Ecology

Appendix 7.10 Bat Survey

Legislation and Conservation Status

A7.1 All UK bat species are listed on Appendix II of the Bern Convention and on Annexes II and IV of the EU Natural Habitats Directive. In England and Wales bats are protected under Schedule 2 of the Conservation of Habitats and Species Regulations 2017 and under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is an offence, with certain exceptions, to:

- Intentionally or deliberately capture, kill, or injure a bat;
- Intentionally or recklessly damage, destroy, and disturb bats in a place used for shelter or protection, or obstruct access to such areas;
- Damage or destroy a bat breeding site or resting place;
- Possess a bat, or any part of it, unless acquired lawfully; and
- Sell, barter, exchange, transport, or offer for sale a bat or parts of them.

A7.2 Actions that are prohibited can be made lawful by a licence issued by the appropriate Statutory Nature Conservation Organisation.

A7.3 Several species of bats barbastelle *Barbastella barbastellus*, Bechstein's *Myotis bechsteinii*, brown long-eared *Plecotus auritus*, greater horseshoe *Rhinolophus ferrumequinum*, lesser horseshoe *Rhinolophus hipposideros*, noctule *Nyctalus noctula* and soprano pipistrelle *Pipistrellus pygmaeus* are listed as Priority Species under the 'UK Post-2010 Biodiversity Framework which provides a statutory list of priority species in England, Scotland, Wales and Northern Ireland, as required under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (England), Section 7 of the Environment (Wales) Act 2016, Section 2(4) of the Nature Conservation (Scotland) Act 2004, and Section 3(1) of the Wildlife and Natural Environment Act (Northern Ireland) 2011. Decision-makers such as Local Planning Authorities must have regard for Priority Species in all their activities, including when making decisions on planning applications.

Previous Records

A7.4 Bat Surveys of the Site were undertaken by Tyler Grange in 2021, including Bat Activity Transect Surveys and Static Deployments. 13539/R02b at **Appendix 7.3** details the full methods and results of these surveys.

A7.5 Activity Surveys were completed once per month from May to October 2021, with two static detectors delayed in each of these months for 5 consecutive nights.

A7.6 A total of 287 bat passes were recorded during the transect survey visits. These passes were from four distinct species and two species groups which were:
• common pipistrelle (184 passes);
• soprano pipistrelle (78 passes);
• noctule (12 passes);
• Myotis species group (9 passes);
• Pipistrelle species group (2 passes).

A7.7 A total of 4973 bat passes were recorded during the static detector surveys. These passes were from:
- common pipistrelle (3035 passes);
- soprano pipistrelle (1367 passes);
- Myotis species bats (138 passes);
- noctule (269 passes);
- lesser horseshoe bat (2 passes);
- brown long-eared (34 passes);
- Myotis Sp./brown long-eared bat (26 passes); and
- Unidentified Pipistrelle bat species (102 passes).

A7.8 Following the 2021 surveys, the Site was considered to be of moderate level for local bat commuting and foraging. The mature trees scattered across Site were also deemed likely to offer roosting resources to a selection of bat species throughout the year.

A7.9 As such, Arial Inspection for bats were completed on eight trees including T1, T2, T3, T4, T6, T8, T20 and T28, located within Phase 1 of the development on 10th August 2022 by John Moorcroft MSc MCIEEM CEnv, an experienced tree climber holding a MP2C CS 38 Tree Climbing and Aerial Rescue qualification and a S091008/1 bat licence. The survey aimed to determine the presence or likely absence of bats within the identified trees, with the tree references taken from the Arboricultural Impact assessment (AIA) produced by Tyler Grange (Report Ref: 13539_R01a AIA). 13539/R04 at **Appendix 7.14** details the full surveys methods and results of Aerial Inspection.

A7.10 Trees outside of Phase 1 or shown to be outside the development area of Phase 1 were not surveyed as the future phases may take some years to come forward and bat trees assessments have a limited timespan of validity.

A7.11 The results of the Aerial Inspection of the eight trees is Phase 1 were:
- Two were considered to have negligible bat roost potential (T2, T20)
- One was considered to have low bat roosting potential (T28)
- Three were considered to have moderate bat roost potential (T6, T8, T1)
- Two were considered to have high bat roost potential (T4, T3).

