



Bat Survey Report

Storthes Hall Student Village
for:

Ubrique Investments Ltd

SHF.1337.003.EC.R.002



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Project:	Storthes Hall Student Village
For:	Ubrique Investments Ltd
Status:	Final – Rev A
Date:	24 th July 2023
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1 Introduction

1.1 Commission

1.1.1 In July 2022, Enzygo Ltd was commissioned by Ubrique Investments Ltd to undertake an updated Bat Emergence/Re-entry Survey at Storthes Hall Student Village, off Storthes Hall Lane, Kirkburton, Huddersfield HD8 OPT (central grid reference: SE 1806 1278), located within the Kirklees Council (Kirkburton Ward) planning authority. This study presents an update to surveys previously completed in 2018, which are also reported here, and shall inform proposals for demolition of existing buildings and redevelopment of the site to residential housing.

1.1.2 The proposed works will involve clearance of the site, including demolition of existing buildings and felling of trees, followed by the construction of residential housing with associated access and greenspace. Refer to Appendix A for a plan of the proposals.

1.2 Aims and Objectives

1.2.1 The aim of the Bat Emergence/Re-entry Survey was to:

- Determine the presence/absence of roosting bats;
- Determine species/status/time of year when in use, of any roost present (including status from current season);
- Location of egress/ingress points and which part(s) of the structure bats utilise;
- Environmental conditions within the roost (i.e. temperature, humidity, lighting, disturbance levels, aspect/orientation, surrounding habitat);
- Identify likely impacts of the proposed development on roosting bats;
- Recommend measures to avoid, mitigate or compensate for identified impacts to roosting bats, including any requirement to undertake further surveys or obtain a European Protected Species (EPS) licence from Natural England; and
- Recommend enhancements.

1.2.2 This report has been produced with reference to current guidelines, *Bat Surveys for Professional Ecologist: Good Practice Guidelines, 3rd edition* (Collins, 2016), and in accordance with *BS42020:2013: Biodiversity – Code of Practice for Planning and Development* (BSI, 2013).

1.2.3 This report remains valid for 2 years from the date of survey, or until conditions across the site should substantially alter (although it should be noted that the presence/absence and status of bat roosts can change annually). The age of data should be assessed separately when considering the submission of any EPS Licence (i.e. Natural England may require this to be from the current season).

1.3 Background

1.3.1 A 2018 Preliminary Ecological Appraisal (PEA) and Preliminary Bat Roost Assessment of site (Enzygo, 2018) identified the presence of four bat roosts in roof voids of existing buildings and further opportunities for roosting bats across the site. Bat droppings were collected from the four identified bat roosts in order for them to be subject to species identification through DNA analysis. The assessment concluded that further survey was required to determine the status of the identified roosts and to determine the presence or absence of further bat roosts

associated with buildings across the site. Details of the desk study and field survey undertaken as part of the PEA and PRA have been incorporated into the relevant sections of this report. No specific further survey of mature trees with potential roosting features has been undertaken with the recommendation that these trees are retained and protected (Enzygo, 2022).

- 1.3.2 Following the further nocturnal bat surveys in 2018, and DNA analysis of droppings, a total of six roosts were confirmed at buildings to be demolished comprising three roosts of Common Pipistrelle (*Pipistrellus pipistrellus*) and three roosts of Brown Long-eared Bat (*Plecotus auritus*). In all cases, the roost statuses were assessed in accordance with as of Local value (Wray, Wells, Long, & Mitchell-Jones, 2007) being used by individual bats (common species) or small numbers of non-breeding bats (common species). As the scheme is progressing, it was confirmed in 2022 that updated surveys should be undertaken to confirm the roost statuses and provide updated information to inform appropriate mitigation (including to inform a Natural England licence application).
- 1.3.3 There have been no known discussions regarding ecology with the LPA/County Ecologist/third party consultees (i.e. EA or Natural England) for this application. However, we are aware that Kirklees Council have a specific policy relating to the submission of ecological information where there is the potential for bat roosts on-site (Kirklees Council, 2018), and as such this has been considered in the survey design.

1.4 Site Context

- 1.4.1 The approximately 9.5ha site comprises a student village located in a suburban location approximately 1.5km west of the village of Kirkburton and 5km south-east of Huddersfield town centre. The site comprises large student accommodation buildings, with other associated buildings including a reception and administration building, a gym, and the Venue building which contains a bar, function rooms and study areas.
- 1.4.2 Habitats at the site comprise close-mown amenity grassland, scattered trees and ornamental planting associated with the accommodation blocks, mature broadleaf trees predominantly around the perimeter of the site, and areas of unmanaged scrub, grassland and tall ruderal herb vegetation at the south-west of the site.
- 1.4.3 The north and west boundaries are defined by Storthes Hall Lane beyond which is residential housing, broadleaf woodland and open countryside. The east and south-east boundaries are demarcated by an unnamed access road beyond which is sports pitches and further broadleaf woodland. The south-western boundary is again defined by an unnamed access road beyond which is an active construction site associated with the former Storthes Hall Hospital.

Figure 1.1: Application Site



Image courtesy of Google Image Pro 7.3.2.5491, [Grid Ref: SE 1806 1278]. Imagery date April 2021. Image accessed 24th July 2023.

2 Methodology

2.1 Desk Study

2.1.1 Desk study details were obtained from the following sources on the associated dates as part of the PEA (Enzygo, 2022) to provide background on bat records in the vicinity of the site. Records over 10 years old for transient species and all species protected from sale only are excluded. In each case the search included the site and the specified area beyond the site boundary. The search radius was based on the professional judgement of the ecologist leading the appraisal, taking into account the scope of the proposed works and associated potential impacts, with reference to current guidelines for preliminary ecological appraisal (CIEEM, 2017). Records obtained included:

- Any national statutory sites within a 2km radius designated for bats or associated with an important bat population (Magic Map, 25th October 2022);
- Records of existing Bat EPS Licence applications within a 2km radius (Magic Map, 25th October 2022);
- Any local wildlife sites designated for bats or associated with important bat populations and records of bats within a 2km radius (West Yorkshire Ecological Service (WYES) (17th August 2022); and
- Additional records of Bats within a 2km radius [West Yorkshire Bat Group (18th August 2022)].

2.2 Field Survey

Presence/Absence Survey and Roost Characterisation Survey

2.2.1 Where buildings or structures are found to contain features with the potential to support roosting bats during a Preliminary Bat Roost Assessment or a roost is identified, the building or structure is subject to emergence/re-entry surveys in accordance with current guidelines (Collins, 2016) to determine the presence/absence of roosting bats and to obtain sufficient information in support of an EPS Licence application for submission to Natural England where roosts are identified.

2.2.2 In accordance with current guidance (Collins, 2016) based on the above assessment, buildings should be subject to the following level of survey, although this is also subject to review by the ecologist:

- Known or confirmed roost – Survey effort to be decided by ecologist, but sufficient information should be obtained to satisfy Natural England requirements in support of EPS Licence (should determine species/roost status/time of year when in use, which part of the structure bats utilise/likely egress points/environmental conditions etc);
- High Suitability – Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. The third visit could be either dusk or dawn;
- Moderate Suitability – Two separate survey visits. One dusk emergence and a separate dawn re-entry survey;
- Low Suitability – One survey visit. One dusk emergence or dawn re-entry survey; and
- Negligible Suitability – No further survey.

- 2.2.3 Although the Preliminary Bat Roost Assessment assessed the existing accommodation buildings as of Moderate suitability for roosting bats, it was considered in 2018 that due to the difficulties in surveying the buildings (as a result of the size of the buildings and site and the number of buildings requiring survey), that three separate survey visits were to be undertaken at the appropriate time of year and under suitable weather conditions, comprising one dawn survey and two dusk survey repetitions. In addition, as recommended by current guidance (Collins, 2016) the surveys were spaced out as much as possible over the remaining time within the survey season (following the commission of the surveys) with at least one full survey repetition being conducted between May and August.
- 2.2.4 In 2022, following the updated Preliminary Bat Roost Assessment (Enzygo, 2022), and considering the results established from the previous 2018 surveys, two updated survey repetitions were conducted in accordance with current guidance (Collins, 2016) for buildings assessed as of Moderate suitability for roosting bats. This comprised a single dusk and a single dawn survey repetition at each survey position, with surveys undertaken at the appropriate time of year (and one full repetition within the May to August period). With the conditions on site not having significantly changed between 2018 and 2022 (i.e. buildings and surrounding habitats remain as previously described), these surveys were undertaken to update and confirm the status of roosts previously identified (not as standalone presence/absence surveys due to the existing information available).
- 2.2.5 The number of surveyors and surveyor positions was carefully considered to maximise the coverage of the site and generate the highest chance of detecting roosting bats. Surveyor numbers and locations were adapted following each survey repetition as determined by the findings of the previous surveys and to ensure different elevations of buildings were focussed upon, and therefore adequately covering all potential egress points and aspects of the buildings. Due to the size of the site and the number of surveyors required, each survey repetition was divided into separate site visits, as detailed at Table 2.1 below. Refer to the appended Drawings for the locations of surveyors on each of the survey repetitions and illustration of the bat activity detected.
- 2.2.6 As recommended by current guidance (Collins, 2016), the dawn re-entry survey commenced at least 1.5 hours before, and finished 15 minutes after, sunrise, and the dusk emergence surveys commenced 15 minutes before, and finished at least 1.5 hours after, sunset.
- 2.2.7 During the survey, the surveyors recorded the time, location, species, and behaviour (i.e. emergence/re-entry, foraging, commuting or swarming) of each bat pass where observed. Additional factors, such as, the number of bats, flight height, bat appearance and relative speed, were recorded where appropriate. Although no specific bat activity survey was undertaken, all incidental observations of bats throughout surrounding habitats were also recorded.
- 2.2.8 As detailed within the *Minimum Standards for Bat Surveys in West Yorkshire* (West Yorkshire Ecology Advisory Group, 2012) guidance document, all surveyors were suitably experienced, and all surveys were orchestrated by licensed bat surveyor, and Director of Ecology at Enzygo, Derek Allan MSc BSc (Hons) MCIEEM (Natural England licence Level 2, 2015-14659-CLS-CLS). Additionally, the surveys were not undertaken with the use of heterodyne detectors alone, with each survey utilising frequency division or time expansion detectors.
- 2.2.9 Table 2.1, below, presents the survey dates, surveyors, bat detectors used, survey times and the weather conditions at the time of survey (this includes all surveys undertaken in 2018 and updated surveys completed in 2022).

