sub-optimal for hibernating bats
2	Building 2 was a single storey garage that had been converted into a swimming pool. The roof was pitched and hippped with a central timber roof vent. Internally, the building had a suspended ceiling with no access into the void above.	No evidence of bats was recorded but multiple suitable roosting features were recorded on the building, including lifted roof, ridge and hip tiles and gaps in the timbers on the roof vent. No droppings were found and, therefore, no analysis was undertaken.	High suitability for roosting bats Sub-optimal for hibernating bats
3	Building 3 was a small, timber framed shed with pitched roof covered with timber boarding. Internally, the building was open to the apex and the roof covered with timber plywood.	Lifted timbers on the roof and building provided suitable roosting features for bats. No droppings were found and, therefore, no analysis was undertaken.	Low suitability for roosting bats Unlikely to support hibernating bats

Preliminary Ground Level Roost Assessment - Trees

3.13 Table 3.4 below provides details of the trees assessed for bat roost suitability.

Table 3.4: Results of the ground level roost assessment

Tree number	Tree Species	Feature type	Distance & Orientation	Roost potential
T1	Oak	None recorded	N/A	Low – no features recorded but of a size and age suitable for roosting bats
T2	Leylandii	None recorded	N/A	Negligible
T3	Cherry	None recorded	N/A	Negligible
T4	Eucalyptus	None recorded	N/A	Low – no features recorded but of a size and age suitable for roosting bats
T5	Holly	None recorded	N/A	Negligible
T6	Leylandii	None recorded	N/A	Negligible
T7	Oak	Ivy covering and dead branches	Multiple	Moderate
T8	Cedar	None recorded	N/A	Low – no features recorded but of a size and age suitable for roosting bats
T9	Cedar	None recorded	N/A	Negligible

Emergence Survey 1 : 04 May 2020

3.14 Four surveyors with Elekon bat logger M, full spectrum detectors and one FLIR Thermal imaging camera (T1020) were used to survey B1, B2, B3 and T7. The first survey was carried out on the 04 May 2020. Full survey data is provided in Appendix 3. A survey summary of the main results is provided below.

3.15 A total of four species of bat including: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, long-eared species *Plecotus* sp. and serotine *Eptesicus serotinus* bats were recorded across the survey period.

3.16 Three common pipistrelle bats were observed emerging from the western elevation of B1 under hanging tiles. The first bat emerged at 20:52 and two more common pipistrelle bats emerged at 20:57. Post-survey analysis of the TI camera footage recorded a further two bats, species unknown, emerging at 20:24 from under a lifted tile on the roof of B2 on the western aspect. No emergences were recorded from B3 or T7.

- 3.17 A low level of foraging and commuting activity was recorded throughout the survey. Bats were recorded foraging around B1 and B2 with a peak in activity recorded in the garden to the southeast of B1 between 20:53 and 21:10.
- The most commonly recorded bat species was the common pipistrelle with commuting and foraging activity recorded throughout the survey period.
 - Long-eared bat commuting activity was recorded at 21:27, and between 21:43 and 21:52.
 - Serotine and soprano pipistrelle bats were also recorded commuting across site during the survey period.
- 3.18 *Sound Analysis:* There was no accompanying sound file for the emergences recorded on the TI camera, therefore it is not possible to confirm the ID of these bats. The emergence time and flight line of the emerging bats suggests they are likely to be bats from the genus *Pipistrellus*.

Emergence Survey 2: 18 May 2020

- 3.19 Four surveyors with Elekon bat logger M, full spectrum detectors and two FLIR Thermal imaging cameras (T1020) were used to survey B1, B2 and T7 on the 18th May 2020. Full survey data can be found in Appendix 2. A summary is provided below.
- 3.20 A total of four species of bat were recorded across the survey period including: common pipistrelle, soprano pipistrelle, long-eared species and a bat within the *Myotis* genus.
- 3.21 A total of one common pipistrelle bat was observed emerging from the southwest corner of B1 through a gap in the soffit at 21:13. A second bat was recorded emerging from the same location at 21:28 but the species could not be confirmed by post-survey analysis of sound.
- 3.22 There was a moderate level of commuting and foraging activity recorded throughout the survey, with more observations and longer duration of activity recorded than on the previous survey.
- The first call recorded was a common pipistrelle at 21:13 when it was observed emerging from B1 (23 minutes after sunset). Constant foraging activity was then recorded until 21:36. Multiple bats were recorded foraging simultaneously across the site during the survey period.
 - Soprano pipistrelle, long-eared bats and the myotis bat were all recorded commuting across site a single time each during the survey.

3.23 *Sound Analysis*: One call was not clear enough to be identifiable to species level.

Emergence Survey 3: 01 July 2020

3.24 The final survey was carried out on 01 July 2020. Three surveyors with Elekon bat logger M, full spectrum detectors and one infra-red camera were used to survey B1 and B2. Full survey data is provided in Appendix 3. A summary of the main results is provided below.

3.25 A total of two species of bat were recorded across the survey period including: common pipistrelle and soprano pipistrelle.

3.26 No bats were seen to emerge from B1 or B2 on site during the survey and following video analysis.

3.27 There was a low level of commuting and foraging activity recorded throughout the survey. Bats were recorded foraging around the garden space and boundary hedgelines on site.