A7.12 The results of the Aerial Inspection, allow with the recommendations is included in **Table A7.10.1.**

Table A7.10.1 Results of Aerial Inspection

Tree No. (As per Tree Survey Plan)	Proposed Impact	Notes	Bat potential following climbing inspection	Recommendation
1	Not to be directly or indirectly impacted. Avoiding impacts by the lighting schedule.	**Climbed, Mature Oak** all suitable PRF examined with torch and endoscope. 8 PRFs identified spread across all aspects. Includes callus rolls, limb breaks and small cavities within limbs	Moderate	No proposed direct or indirect impacts. No further works required.
2	Not to be directly or indirectly impacted. Avoiding impacts by the lighting schedule.	**Climbed, Immature Sycamore** Young sycamore tree with stem diameter of approximately, 15cm. Height is approximately 8m bifurcates at 2m. No potential roost features have developed.	Negligible	No proposed direct or indirect impacts. No further works required.

Tree No. (As per Tree Survey Plan)	Proposed Impact	Notes	Bat potential following climbing inspection	Recommendation
3	Not to be directly or indirectly impacted. Avoiding impacts by the lighting schedule.	**Climbed, Sycamore** all suitable PRF examined with torch and endoscope. 4 PRFs identified spread across all aspects. Includes 3 knot holes offering low potential for individual bats and a large trunk cavity with a ramshorn feature which offers high potential offering wider bat roosting opportunities	High	No proposed direct or indirect impacts. No further works required.
4	Not to be directly or indirectly impacted. Avoiding impacts by the lighting schedule.	**Climbed, Mature Oak** all suitable PRF examined with torch and endoscope. 6 PRFs identified spread across all aspects. Includes tear outs from the main trunk leading to cavities as well as broken limb features.	High	No proposed direct or indirect impacts. No further works required.
6	Not to be directly or indirectly impacted. Avoiding impacts by the lighting schedule.	**Climbed, Mature Oak** all suitable PRF examined with torch and endoscope. 6 PRFs identified spread across all aspects. Includes tear outs from the main trunk leading to cavities as well as broken limb features	Moderate	No proposed direct or indirect impacts. No further works required.
8	Not to be directly or indirectly impacted. Avoiding impacts by the lighting schedule.	**Climbed, Mature Oak** all suitable PRF examined with torch and endoscope. 6 PRFs identified spread across all aspects. Includes tear outs from the main trunk leading to cavities as well as broken limb features.	Moderate	No proposed direct or indirect impacts. No further works required.
20	To be removed	**Climbed, Ash** all suitable PRF examined with torch and endoscope. 6 PRFs identified spread across all aspects. Includes tear outs from the main trunk leading to cavities as well as broken limb features	Negligible	No Further survey required
28	To be removed	**Not Climbed, Dead Standing Oak** Tree unsuitable to climb as no safe anchor points. The tree is dead and all bark has fallen off leaving hard wood dead standing tree.	Low	Section felling with pre-inspection check from MEWP due to inability to climb this tree

Field Survey Methodology

A7.13 The surveys followed standard methodologies set out in the Bat Mitigation Guidelines (Mitchell-Jones, A.J., 2004)[1], the Bat Workers Manual (Mitchell-Jones, A.J. and McLeish, A.P., 2004)[2] and Bat Surveys - Good Practice Guidelines (Collins, 2016)[3].

Preliminary Bat Roost Assessment (PBRA)

A7.14 A PBRA update assessment of the trees within Phase 1 of the development was undertaken on 22nd August 2023 by Dale Mortiboys (accredited agent under a S091008/1 bat licence) with assistance from Elliot Grundy. All trees within and adjacent to Phase 1 of the development were assessed to identify and potential roosting features (PRF) for bats, including hibernation roosts, as identified within published guidance[4] [5]. These PRFs include:

- Woodpecker/ rot holes;
- Hazard beams;
- Other vertical or horizontal cracks and splits (such as frost-cracks) in stems or branches;
- Partially detached platey bark;
- Knot holes arising from naturally shed branches, or branches previously pruned back to the branch collar;
- Man-made holes (e.g. cavities that have developed from flush cuts) or cavities created by branches tearing out from the parent stems;
- Cankers (caused by localised bark death) in which cavities have developed;
- Other hollows or cavities, including butt-rots;
- Double-leaders forming compression forks with included bark and potential cavities;
- Gaps between overlapping stems or branches;
- Partially detached ivy with stem diameters in excess of 50mm; and
- Bird, bat or dormouse boxes.