Table 2.1: Survey and Surveyor Details

Survey Repetition	Survey Type	Date	Surveyor, Location No. and Detectors	Sunset / Sunrise Time	Start	End	Weather Conditions
1 (2018)	Dusk Emergence	22/08/2018	<ul style="list-style-type: none"> 1) Jordan Prendergast BSc (Hons) (Batbox Duet with Tascam DR-05 Audio Recorder) 2) Joanne Dodd (iPhone with Echo Meter Touch 2) 3) Nathan Rimmer (iPhone with Echo Meter Touch 2) 4) Joe Cooper (Magenta Bat 5) 5) Chris Schofield MSc BSc GradCIEEM (iPad with Echo Meter Touch 2 Pro) 	20:21	20:10	21:50	Dry with 100% cloud cover, light wind and 17°C. Occasional showers before the start of the survey.
		23/08/2018	<ul style="list-style-type: none"> 6) Jordan Prendergast BSc (Hons) (Elekon Batscanner) 7) Chris Schofield MSc BSc GradCIEEM (iPad with Echo Meter Touch 2 Pro) 8) Sophie Gordon (Batbox Duet with Tascam DR-05 Audio Recorder) 9) Rachel Thompson (Batbox Duet) 10) Joe Cooper (iPhone with Echo Meter Touch 2) 11) Joanne Dodd (iPhone with Echo Meter Touch 2) 12) Nathan Rimmer (iPhone with Echo Meter Touch 2) 	20:18	20:05	21:50	Dry with 0% cloud cover, moderate wind and 13°C.
		24/08/2018	<ul style="list-style-type: none"> 13) Rachel Thompson (Batbox Duet with Tascam DR-05 Audio Recorder) 14) Emma Gray (Elekon Batscanner) 15) Joanne Dodd (iPhone with Echo Meter Touch 2) 16) Joe Cooper (iPhone with Echo Meter Touch 2) 17) Sophie Gordon (Batbox Duet) 18) Nathan Rimmer (iPhone with Echo Meter Touch 2) 19) Chris Schofield MSc BSc GradCIEEM (iPad with Echo Meter Touch 2 Pro) 20) Jordan Prendergast BSc (Hons) (Elekon Batscanner) 	20:16	20:05	21:45	Dry with 10% cloud cover, light wind and 11°C.

Survey Repetition	Survey Type	Date	Surveyor, Location No. and Detectors	Sunset / Sunrise Time	Start	End	Weather Conditions
2 (2018)	Dawn Re-entry	29/08/2018	<ol style="list-style-type: none"> 1) Jordan Prendergast BSc (Hons) (Batbox Duet with Tascam DR-05 Audio Recorder) 2) Joanne Dodd (iPhone with Echo Meter Touch 2) 3) Joe Cooper (iPhone with Echo Meter Touch 2) 4) Nathan Rimmer (iPhone with Echo Meter Touch 2) 5) Chris Schofield MSc BSc GradCIEEM (iPad with Echo Meter Touch 2 Pro) 	06:10	04:30	06:20	Dry with 90% cloud cover, no wind and 14°C.
		30/08/2018	<ol style="list-style-type: none"> 6) Chris Schofield MSc BSc GradCIEEM (iPad with Echo Meter Touch 2 Pro) 7) Jordan Prendergast BSc (Hons) (Batbox Duet with Tascam DR-05 Audio Recorder) 8) Joanne Dodd (iPhone with Echo Meter Touch 2) 9) Joe Cooper (iPhone with Echo Meter Touch 2) 10) Nathan Rimmer (iPhone with Echo Meter Touch 2) 11) Ben Arkless (Elekon Batscanner) 	06:12	04:30	06:20	Dry with 0% cloud cover, no wind and 8°C.
		13/09/2018	<ol style="list-style-type: none"> 12) Joe Cooper (iPhone with Echo Meter Touch 2) 13) Caitlin O'Connor (Elekon Batscanner) 14) Chloe Harris (Elekon Batscanner) 15) Joanne Dodd (iPhone with Echo Meter Touch 2) 16) Jordan Prendergast BSc (Hons) (iPhone with Echo Meter Touch 2 Pro) 17) Chris Schofield MSc BSc GradCIEEM (iPad with Echo Meter Touch 2 Pro) 18) Joanne Dodd (iPhone with Echo Meter Touch 2) 	06:37	05:05	06:50	Dry with 25% cloud cover, light wind and 10°C.

Survey Repetition	Survey Type	Date	Surveyor, Location No. and Detectors	Sunset / Sunrise Time	Start	End	Weather Conditions
3 (2018)	Dusk Emergence	19/09/2018	1) Nathan Rimmer (iPhone with Echo Meter Touch 2) 2) Joe Cooper (iPhone with Echo Meter Touch 2) 3) Chloe Harris (Batbox Duet with Tascam DR-05 Audio Recorder) 4) Caitlin O'Connor (iPad with Echo Meter Touch 2 Pro) 5) Chris Schofield MSc BSc GradCIEEM (Elekon Batscanner)	19:13	19:00	20:45	Dry with 0% cloud cover, moderate wind and 14°C.
		25/09/2018	6) Jordan Prendergast BSc (Hons) (iPhone with Echo Meter Touch 2 Pro) 7) Chris Schofield MSc BSc GradCIEEM (iPad with Echo Meter Touch 2 Pro) 8) Joe Cooper (iPhone with Echo Meter Touch 2) 9) Sophie Gordon (Batbox Duet with Tascam DR-05 Audio Recorder) 10) Nathan Rimmer (iPhone with Echo Meter Touch 2)	18:58	18:45	20:30	Dry with 10% cloud cover, no wind and 14°C.
		26/09/2018	11) Chloe Harris (Elekon Batscanner) 12) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 13) Chris Schofield MSc BSc GradCIEEM (Batbox Duet) 14) Ben Arkless (Elekon Batscanner) 15) Caitlin O'Connor (iPad with Echo Meter Touch 2 Pro)	18:56	18:40	20:25	Dry with 25% cloud cover, light wind and 17°C.
		27/09/2018	16) Chris Schofield MSc BSc GradCIEEM (iPad with Echo Meter Touch 2 Pro) 17) Chloe Harris (Batbox Duet with Tascam DR-05 Audio Recorder) 18) Joe Cooper (iPhone with Echo Meter Touch 2) 19) Caitlin O'Connor (Elekon Batscanner) 20) Jordan Prendergast BSc (Hons) (iPhone with Echo Meter Touch 2 Pro)	18:53	18:40	20:25	Dry with 75% cloud cover, light wind and 16°C.

Survey Repetition	Survey Type	Date	Surveyor, Location No. and Detectors	Sunset / Sunrise Time	Start	End	Weather Conditions
1 (2022)	Dusk Emergence	29/08/2022	1) Steve Smith (Elekon Batscanner) 2) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 3) Eleanor Lowe (Pettersson D100) 4) Becky Williams (iPhone with Echo Meter Touch 2 Pro) 5) Richard Lowe (Pettersson D100)	20:04	19:49	21:34	Dry with 100% cloud cover, light wind and 16°C.
		30/08/2022	11) Eleanor Lowe (Pettersson D100) 12) Marisa Hensey (iPhone with Echo Meter Touch 2 Pro) 15) Steve Smith (Elekon Batscanner) 19) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 20) Richard Lowe (Pettersson D100)	20:02	19:47	21:32	Dry with 60% cloud cover, no wind and 16°C.
		12/09/2022	14) Steve Smith (Elekon Batscanner) 16) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 17) Sam Kellett (iPhone with Echo Meter Touch 2 Pro) 18) Richard Lowe (Pettersson D100)	19:30	19:15	21:00	Dry with 90% cloud cover, light wind and 16°C.
		13/09/2022	6) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 7) Steve Smith (Elekon Batscanner) 8) Sam Kellett (iPhone with Echo Meter Touch 2 Pro) 10) Richard Lowe (Pettersson D100)	19:25	19:10	20:55	Dry with 50% cloud cover, no wind and 15°C.
		21/09/2022	9) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 13) Antony Johnson (iPhone with Echo Meter Touch 2 Pro)	19:08	18:53	20:38	Dry with 50% cloud cover, light wind and 15°C.

2 (2022)	Dawn Re-entry	30/08/2022	6) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 7) Steve Smith (Elekon Batscanner) 8) Eleanor Lowe (Pettersson D100) 9) Becky Williams (iPhone with Echo Meter Touch 2 Pro) 10) Richard Lowe (Pettersson D100)	06:12	04:42	06:27	Dry with 20% cloud cover, light wind and 11°C.
		31/08/2022	13) Marisa Hensey (iPhone with Echo Meter Touch 2 Pro) 14) Steve Smith (Elekon Batscanner) 16) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 17) Eleanor Lowe (Pettersson D100) 18) Richard Lowe (Pettersson D100)	06:16	04:46	06:31	Dry with 100% cloud cover, no wind and 13°C.
		13/09/2022	4) Richard Lowe (Pettersson D100) 11) Sam Kellett (iPhone with Echo Meter Touch 2 Pro) 12) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 15) Steve Smith (Elekon Batscanner)	06:36	05:06	06:51	Dry with 10% cloud cover, light wind and 9°C.
		14/09/2022	1) Steve Smith (Elekon Batscanner) 2) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 3) Sam Kellett (iPhone with Echo Meter Touch 2 Pro) 4) Richard Lowe (Pettersson D100)	06:38	05:08	06:53	Dry with 50% cloud cover, light wind and 9°C.
		22/09/2022	19) Jordan Prendergast (iPhone with Echo Meter Touch 2 Pro) 20) Antony Johnson (iPhone with Echo Meter Touch 2 Pro)	06:52	05:22	07:07	Dry with 80% cloud cover, light wind and 11°C

Complementary Methods

2.2.10 The four samples of bat droppings collected during the 2018 Preliminary Roost Assessment, were analysed (i.e. measurement and characteristics recorded) in accordance with current guidance (Stebbing, 2007), and submitted for eDNA analysis to SureScreen Scientifics (see Appendix C for results & methodology). No eDNA analysis of droppings was undertaken in 2022 as droppings were located in the same positions as in 2018.

2.2.11 No additional capture methods, such as hand nets, and no further complementary surveys methods, such as Infra-Red cameras, were used.

2.3 Assessment

2.3.1 Where roosts are identified, likely status (irrespective of species conservation status) has been categorised as follows in accordance with current guidance (Collins, 2016):

- Transitional roost (April-September/October) – used by a few individuals or occasionally small groups of bats on waking from hibernation or in the period prior to hibernation;
- Maternity roost (May-August) – used by breeding females, where babies are born and raised to independence. Adult males rarely found here;
- Satellite roost (May-August) – used by a few individuals to small groups of breeding females as alternative roost sites in close proximity to maternity roosts;
- Mating roost (September-November) – established by males of some species to display/call to females to mate;
- Hibernation roost (October-March) - where bats may be found during the winter. They vary greatly in terms of the number of individuals and diversity of species using them;
- Night roost (March-November) – used by bats as roosts other than traditional day roosts to rest in during the night. May be used by a single individual on occasion or regularly by an entire colony;
- Day roost (March-November) – used by bats during the day to rest in, often by males. Bats may regularly use a number of days' roosts or the same site for several weeks;
- Feeding roost (May-November) – can be occupied by a single bat or a few individuals to an entire colony to feed, shelter from the weather or to rest temporarily; and
- Swarming sites (August-November) – where large numbers of bats from several species gather, generally around caves and mines.