- The first call recorded was a common pipistrelle at 21:37, within 20 minutes of sunset. Foraging activity was then recorded until 22:07. Commuting behaviour of common pipistrelle bats on site was first recorded on site at 22:30 and continued until 22:39.
- Two calls from commuting soprano pipistrelles were recorded at 22:26 and 22:31 from the surveyor located to the north-west of B2.

3.28 *Sound Analysis*: It was possible to identify all calls to species level.

ROOST CHARACTERISATION

3.29 The table below provides a summary of the results of the assessment for each building and tree that were included in the surveys.

Table 3.3: Characterisation of roost type and status

ID	Evidence	Species	Count	Potential/Type	Annual pattern of use
B1	Emergence counts and sound analysis	Common pipistrelle	Max. 5 bats, peak 3 bats	Confirmed	N/A
B2	Emergence counts and sound analysis	<i>Pipistrellus sp</i>	Max. and peak count of 2 bats	Confirmed	N/A
B3	None	N/A	N/A	Low	N/A
T7	None	N/A	N/A	Moderate	N/A

4 Evaluation and Impacts

EVALUATION

Species

- 4.1 Common pipistrelle bats are probably one of the most common and widespread species; found throughout the UK with pre-breeding population estimates grouped with the soprano pipistrelle at up to two million (Harris and Yalden, 2008). This species is believed to be common and widespread throughout West Sussex and the data search located two maternity roosts within 2km of the site.
- 4.2 Soprano pipistrelle bats are also a common and widespread species; found throughout the UK. These species are believed to be common and widespread throughout West Sussex.
- 4.3 Serotine bats are widespread throughout England; however, this species is scarce in southern Britain, restricted to the south and south-west of England, and declining in Kent with occasional records in Wales. A pre-breeding population estimate of up to 15,000 throughout England and Wales, although this is a possible underestimate (Harris & Yalden 2008). Whilst considered a rare species across the UK as a whole there are numerous breeding sites in West Sussex although none were identified in the data search.
- 4.4 Bats within the *Myotis* genus are less common but are widespread across the UK. Bats within the *Myotis* genus are believed to be common within West Sussex.
- 4.5 B1 and B2 was found to provide an occasional roost for a small number of bats within the *Pipistrellus* genus. Following the Bat Mitigation Guidelines (Mitchell-Jones, 2004) this roost is classified as having Low conservation significance.

Foraging and commuting

- 4.6 The site provides a function as a foraging and commuting resource used by at least five species of bat; common pipistrelle, soprano pipistrelle, serotine bat and bats under the *Myotis* and *Plecotus* genus.

Summary of the Site's Importance to Bats

- 4.7 The site is assessed as important at the Site Level only. This is due to the low numbers of common species of bats roosting within the buildings on site.

IMPACT ASSESSMENT

Species

- 4.8 As the proposed works include the demolition of B1 and B2 on site, the works have the potential to disturb, injure or kill bats that may be roosting in the buildings and will result in the destruction of an occasional roost used by pipistrelle bats. This would contravene The Conservation of Habitats and Species Regulations 2017 (as amended) and Wildlife and Countryside Act 1981 (as amended).

Foraging and commuting habitats

- 4.9 The proposed works will result in the temporary loss of foraging habitat through site clearance, and the operational phase of the development may result in disruption to commuting routes identified during the surveys.

Summary of the Predicted Impact at Site Level

- 4.10 In the absence of mitigation the development proposals will result in the destruction and permanent loss of an occasional roost used by pipistrelle bats. This will result in a long term but Low impact to local bat populations.

5 Summary and Recommendations

SUMMARY OF FINDINGS

5.1 This section summarises the findings of the surveys and the likely impacts on bats, bat roosts and supporting habitats that are present on the site, as described in previous sections of this report.

5.2 The following ecological constraints have been identified:

- The presence of a high number of suitable roosting features on Buildings 1 (B1) and 2 (B2) and a low number of suitable roosting features on Building 3 (B3);
- The presence of suitable foraging/commuting habitat within the garden of the site;
- The presence of one tree (T7) with Moderate suitability for roosting bats and three trees with Low suitability for roosting bats;
- Bats were recorded using B1 and B2 as an occasional roost. Roost locations included under hanging tiles on the western elevation of B1, beneath the soffit on the south-west corner of B1 and from under a lifted tile on the roof of B2 on the western aspect. No bats were seen to emerge from T7 or B3 during the emergence surveys;
- The site supports foraging and commuting behaviour of at least five species of bat within the associated garden space and boundary hedgerows. The proposals will result in the temporary loss of the garden space and the operational phase of the development may result in disruption to commuting routes;
- In the absence of mitigation, any works to the roof of the buildings has the potential to:
 - result in the disturbance, injury or killing of bats that may be roosting within the buildings;
 - result in the loss of an occasional roost for low numbers of Pipistrelle bats;
 - cause a fragmentation effect on foraging bats, through habitat clearance and new lighting;
- Due to the nature of the predicted impacts to the roosts it will be necessary to obtain a Bat Mitigation Class licence from Natural England prior to works commencing.