A7.15 Signs of a bat roost, as identified by the BCT, besides the actual presence of bats themselves, were also searched for. These signs include:

- Bat droppings in, around or below a PRF;

[1] Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines* English Nature, Peterborough
[2] Mitchell-Jones, A.J, & McLeish, A.P. (eds). 2004., 3rd Edition Bat Workers' Manual, JNCC, Peterborough, ISBN 1 86107 558 8
[3] Collins, J. (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines. 3rd edition. Bat Conservation Trust, London
[4] Collins, J. (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines*. 3rd edition. Bat Conservation Trust, London.
[5] Bat Tree Habitat Key (2018) *Bat Roosts in Trees: a guide for identification and assessment for tree-care and ecology professionals*. Pelagic Publishing, Exeter.

- Odour emanating from a PRF;
- Audible squeaking at dusk or in warm weather; and
- Staining below the PRF.

A7.16 The potential of the trees to support roosting bats was assessed using the criteria shown in **Table A7.10.2** below.

Table A7.10.2 Roost Assessment Criteria

Suitability	Description of Roosting Habitats
Negligible	Negligible habitat features on-site likely to be used by roosting bats.
Low	A structure or tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for long periods of time due to their size, shelter, protection conditions and surrounding habitat.

Limitations

A7.17 Bats use a variety of roosts, ranging from maternity, mating or swarming and hibernation roosts, containing many individuals, to mating or night-time feeding roosts containing few individuals or single animals. Bats also tend to be nomadic (although are faithful to certain favoured roosting sites), spending variable lengths of time in a variety of roosts. Thus, even with considerable survey effort it is possible that small transient roosts of bats may have been missed, although these tend to be less important to bats and so this should not affect the evaluation and recommendations made.

Bat Activity – Transect Surveys

A7.18 Two update Bat Transect Surveys were completed between August and September 2023 at the Site to update the previous surveys completed across the Site in 2021 (13539/R02b at **Appendix 7.3**). The update surveys concentrated on habitats of local ecological importance, such as the broadleaved woodland, hedgerows and scattered trees, and aimed to record the bat species present to determine the importance of any habitat features to foraging and / or commuting bats in line with survey guidance. Plan 13539/P06a at **Appendix 7.11** shows the transect route.

A7.19 The survey details are provided in **Table A7.10.3** below. Surveyors used a combination of direct visual observation and echolocation detection techniques to identify any bat activity on the Site. In line with survey guidelines, the surveys started approximately at sunset and ended up to two hours after sunset.

Table A7.10.3 Transect Survey Details

Survey	Date	Survey times	Weather conditions (start-end)	Surveyors and equipment
1	17/08/2023	Start: 20:35 Sunset: 20:35 End: 22:35	Wind (Beaufort): 1-1 Temp (°C): 18-16 Precipitation: None Cloud (%): 50-50	Laura Jones Richard Laws *Batlogger M2*
2	13/09/2023	Start: 19:33 Sunset: 19:33 End: 21:33	Wind (Beaufort): 1-1 Temp (°C): 17-17 Precipitation: None Cloud (%): 60-70	William Robson Bek Stobbart *Batlogger M2*

A7.20 Elekon BatLogger M2 detectors were used throughout surveys for active monitoring and full spectrum recording. AnalookW, Anabat Insight and BatExplorer software was used to confirm the identification of bat calls recorded in the field.

Bat Activity – Static Deployments

A7.21 Further update activity data was obtained from the deployment of static bat detectors in August and September 2023. The detector locations are shown on plan 13539/P06a at **Appendix 7.11.**

A7.22 During each deployment, detectors were set to record for a minimum of five consecutive nights and were programmed to begin recording 30 minutes before sunset and continue to record until 30 minutes after sunrise. The details of the static deployments are shown in **Table A7.10.4** below.