2.3.2 Following the framework for valuing bats in Ecological Impact Assessment set out by Wray et al. (2007), bat roosts are assigned a value, based on roost type and species rarity (as detailed within Table 2.2), using a geographic frame of reference as shown in Table 2.3.

Table 2.2: Categorisation of Bats by National Rarity

Rarity within Range	England	Wales	Scotland	Northern Ireland
Common (population over 100,000)	Common Pipistrelle Bat (<i>Pipistrellus pipistrellus</i>), Soprano Pipistrelle Bat (<i>Pipistrellus pygmaeus</i>), Brown Long-eared Bat (<i>Plecotus auritus</i>)	Common Pipistrelle Bat, Soprano Pipistrelle Bat	Common Pipistrelle Bat, Soprano Pipistrelle Bat	Common Pipistrelle Bat, Soprano Pipistrelle Bat
Rarer (population 10,000-100,000)	Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>), Whiskered Bat (<i>Myotis mystacinus</i>), Brandt's Bat (<i>Myotis brandtii</i>), Daubenton's Bat (<i>Myotis daubentonii</i>), Natterer's Bat (<i>Myotis nattereri</i>), Leisler's Bat (<i>Nyctalus leisleri</i>), Noctule Bat (<i>Nyctalus noctula</i>), Nathusius' Pipistrelle Bat (<i>Pipistrellus mathusii</i>), Serotine Bat (<i>Eptesicus serotinus</i>)	Lesser Horseshoe Bat, Daubenton's Bat, Natterer's Bat, Brown Long-eared Bat	Daubenton's Bat, Natterer's Bat, Brown Long-eared Bat	Daubenton's Bat, Natterer's Bat, Leisler's Bat, Nathusius' Pipistrelle Bat, Brown Long-eared Bat
Rarest (population under 10,000)	Greater Horseshoe Bat (<i>Rhinolophus ferrumequinum</i>), Bechstein's Bat (<i>Myotis bechsteinii</i>), Alcathoe Bat (<i>Myotis alcathoe</i>), Barbastelle Bat (<i>Barbastelle barbastellus</i>), Grey Long-eared Bat (<i>Plecotus austriacus</i>)	Greater Horseshoe Bat, Whiskered Bat, Brandt's Bat, Bechstein's Bat, Alcathoe Bat, Noctule Bat, Nathusius' Pipistrelle Bat, Serotine Bat, Barbastelle Bat	Whiskered Bat, Brandt's Bat, Alcathoe Bat, Noctule Bat, Nathusius' Pipistrelle Bat, Leisler's Bat	Whiskered Bat
*Vagrant species and occasional visitors	Greater Mouse-eared Bat (<i>Myotis myotis</i>), Parti-coloured Bat (<i>Vespertilio murinus</i>), Kuhl's Pipistrelle Bat (<i>Pipistrellus kuhlii</i>), Savi's Pipistrelle Bat (<i>Hypsugo savii</i>), Pond Bat (<i>Myotis dasycneme</i>), Notch-eared Bat (<i>Myotis emarginatus</i>), Northern Bat (<i>Eptesicus nilssoni</i>)			

Table 2.3: Roost valuation system

Geographic Frame of Reference	Roost Types
District, Local or Parish	Feeding Perches (common species), individual bats (common species), small numbers of non-breeding bats (common species), mating sites (common species)
County	Maternity sites (common species), small numbers of hibernating bats (common and rarer species), feeding perches (rarer/rarest species), individual bats (rarer/rarest species), small numbers of non-breeding bats (rarer/rarest species)
Regional	Mating sites (rarer/rarest species) including well-used swarming sites, maternity sites (rarer species), hibernation sites (rarest species), significant hibernation sites
National/UK	Maternity sites (rarest species), Sites of Special Scientific Interest (SSSI)
International	Special Areas of Conservation (SAC)

2.3.3 Potential ecological constraints to development have been identified from desk study and field survey data using current development proposals.

2.3.4 An assessment of likely ecological impacts has been undertaken in accordance with CIEEM guidelines (CIEEM, 2016) only where clear evidence is available to substantiate and justify the findings. This covers construction and operational impacts and includes (but is not limited to): short-term impacts: disturbance; long-term impacts: modification, loss, and fragmentation/isolation; and post-development interference impacts. In the absence of such evidence, the ecological feature is merely identified as a potential constraint to development.

2.3.5 Where ecological constraints to development are identified, further survey requirements and/or avoidance, mitigation, compensation measures that are proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed works are described. In addition, in accordance with the NPPF, opportunities to enhance or create benefits to wildlife are explored alongside the hierarchy of aforementioned measures.

2.4 Limitations

2.4.1 Data held by consultees may not be exhaustive. The absence of evidence does not indicate evidence of absence.

2.4.2 Enzygo cannot take responsibility for the accuracy of external data sources and as such discrepancies and inaccuracies may occur.

2.4.3 Once light levels drop below a given point it is possible to miss bats emerging from egress points. While every effort is made to detect emerging bats, it cannot be guaranteed that all emerging bats will be detected.

2.4.4 It should be noted that Long-eared Bats in particular echolocate more quietly, and Horseshoe Bat species in particular echolocate more directionally, compared to other bat species and so can sometimes be more difficult to detect and often go unrecorded.

2.4.5 Species from the *Myotis* and *Nyctalus* genera are notoriously difficult to distinguish in the field and from recorded sonograms, as there is considerable overlap in their range of echolocation frequencies. Where the species cannot be determined only the genus is stated.

2.4.6 Although the location and number of surveyors was carefully considered, due to the size and nature of the buildings (typically three to four storeys), it was not possible to observe all roof

aspects from ground level, and as such it is possible roosting bats may have gone unobserved, particularly late-emerging and “quiet” echolocating species such as Brown Long-eared bat. However, this survey limitation has been fully considered, both in the design of the survey and in the assessment of potential impacts made below.

3 Results and Evaluation

3.1 Desk Study

3.1.1 A description of desk study findings relevant to bats is presented in Table 3.1. Along with predicted impacts and their effect on Bats, determined following guidelines set out by CIEEM (CIEEM 2016), in the absence of mitigation.

Table 3.1: Desk Study Findings

Reference	Description	Assessment	Potential Constraint
<i>Statutory Sites Designated or Associated with Bats</i>			
None	-	-	-
<i>Local Wildlife Sites Designated or Associated with Bats</i>			
None (but located within Bat Alert Zone)	The site is likely located within a 'Kirklees District Bat Alert Zone' as it is located within a 200m radius of woodland.	Refer to Table 3.2 below	Refer to Table 3.2 below
<i>Historical Records</i>			
2km radius	Surveys in 2012 at the former Storthes Hall Hospital, 180m south of the site, identified roosts of Common Pipistrelle (<i>Pipistrellus pipistrellus</i>), and foraging and commuting activity of Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>), Noctule (<i>Nyctalus noctula</i>), Brown Long-eared (<i>Plecotus auritus</i>) and <i>Myotis</i> sp. (Quants Environmental Ltd., 2012). In addition to the above listed species, West Yorkshire Bat Group and West Yorkshire Ecological Service report records of Leisler's Bat (<i>Nyctalus leisleri</i>), Whiskered Bat (<i>Myotis mystacinus</i>), Daubenton's Bat (<i>Myotis daubentonii</i>) in the wider area of the site. The closest is a 2021 record of a Whiskered Bat roost from 475m to the south. Four records of previous Natural England EPS licence applications within a 2km radius with the closest a 2017 Common Pipistrelle licence record from approximately 250m to the south (licence reference 2017-30682-EPS-MIT).	Refer to Table 3.2 below	Refer to Table 3.2 below

3.2 Field Survey

- 3.2.1 A description of the survey results at each of the existing accommodation buildings, and corresponding roost status, is presented in Table 3.2. Along with any identified potential impacts and their effect on bats, determined following guidelines set out by CIEEM (CIEEM 2016), in the absence of mitigation. Refer to Drawing SHF.1337.002.EC.D.003-5 and SHF.1337.003.EC.D.002 and .003 for surveyor and bat activity locations and Appendix B for full survey results.
- 3.2.2 In summary, a combination of the PRA, DNA analysis of droppings and the nocturnal emergence/re-entry surveys in 2018 and 2022 have confirmed the presence of a total of eleven bat roosts at the existing buildings, comprising eight roosts of Common Pipistrelle and three roosts of Brown Long-eared Bat (*Plecotus auritus*). The buildings where confirmed roosts have been identified comprise: Building 1, Building 3, Building 9, Building 16, Building 18 and Building 20. In all cases the detected emerging bats were observed flying directly to the mature trees which border the site, or entering the site from these boundary habitats; no use of building/roof lines commuting to/from roosts was observed (the environmental conditions within the identified roosts (i.e. temperature, humidity, lighting, disturbance levels, aspect/orientation, surrounding habitat) will be fully detailed within the EPS licence application).
- 3.2.3 In addition, due to the size and nature of the remaining buildings (with the exception of the smaller two storey buildings of Building 2 and Building 22), it was not possible to observe all roof aspects from ground level, and as such it is possible low status roosts may have gone unobserved at Buildings 3 to 14, Building 17 and Building 19.
- 3.2.4 In accordance with the framework for valuing bats in Ecological Impact Assessment set out by Wray et al. (2007), the roost statuses are considered of Local value being used on an occasional and transitional basis by individual bats (common species) or small numbers of non-breeding bats (common species).
- 3.2.5 No evidence of any higher status roost, such as maternity roosts, has been identified through the surveys. The survey design, including appropriate spread of surveyors, and undertaking appropriate numbers of repetitions at a suitable time of year, is considered suitable to exhaustively and conclusively confirm that no higher status roost(s) is present.
- 3.2.6 In addition to the above detected roosting species, low levels of Noctule (*Nyctalus noctula*), Leisler's Bat (*Nyctalus leisleri*) and (Soprano Pipistrelle (*Pipistrellus pygmaeus*) were recorded utilising surrounding habitats. No other bats species was detected during the surveys.
- 3.2.7 The site is significantly lit by artificial lighting throughout, which also spills on to the adjacent woodland habitats, which are otherwise of High suitability for foraging and commuting bats (Collins, 2016).
- 3.2.8 Observations during the survey did not identify any significant commuting routes within or adjacent to the site. No significant loss of foraging habitat and no severance/fragmentation of commuting routes is predicted.
- 3.2.9 Surveys did not specifically target mature trees around the perimeter of the site which have been identified as supporting potential roosting features (refer to the separate Preliminary Ecological Appraisal (Enzygo, 2022)), however, no incidental observation of any tree roosts was observed.

