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Bryn Lane

Wrexham

## Bat Survey Report

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TEP  
Genesis Centre  
Birchwood Science Park  
Warrington  
WA3 7BH

Tel: 01925 844004  
Email: [tep@tep.uk.com](mailto:tep@tep.uk.com)  
[www.tep.uk.com](http://www.tep.uk.com)

Offices in Warrington, Market Harborough, Gateshead, London and Cornwall



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| Author   | Lizi Pimlott |
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## 1.0 INTRODUCTION

1.1 TEP was commissioned by Overlord Ltd to complete bat surveys of land off Bryn Lane in Wrexham to inform a planning application for a proposed commercial development.

1.2 This report has the following objectives:

- give an overview of the habitats present within the site which could be used by bats for roosting, foraging and commuting;
- identify and characterise any confirmed bat roosts within the site, including species, type and status of roost;
- identify how bats use the site for foraging and commuting; and
- evaluate the value of the site for bats.

### Legislation

1.3 All bat species and their roosts are legally protected in the UK. All bats are listed as European Protected Species (EPS) in Conservation of Natural Habitats and of Wild Fauna and Flora, better known as the Habitats Directive. There is also protection for bats and roosts in England and Wales under the Wildlife & Countryside Act 1981 (as amended).

1.4 It is a criminal offence if any persons:

- deliberately capture, injure or kill a bat;
- intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
- damage or destroy a bat roosting place (even if bats are not occupying the roost at the time);
- possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat; or
- intentionally or recklessly obstruct access to a bat roost.

### Site Description

1.5 The site incorporates three fields (arable and improved grassland), divided by hedgerows, with a strip of woodland along the whole southern boundary (bordering a watercourse) and a small area of poor semi-improved grassland/ tall ruderal/ scrub mosaic within the south eastern part of the site.

1.6 The site lies north east of Wrexham Industrial Estate, in North Wales. Ridley Wood Lane sits north of the site, where access onto the arable field can be obtained via a pre-existing gate off this B-road. The site, shown in Figure 1, is centred on grid reference SJ 39401 50794.

Figure 1: Site Location and Context



## 2.0 Methods

- 2.1 The following bat surveys were undertaken in accordance with the Bat Conservation Trust (BCT) Survey Guidelines (Collins, 2016<sup>1</sup>).

### Desk Study

- 2.2 Information regarding historic flora species records, protected habitats and protected sites was collated as part of a desk study which was completed by TEP in August 2018 (ref: 7215.001).

### Roost Surveys

#### Trees

##### Preliminary Roost Assessment

- 2.3 All trees within and adjacent to the site were subject to daytime ground level assessment (GLTA) for their suitability to support roosting bats. The GLTA was completed on 31<sup>st</sup> August 2018 and updated on 2<sup>nd</sup> September 2020 by licensed bat consultant Lizi Pimlott.
- 2.4 An updated ground based inspection of trees T10, T43, T45, T46, T47, G3, G5, G8 and G17 was undertaken on the 15<sup>th</sup> April 2020 by licensed bat consultant John Crowder (Natural Resources Wales S089169-1). The updated survey of these trees was undertaken as they have been identified for removal as part of proposed construction activities on site. Tree T10 was recommended for removal due to its condition if it cannot be safely retained.
- 2.5 Trees were viewed from the ground with the aid of binoculars and a high powered torch (fitted with a red filter) where necessary. Where accessible from the ground, potential roost features (PRF) were closely inspected using an endoscope and torch as aids. Based on the PRF characteristics, trees were categorised for their roost suitability according to the criteria summarised in Table 1.

*Table 1: Categorisation of trees for bat roost suitability*

| Suitability | Potential Roost Features (PRF)                                                                                                                                                                                                                                        |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| High        | A tree with one or more PRF that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time (e.g. maternity/hibernation) due to their size, shelter, protection, conditions and surrounding habitat. |
| Moderate    | A tree with one or more PRF that could be used by bats but which are unlikely to support a roost of high conservation status (i.e. not suitable for maternity or hibernation use).                                                                                    |
| Low         | One or more PRF that could be used by individual bats opportunistically, but which is not suitable to be used on a regular basis or by larger numbers of bats.                                                                                                        |
| Negligible  | No PRF present.                                                                                                                                                                                                                                                       |

<sup>1</sup> Collins, J (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London

## Survey Constraints

- 2.6 Some PRF could not be fully categorised from the ground due, for example, to the angle of view or elevation of the PRF. In these instances a precautionary approach was adopted. Trees were categorised based on the ground-based view of the PRF but to overcome observational limitations of the GLTA, were identified for close inspection by aerial survey.
- 2.7 Some trees adjacent to the site were not subject to survey as dense vegetation and fences prevented sufficient access. However as these were not located on the site itself and are unlikely to be directly impacted by the proposals this was not considered to be a significant limitation.
- 2.8 At the time of the GLTA the weather conditions were optimal for survey.