RECOMMENDATIONS

Bats

- 5.3 As bats have been recorded roosting within the buildings, any works to B1 and B2 will need to take place under a Bat Mitigation Class licence obtained from Natural England. Full planning permission (or similar) must be obtained before a licence can be applied for. Mitigation will include the hand removal of all known and potential bat roost features under the supervision of the Named Ecologist or an accredited agent. This should be undertaken outside of the bat hibernation season (mid-November to mid-March inclusive). If any bats are discovered during the hand removal of all known and potential bat roost features they will be placed in a temporary bat box on site or taken into care and released on site on the evening of capture.
- 5.4 Although no compensation is required under this licence it is recommended that the site is enhanced for bats post-development. Enhancements include the incorporation of bat access tiles and bat bricks/tubes incorporated within the fabric of the proposed new buildings and bat boxes placed on the sides of buildings or on suitably mature trees within the ownership boundary. It is also recommended that only bitumen roofing felt that does not contain polypropylene filaments (e.g. bitumen felt type 1F) should be used to line the roofs of the new buildings to reduce the risk of bat mortality.
- 5.5 Further generic proposals for compensation and enhancement measures which could be considered for the Wings Nursery site are provided in Appendix 6.
- 5.6 As per the Bat Mitigation Guidelines (Mitchell-Jones, 2004) no post-development monitoring is required for Low conservation significance roosts.

Trees

- 5.7 For those trees with Low and Moderate potential for a roost, the following precautions are advised: felling or remedial works should avoid the hibernation season mid-November to mid-March inclusive, trees to be section felled avoiding any visible cavities, sections (but not brash) to be left for a minimum 24hrs on the ground before chipping or removing from site. No ecological supervision is required.

Breeding Birds

- 5.8 The demolition of all buildings on site and the felling of T7 should be carried out between September to February, inclusive, to avoid any potential offences relating to breeding birds during their main bird breeding season.

- 5.9 If demolition during the breeding season is unavoidable, then potential nesting habitat must be inspected shortly before work commences by a suitably qualified ecologist to identify active birds' nests. Should they be present, the nest, and a suitable buffer around it, must be retained until it has been confirmed by an ecologist that the young have left the nest or that it is no longer active.

Habitat Enhancement

- 5.10 To improve the bat foraging potential of the site, it is recommended that the proposed landscaping plan includes native or non-native, locally sourced plants that are beneficial to bats and local wildlife. Such plants include rowan *Sorbus aucuparia* and hawthorn *Crataegus monogyna*. Climbing plant species such as native honeysuckle *Lonicera periclymenum* and common ivy *Hedera helix* could be planted around the proposed replacement building.
- 5.11 The change in artificial light levels, following development, has the potential to impact neighbouring bat commuting routes. It is, therefore, recommended that the final lighting scheme should be designed to minimise any light spillage to linear habitat features including the boundary hedgerows, proposed and existing.
- 5.12 In order to compensate for the loss of bird nesting opportunities on site, artificial nest boxes should be installed on the external walls of the proposed new buildings. Many different designs are available including boxes to support colonial bird species such as starling, house martin or house sparrow.
- 5.13 In order to enhance the site for bats post-development, bat boxes should be installed on suitably mature trees within the ownership boundary. Woodcrete bird and bat boxes (or equivalent sustainable material) are recommended as they are longer lasting compared to wooden boxes, insulate occupants from extremes of temperature and condensation and are available in a broad range of designs.

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Appendix 1: Map of Survey Results

Figure 1: Preliminary Roost Assessment and Preliminary Ground Level Roost Assessment



Figure 2: Bat Dusk Emergence Survey Results 04 May 2020



Figure 3: Bat Dusk Emergence Survey Results 18 May 2020



Figure 4: Bat Dusk Emergence Survey Results 01 July 2020



Appendix 2: Photographs

Photograph 1
Building 1 roof void



Photograph 2
Eastern and northern elevations
of Building 1



Photograph 3
Eastern elevation of Building 2



Photograph 4
Western elevation of Building 1



Photograph 5
Gaps under roof tile on eastern elevation of Building 2



Photograph 6
Gaps under hanging tiles on eastern elevation of Building 2



Appendix 3: Survey Data

Project	8296.2 Wings		Building reference		B1
Surveyor	Rosie McLaughlin		Date		11/10/2019
Grid ref - Easting, Northing	493767	104131	Equipment used		Ladders, Clulite
General weather conditions					
Drizzly, cloudy					
Temperature	16	Cloud cover (0-8)	8	Wind (Beaufort 0-12)	2
External Assessment					
Structure type	Residential property		In use as:		Residential property
Approximate age	Mid-late 1900s		Roof material		Clay roof and ridge tiles
Roof shape	Pitched		Cladding?	Y	Soffits?
Hanging tiles?	Y		Chimney?	N	Lead flashing?
Shape of Building	Several linked rectangular sections		Dormers?	N	Bargeboard?
Constructed of:	Brick		General condition		Good
Internal Assessment					
Roof void present?	Yes		Frame type		Truss roof
Truss Type	Timber rafters, purlins and ridge board		Insulation type		Bitumen roofing felt on ceiling, ply on floor
Floor type (void)	Ply		Cavity in wall?		Yes
Evidence of use by bats	None recorded				
Description / notes	Several potential roosting features on all elevations of the building including lifted roof, ridge and hanging tiles. No evidence of bats recorded. High suitability for roosting bats.				