Table 3.2: Presence/Absence and Roost Characterisation Survey Results

Reference	Survey Results	Assessment (Wray et al. (2007))	Potential Constraint
Building 1	<p>An area of approximately 50 bat droppings was found within the roof void at the south-east of the building on an area of fibreglass insulation during the PRA. DNA analysis has confirmed these droppings are of Common Pipistrelle.</p> <p>Survey 1 in 2018 (22/08/18): Single Common Pipistrelle observed emerging from roost at the valley of the roof at the northern elevation of the building at the location shown on the images below.</p> <p>Remaining 2018 and 2022 surveys did not detect any roosting activity.</p> <p><i>Roost 1.</i></p>  <p>No roosting activity detected on remaining surveys in 2018 or in 2022.</p> <p>No evidence of any maternity roosts, or other higher status roost, was detected associated with Building 1 either through the PRA or the emergence/re-entry surveys. In addition, although a cellar is present, with some undisturbed darkened rooms, no opportunities for access by bats to these areas was noted during the interior and exterior inspection of the building; the presence of hibernating bats at the cellar or anywhere else associated with Building 1 is reasonably discounted.</p>	<p>Confirmed day roost of Common Pipistrelle, likely only used on an occasional and transitional basis by individual or low numbers.</p> <p>Local value.</p>	<p>Yes – a) risk of killing/injury of roosting bats, and b) destruction of roost during demolition activities.</p> <p>Significant adverse, permanent, irreversible impact.</p>
Building 2	<p>No roosting bats detected on any survey repetition and no droppings identified during the PRA. Absence of roosting bats confirmed; no survey limitations experienced.</p>	-	No

<p>Building 3</p>	<p>Total of three Common Pipistrelle roosts identified through 2018 and 2022 surveys</p> <p>2018 Survey 1 (22/08/18): No roosting bats detected.</p> <p>2018 Survey 2 (29/08/18): Two Common Pipistrelle observed entering roost (Roost 6a) beneath the timber fascia at the roof line (shown on image below) at the eastern end of the south-east elevation of the building.</p> <p>2018 Survey 3: (19/09/18): Single Common Pipistrelle observed leaving roost (Roost 6a) at the same location as above (shown below).</p> <p>2022 Survey 1: (29/08/22): Two Common Pipistrelle observed leaving roost from beneath timber fascia at the roofline on the west elevation of building (Roost 7). Single Common Pipistrelle observed emerging Roost 6a, and a second Common Pipistrelle observed emerging from the apex of the gable end of the eastern section of the Building 3 (Roost 6b).</p> <p>2022 Survey 2: (14/09/22): No roosting activity detected.</p> <p><i>Roost 6a and 6b</i></p>  <p><i>Roost 7</i></p> 	<p>Confirmed day roosts of Common Pipistrelle, likely only used on a transitional and occasional basis by individual or low numbers.</p> <p>Local value.</p>	<p>Yes – a) risk of killing/injury of roosting bats, and b) destruction of roost during demolition activities.</p> <p>Significant adverse, permanent, irreversible impact.</p>
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Reference	Survey Results	Assessment (Wray et al. (2007))	Potential Constraint
	<p>No evidence of any higher status roost, such as a maternity roost, was detected associated with Building 3 either through the PRA or the emergence/re-entry surveys. The building does not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>		
<p>Building 4 - Building 8</p>	<p>No roosting bats detected on any survey repetition and no droppings identified during the PRA. Due to the size and nature of the buildings, it is possible that low status roosts may have gone unobserved through the surveys.</p> <p>No evidence of any higher status roosts, such as a maternity roosts, were detected associated with Buildings 4 to 8 either through the PRA or the emergence/re-entry surveys. The buildings do not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>	<p>Possible low status roosts of local value.</p>	<p>Yes – a) low risk of killing/injury of roosting bats, and b) low risk of destruction of roost during demolition activities.</p> <p>Low risk of significant adverse, permanent, irreversible impact.</p>
<p>Building 9</p>	<p>Single Common Pipistrelle roost identified through 2018 and 2022 surveys. 2022 Survey 1: (29/08/22): Two Common Pipistrelle observed emerging beneath timber fascia at the roofline on the southern elevation of building (Roost 8).</p> <p><i>Roost 8</i></p>  <p>No roosting activity detected on other surveys in 2018 or in 2022.</p> <p>No evidence of any higher status roost, such as a maternity roost, was detected associated with Building 3 either through the PRA or the emergence/re-entry surveys. The building does not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>	<p>Confirmed day roost of Common Pipistrelle, likely only used on an occasional and transitional basis by individual or low numbers. Local value.</p>	<p>Yes – a) risk of killing/injury of roosting bats, and b) destruction of roost during demolition activities.</p> <p>Significant adverse, permanent, irreversible impact.</p>
<p>Building 10 - Building 15</p>	<p>No roosting bats detected on any survey repetition and no droppings identified during the PRA. Due to the size and nature of the buildings, it is possible that low status roosts may have gone unobserved through the surveys.</p>	<p>Possible low status roosts of local value.</p>	<p>Yes – a) low risk of killing/injury of roosting bats, and b) low risk of</p>

Reference	Survey Results	Assessment (Wray et al. (2007))	Potential Constraint
	<p>No evidence of any higher status roosts, such as a maternity roosts, were detected associated with Buildings 10 to 15 either through the PRA or the emergence/re-entry surveys. The buildings do not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>		<p>destruction of roost during demolition activities. Low risk of significant adverse, permanent, irreversible impact.</p>
Building 16	<p>An area of approximately 30 bat droppings was found within the roof void at the south of the building during the PRA in 2018. In 2022, approximately 10 droppings were found in this location, appearing old and likely a remnant of those present in 2018. DNA analysis has confirmed these droppings are of Brown Long-eared Bat (Roost 2). <i>Roost 2 – Brown Long-eared Bat droppings</i></p>  <p>No roosting bats detected during the emergence/re-entry surveys. No evidence of any higher status roost, such as a maternity roost, was detected associated with Building 16 either through the PRA or the emergence/re-entry surveys. The building does not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>	<p>Confirmed low status roost of Brown Long-eared bat, likely only used on a transitional and occasional basis by individual or low numbers. Local value.</p>	<p>Yes – a) risk of killing/injury of roosting bats, and b) destruction of roost during demolition activities. Significant adverse, permanent, irreversible impact.</p>
Building 17	<p>No roosting bats detected on any survey repetition and no droppings identified during the PRA. Due to the size and nature of the building, it is possible that low status roosts may have gone unobserved through the surveys. No evidence of any higher status roost, such as a maternity roost, was detected associated with Building 17 either through the PRA or the emergence/re-entry surveys. The building does not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>	<p>Possible low status roosts of local value.</p>	<p>Yes – a) low risk of killing/injury of roosting bats, and b) low risk of destruction of roost during demolition activities. Low risk of significant adverse, permanent, irreversible impact.</p>

Reference	Survey Results	Assessment (Wray et al. (2007))	Potential Constraint
Building 18	<p>An area of approximately 15 bat droppings was found within the roof void at the east of the building during the PRA in 2018. DNA analysis has confirmed these droppings are of Brown Long-eared Bat (Roost 3). No droppings detected in 2022.</p> <p>In addition, a single Common Pipistrelle roost identified during the 2022 surveys.</p> <p>2022 Survey 1: (12/09/22): Single Common Pipistrelle emerged from roost beneath timber fascia on the east elevation and commuted north to tree-line (Roost 9).</p> <p><i>Roost 3 - Brown Long-eared Bat droppings</i></p>  <p><i>Roost 9</i></p>  <p>No other roosting activity detected during the surveys in 2018 or 2022.</p>	<p>Confirmed low status roosts of Brown Long-eared bat and Common Pipistrelle, likely only used on a transitional and occasional basis by individual or low numbers.</p> <p>Local value.</p>	<p>Yes – a) risk of killing/injury of roosting bats, and b) destruction of roost during demolition activities.</p> <p>Significant adverse, permanent, irreversible impact.</p>

Reference	Survey Results	Assessment (Wray et al. (2007))	Potential Constraint
	<p>No evidence of any higher status roost, such as a maternity roost, was detected associated with Building 18 either through the PRA or the emergence/re-entry surveys. The building does not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>		
Building 19	<p>No roosting bats detected on any survey repetition and no droppings identified during the PRA. Due to the size and nature of the building, it is possible that low status roosts may have gone unobserved through the surveys.</p> <p>No evidence of any higher status roost, such as a maternity roost, was detected associated with Building 19 either through the PRA or the emergence/re-entry surveys. The building does not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>	Possible low status roosts of local value.	<p>Yes – a) low risk of killing/injury of roosting bats, and b) low risk of destruction of roost during demolition activities.</p> <p>Low risk of significant adverse, permanent, irreversible impact.</p>

<p>Building 20</p>	<p>Approximately 200 bat droppings have accumulated on an area of fibreglass insulation at the east of the building at the base of an internal dividing wall and beneath an area of adjacent loose roofing membrane. Further individual droppings are scattered down the dividing wall. DNA analysis has confirmed these droppings are of Brown Long-eared Bat (Roost 4). These droppings were present in similar number in 2022.</p> <p>In addition, a two Common Pipistrelle roosts identified during the 2018 and 2022 surveys.</p> <p>2018 Survey 2 (13/09/18): A single Common Pipistrelle observed entering a roost at a gap beneath the window ledge at the western end of the south-east elevation of the building (indicated on the images below) (Roost 5)</p> <p>2022 Survey 2 (31/08/22): A single Common Pipistrelle observed entering a roost on the northern elevation of the western arm of the building. Entered beneath timber fascia at the wall top (Roost 10)</p> <p><i>Roost 4 - Brown Long-eared Bat droppings</i></p>  <p><i>Roost 5</i></p> 	<p>Confirmed low status roost of Common Pipistrelle and day roost of Brown Long-eared bat, likely only used on a transitional and occasional basis by individual or low numbers.</p> <p>Local value.</p>	<p>Yes – a) risk of killing/injury of roosting bats, and b) destruction of roost during demolition activities.</p> <p>Significant adverse, permanent, irreversible impact.</p>
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Reference	Survey Results	Assessment (Wray et al. (2007))	Potential Constraint
	<p><i>Roost 10</i></p>  <p>No evidence of any higher status roost, such as a maternity roost, was detected associated with Building 20 either through the PRA or the emergence/re-entry surveys. The building does not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>		
Building 21	<p>No roosting bats detected on any survey repetition and no droppings identified during the PRA. Due to the size and nature of the building, it is possible that low status roosts may have gone unobserved through the surveys.</p> <p>No evidence of any higher status roost, such as a maternity roost, was detected associated with Building 21 either through the PRA or the emergence/re-entry surveys. The building does not provide any hibernation potential, with no features which would maintain a constant cool temperature and high humidity over the winter.</p>	Possible low status roosts of local value.	<p>Yes – a) low risk of killing/injury of roosting bats, and b) low risk of destruction of roost during demolition activities.</p> <p>Low risk of significant adverse, permanent, irreversible impact.</p>
Building 22	<p>No roosting bats detected on any survey repetition and no droppings identified during the PRA. Absence of roosting bats confirmed; no survey limitations experienced.</p>	-	No

4 Relevant Legislation and Policy

4.1 Legislation

4.1.1 Wildlife legislation and policy relevant (or potentially relevant pending further survey) to the proposed works, based on the findings of the desk study and field survey are set out below. This legal information is a summary only, and the original legal documents should be consulted for definitive information.