## Activity Transects

- 2.9 A single walked transect has been completed across the site in September 2018 and July 2020. Drawing G8304.007 illustrates the pre-defined transect routes walked on each survey visit.
- 2.10 These comprised dusk transects. Dusk surveys commenced at sunset and continued for approximately 2 hours. Dates, times and start and end conditions for each of the transects completed are summarised in Table 22.

*Table 2: Survey conditions for manual walked transects*

| Date     | Start Time | End Time | Sunset | Weather at Start |      |                   |                    | Weather at End |      |      |             |
|----------|------------|----------|--------|------------------|------|-------------------|--------------------|----------------|------|------|-------------|
|          |            |          |        | Temp. °C         | Rain | Wind <sup>2</sup> | Cloud <sup>3</sup> | Temp. °C       | Rain | Wind | Cloud Cover |
| 13/09/18 | 19:32      | 21:35    | 19:32  | 14               | 0    | 2                 | 5                  | 14             | 0    | 1    | 5           |
| 20/07/20 | 21:24      | 23:43    | 21:24  | 18               | 0    | 0                 | 0                  | 17             | 0    | 0    | 1           |

- 2.11 The transect was walked at a slow steady pace. Surveyors carried a broadband frequency division detector (Anabat Express, set to transect mode) supplemented by heterodyne detectors. Bat passes were recorded, together with the maximum number of bats observed, the species identified, and any other contextual data such as flight direction, social calling or feeding buzzes.
- 2.12 The transect route was designed to sample the range of habitats present across the site, focussing on those most likely to be affected by the development proposals. The transects were completed by trained TEP surveyors.
- 2.13 Sonogram analysis was undertaken using Analook software.

<sup>2</sup> Wind strength is reported using the Beaufort Scale of Wind Force, this scale runs from 0 to 12, information on the conditions experienced during surveys are as follows: 0 – Calm (vertical smoke); 1 – Light Air (slight smoke drift); 2 – Light Breeze (leaves gently rustle).

<sup>3</sup> Cloud cover is reported in oktas or eighths (i.e. 0 oktas represents the complete absence of cloud, 1 okta cloud cover of 1 eighth or less, and so on to 8 oktas which represents full cloud cover), with the additional convention that 9 oktas represents sky obscured by fog or mist.

## Survey Constraints

- 2.14 No surveys were undertaken during the Spring period (April/May). Given the habitats present on the site and the low levels of bat activity recorded across the Summer (July 2020) and Autumn (September 2018) seasons, it is not anticipated that there would be significantly higher levels of bat activity in Spring.
- 2.15 Weather conditions were optimal throughout all surveys.
- 2.16 Analysing bat sonograms using Analook can clearly identify certain species. However some genus groups (such as *Myotis* spp) can be difficult to determine the specific species due to their similar styles of calls. In addition it can be difficult to determine species or even genus in some circumstances, due to partial calls being heard or due to distortion from, for example passing cars, rain or wind. In cases when it is not possible to identify a bat call to genus, it is labelled as an unknown bat. If the genus can be identified but not the species, the call is labelled by the genus group only.

## Static Remote Monitoring

- 2.1 Static remote monitoring bat detectors (Anabat Express, set to night mode) were deployed at three fixed locations within the site, in September 2018 and July and August 2020. The locations are described at Table 3.
- 2.2 Static monitoring locations are illustrated at Drawing G8304.007. The static locations were non-random (as micro-siting was determined by habitat and/or potential impacts) and the spread of locations was designed to:
- confirm the species assemblage using the habitats within the site;
  - determine the relative activity and spatial distribution of bats across the site; and
  - identify potential commuting / dispersal corridors.
- 2.3 Each detector was deployed on a monthly basis for a minimum of five consecutive nights. Detectors were deployed with standardised sensitivity settings. Further information regarding deployment locations, survey dates and survey conditions is provided in Table 33 and Table 44.