Table A7.10.4 Static Deployment Details

Visit	Month	Dates Deployed	Overnight Weather Conditions (min max temp °C, min & max wind mph, precipitation*)
1	August	17/08/2023 – 21/08/2023	Temp (°C): 13 – 22 Wind (mph): 12 – 21 No precipitation
2	September	13/09/2023 – 17/09/2023	Temp (°C): 9 – 20 Wind (mph): 8 – 15 No precipitation

Limitations

A7.23 Only two update Bat Activity and Static Detector Surveys were completed in 2023, which does not follow best practice guidance. However, the aim of these surveys were to act as updates from the full monthly surveys completed in May-October 2021. As there had not been any change in on-site habitats between 2021 and 2023, and the results of the update surveys were similar to those completed in 2021, undertaking further update surveys was deemed unnecessary as the results would only have compounded the current assessment of Site's importance for local bats.

A7.24 Bat surveys are subject to numerous variables. The echolocation of species such as brown long-eared bats are of low amplitude and may not always be picked up on bat detectors. Survey results represent a sample of bat activity during the surveys; it is possible that bats may use the Site at other times.

A7.25 Bat calls cannot always be identified to species level, either due to distant contacts or the similarity between some types of bats. Where this occurs, it is recorded as 'unidentified bat species' (Unid) or will show which bat species it is likely to be (e.g *Pipistrelle* sp./*Mytosis* sp.).

Survey Results and Summary

PBRA

A7.26 All trees surveyed within Phase 1 of the development were found to be as assessed in the 2022 Aerial Inspections.

Bat Activity – Transect Surveys

A7.27 A total of 156 bat passes were recorded during the transect survey visits. These passes were from three different species including common pipistrelle *Pipistrellus pipistrelllus* (90 passes), soprano pipistrelle *Pipistrellus pygmaeus* (65 passes), and brown long-eared bat *Plecotus auritus* (1 pass).

A7.28 The number of passes recorded for each species on each visit are detailed and illustrated in **Table A7.10.5** and **Figure A7.10.1** below.

Table A7.10.5 Summary of bat passes and species recorded during bat activity surveys.

Bat Species	Number of Recordings		
	V1 – 17/08/2023	V2 – 13/09/2023	Total
Common Pipistrelle	27	63	**90**
Soprano Pipistrelle	44	21	**65**
Brown Long-eared	1	0	**1**

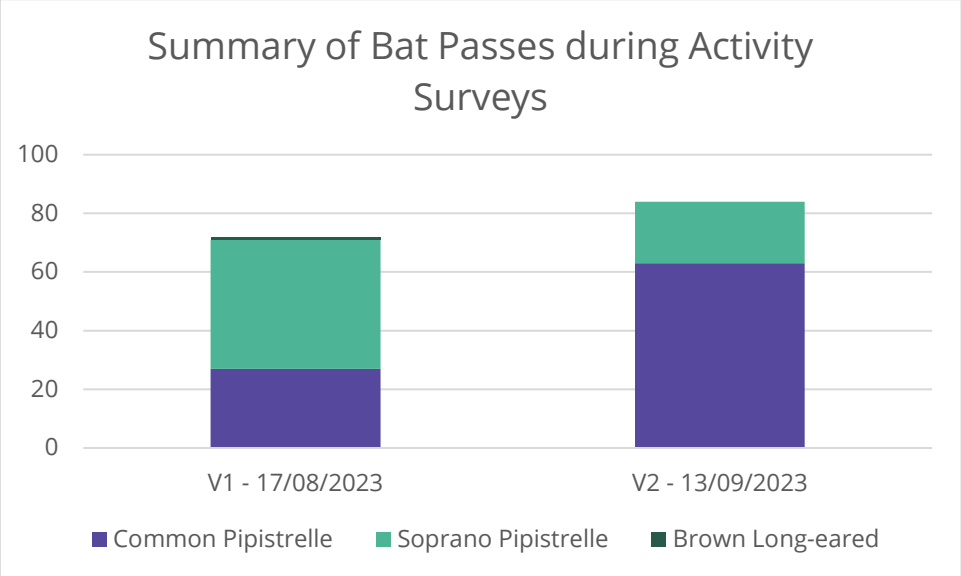


Figure A7.10.1 – Illustration of bat passes and species recorded during bat activity surveys.