Table 4-1: Legislation Protection Afforded to Sites/Habitats that could Potentially be Affected by the Proposed Works

Designated Site/Habitat	Legal Status
None	-

Table 4-2: Legislation Protection Afforded to Species that could Potentially be Affected by the Proposed Works

Species	Legal Status
European Protected	
Bats	<p>These animal species and their breeding sites or resting places are protected under Regulation 41 of the Conservation of Habitats and Species (Amendment) Regulations 2012, which makes it illegal to:</p> <ul style="list-style-type: none"> • Deliberately capture, injure or kill any such animal or to deliberately take or destroy their eggs; • Deliberately disturb such an animal; • Damage or destroy a breeding site or resting place of such an animal. <p>European Protected Species (EPS) licences can be granted by Natural England in respect of development to permit activities that would otherwise be unlawful under the Conservation Regulations, providing that the following 3 tests (set out in the EC Habitats Directive) are passed:</p> <ul style="list-style-type: none"> • The development is for reasons of overriding public interest; • There is no satisfactory alternative; and • The favourable conservation status of the species concerned will be maintained and/or enhanced. <p>Under Regulation 9(5) of the Conservation Regulations, Planning Authorities have a legal duty to 'have regard to the requirements of the EC Habitats Directive in the exercise of their functions'. This means that they must consider the above 3 tests when determining whether Planning Permission should be granted for developments likely to cause an offence under the Conservation Regulations. As a consequence, Planning Applications for such developments must demonstrate that the 3 tests will be passed.</p>
Nationally Protected	
Bats	<p>These animals receive full protection under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000), which makes it illegal (subject to exceptions) to:</p> <ul style="list-style-type: none"> • Intentionally kill, injure or take any such animal; • Intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any such animal; and • Intentionally or recklessly disturb such animals while they occupy a place used for shelter or protection.

4.1.2 Section 40 of the Natural Environment and Rural Communities Act 2006 (the NERC Act) places a legal duty on public bodies, including planning authorities, to 'have regard' to the conservation

of biodiversity when carrying out their normal functions, which includes consideration of planning applications.

4.1.3 In compliance with Section 41 of the NERC Act, the Secretary of State has published a list of species and habitats considered to be of principal importance for conserving biodiversity in England under the UK Post-2010 Biodiversity Framework. This is known as the list of Habitats and Species of Principal Importance (HPI/SPI), of which there are 56 habitats and 943 species. The HPI/SPI list is used to guide planning authorities in implementing their duty under the NERC Act. Seven bat species are listed as SPI including: Barbastelle Bat, Bechstein's Bat, Noctule Bat, Soprano Pipistrelle Bat, Brown Long-eared Bat, Greater Horseshoe Bat, and Lesser Horseshoe Bat.

4.2 National Planning Policy

4.2.1 The NPPF (2021) set out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development.

4.2.2 The NPPF states that:

'To protect and enhance biodiversity and geodiversity, plans should:

- Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping-stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and
- promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.'

'When determining planning applications, local planning authorities should apply the following principles:

- if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
- development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists;
- development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be integrated as part of their design, especially where

this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate

'The following should be given the same protection as European sites:

- potential Special Protection Areas (SPA) and possible Special Areas of Conservation (SAC);
- listed of proposed Ramsar Sites; and,
- site identified, or required, as compensatory measures for adverse effects on European sites, potential SPAs, possible SACs, and listed or proposed Ramsar sites.'

4.2.3 The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on European sites (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.'

4.3 Local Planning Policy

4.3.1 The following policies of the Kirklees Local Plan Strategy and Policies document (Kirklees Council, 2019a) are applicable to biodiversity and nature conservation (provided in summary only and the full Local Plan document should be viewed for full details):

- **Policy LP30 – Biodiversity and Geodiversity**
- **Policy LP31 – Strategic Green Infrastructure Network**
- **Policy LP33 – Trees**
- **Policy LP34 – Conserving and Enhancing the Water Environment**

4.3.2 In addition, the site forms part of the site allocation covered by **Policy LP73 – Land at Storthes Hall**, as identified within the Kirklees Local Plan Allocations and Designations document (Kirklees Council, 2019b). This details site specific constraints and considerations which in relation to biodiversity include the presence and required retention of UK BAP Priority Habitat Woodland and TPO trees, and that the site lies within the Strategic Green Infrastructure Network and should consider links to the Kirklees Wildlife Habitat Network. Again, refer to the Kirklees Local Plan Allocations and Designations document for full details.

5 Discussions and Recommendations

5.1 Further Survey

5.1.1 No further survey is recommended at this time. All survey effort followed current guidance (Collins, 2016), with a precautionary approach adopted due to the survey limitations experienced. Sufficient information has been obtained to: demonstrate the presence of eight low status Common Pipistrelle roosts and three low status roosts of Brown long-eared bat, the risk of further low status roosts having gone unobserved, with confidence in likely absence in other locations, and to enable completion of an EPS Licence application for submission to Natural England to cover the proposed demolition works. Further surveys would be required in summer 2023 if the EPS licence application is not submitted by this time; these would consist of a single internal inspection (PRA) and dusk or dawn survey(s) to confirm roost status.

5.2 Mitigation

5.2.1 For each potential constraint identified, all mitigation options provided follow the established mitigation hierarchy as set out in BS42020:2013 (BSI, 2013). This seeks as a preference to avoid impacts, then to mitigate unavoidable impacts, and as a last resort, to compensate for unavoidable residual impacts that remain after avoidance and mitigation measures. All recommended mitigation measures follow current guidance (Mitchell-Jones, 2004) and have considered the emerging June 2021 draft *Bat Mitigation Guidelines* (CIEEM, 2021), and is proportionate to the level of impact identified and to the nature and scale of the proposed works. A clear and valid justification of methods has been provided where necessary. The implementation of mitigation methods should make reference to the Construction (Design and Management) Regulations 2015 (CITB, 2016) where applicable.

Avoidance

5.2.2 Given the redevelopment proposals at the site and the location of the identified roosts, it is not feasible to maintain, protect and avoid impacts to the identified roosts.

5.2.3 However, to avoid the risk of killing/injury of roosting bats, works to Building 1, and Buildings 3 to Buildings 21 (i.e. all buildings with the exception of Buildings 2 and 22) will only proceed under an EPS Licence from Natural England. As a condition of this EPS Licence, demolition works (i.e. disturbance of potential roosting features) will be timed to avoid periods when bats are likely to be present (i.e. avoiding the late-Spring to early-Autumn period), and a licensed bat ecologist/accredited agent will directly supervise the removal/disturbance of all suitable roosting materials (i.e. roofs & timber fascias). The principal contractor will need to provide scaffolding/a cherry picker to allow the ecologist safe and clear access to these features. Any bats encountered will need to be immediately relocated to an undisturbed roosting location (as no bats are expected to be encountered temporary roosting features installed on nearby trees will be sufficient for this purpose or if the new roost has been completed bats will be relocated to the new roost).

5.2.4 The EPS licence will only cover low status roosts of common species (i.e. Common Pipistrelle and Brown Long-eared). In the significantly unlikely event that a higher status roost (e.g. maternity roost) or rarer bat species is encountered during the works, it will be necessary to conduct an updated assessment of impacts to determine if any additional mitigation measures are required, and to submit a modified Natural England licence application (it is noted that the mitigation offered here would remain sufficient to mitigate for the loss of a maternity roost of a common species).

5.2.5 Additionally, a sensitive lighting scheme will be incorporated into the site design to avoid lighting impacts to bats through artificial lighting overspill on to adjacent habitats. This will include incorporating appropriate products such as low lux/low level bollard lighting, capped and screened lighting. Flood lighting or security lighting shining on to off-site habitats will be avoided.

Mitigation

5.2.6 An EPS Licence will need to be obtained from Natural England to permit demolition of the works to Building 1, and Buildings 3 to Buildings 21.

Compensation

5.2.7 To maintain the favourable conservation status of the species concerned, roosting features will be incorporated into the redeveloped site at strategically determined locations which are located away from external lighting sources and human disturbance, will ideally have a south facing aspect which gets full sunlight during the summer (to warm the roost, and prevent an alternative heating source from being required), be situated close-to/overlooking off-site habitats which provide commuting routes for bats, and have the highest chance of being discovered and utilised by roosting bats. Specifications will be fully detailed within the EPS Licence Method Statement which will be submitted to Natural England, and will be in accordance with current guidance (Mitchell-Jones, 2004). At no point will bats have access to any modern Breathable Roofing Membranes (BRMs) which are known to cause bat mortality. In accordance with current guidance, due to the species/roost status present compensatory roosting features do not need to be provided in advance of the existing roost loss, but should be provided at least in part by the following bat activity (i.e. summer) season to provide bats with continued access to roosting features.

5.2.8 In summary the following compensatory roosting features will be incorporated into the final site layout:

- Three dedicated roof voids to be located within the new buildings to provide favourable roosting habitat for void-dwelling bat species such as Brown Long-eared Bat. The roof voids will have an insulated floor to create warm conditions suitable for summer roosts. To ensure the roof voids provide suitable roosting habitat for species such as Brown Long-eared Bat which require a large space to fly in and with an exposed ridge beam to roost alongside, the design will follow guidance and specifications described at Section 8.4 of the *Bat Mitigation Guidelines* (English Nature, 2004).
- Eight bat roost boxes will be incorporated into the brickwork of the new residential properties, to provide permanent roosting provision at the site for species such as Common Pipistrelle which readily taken up roosting at such features. Where possible, these features will be located on the southern elevation of the proposed buildings to maximise the sunlight and warmth received by the boxes.
- Five further ridge tile access points and five roofing tile access points will be incorporated into the site layout.

5.2.9 Information to address the other two tests (i.e. 'imperative reasons of overriding public interest (IROPI)' and 'no satisfactory alternative') will be addressed by the client/their planner on production of the final Method Statement to be submitted to Natural England.

5.2.10As necessary, all of the above can be subject to a planning condition, and a draft Method Statement can be provided for approval by the planning authority prior to submission to Natural England (an EPS Licence application can only be submitted to Natural England upon granting of planning approval).