*Table 3: Static locations and recording periods*

| Location | Survey Dates        | Nr. Nights Deployed | Nr. Nights of Activity | Description of Location      |
|----------|---------------------|---------------------|------------------------|------------------------------|
| A        | 13/09/18 – 18/09/18 | 5                   | 5                      | In hedgerow adjacent to pond |
|          | 20/07/20 – 25/07/20 | 5                   | 5                      |                              |
| B        | 13/09/18 – 18/09/18 | 5                   | 5                      | In hedgerow, west-facing     |
|          | 20/07/20 – 25/07/20 | 5                   | 0                      |                              |
|          | 26/08/20 – 31/08/20 | 5                   | 5                      |                              |
| C        | 13/09/18 – 18/09/18 | 5                   | 5                      | On woodland edge             |

| Location | Survey Dates        | Nr. Nights Deployed | Nr. Nights of Activity | Description of Location |
|----------|---------------------|---------------------|------------------------|-------------------------|
|          | 20/07/20 – 25/07/20 | 5                   | 5                      |                         |

*Table 4: Weather conditions during recording periods*

| Survey Date | Time of Sunset | Time of Sunrise | Recording Time (mins) | Sunset Temp °C | Midnight Temp °C | Sunrise Temp °C | Wind Speed (mph) | Wind Direction | Rain    | Cloud     | Moon Illuminance (%) |
|-------------|----------------|-----------------|-----------------------|----------------|------------------|-----------------|------------------|----------------|---------|-----------|----------------------|
| 13/09/18    | 19:32          | 06:43           | 731                   | 14.50          | 13.25            | 12.00           | 16               | NE             | None    | Scattered | 18.8                 |
| 14/09/18    | 19:30          | 06:45           | 735                   | 14.50          | 11.50            | 11.00           | 6                | NE             | None    | Scattered | 28.0                 |
| 15/09/18    | 19:27          | 06:47           | 740                   | 16.00          | 14.50            | 15.20           | 9                | NE             | None    | Scattered | 37.9                 |
| 16/09/18    | 19:25          | 06:48           | 743                   | 16.25          | 11.25            | 11.50           | 2                | S              | None    | Scattered | 48.0                 |
| 17/09/18    | 19:22          | 06:50           | 748                   | 19.50          | 15.00            | 17.25           | 9                | NW             | None    | Scattered | 57.9                 |
| 20/07/20    | 21:24          | 05:13           | 529                   | 17.00          | -                | 12.00           | 13               | SE             | None    | Scattered | 0.1                  |
| 21/07/20    | 21:22          | 05:14           | 532                   | 16.00          | -                | 13.00           | 3                | SE             | None    | Scattered | 0.9                  |
| 22/07/20    | 21:21          | 05:16           | 535                   | 17.00          | -                | 15.00           | 9                | NE             | None    | Scattered | 4.5                  |
| 23/07/20    | 21:19          | 05:17           | 538                   | 17.00          | -                | 17.00           | 6                | SE             | None    | Overcast  | 10.7                 |
| 24/07/20    | 21:18          | 05:19           | 541                   | 20.00          | -                | 20.00           | 7                | NE             | None    | Scattered | 19.2                 |
| 26/08/20    | 20:13          | 06:14           | 661                   | 17.00          | -                | 12.00           | 7                | NE             | None    | Scattered | 61.6                 |
| 27/08/20    | 20:11          | 06:15           | 664                   | 13.00          | -                | 13.00           | 5                | NW             | None    | Scattered | 72.2                 |
| 28/08/20    | 20:09          | 06:17           | 668                   | 13.00          | -                | 11.00           | 14               | S              | None    | Scattered | 81.5                 |
| 29/08/20    | 20:06          | 06:19           | 673                   | 14.00          | -                | 14.00           | 12               | S              | Showers | Scattered | 89.1                 |
| 30/08/20    | 20:04          | 06:20           | 676                   | 14.00          | -                | 14.00           | 9                | SE             | None    | Scattered | 94.8                 |

## Data Analysis and Species Identification

- 2.17 Recorded data was analysed following completion of the static recording periods using Analook software.
- 2.18 No automated filters or automated identification packages have been applied during sonogram analysis.