Project	8296.2 Wings		Building reference		B2
Surveyor	Rosie McLaughlin		Date		11/10/2019
Grid ref - Easting, Northing	493768	104150	Equipment used		Ladders, Clulite
General weather conditions					
Drizzly, cloudy					
Temperature	16	Cloud cover (0-8)	8	Wind (Beaufort 0-12)	2
External Assessment					
Structure type	Garage		In use as:		Garage/swimming pool
Approximate age	Mid-1900s		Roof material		Clay roof, ridge and hip tiles
Roof shape	Hipped		Cladding?	N	Soffits?
Hanging tiles?	N		Chimney?	N/A but timber vent	Lead flashing?
Shape of Building	Rectangular		Dormers?	N	Bargeboard?
Constructed of:	Brick		General condition		Good
Internal Assessment					
Roof void present?	Access to void not possible				
Truss Type					
Floor type (void)					
Evidence of use by bats	None recorded				
Description / notes	Several potential roosting features on all elevations of the building including lifted roof, ridge and hip tiles. No evidence of bats recorded. High suitability for roosting bats				

Project	8296.2 Wings		Building reference		B3
Surveyor	Rosie McLaughlin		Date		11/10/2019
Grid ref - Easting, Northing	493759	104136	Equipment used		Ladders, Clulite
General weather conditions					
Drizzly, cloudy					
Temperature	16	Cloud cover (0-8)	8	Wind (Beaufort 0-12)	2
External Assessment					
Structure type	Shed		In use as:		Shed
Approximate age	Late 1900s/early 2000s		Roof material		Timber
Roof shape	Pitched		Cladding?	Y – wooden	Soffits?
Hanging tiles?	N		Chimney?	N	Lead flashing?
Shape of Building	Rectangular		Dormers?	N	Bargeboard?
Constructed of:	Timber		General condition		Moderate
Internal Assessment					
Roof void present?	No		Frame type		N/A
Truss Type	N/A		Insulation type		Ply
Floor type (void)	N/A		Cavity in wall?		No
Evidence of use by bats	None recorded				
Description / notes	No evidence of bats recorded. Low number of suitable roosting features including lifted timbers on the roof. Low suitability for roosting bats.				

Project	8296.3 Wings nursery			Building reference		B1 & B3		
Surveyor	Sophie Bracken			Date		04.05.2020		
Survey no	1			Survey start/end times		20:15 / 22:00		
Sunset/rise time	20:30			Equipment reference		BLM 3		
Surveyor-Easting, Northing	493774	104149	Surveyor location					SW corner of site
General weather conditions			Mild, breezy					
Temperature (start and end)	14, 11	Cloud cover (0-8)	3/8	Wind (Beaufort 0-12)	2	Rain (0-5)	0	
Species - (CP=common pipistrelle, SP=soprano pipistrelle, LE=long-eared, N=Noctule, S=Serotine, M=Myotis, U=Unknown								
Activity type - (E = Emergence, R = Return to roost, C = Commuting, F = Foraging, S = Socialising)								
Time	Species	Number of bats	Seen/not seen (S/NS)	Activity type	Direction of flight	Notes (inc map ref)		
20:31						Bird nesting in top left corner of gable at SW corner B1		
20:52	Common pipistrelle	1	Seen	Emerging	West	Emerged from east elevation of B1, flew around corner of gable end and foraged in garden south of B1 until 21:08 when it flew west		
20:57	Common pipistrelle	1	Seen	Emerging	South	As above		
20:57	Common pipistrelle	1	Seen	Emerging	South	As above		
21:43	Serotine	1	Not seen	Commuting		HNS		
21:51	Serotine	1	Not seen	Commuting		HNS		

Project	8296.3 Wings nursery		Building reference		B1	
Surveyor	Max Robards		Date		04.05.2020	
Survey no	01-Mar		Survey start/end times		20:15 / 22:00	
Sunset/rise time	20:30		Equipment reference		BLM 4	
Surveyor-Easting, Northing	937	41	Surveyor location		SE corner of B1	
General weather conditions calm, clear						
Temperature (start and end)	12-Oct	Cloud cover (0-8)	1/8	Wind (Beaufort 0-12)	1	Rain (0-5) 0
Species - (CP=common pipistrelle, SP=soprano pipistrelle, LE=long-eared, N=Noctule, S=Serotine, M=Myotis, U=Unknown)						
Activity type - (E = Emergence, R = Return to roost, C = Commuting, F = Foraging, S = Socialising)						
Time	Species	Number of bats	Seen/not seen (S/NS)	Activity type	Direction of flight	Notes (inc map ref)
20:53 - 21:10	Common pipistrelle	1	Seen	Foraging		Circling in south garden foraging #1
21:43	Long-eared	1	Not seen			36kHz
21:52	Long-eared	1	Not seen			31kHz
21:53	Long-eared	1	Not seen			Likely same bat