5.3 Enhancement

5.3.1 Opportunities for biodiversity enhancement have been determined through consideration of: Ecological Features identified on site and within the zone of influence; Historical records of protected species/habitats present within the locality; National and Local planning policy including UK BAP SPI/HPI and Local BAP species/habitats; Local Development Plan including consideration of Green/Blue Infrastructure Resource; Consultation with third parties/stakeholders where applicable; and Other influencing factors such as Geology/Hydrology, intended operational activities, and existing disturbance activities within the locality. Where necessary, proposed enhancements should refer to the Construction (Design and Management) Regulations 2015 (CITB, 2016):

- Incorporating tree and shrub planting into the landscape scheme will provide enhanced opportunities for foraging and commuting bats; and
- Installation of five Schwegler 1FF bat box (or similar product if not available), located on retained mature trees around the boundaries of the site (positioned away from lighting sources and human disturbance, and at least 10ft from the ground on a south or west facing aspect), will provide enhanced opportunities at the site for roosting bats.

5.4 Management and Monitoring

5.4.1 No management of the new roosting features at the site is required, with the proposed features being durable and long-lasting, and due to the nature of the incorporated features they will be self-cleaning in that droppings will fall out and will not need to be cleared.

5.4.2 Although, roosts of the status identified at the site (day roosts, individual bats of a common species) do not require the provision of any long-term monitoring scheme, it is recommended that a single year of monitoring should be undertaken 1 year following the completion of the development in order to identify the success of the compensation features implemented. It is recommended this monitoring should comprise a single dusk emergence or dawn re-entry survey in accordance with the current survey guidance (Collins, 2016).

6 Conclusion

- 6.1.1 Works to Building 1, and Buildings 3 to Buildings 21 (i.e. all buildings with the exception of Buildings 2 and 22) will only proceed under an EPS Licence from Natural England, and implementation of agreed appropriate mitigation to ensure no significant residual impact to protected species.
- 6.1.2 The proposals present an opportunity to provide enhancements for bat species at the operational site.

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**Drawing SHF.1337.002.EC.D.004-6 – 2018 Surveyor Locations and
Observed Bat Activity**



- Key**
- Site Boundary
 - ★ Bat Roost Locations (Identified during PRA)
 - Tree with Potential Roosting Features (Identified during PRA)
 - Buildings
 - ⊗ Surveyor Locations (1 - 20)
 - ↻ Observed Bat Activity (All common pipistrelle)
 - ★ Emergence/Re-entry Location



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:
Ubrique Investments Ltd

SCALE: 1:2,000@A3 PROJECT REF: SHF.1337.002

DRAWN: MG CHECKED: CS DATE: Nov 2018

PROJECT:
Storthes Hall Student Village

TITLE:
Survey 1 - Surveyor and Bat Activity Locations

DRAWING NO:
SHF.1337.002.EC.D.004



- Key**
- Site Boundary
 - ★ Bat Roost Locations (Identified during PRA)
 - Tree with Potential Roosting Features (Identified during PRA)
 - Buildings
 - X Surveyor Locations (1 - 20)
 - ↷ Observed Bat Activity (All common pipistrelle)
 - ★ Emergence/Re-entry Location



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:
Ubrique Investments Ltd

SCALE: 1:2,000@A3
PROJECT REF: SHF.1337.002

DRAWN: MG
CHECKED: CS
DATE: Nov 2018

PROJECT:
Storthes Hall Student Village

TITLE:
Survey 2 - Surveyor and Bat Activity Locations

DRAWING NO:
SHF.1337.002.EC.D.005



- Key**
- Site Boundary
 - ★ Bat Roost Locations (Identified during PRA)
 - Tree with Potential Roosting Features (Identified during PRA)
 - Buildings
 - ⊗ Surveyor Locations (1 - 20)
 - ↪ Observed Bat Activity (All common pipistrelle)
 - ★ Emergence/Re-entry Location



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:
Ubrique Investments Ltd

SCALE: 1:2,000@A3
PROJECT REF: SHF.1337.002

DRAWN: MG
CHECKED: CS
DATE: Nov 2018

PROJECT:
Storthes Hall Student Village

TITLE:
Survey 3 - Surveyor and Bat Activity Locations

DRAWING NO:
SHF.1337.002.EC.D.006

Drawing SHF.1337.003.EC.D.002-3 – 2022 Surveyor Locations and Observed Bat Activity



- Key**
- Site Boundary
 - ★ Bat Roost Locations (Identified during PRA)
 - Tree with Potential Roosting Features (Identified during PRA)
 - Buildings
 - ⊗ Surveyor Locations (1 - 20)
 - ↪ Observed Bat Activity (All common pipistrelle)
 - ★ Emergence/Re-entry Location



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:
Ubrique Investments Ltd

SCALE: 1:2,000@A3 PROJECT REF: SHF.1337.003

DRAWN: MG CHECKED: CS DATE: Oct 2022

PROJECT:
Storthes Hall Student Village

TITLE:
2022 Survey 1 (Dusk) Surveyor and Bat Activity Locations

DRAWING NO:
SHF.1337.003.EC.D.002



- Key**
- Site Boundary
 - ★ Bat Roost Locations (Identified during PRA)
 - Tree with Potential Roosting Features (Identified during PRA)
 - Buildings
 - ⊗ Surveyor Locations (1 - 20)
 - ↪ Observed Bat Activity (All common pipistrelle)
 - ★ Emergence/Re-entry Location



Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:
Ubrique Investments Ltd

SCALE: 1:2,000@A3
PROJECT REF: SHF.1337.003

DRAWN: MG
CHECKED: CS
DATE: Oct 2022

PROJECT:
Storthes Hall Student Village

TITLE:
2022 Survey 2 (Dawn) Surveyor and Bat Activity Locations

DRAWING NO:
SHF.1337.003.EC.D.003

Appendix A – Site Proposals

STORTHES HALL, KIRKBURTON



ISSUE FOR PLANNING

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS STATED OTHERWISE.
2. DO NOT SCALE FROM THIS DRAWING.
3. ALL DIMENSIONS TO BE VERIFIED ON SITE BEFORE CONSTRUCTION COMMENCES.
4. EXISTING SERVICE RUNS TO BE VERIFIED BY SITE INSPECTION.

LEGEND

- Reception building & The Venue building
- Application red line
- Existing Trees to be retained



Storthes Hall, Kirkburton Schedule of Accommodation

House Type	Bed No / Storey	Type	Parking	No. Units
Freesale				
1 Bedroom				
Fog	1B/1S	Apt	PS	1
2 Bedroom				
Apt 1	2B/1S	Apt	PS	2
A Type	2B/2S	End/ Mid	PS	15
B Type	2B/2S	End/ Mid	PS	21
B1 Type	2B/2S	End	PS	4
3 Bedroom				
C Type	3B/2S	End/ Mid	PS	45
C1 Type	3B/2S	End	PS	11
D Type	2B/2S	End/ Mid	PS	2
E Type	3B/2S	Det	PS	2
F Type	3B/2S	Det/ End	PS	23
F1 Type	3B/2S	End	PS	2
G Type	3B/2.5S	End/ Mid	PS	12
H Type	3B/3S	Mid	PS	1
J Type	3B/3S	Mid	PS	1
R Type*	3B/3S	Mid	INT	8
S Type*	3B/3S	End/ Mid	INT	5
4 Bedroom				
K Type	4B/2S	Det	INT	7
L Type	4B/2S	Det/ End	PS	19
M Type	4B/2S	Det	INT	11
N Type	4B/2S	Det	INT	10
P Type	4B/2S	Det	SG	21
P1 Type	4B/2S	Det	SG	2
Q Type	4B/2S	Det	SG	19
5 Bedroom				
V Type	5B/2S	Det	INT	6
T Type	5B/2S	Det	DG	5
U Type	5B/2S	Det	DG	6
Total				261

Rev. Description Date

PARKER PEEL
ARCHITECTURAL

• info@parkerpeel.co.uk • www.parkerpeel.co.uk 101924 921 860

Client:
Ubrique

Project:
1826
Residential Development at
Storthes Hall, Kirkburton

Title:
Planning Layout

Drawn: 1826-SI-03
Scale: 1:1000@A1
Checked: GK
Date: 07/23

Planning Layout - Scale 1:1000

Appendix B – Raw Survey Data

2018 Survey 1 (Dusk Emergence)

Date	Position	Time	Species	Details
22/08/2018	1	20:31	Common Pipistrelle	Emergence - one individual from valley of the roof.
22/08/2018	1	20:42	Common Pipistrelle	Heard not seen.
22/08/2018	1	20:45	Common Pipistrelle	Heard not seen.
22/08/2018	1	20:53	Common Pipistrelle	Heard not seen.
22/08/2018	1	20:58	Noctule	Heard not seen.
22/08/2018	1	21:10	Soprano Pipistrelle	Heard not seen.
22/08/2018	1	21:17	Noctule	Heard not seen.
22/08/2018	1	21:19 to 21:21	Common Pipistrelle	Heard not seen, likely foraging
22/08/2018	1	21:26	Common Pipistrelle	Heard not seen.
22/08/2018	1	21:28	Common Pipistrelle	Heard not seen.
22/08/2018	1	21:31 to 21:41	Common Pipistrelle	Heard not seen, likely foraging, at least two individuals
22/08/2018	1	21:46	Common Pipistrelle	Heard not seen.
22/08/2018	2	20:54	Noctule	Heard not seen.
22/08/2018	3	20:51 to 20:52	Noctule	Heard not seen.
22/08/2018	3	21:01	Noctule	Heard not seen.
22/08/2018	3	21:18	Common Pipistrelle	Heard not seen.
22/08/2018	3	21:26	Soprano Pipistrelle	Heard not seen.
22/08/2018	4	20:40	Soprano Pipistrelle	Two commuting bats passing north-west to south-east
22/08/2018	4	20:59	Noctule	Heard not seen.
22/08/2018	4	21:18	Common Pipistrelle	Individual foraging above trees
22/08/2018	4	21:20	Common Pipistrelle	Individual foraging above trees
22/08/2018	4	21:29	Noctule	Heard not seen.
22/08/2018	5	20:40	Common Pipistrelle	Heard not seen, single pass.
22/08/2018	5	20:52	Noctule	Heard not seen, single pass.
22/08/2018	5	20:57	Noctule	Heard not seen.
22/08/2018	5	21:14	Noctule	Heard not seen.
22/08/2018	5	21:15 to 21:19	Common Pipistrelle	Foraging above mature trees to south
22/08/2018	5	21:17	Noctule	Heard not seen, single pass.
22/08/2018	5	21:21 to 21:22	Common Pipistrelle	Foraging above mature trees to south
22/08/2018	5	21:24 to 21:26	Common Pipistrelle	Foraging above mature trees to south
22/08/2018	5	21:29	Common Pipistrelle	Heard not seen, single pass.
22/08/2018	5	21:30	Common Pipistrelle	Heard not seen, single pass.
22/08/2018	5	21:32 to 21:37	Common Pipistrelle	Heard not seen.
22/08/2018	5	21:40	Common Pipistrelle	Heard not seen, single pass.
22/08/2018	5	21:43 to 21:44	Common Pipistrelle	Foraging above mature trees to south
22/08/2018	5	21:44	Brown Long-eared	Heard not seen, single pass.
23/08/2018	6	20:52	Common Pipistrelle	Commuting east to west between buildings 6 and 7
23/08/2018	7	20:40	Common Pipistrelle	Heard not seen, distant pass.
23/08/2018	7	21:25	Leisler's Bat	Heard not seen, distant pass.
23/08/2018	7	21:26	Leisler's Bat	Heard not seen, single pass.
23/08/2018	7	21:30	Brown Long-eared	Heard not seen, brief pass
23/08/2018	7	21:31	Noctule	Heard not seen, brief pass
23/08/2018	8	20:25	Common Pipistrelle	Commuting to tree-line to the south
23/08/2018	8	20:28	Common Pipistrelle	Foraging above mature trees to south
23/08/2018	8	20:36	Common Pipistrelle	Foraging above mature trees to south
23/08/2018	9	20:55	Common Pipistrelle	Heard not seen, brief pass
23/08/2018	10			No activity detected
23/08/2018	11	21:32	Common Pipistrelle	Heard not seen.
23/08/2018	11	21:33	Common Pipistrelle	Heard not seen.
23/08/2018	12	20:54	Common Pipistrelle	Heard not seen, distant pass.
24/08/2018	13	20:24	Common Pipistrelle	Passing along mature trees north-east to south-west
24/08/2018	13	21:40	Common Pipistrelle	Heard not seen, brief pass
24/08/2018	14	21:40	Common Pipistrelle	Heard not seen.
24/08/2018	15			No activity detected
24/08/2018	16			No activity detected
24/08/2018	17			No activity detected
24/08/2018	18	20:38	Noctule	Heard not seen.
24/08/2018	18	21:02	Noctule	Heard not seen.
24/08/2018	18	21:03	Noctule	Heard not seen.
24/08/2018	18	21:36	Noctule	Heard not seen.
24/08/2018	18	21:38	Common Pipistrelle	Heard not seen.
24/08/2018	18	21:42	Common Pipistrelle	Heard not seen.
24/08/2018	18	21:42	Noctule	Heard not seen.
24/08/2018	19	20:35	Common Pipistrelle	Passed south-west to north-east along north elevation of Building 20
24/08/2018	19	21:03	Common Pipistrelle	Heard not seen.
24/08/2018	20	20:47 to 20:50	Common Pipistrelle	Foraging at trees along road
24/08/2018	20	20:54 to 20:56	Common Pipistrelle	Foraging at trees along road
24/08/2018	20	21:01	Soprano Pipistrelle	Flying south to north along road
24/08/2018	20	21:36	Common Pipistrelle	Flying south to north along road