- 2.19 *Myotis* species have overlapping call characteristics and it is therefore not possible to identify these bats to species level with good confidence (at least 80%). *Myotis* data represent a small proportion of the activity recorded and therefore for the purposes of meaningful data presentation, *Myotis* species have been grouped. Where possible, individual *Myotis* species are identified.
- 2.20 The detectability of some bat species, such as *Plecotus* and *Barbastella*, is lower than that of, for example, *Nyctalus* and *Pipistrellus*. The echolocation calls of *Plecotus* and *Barbastella* are comparatively more difficult to detect with bat detectors, and their particular hunting strategies take them into less open habitats, where survey transect routes may not venture. Careful interpretation has been applied when comparing survey results across species.
- 2.21 For the purposes of presentation, data have been transformed to calculate bat activity indices (BAI). For the majority of datasets and statistical analysis the BAI represents bat passes per hour (bph), to account for different night lengths throughout the recording period.
- 2.22 BAIs quantify the amount of use bats make of an area i.e. activity levels, not abundance. Consistency has been achieved throughout the monitoring period in regard to detector model, sensitivity and calibration, position and orientation and also subsequent sonogram analysis. High confidence can therefore be placed in the relative activity levels presented.

### Survey Constraints

- 2.23 The static detector at Location B malfunctioned during the July 2020 survey. Therefore additional static monitoring was undertaken at Location B in August 2020 to obtain survey data for the summer season.
- 2.24 No surveys were undertaken during the spring period (April/May). Given the habitats present on the site and the low levels of bat activity recorded across the summer (July/August 2020) and autumn (September 2018) seasons, it is not anticipated that there would be significantly higher levels of bat activity in spring. The development proposals will be designed with bats in mind, where possible.
- 2.25 No weather data was available for parts of the nights during the July and August 2020 monitoring. Sub-optimal weather conditions were encountered during some of the surveys. High wind speeds were encountered during each period, however these are largely attributed to gusts rather than continuous wind. Occasional rain showers were also recorded. As these were infrequent and bat activity was still recorded these weather conditions were not considered to be a significant constraint. High moon illuminance was also recorded during the August 2020 survey. This may have resulted in a small reduction in bat activity but is unlikely to have a significant effect on the overall assessment of the site for bats.
- 2.26 Foliage growth in trees and hedgerows throughout the survey period was overcome by the use of microphone extension cables, enabling deployment of the microphones at the edge of the canopy to avoid noise and deflection.

- 2.27 Analysing bat sonograms using Analook can clearly identify certain species. However some genus groups (such as *Myotis* spp) can be difficult to determine the specific species due to their similar styles of calls. In addition it can be difficult to determine species or even genus in some circumstances, due to partial calls being heard or due to distortion from, for example passing cars, rain or wind. In cases when it is not possible to identify a bat call to genus, it is labelled as an unknown bat. If the genus can be identified but not the species, the call is labelled by the genus group only.

## Evaluation Method

- 2.4 For the purposes of this assessment and of assigning value to bats, the guidance set out in (Wray *et. al.* 2010) has been followed.
- 2.5 The guidance provided by Wray *et. al.* (2010<sup>4</sup>) includes a framework for identifying the importance of bats in the landscapes through the evaluation of bat roosts and habitats. Applying this framework, bat roosts can be valued according to species rarity (Table 55) and roost status (Table 66).

Table 5: Species rarity in England (adapted from Wray *et. al* 2010)

| Rarity                                  | Species*                                                                                                                                                     |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Common<br>(population over 100,000)     | Common pipistrelle<br>Soprano pipistrelle<br>Brown long-eared                                                                                                |
| Rarer<br>(population 10,000 to 100,000) | Lesser horseshoe bat<br>Daubenton's bat<br>Natterer's bat<br>Whiskered bat<br>Leisler's bat<br>Noctule<br>Nathusius' pipistrelle<br>Serotine<br>Brandt's bat |
| Rarest<br>(population under 10,000)     | Greater horseshoe<br>Bechstein's bat<br>Barbastelle<br>Grey long-eared<br>Alcathoe bat<br>Greater mouse-eared bat                                            |

Table 6: Valuation of roosts

| Geographic Scale Of Importance | Roost Type                                                                                                                                                                                                                                        |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Negligible                     | -                                                                                                                                                                                                                                                 |
| Site                           | -                                                                                                                                                                                                                                                 |
| Local                          | Feeding perches (common species)<br>Individual bats (common species)<br>Small numbers of non-breeding bats (common species)<br>Mating sites (common species)                                                                                      |
| County                         | Maternity sites (common species)<br>Small numbers of hibernating bats (common and rarer species)<br>Feeding perches (rarer/rarest species)<br>Individual bats (rarer/rarest species)<br>Small numbers of non-breeding bats (rarer/rarest species) |