Project	8296.3 - Wings Nursery			Building reference		Main House	
Surveyor	GJ			Date		18/05/2020	
Survey no	2			Survey start/end times		20:35 - 22:20	
Sunset/rise time	20:50			Equipment reference		BLM2	
Surveyor-Easting, Northing				Surveyor location		SE elevation	
General weather conditions		Overcast, still, warm					
Temperature (start and end)	13 11	Cloud cover (0-8)	6/8	Wind (Beaufort 0-12)	2	Rain (0-5)	0
Species - (CP=common pipistrelle, SP=soprano pipistrelle, LE=long-eared, N=Noctule, S=Serotine, M=Myotis, U=Unknown)							
Activity type - (E = Emergence, R = Return to roost, C = Commuting, F = Foraging, S = Socialising)							
Time	Species	Number of bats	Seen/not seen (S/NS)	Activity type	Direction of flight	Notes (inc map ref)	
21:13 - 21:37	Common pipistrelle	1	Seen	Foraging		Circular foraging over driveway and garden	
21:40	Common pipistrelle	1	Seen	Commuting	South-west	Quick pass over driveway	
21:56	Common pipistrelle	1	Seen	Foraging	South-west	Foraging over garden/driveway	
22:04	Common pipistrelle	1	Not seen	Foraging		Heard not seen - quick pass	
22:12	Common pipistrelle	1	Not seen	Foraging		Heard not seen	
22:14 - 22:15	Common pipistrelle	1	Seen	Foraging	South-west	Foraging over garden	
22:19	Common pipistrelle	1	Not seen	Commuting		Quick pass	

Project	8296.3		Building reference		Main house	
Surveyor	Francesca West		Date		18.05.20	
Survey no	2		Survey start/end times		20:35 - 22:20	
Sunset/rise time	22:50		Equipment reference		BLM5	
Surveyor-Easting, Northing	93748	4160	Surveyor location		See map	
General weather conditions			Dry, clear and hazy			
Temperature (start and end)	15-Nov	Cloud cover (0-8)	0/8	Wind (Beaufort 0-12)	2	Rain (0-5)
0						
Species - (CP=common pipistrelle, SP=soprano pipistrelle, LE=long-eared, N=Noctule, S=Serotine, M=Myotis, U=Unknown						
Activity type - (E = Emergence, R = Return to roost, C = Commuting, F = Foraging, S = Socialising)						
Time	Species	Number of bats	Seen/not seen (S/NS)	Activity type	Direction of flight	Notes (inc map ref)
21:22	Common pipistrelle	1	Seen	Foraging	South-east	1 - multiple passes above garden
21:28	Common pipistrelle	1	Seen	Foraging	South	2 - single pass foraging above garden
21:54	Common pipistrelle	N/A	Not seen	Foraging		single pass, quick
21:56	Myotis	N/A	Not seen	Commuting		single pass
22:04	Common pipistrelle	N/A	Not seen	Foraging		single pass
22:08	Common pipistrelle	N/A	Not seen	Foraging		single pass - faint

Project	8296.3 Wings Nursery			Building reference		B2 & B1		
Surveyor	Clara Gonzalez			Date		18/05/2020		
Survey no	2			Survey start/end times		20:40 / 22:20		
Sunset/rise time	20:50			Equipment reference		BLM4		
Surveyor-Easting, Northing	493788	104145	Surveyor location					NE corner of B2
General weather conditions			Warm calm night					
Temperature (start and end)	13/11	Cloud cover (0-8)	3/8	Wind (Beaufort 0-12)	1	Rain (0-5)	0	
Species - (CP=common pipistrelle, SP=soprano pipistrelle, LE=long-eared, N=Noctule, S=Serotine, M=Myotis, U=Unknown								
Activity type - (E = Emergence, R = Return to roost, C = Commuting, F = Foraging, S = Socialising)								
Time	Species	Number of bats	Seen/not seen (S/NS)	Activity type	Direction of flight	Notes (inc map ref)		
21:13	Common pipistrelle	2	Seen	Foraging	South	Foraging in front of E elevation (1 in map)		
21:17	Common pipistrelle	1	Seen	Foraging	South	Came from road and foraging over garden		
21:23	Common pipistrelle	1	Seen	Foraging	South	From norther end and then turned south (2 in map)		
21:27	Common pipistrelle	1	Seen	Foraging	North	Along E elevation and over hedge (3 in map)		
21:30	Common pipistrelle	1	Seen	Foraging	East	Along N elevation and foraging in garden		
21:32	Common pipistrelle	1	Seen	Foraging	West	From road and over building		
21:35	Common pipistrelle	1	Seen	Foraging	West	Foraging along E and N elevations of building		
21:54	Soprano pipistrelle	1	Not seen					
21:57	Common pipistrelle	1	Not seen					

21:59	Long-eared		1	Seen	Commuting	West	From road and over building
22:04	Common pipistrelle		1	Not seen			
22:13	Common pipistrelle		1	Not seen			
22:14	Common pipistrelle		1	Not seen	Foraging		

Project	8296.3 Wings Nursery			Building reference		1	
Surveyor	Robin Searle			Date		18/05/2020	
Survey no				Survey start/end times		20:44-22:20	
Sunset/rise time	20:52			Equipment reference		BLM11	
Surveyor-Easting, Northing				Surveyor location		SW corner of building	
Cool, dry							
Temperature (start and end)	13	Cloud cover (0-8)	5/8	Wind (Beaufort 0-12)	2	Rain (0-5)	0
Species - (CP=common pipistrelle, SP=soprano pipistrelle, LE=long-eared, N=Noctule, S=Serotine, M=Myotis, U=Unknown							
Activity type - (E = Emergence, R = Return to roost, C = Commuting, F = Foraging, S = Socialising)							
Time	Species	Number of bats	Seen/not seen (S/NS)	Activity type	Direction of flight	Notes (inc map ref)	
21:13	Common pipistrelle	1	Seen	Emerging	East	Emerged from corner of roof/building(see map) from soffit area.	
21:13-21:36	Common pipistrelle	1	Seen	Foraging	South-east	Same bat that emerged from building foraged up and down hedgeline on southern border and in rear garden	
21:28	Common pipistrelle	2	Seen	Foraging	East	Another pip joined existing one (did not see it emerge but could have missed it as it was dark)	
21:40	Unknown	1	Not seen	Foraging			
21:54	Common pipistrelle	1	Seen	Foraging	North	Foraged/commuted north past house	
22:04	Common pipistrelle	1	Seen	Foraging	West	Foraged/commuted over house towards west	
22:13	Common pipistrelle	1	Seen	Foraging		Foraged in rear garden	
22:16	Common pipistrelle	1	Not seen	Foraging			