2018 Survey 2 (Dawn Re-entry)

Date	Position	Time	Species	Details
29/08/2018	1	05:08 to 05:09	Common Pipistrelle	Heard not seen.
29/08/2018	2	04:51	Common Pipistrelle	Passing south to north along west elevation of building 1
29/08/2018	2	05:28	Common Pipistrelle	Heard not seen.
29/08/2018	3	04:58	Noctule	Heard not seen.
29/08/2018	3	05:26	Common Pipistrelle	Heard not seen.
29/08/2018	3	05:34	Common Pipistrelle	Heard not seen.
29/08/2018	4	04:54	Noctule	Heard not seen.
29/08/2018	4	05:25	Common Pipistrelle	Heard not seen.
29/08/2018	4	05:30	Common Pipistrelle	Heard not seen.
29/08/2018	4	05:32	Common Pipistrelle	Heard not seen.
29/08/2018	4	05:54	Common Pipistrelle	Heard not seen.
29/08/2018	5	04:48	Common Pipistrelle	No activity detected
29/08/2018	5	04:53	Noctule	Heard not seen.
29/08/2018	5	04:59	Brown Long-eared	Heard not seen.
29/08/2018	5	05:53	Common Pipistrelle	Individual entered roost at fascia at east end of southern elevation
29/08/2018	5	05:54	Common Pipistrelle	Individual entered roost at fascia at east end of southern elevation
30/08/2018	6			No activity detected
30/08/2018	7			No activity detected
30/08/2018	8			No activity detected
30/08/2018	9			No activity detected
30/08/2018	10			No activity detected
30/08/2018	11			No activity detected
13/09/2018	12			No activity detected
13/09/2018	13			No activity detected
13/09/2018	14			No activity detected
13/09/2018	15	05:59	Noctule	Heard not seen, distant pass.
13/09/2018	16			No activity detected
13/09/2018	17	05:48	Common Pipistrelle	Heard not seen, single pass.
13/09/2018	17	06:05	Noctule	Heard not seen, single pass.
13/09/2018	17	06:21	Common Pipistrelle	Individual entered roost at bottom ledge of window
13/09/2018	18	05:24	Common Pipistrelle	Heard not seen, single pass.
13/09/2018	18	05:28	Common Pipistrelle	Heard not seen, single pass.
13/09/2018	18	05:29	Common Pipistrelle	Heard not seen, single pass.
13/09/2018	18	05:33	Common Pipistrelle	Heard not seen, single pass.
13/09/2018	18	05:45	Common Pipistrelle	Foraging at mature trees along road
13/09/2018	18	05:46	Common Pipistrelle	Foraging at mature trees along road
13/09/2018	18	06:07	Common Pipistrelle	Heard not seen, single pass.
13/09/2018	18	06:09	Common Pipistrelle	Heard not seen, single pass.

2018 Survey 3 (Dusk Emergence)

Column1	Position	Time	Species	Details
19/09/2018	1			No activity detected
19/09/2018	2	20:08	Common Pipistrelle	Heard not seen, single pass.
19/09/2018	3	19:55	Common Pipistrelle	Heard not seen, single pass.
19/09/2018	3	20:40	Noctule	Heard not seen, single pass.
19/09/2018	4	20:18	Common Pipistrelle	Heard not seen.
19/09/2018	5	19:27	Common Pipistrelle	Individual emerged from roost at fascia at east end of southern elevation
19/09/2018	5	19:38	Common Pipistrelle	Individual commuting north-east to south-west
25/09/2018	6	19:30	Noctule	Heard not seen, single pass.
25/09/2018	6	19:35	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	6	20:01	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	6	20:15	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	7	19:16	Noctule	Heard not seen, single pass.
25/09/2018	7	20:02	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	7	20:17	Noctule	Heard not seen.
25/09/2018	8	19:39	Common Pipistrelle	Pass north to south between buildings
25/09/2018	9	21:15	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	10	19:29	Common Pipistrelle	Single pass from east to west in front of Building 21
25/09/2018	10	19:38	Common Pipistrelle	Two individuals foraging at mature trees to south
25/09/2018	10	19:48	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	10	19:51	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	10	19:54	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	10	20:03 to 20:04	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	10	20:11	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	10	20:14 to 20:15	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	10	20:17	Common Pipistrelle	Heard not seen, single pass.
25/09/2018	10	20:26	Common Pipistrelle	Heard not seen, single pass.
26/09/2018	11	19:30	Common Pipistrelle	Heard not seen.
26/09/2018	11	19:40	Common Pipistrelle	Heard not seen.
26/09/2018	11	19:55 to 19:57	Common Pipistrelle	Heard not seen.
26/09/2018	11	20:04	Common Pipistrelle	Heard not seen.
26/09/2018	12	19:12	Noctule	Heard not seen.
26/09/2018	12	19:13	Leisler's Bat	Heard not seen.
26/09/2018	12	19:19	Noctule	Heard not seen.
26/09/2018	12	19:52	Noctule	Heard not seen.
26/09/2018	12	19:56	Leisler's Bat	Heard not seen.
26/09/2018	12	19:56	Common Pipistrelle	Heard not seen.
26/09/2018	12	20:04	Common Pipistrelle	Two passes, heard not seen
26/09/2018	12	20:05	Common Pipistrelle	Three passes, heard not seen
26/09/2018	13	19:24	Common Pipistrelle	Two individuals passing from south to north along west side of Building 12
26/09/2018	13	19:27	Common Pipistrelle	Two individuals foraging east to west along trees to north
26/09/2018	14	19:44	Common Pipistrelle	Heard not seen.
26/09/2018	14	20:14	Common Pipistrelle	Heard not seen.
26/09/2018	15	19:54	Common Pipistrelle	Heard not seen, single pass.
26/09/2018	15	19:56	Leisler's Bat	Heard not seen, single pass.
26/09/2018	15	19:56	Common Pipistrelle	Heard not seen, single pass.
26/09/2018	15	20:00	Common Pipistrelle	Heard not seen, single pass.
26/09/2018	15	20:02	Common Pipistrelle	Heard not seen, single pass.
26/09/2018	15	20:03	Common Pipistrelle	Heard not seen, single pass.
26/09/2018	15	20:04	Common Pipistrelle	Heard not seen, three passes.
26/09/2018	15	20:05	Common Pipistrelle	Heard not seen, single pass.
26/09/2018	15	20:06	Common Pipistrelle	Heard not seen, two passes.
26/09/2018	15	20:22	Noctule	Heard not seen, single pass.
27/09/2018	16	19:06	Common Pipistrelle	Heard not seen, distant pass.
27/09/2018	16	19:35	Common Pipistrelle	Single pass around north side of Building 15 from the east
27/09/2018	16	19:46	Common Pipistrelle	Heard not seen, single pass.
27/09/2018	16	20:01	Brown Long-eared	Heard not seen, single pass.
27/09/2018	16	20:05	Brown Long-eared	Heard not seen, single pass.
27/09/2018	16	20:06	Brown Long-eared	Heard not seen, single pass.
27/09/2018	16	20:11	Common Pipistrelle	Heard not seen, single pass.
27/09/2018	16	20:12	Common Pipistrelle	Heard not seen, single pass.
27/09/2018	16	20:14	Common Pipistrelle	Heard not seen.
27/09/2018	16	20:15	Common Pipistrelle	Heard not seen.
27/09/2018	17			No activity detected
27/09/2018	18	20:14	Common Pipistrelle	Heard not seen, single pass.
27/09/2018	18	20:19	Common Pipistrelle	Heard not seen, single pass.
27/09/2018	19	19:16 to 19:18	Common Pipistrelle	Five passes, heard not seen
27/09/2018	19	19:26 to 19:27	Common Pipistrelle	Three passes, heard not seen
27/09/2018	19	19:52 to 19:54	Common Pipistrelle	Four passes, heard not seen
27/09/2018	20	19:15	Noctule	Heard not seen, single pass.
27/09/2018	20	19:15	Common Pipistrelle	Foraging in trees over Building 22
27/09/2018	20	19:21	Soprano Pipistrelle	Heard not seen, single pass.
27/09/2018	20	19:24	Soprano Pipistrelle	Heard not seen, single pass.
27/09/2018	20	19:26	Noctule	Heard not seen, single pass.
27/09/2018	20	19:35	Common Pipistrelle	Heard not seen, single pass.
27/09/2018	20	19:45	Common Pipistrelle	Heard not seen.
27/09/2018	20	19:51	Common Pipistrelle	Heard not seen.
27/09/2018	20	19:53	Common Pipistrelle	Heard not seen.
27/09/2018	20	20:08	Noctule	Heard not seen.