<sup>4</sup> Wray, S., Wells, D., Long, E., Mitchell-Jones, T (2010) Valuing Bats in Ecological Impact Assessment. IEEM In-Practice. Number 70 (December 2010). Pp. 23-25

| Geographic Scale Of Importance | Roost Type                                                                                                                                                                                                                          |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Regional                       | Mating sites (rarer/rarest species) including well used swarming sites<br>Maternity sites (rarer species)<br>Hibernation sites (rarest species)<br>Significant hibernation sites for rare/rarest species or all species assemblages |
| National                       | Maternity sites (rarest species)<br>Sites meeting Sites of Special Scientific Interest (SSSI) guidelines based on bats                                                                                                              |
| International                  | Special Area of Conservation (SAC) sites with bats as qualifying species                                                                                                                                                            |

- 2.6 Wray et. al (2010) identifies a numerical scoring system which can be applied to commuting habitat (Table 77) and foraging habitat (Table 88). The score derived from these evaluations is then applied to the geographical scale proposed by the CIEEM EclA guidelines (Table 99).

*Table 7: Valuing commuting habitat for bats*

| Species (Score) | Number Of Bats (Score)       | Roosts/Potential Roosts Nearby (Score)                            | Type And Complexity Of Linear Features (Score)                                                    |
|-----------------|------------------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Common<br>(2)   | Individual bats<br>(5)       | None<br>(1)                                                       | Absence of (other) linear features<br>(1)                                                         |
|                 | Small number of bats<br>(10) | Small number<br>(3)                                               | Un-vegetated fences and large field sizes<br>(2)                                                  |
| Rarer<br>(5)    | Large number of bats<br>(20) | Moderate number/not known<br>(4)                                  | Walls, gappy or flailed hedgerows, isolated well-grown hedgerows, and moderate field sizes<br>(3) |
|                 | Individual bats<br>(5)       | Large number of roosts, or close to a SSSI for the species<br>(5) | Well-grown and well connected hedgerows, small field size<br>(4)                                  |
| Rarest<br>(20)  | Small number of bats<br>(10) | Close to or within a SAC for the species<br>(20)                  | Complex network of mature well established hedgerows, small fields and rivers/streams<br>(5)      |

*Table 8: Valuing foraging habitat for bats*

| Species (Score) | Number Of Bats (Score)       | Roosts/Potential Roosts Nearby (Score) | Type And Complexity Of Features (Score)                                                 |
|-----------------|------------------------------|----------------------------------------|-----------------------------------------------------------------------------------------|
| Common<br>(2)   | Individual bats<br>(5)       | None<br>(1)                            | Industrial or other site without established vegetation<br>(1)                          |
| Rarer<br>(5)    | Small number of bats<br>(10) | Small number<br>(3)                    | Suburban areas or intensive arable land<br>(2)                                          |
| Rarest<br>(20)  | Large number of bats<br>(20) | Moderate number/not known<br>(4)       | Isolated woodland patches, less intensive arable and/or small towns and villages<br>(3) |

| Species (Score) | Number Of Bats (Score) | Roosts/Potential Roosts Nearby (Score)                         | Type And Complexity Of Features (Score)                                                |
|-----------------|------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------|
|                 |                        | Large number of roosts, or close to a SSSI for the species (5) | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) |
|                 |                        | Close to or within a SAC for the species (20)                  | Mosaic of pasture, woodlands and wetland areas (5)                                     |

*Table 9: Scoring system for commuting and foraging habitats*

| Score   | Geographic Value |
|---------|------------------|
| 1 – 10  | Not important    |
| 11 – 20 | Local            |
| 21 – 30 | County           |
| 31 – 40 | Regional         |
| 41 – 50 | National         |

## 3.0 Results

### Desk Study

3.1 The desk study identified the following bat species within 1km of the site (none of these relate to roosts):

- Common pipistrelle *Pipistrellus pipistrellus*;
- Noctule *Nyctalus noctula*;
- Soprano pipistrelle *Pipistrellus pygmaeus*; and
- Whiskered bat *Myotis mystacinus*.

### Roost Surveys

#### Trees

##### Preliminary Roost Assessment

###### *Survey findings 2021*

3.2 Trees T43, T45 and G5 were assessed as having low suitability to support roosting bats. Tree T10 was assessed as having high suitability to support roosting bats. Trees T46, T47, G3, G8 and G17 were assessed as having negligible suitability to support roosting bats.

###### *Survey findings 2018 and 2020*

3.3 The locations of the trees within and adjacent to the site that were subject to GLTA are illustrated in Drawing G7215.002.