Project	8296.3 Wings Nursery			Building reference		B1 + B2	
Surveyor	AB			Date		01.07.2020	
Survey no	3			Survey start/end times		21:03/22:48	
Sunset/rise time	21:18			Equipment reference		BLM10	
Surveyor-Easting, Northing				Surveyor location		S1	
General weather conditions							
Some cloud, breezy, cool							
Temperature (start and end)	20/16	Cloud cover (0-8)	5/8	Wind (Beaufort 0-12)	2	Rain (0-5)	0
Species - (CP=common pipistrelle, SP=soprano pipistrelle, LE=long-eared, N=Noctule, S=Serotine, M=Myotis, U=Unknown							
Activity type - (E = Emergence, R = Return to roost, C = Commuting, F = Foraging, S = Socialising)							
Time	Species	Number of bats	Seen/not seen (S/NS)	Activity type	Direction of flight	Notes (inc map ref)	
22:05	Common pipistrelle	1	Seen	Commuting	North-east	See 1 on Map	
22:05	Common pipistrelle	1	Seen	Foraging	North	Foraged until 22:11, may have been same bat as 1. See 2 on map.	
22:26	Soprano pipistrelle	1	Not seen			#67	
22:28	Common pipistrelle	1	Not seen			#68, very brief	
22:30	Common pipistrelle	1	Not seen			#70	
22:31	Soprano pipistrelle	1	Not seen			#72	
22:31	Common pipistrelle	1	Not seen			#73-74	
22:35	Common pipistrelle	1	Not seen			#75	
22:35	Common pipistrelle	1	Not seen			#77	

22:39	Common pipistrelle	1	Not seen			#80-81

Project	8296.3 Wings Nursery	Building reference	B1
Surveyor	OGJ	Date	01.07.2020
Survey no	3	Survey start/end times	21:03-22:48

Sunset/rise time		21:18		Equipment reference		BLM12	
Surveyor-Easting, Northing				Surveyor location		S4	
General weather conditions		Warm, bright evening with some cloud					
Temperature (start and end)	18/18	Cloud cover (0-8)	3/8	Wind (Beaufort 0-12)	3	Rain (0-5)	0
Species - (CP=common pipistrelle, SP=soprano pipistrelle, LE=long-eared, N=Noctule, S=Serotine, M=Myotis, U=Unknown)							
Activity type - (E = Emergence, R = Return to roost, C = Commuting, F = Foraging, S = Socialising)							
Time	Species	Number of bats	Seen/not seen (S/NS)	Activity type	Direction of flight	Notes (inc map ref)	
21:37	Common pipistrelle	1	Seen	Foraging		Map ref 1. Circling around garden for approximately 10mins	
21:49	Common pipistrelle	1	Seen	Foraging		Map ref 1. Foraging over southern garden area and hedge for approx 2 mins	
22:07	Common pipistrelle	1	Seen	Foraging		Map ref 2. Foraging around garden for approx 6 mins	
22:30	Common pipistrelle	1	Not seen	Commuting		Not seen	
22:33	Common pipistrelle	1	Not seen	Commuting		Not seen	
22:46	Common pipistrelle	1	Not seen	Commuting		Not seen	
Project		8296 Wings Nursery			Building reference		B1
Surveyor		KH			Date		01/07/2020
Survey no		3			Survey start/end times		21:03/22:48

Sunset/rise time		21:18		Equipment reference		BLM16	
Surveyor-Easting, Northing		SU93771 04158		Surveyor location		S2	
General weather conditions		Warm and breezy during day, cloudy warm evening with strong breeze					
Temperature (start and end)	19/17	Cloud cover (0-8)	7/8	Wind (Beaufort 0-12)	2	Rain (0-5)	0
Species - (CP=common pipistrelle, SP=soprano pipistrelle, LE=long-eared, N=Noctule, S=Serotine, M=Myotis, U=Unknown)							
Activity type - (E = Emergence, R = Return to roost, C = Commuting, F = Foraging, S = Socialising)							
Time	Species	Number of bats	Seen/not seen (S/NS)	Activity type	Direction of flight	Notes (inc map ref)	
21:37	Common pipistrelle	1	Seen	Foraging	East	Appeared from around corner of house from S4. " laps of driveway then disappeared over road	
21:39	Common pipistrelle	1	Seen	Foraging	West	Possibly same bat again. Several passes from road, over driveway then back to road.	
22:00						Tawny owl calling from T7	
22:07	Common pipistrelle	1	Seen	Foraging	South	Several passes over driveway	

Appendix 4: Legislation

Important Notice: This section contains details of legislation applicable in Britain only (i.e. not including the Isle of Man, Northern Ireland, the Republic of Ireland or the Channel Islands) and is provided for general guidance only. While every effort has been made to ensure accuracy, this section should not be relied upon as a definitive statement of the law.