A7.29 Common pipistrelle and soprano pipistrelle activity was distributed across the areas of the Site surveyed – see plan **13539/P06a at Appendix 7.11**. Pipistrelle activity appeared highest within the area of amenity and woodland situated in the western region of the Site. Brown long-eared bat activity was generally low throughout the surveys, and no signs of fidelity were seen to certain areas of the Site.

Bat Activity – Static Deployments

A7.30 A total of 1184 bat passes were recorded during the static detector deployment periods. These passes were from six different species including common pipistrelle (591 passes), soprano pipistrelle (388 passes), noctule bat *Nyctalus noctula* (20 passes), myotis species *Myotis* (110 passes), brown long-eared bat (71 passes), and lesser horseshoe *Rhinolophus hipposideros* (3 passes).

A7.31 The number of passes recorded for each species during each deployment are detailed and illustrated in **Table A7.10.6** and **Figure A7.10.2** below. Locations of each static detector deployment can be seen on plan **13539/P06a** at **Appendix 7.11.**

Table A7.10.6 Summary of bat passes and species recorded during static detector deployments

Bat Species	Number of Recordings			
	V1A	V2A	V2B	Total
Common Pipistrelle	425	78	88	**591**
Soprano Pipistrelle	117	116	155	**388**
Noctule	7	0	13	**20**
Myotis Sp.	40	22	48	**110**
Brown long-eared	36	3	32	**71**
Lesser Horseshoe	4	0	0	**4**

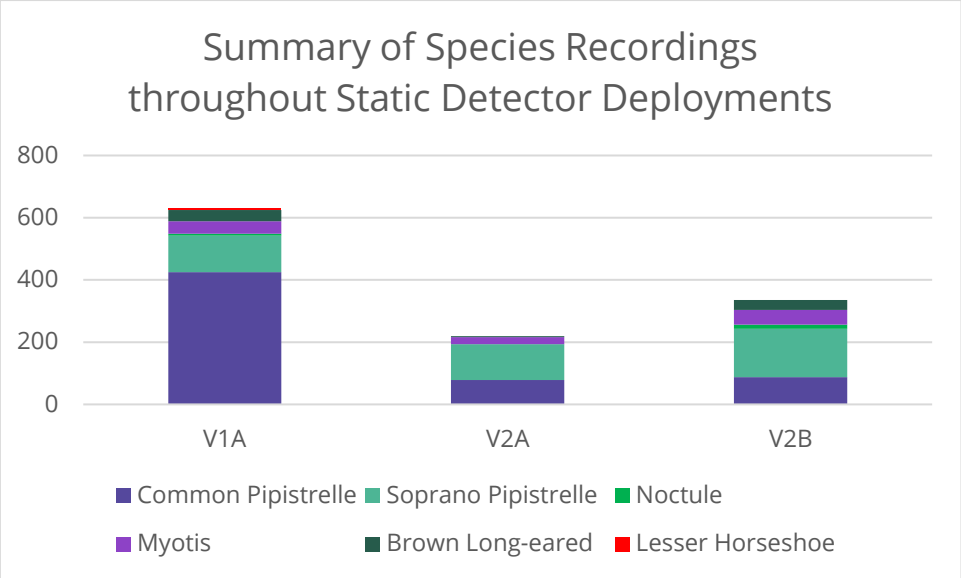


Figure A7.10.2 – Illustration of bat passes and species recorded during static detector deployments.

A7.32 Most bat activity was recorded from location V1A, situated within the western area of the Site during the month of August, with the highest number of passes of any deployment (629 passes). Elsewhere across the Site, levels of bat activity remained consistent.

A7.33 Common pipistrelle and soprano pipistrelle bats were recorded most frequently and at all static detector locations. Although brown long-eared and myotis bats were recorded less frequently, these were also recorded across all locations and were distributed evenly across the Site.

A7.34 Lesser horseshoe and noctule bats were not recorded on every visit. Noctules were however recorded during the majority of visits, albeit in lower numbers, and were distributed evenly across the Site. Lesser horseshoe bats were recorded only during visit 1 from location V1A, located in the woodland block surrounding the on-site pond in the west of the Site.