3.4 Tree descriptions and roost suitability categorisations assigned from the GLTA are summarised in Table 10.

3.5 Eight trees were categorised as having high roost suitability, eight as moderate and fourteen as low. The remaining trees surveyed were found to have negligible suitability due to an absence of potential roost features.

Table 10: Results of GLTA

| Tree No. | Description                                                                    | Photo                                                                                | Roost Classification |
|----------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------|
| 1        | Mature oak with a large upward-extending trunk cavity at 3m, south facing      |   | High                 |
| 2        | Semi-mature oak with a shallow branch split and loose bark at 2m, south facing |  | Low                  |

|   |                                                                                     |                                                                                      |     |
|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----|
| 4 | Mature oak with a small, shallow, upward-extending trunk cavity at 3m, south facing |   | Low |
| 5 | Mature oak with a shallow trunk cavity at 1m, south facing. Covered with cobwebs    |  | Low |

|   |                                                                                     |                                                                                      |     |
|---|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----|
| 7 | Mature oak with a shallow south facing branch cavity at 4m.<br>Covered with cobwebs |   | Low |
| 8 | Mature oak with a shallow south facing branch cavity at 2m                          |  | Low |

|    |                                                                                                      |                                                                                      |      |
|----|------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------|
| 9  | Mature oak with shallow branch splits at 2m and 4m, south facing                                     |   | Low  |
| 14 | Mature oak with a small branch split and cavity at 3m, south facing. Partially obstructed by foliage | No photo                                                                             | Low  |
| 15 | Mature oak with north facing trunk cavity at 1m and south facing trunk cavity at 2m                  |  | High |

|    |                                                         |                                                                                      |          |
|----|---------------------------------------------------------|--------------------------------------------------------------------------------------|----------|
| 19 | Mature oak with small branch cavity at 2m, south facing |   | Moderate |
| 20 | Mature oak with loose bark at 3m, south facing          |  | Low      |

|    |                                                                                                               |                                                                                      |      |
|----|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------|
| 21 | Mature oak with hollow trunk at 2m, west facing and woodpecker hole at 2m, south facing                       |   | High |
| 22 | Mature oak with dense ivy cover which may obscure potential roost features. Precautionary approach undertaken |  | Low  |

|    |                                                   |                                                                                      |          |
|----|---------------------------------------------------|--------------------------------------------------------------------------------------|----------|
| 26 | Mature oak with a trunk cavity at 4m, west facing |   | High     |
| 28 | Mature oak with a trunk cavity at 4m, east facing |  | Moderate |

|    |                                                                         |                                                                                      |          |
|----|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------|
| 32 | Mature oak with upward-extending trunk cavity at base, east facing      |   | High     |
| 36 | Mature oak with small trunk cavity at 5m, west facing. Bird box present |  | Moderate |

|     |                                                               |                                                                                      |      |
|-----|---------------------------------------------------------------|--------------------------------------------------------------------------------------|------|
| 39  | Mature oak with a large trunk cavity at 2m, east facing       |   | High |
| 155 | Mature oak with tree tag 155. Split branch north facing at 2m |  | Low  |

|     |                                                                                                            |                                                                                      |          |
|-----|------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------|
| 156 | Mature oak with tree tag 156. Upward-extending branch cavity at 5m, west facing                            |   | Moderate |
| 52  | Mature oak with trunk cavities at 1m west facing and 3m north facing. Also a branch cavity 4m north facing |  | High     |

|     |                                                                                       |                                                                                      |          |
|-----|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------|
| 157 | Mature oak with tree tag 157. Trunk cavity at 2m and a split branch at 4m east facing |   | Moderate |
| 158 | Mature oak with tree tag 158. Trunk cavities at 2m south facing and 4m east facing    |  | Moderate |

|     |                                                                                |                                                                                      |          |
|-----|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------|
| 159 | Mature oak with tree tag 159. Trunk cavity from base. Damp inside              |   | Moderate |
| 160 | Mature oak with tree tag 160. Trunk cavity at 3m, east facing. Obscured by ivy |  | High     |

|    |                                                                                                                             |                                                                                      |     |
|----|-----------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----|
| 46 | Mature oak with shallow branch cavity at 2m, west facing                                                                    |   | Low |
| 44 | Mature oak with a shallow trunk split east facing at 3m                                                                     |  | Low |
| 43 | Mature oak where no features were noted but visibility was partially obscured by foliage. Precautionary approach undertaken | No photo                                                                             | Low |

|     |                                                                                                                                          |                                                                                     |          |
|-----|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------|
| 162 | Mature oak with tree tag 162. Trunk cavity at base, north facing                                                                         |  | Moderate |
| 161 | Mature oak with tree tag 161. No features were noted but visibility was partially obscured by foliage. Precautionary approach undertaken | No photo                                                                            | Low      |