NATIONAL LEGISLATION AFFORDED TO BAT SPECIES

The objective of the EC Habitats Directive⁹ is to conserve the various species of plant and animal which are considered rare across Europe. The Directive is transposed into UK law by The Conservation of Habitats and Species Regulations 2017 (as amended) (formerly The Conservation (Natural Habitats, &c.) Regulations 2010 (as amended) and The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended).

The Wildlife and Countryside Act 1981 (as amended) is a key piece of national legislation which implements the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and implements the species protection obligations of Council Directive 2009/147/EC (formerly 79/409/EEC) on the Conservation of Wild Birds (EC Birds Directive) in Great Britain.

Explanatory notes relating to all bat species protected under The Conservation of Habitats and Species Regulations 2017 (as amended) are given below.

- In the Directive, the term ‘deliberate’ is interpreted as being somewhat wider than intentional and may be thought of as including an element of recklessness.
- The Conservation of Habitats and Species Regulations 2017 (as amended) does not define the act of ‘migration’ and therefore, as a precaution, it is recommended that short distance movement of animals for e.g. foraging, breeding or dispersal purposes are also considered.
- In order to obtain a European Protected Species Mitigation (EPSM) licence, the application must demonstrate that it meets all of the following three ‘tests’: i) the action(s) are necessary for the purpose of preserving public health or safety, or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequence of primary importance for the environment; ii) that there is no satisfactory alternative and iii) that the action authorised will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range.

⁹ Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora

All species of bat are fully protected under The Conservation of Habitats and Species Regulations 2017 (as amended) through their inclusion on Schedule 2. Regulation 41 prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species (all bats)
- Deliberate disturbance of bat species as:
 - a) to impair their ability:
 - (i) to survive, breed, or reproduce, or to rear or nurture young;
 - (ii) to hibernate or migrate³
 - b) to affect significantly the local distribution or abundance of the species
- Damage or destruction of a breeding site or resting place
- Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

Bats are also currently protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5. Under this Act, they are additionally protected from:

- Intentional or reckless disturbance (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

How is the legislation pertaining to bats liable to affect development works?

An EPSM licence issued by the relevant countryside agency (e.g. Natural England) will be required for works liable to affect a bat roost or for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (survive, breed, rear young and hibernate). The licence is to allow derogation from the relevant legislation but also to ensure appropriate mitigation measures be put in place and their efficacy to be monitored.

Though there is no case law to date, the legislation may also be interpreted such that, in certain circumstances, important foraging areas and/or commuting routes can be regarded as being afforded *de facto* protection, for example, where it can be proven that the continued usage of such areas is crucial to maintaining the integrity and long-term viability of a bat roost¹⁰.

¹⁰ Garland & Markham (2008) Is important bat foraging and commuting habitat legally protected? Mammal News, No. 150. The Mammal Society, Southampton.

Appendix 5: Assessment Criteria for Preliminary Roost Assessments

ASSESSMENT CRITERIA – PRELIMINARY ROOST ASSESSMENT – STRUCTURES

The potential for structures to support roosting bats, ranging from negligible to the presence of a confirmed roost, is assessed using the findings of the survey and the desk study. The following criteria were used to determine the level of potential of the buildings for roosting bats:

- **Negligible potential** – While presence cannot be absolutely discounted there were no significant visible features that could be used by bats for roosting.
- **Low** – Small number of potential roosting features such as could be utilised by individual opportunistic roosting bats. Site situated within isolated habitat that could be used by foraging bats but which is not connected by prominent linear features such as woodland edge, hedgerows and tree lines.
- **Moderate** – Several potential roosting features in the buildings or other structures. There is surrounding habitat such as woodland, scattered trees, hedgerows suitable to support foraging and roosting bats. The site is connected with the wider landscape by linear features such as woodland edge, hedgerows and tree lines that could be used by commuting bats.
- **High** – Buildings or other structures, such as mines, caves, tunnels, ice houses and cellars, with numerous features of potential significance for roosting bats. Surrounding landscape has high value habitat for roosting, foraging and commuting that is contiguous with on-site habitats. The site is connected with the wider landscape by strong linear features and may be close to known roosts or other potentially valuable habitat resources.
- **Confirmed roost** – Evidence indicates a building or other structure is used by bats, for example:
 - bats seen roosting or observed flying from a roost or freely in the habitat;
 - droppings, carcasses, feeding remains;
 - bats heard ‘chattering’ inside on a warm day or at dusk.

ASSESSMENT CRITERIA – GROUND LEVEL ROOST ASSESSMENT – TREES

All trees that may have a level of potential for a roost are assessed using the Cowan Scale (Cowan, 2006). The following values are assigned in considering the availability of suitable features for roosting bats:

- **0 – negligible potential** – No visible features that could be used by bats for roosting
- **1 – low potential** – One or two minor features, possible associated with feeding or night-time roosts, such as:

- sparse ivy *Hedera helix*;
- minor branch splits or fissures;
- small areas of loose bark;
- features less than ten years old.
- **2 – moderate potential** – Features that may provide a more secure site for individuals or small groups of bats, such as:
 - dense ivy;
 - significant branch splits;
 - small cavities such as woodpecker holes;
 - features present for between 10 and 30 years.
- **3 – high potential** – Features of particular significance, suitable for high priority roost such as maternity roosts and likely to be used by larger groups of bats, such as:
 - features that provide rare or uncommon conditions in the local area;
 - large cavities or extensive branch or trunk splits;
 - multiple features in the same tree;
 - features present for more than 30 years that could have been used by several generations of bats.
- **4 – confirmed roost** – Evidence indicating use by bats, such as:
 - droppings, carcasses, feeding remains;
 - bats heard ‘chattering’ inside on a warm day or at dusk;
 - bats seen roosting or observed flying from a feature.