2022 Survey 1 (Dusk Emergence)

Date	Position	Time	Species	Details
29/08/2022	1	20:32 to 21:34	Common Pipistrelle	Occasional foraging activity. No emergence detected.
29/08/2022	2	20:14 to 21:30	Common Pipistrelle	3 total passes, all heard not seen. No emergence detected.
29/08/2022	2	21:09	Noctule	Heard not seen.
29/08/2022	3	19:56	Common Pipistrelle	One bat emerging from beneath timber fascia and heading south
29/08/2022	3	20:03	Common Pipistrelle	One bat emerging from beneath timber fascia and heading south
29/08/2022	3	20:35 to 21:34	Common Pipistrelle	4 total passes.
29/08/2022	3	20:57 to 21:16	Noctule	7 total passes, heard not seen.
29/08/2022	4	19:59 to 21:33	Common Pipistrelle	10 total passes. No emergence detected.
29/08/2022	5	20:10	Common Pipistrelle	One bat emerging from roof apex at gable end and heading south
29/08/2022	5	20:14	Common Pipistrelle	One bat emerging from beneath timber fascia and heading south
29/08/2022	5	20:54	Unknown bat species	Unknown species with no echolocation commuting W to E
29/08/2022	5	21:14 to 21:28	Common Pipistrelle	Occasional foraging activity.
29/08/2022	5	21:31 to 21:34	Common Pipistrelle	Constant foraging activity.
30/08/2022	11	20:10	Common Pipistrelle	Single commuting pass. No emergence detected.
30/08/2022	11	21:02	Common Pipistrelle	Foraging, heard not seen.
30/08/2022	12			No bats detected.
30/08/2022	15	20:13 to 21:33	Common Pipistrelle	Occasional passes. No emergence detected.
30/08/2022	19	21:09 to 21:20	Common Pipistrelle	6 total passes. No emergence detected.
30/08/2022	19	21:25	Brown Long-eared Bat	2 passes, heard not seen.
30/08/2022	20	20:12	Common Pipistrelle	One bat emerging from beneath timber fascia and heading south
30/08/2022	20	20:23	Common Pipistrelle	One bat emerging from beneath timber fascia and heading south
30/08/2022	20	20:52 to 21:03	Common Pipistrelle	4 total passes, heard not seen
12/09/2022	14	19:50	Noctule	Single pass, heard not seen. No emergence detected.
12/09/2022	16	19:32	Common Pipistrelle	Single pass, heard not seen
12/09/2022	16	19:41	Common Pipistrelle	One bat emerging from beneath timber fascia of Building 18
12/09/2022	16	19:47 to 20:56	Common Pipistrelle	5 total passes
12/09/2022	16	20:35	Brown Long-eared Bat	Single pass, heard not seen
12/09/2022	17	19:40	Noctule	Single pass, heard not seen. No emergence detected.
12/09/2022	17	19:45 to 20:47	Common Pipistrelle	6 total passes
12/09/2022	17	20:43 to 20:47	Brown Long-eared Bat	3 passes, heard not seen
12/09/2022	18	19:46 to 20:43	Common Pipistrelle	8 total passes. No emergence detected.
12/09/2022	18	20:43 to 21:00	Common Pipistrelle	Constant foraging activity.
13/09/2022	6	19:49 to 20:47	Common Pipistrelle	5 total passes. No emergence detected.
13/09/2022	7	19:35	Soprano Pipistrelle	Faint pass. No emergence detected.
13/09/2022	7	20:05 to 20:52	Common Pipistrelle	8 total passes
13/09/2022	8	20:01 to 20:41	Common Pipistrelle	3 passes. No emergence detected.
13/09/2022	10	20:23 to 20:28	Common Pipistrelle	2 passes. No emergence detected.
13/09/2022	10	20:45 to 20:49	Common Pipistrelle	Constant foraging activity.
21/09/2022	9			No bats detected.
21/09/2022	13			No bats detected.

2022 Survey 2 (Dawn Re-entry)

Date	Position	Time	Species	Details
30/08/2022	6			No bats detected
30/08/2022	7	05:05 to 05:32	Common Pipistrelle	2 passes. No re-entry detected.
30/08/2022	7	05:33	Noctule	Heard not seen
30/08/2022	8			No bats detected
30/08/2022	9			No bats detected
30/08/2022	10	05:38	Common Pipistrelle	Single foraging pass. No re-entry detected.
31/08/2022	13	05:38 to 06:01	Common Pipistrelle	Single pass. No re-entry detected.
31/08/2022	14	05:37	Noctule	Heard not seen
31/08/2022	14	05:58	Common Pipistrelle	One bat returning to roost behind timber fascia on Building 20
31/08/2022	14	06:01 to 06:19	Common Pipistrelle	5 total passes.
31/08/2022	16	05:50 to 06:02	Common Pipistrelle	3 passes. No re-entry detected.
31/08/2022	17			No bats detected
31/08/2022	18	05:47	Common Pipistrelle	Single pass, heard not seen. No re-entry detected.
13/09/2022	4			No bats detected
13/09/2022	11			No bats detected
13/09/2022	12			No bats detected
13/09/2022	15	05:53	Noctule	Heard not seen. No re-entry detected.
14/09/2022	1	06:05 to 06:25	Common Pipistrelle	Two passes. No re-entry detected.
14/09/2022	2			No bats detected
14/09/2022	3			No bats detected
14/09/2022	5			No bats detected
22/09/2022	19			No bats detected
22/09/2022	20			No bats detected

Appendix C – DNA Results

Folio No: E4053
 Report No:
 Order No: P001621
 Client: ENZYGO LTD
 Contact: Chris Schofield
 Contact Details: chris.schofield@enzygo.com
 Date: 10/10/2018

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA FOR THE DETECTION OF BAT SPECIES

Date sample received at Laboratory: 01/10/2018
Date Reported: 10/10/2018
Matters Affecting Results:

RESULTS

Lab Sample ID.	Site Name	O/S Reference	Genetic Sequence	Common Name	Result	Sequence Similarity
E4053_1	Storthes Hall	SE 18195 12875	NNATNNTAATCGGAGGCTTCGGGAAC TGATTGGTGCCACTAATAATTGGAGCC CCTGATA TAGCTTTTCCCGAATAAATAACATAA GCTTCTGACTGCTTCCCCCATCTTTTC TACTAC TTTTAGCTTCGCTGCAGTAGAGGCTG GAGCAGGTACCGGTTGAACAGTCTAT CCTCCTT TAGCGGGAAACCTAGCTNACGCTGGA GAAATNTCCTG	Brown long-eared bat	Plecotus auritus	100%
E4053_2	Storthes Hall	SE 18153 12869	NNNNNTAATCGGAGGCTTCGGGAA CTGATTGGTGCCACTAATAATTGGAGC CCCTGATA TAGCTTTTCCCGAATAAATAACATAA GCTTCTGACTGCTTCCCCCATCTTTTC TACTAC TTTTAGCTTCGCTGCAGTAGAGGCTG GAGCAGGTACCGGTTGAACAGTCTAT CCTCCTT TAGCGGGAAACCTAGCCCACGCAGGA GAAANTAGACCAN	Brown long-eared bat	Plecotus auritus	99%
E4053_3	Storthes Hall	SE 18135 12796	NNNNNTAATCGGAGGCTTCGGGAA CTGATTGGTGCCACTAATAATTGGAGC CCCTGATA TAGCTTTTCCCGAATAAATAACATAA GCTTCTGACTGCTTCCCCCATCTTTTC TACTAC TTTTAGCTTCGCTGCAGTAGAGGCTG GAGCAGGTACCGGTTGAACAGTCTAT CCTCCTT TAGCGGGAAACCTAGCCCA	Brown long-eared bat	Plecotus auritus	99%

E4053_4	Storthes Hall	SE 18025 12585	<pre> NANNNTGGAGGANTTGGAACTGACT AGTTCCACTAATAATTGGAGCCCTGA CATGGCA TTTCCTCGTATAAATAATATAAGTTTCT GACTCCTACCTCCTTTTCTACTAC TACTA GCCTCGTCTATAGTAGAAGCGGGAGC GGGTACAGGCTGAACAGTCTACCCCC CTCTAGCA GGAAACCTAGCCCACGCAGGAGAAAN GACCA </pre>	Common pipistrelle	Pipistrellus pipistrellus	97%
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METHODOLOGY

First, the DNA from a single bat dropping is extracted and purified. Then, a short fragment of a mitochondrial gene is amplified using polymerase chain reaction (PCR). If the analysis is unassigned the first time, the reaction is performed with different primer. The amplified product is analysed on a gel to confirm that the expected product size was amplified. It then goes through one more purification step before being Sanger sequenced. The sequence results are aligned against a library of known bat reference sequences using bioinformatics software, and we are able to confirm that the dropping sample came from a certain bat species with the reported percent sequence similarity.

INTERPRETATION

Degradation: Samples are extracted following protocol. If DNA is unsuccessfully amplified with SFF primers, specific to bat genome, the reserve samples are then extracted following protocol yet this time with a restorase enzyme which helps repair degraded DNA. If the reserve samples are amplified unsuccessfully, then the sample is amplified with universal 16S primers, these universal primers will amplify the most prolific DNA in the sample so will detect Bat mitochondrial DNA if it is there, or mouse DNA or bacterial DNA. If bacterial DNA is found this is an indicator that the sample has degraded to such an extent that the SFF primers can no longer detect Bat DNA. If no DNA is amplified whatsoever then the sample has long been degraded as the technique is ultra sensitive. We get few samples with DNA degradation. DNA degrades with time and expedited with the environmental conditions it is exposed to such as sunlight and temperature and moisture, therefore we recommend samples are taken out of direct sunlight, away from moisture and away from warmth where possible. If the sample with the freshest appearance, on top of the surface, is collected taking in to account these environmental parameters then it is likely that the sample has degraded due to the sample being there a long time and Bats may no longer be present. We analyse a sample up to three times to achieve a result. If no DNA is detected after three times, we are confident, there is no longer any DNA in the sample to detect.

Genus: A samples goes through DNA extraction, PCR to amplify, electrophoresis and then genetically sequenced to give the genetic code for that sample GCTATATACGCGC etc. The genetic sequence obtained is used to cross reference against millions of known genomes to find the closest match. If the sample sequence is not long enough due to sample degradation, or if a non specific part of the genetic code is obtained, then the results may indicate the precise genus but not the precise species. This is especially important for Myotis species as there are so many similar Myotis species with very similar genetic coding. If the results come back an non specific for a species, then the sample resubmitted through the entire analysis again to see if a better quality sequence, a longer sequence or a sequence in a different area of the genome could have been obtained so that we were able to differentiate between the species.

Reported by: Yaroslav Terentyev

Approved by: Yaroslav Terentyev

End Of Report



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