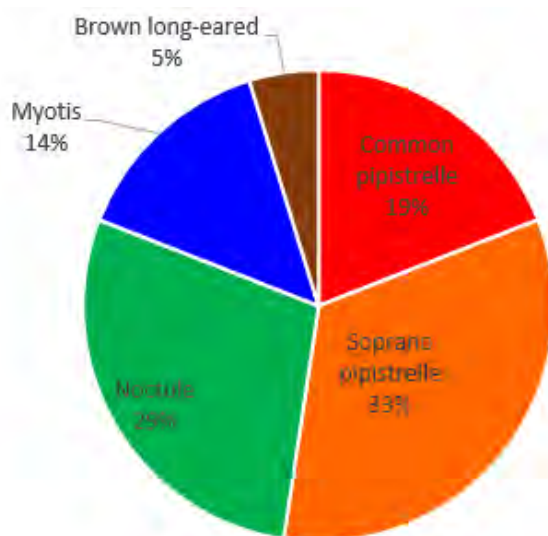
## Activity Transects

- 3.6 The results of the transect surveys are illustrated on Drawings G8304.008 and G8304.009.

### Assemblage

- 3.7 Figure 2 summarises the composition of the species assemblage recorded over the two transect surveys.

*Figure 2: Species assemblage recorded – mean representation across all transects*



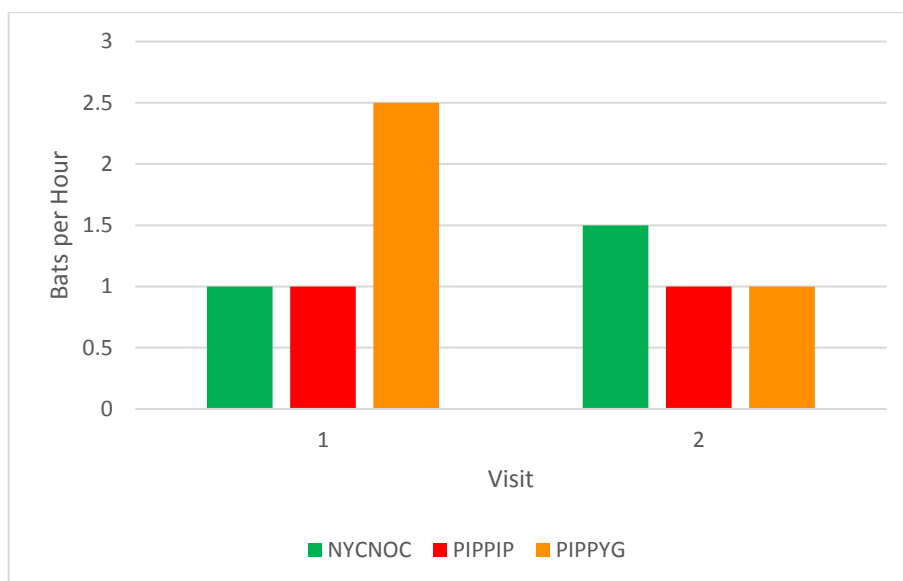
### Spatial Trends

- 3.8 Bat activity was largely associated with the southern part of the site including hedgerows and woodland.

### Seasonal Trends

- 3.9 Figure 2 shows the relative abundance of pipistrelle species recorded during each of the transects. Activity was low across both transects.

*Figure 3: Relative activity levels recorded during transects*



### Foraging

- 3.10 Foraging activity, indicated by circular flight lines in Drawings G8304.008 and G8304.009, was recorded infrequently along the transect during each survey. The key focal areas where foraging was recorded included the woodland edge and hedgerows in the south of the site.