Appendix 6: Standard Guidance for Mitigation, Compensation and Enhancement

Bat tubes, bat bricks and bat boxes

To compensate for the loss of roosts used by crevice dwelling species or to provide enhancement measures thought should be given to utilising proprietary products from recognised manufacturers such as: Bird Brick Houses, The Nest Box Company, Schwegler, Habibat, Causa and Vincent. Bat tubes and integrated bat bricks are artificial roost features that can be incorporated into building structures. Bat boxes are generally fitted externally to mature trees or structures. The site's value to bats could be enhanced by installing any of these features. Any bat tubes and bat bricks used for enhancement would need to be in addition to any required to compensate for the loss of the roosts.

Bat tubes, bat bricks or bat boxes should be located at least 5m above ground level facing southeast – southwest and to allow for clear flight paths and should not be directly lit by artificial lighting. Bat boxes should be woodcrete designs as they are long lasting compared to wooden boxes and insulate occupants from extremes of temperature and condensation.

Breathable roof membrane

Breathable roof membranes (BRMs) have been shown to entangle roosting bats, leading to mortality, sometimes of entire colonies. Therefore it is recommended that only bitumen roofing felt that does not contain polypropylene filaments (e.g. bitumen felt type 1F) should be used to reduce the risk of bat mortality.

Bats and lighting

While different species of bat react differently to night time lighting, research has found that bats overall are sensitive to artificial lighting. Excessive and/or poorly directed lighting may delay bats in emerging from their roosts; shortening the time available for foraging, as well as causing bats to move away from suitable foraging grounds and drinking resources, movement corridors or roosting sites, to alternative dark areas (Jones, 2000). Artificial lighting is also thought to increase the chance of predation, as many avian predators will hunt bats (Institute of Lighting Professionals, 2018).

To minimise indirect impacts from lighting associated with the proposed development it is recommended that artificial lighting is only directed where necessary for health and safety reasons. Lighting should not illuminate any features of value to bats, or suspected or confirmed bat roosting sites. Habitats which are likely to support bats and which could be affected by newly proposed lighting include woodland, mature trees, hedgerows, scrub, ponds, lakes, ditches, streams, canals, rivers, rough grassland and buildings (typically pre 1970's or in

disrepair). Lighting should only be used for the period of time for which it is required (Jones, 2000).

This can be achieved by following accepted best practice (Fure, 2006; Institute of Lighting Engineers 2009; Bat Conservation Trust 2011; Stone 2013; Bat Conservation Trust 2014; Institute of Lighting Professionals, 2018):

- Where appropriate, professional lighting designers should be consulted, and the need for quantitative lighting measurements should be considered;
- Lighting mitigation should be based on robust baseline surveys of bat behaviour and existing light levels on site wherever possible;
- The level of artificial lighting including flood lighting should be kept to an absolute minimum;
- Where this does not conflict with health and safety and/or security requirements, the site should be kept dark during peak bat activity periods (0 to 1.5 hours after sunset and 1.5 hours before sunrise);
- Variable lighting regimes (VLR) can be utilised to lower lighting levels during periods of low human activity (e.g 00:30-05:30);
- Lighting required for security or safety reasons should use a lamp of no greater than 2000 lumens (150 Watts) and should comprise sensor-activated lamps;
- Use narrow-spectrum light sources that peak higher than 550 nanometres, avoiding lights with UV, white and blue wavelengths;
- Lights utilising LED technology are the preferred option as these lights do not emit on the UV spectrum, are easily controllable in terms of direction/spill and can be turned on and off instantly;
- A 'warm white' spectrum LED light (ideally <2700 Kelvin) should be used over 'cool white' to reduce blue light component;
- Avoid the use of sodium or metal halide lamps, these gas lamps require a lengthy period in which to turn off and the diffuse nature of the light emitted makes light spillage a significant problem.
- Lights required for night time deliveries or security patrols could be set to activate with pressure activated sensors set into the ground;
- Lighting should be directed to where it is needed to minimise light spillage. This can be achieved by limiting the height of the lighting columns and by using as steep a downward angle as possible and/or a shield/hood/cowl/baffle/louvre that directs the light below the horizontal plane and restricts the lit area;

- Usually using lower lighting columns and increasing the spacing between them reduces light intensity and spill;
- Plant vegetation to form light barriers and dark corridors. Use close-boarded fencing to screen light until vegetation matures. Dark corridors should be well connected to commuting routes;
- Artificial lighting should not directly illuminate any confirmed or potential bat roosting features or habitats of value to commuting/foraging bats. Similarly, any newly planted linear features or compensatory bat roosting features should not be lit;
- The use of reflective surfaces under lights should be avoided;
- Consider the use of 'smart glass' or automatic blinds where windows and glass facades cannot be avoided; and
- Create new habitat as alternative bat flightpaths if the effects of light cannot be properly mitigated for.



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