### Social Calls

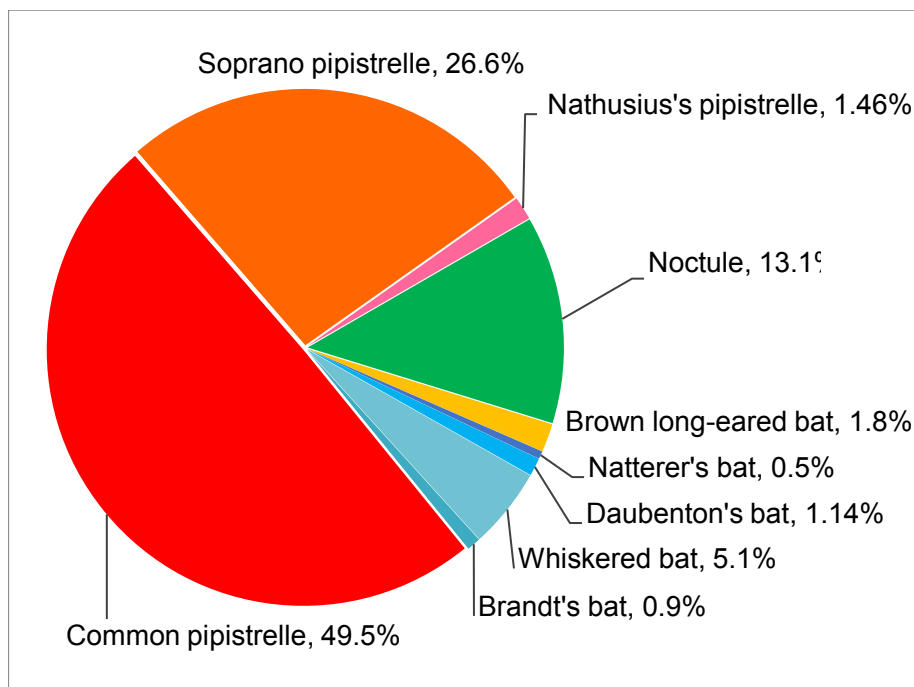
- 3.11 No social calling was recorded during the transect surveys.

### Static Remote Monitoring

### Assemblage

- 3.12 **Error! Not a valid bookmark self-reference.** illustrates the overall bat assemblage recorded from data analysed. A total of 2,271 bat passes were recorded across all static locations and monitoring periods. An assemblage of nine species was recorded: common, soprano and nathusius pipistrelle, noctule, brown long-eared, whiskered, Natterer's, Brandt's and Daubenton's bat.

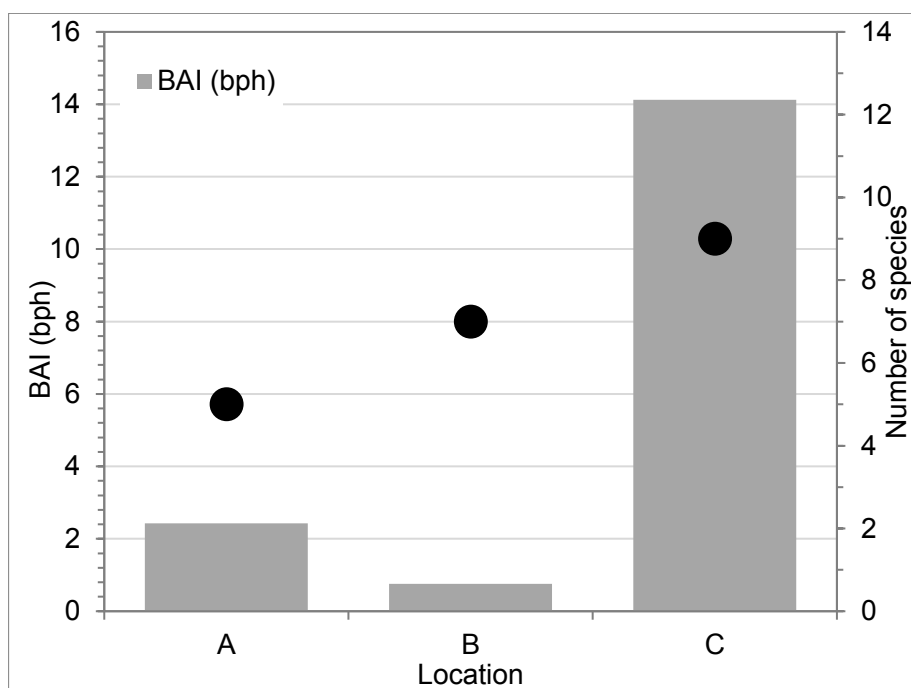
Figure 4: Species assemblage recorded during static remote monitoring



### Spatial Trends

- 3.13 Figure 5 shows the species assemblage BAI and species diversity by location. There is significant variation in the bat assemblage BAI between survey locations ( $\chi^2_4 = 18.95$   $P < 0.01$ ) suggesting that the importance of the site for the local bat population varies by location.

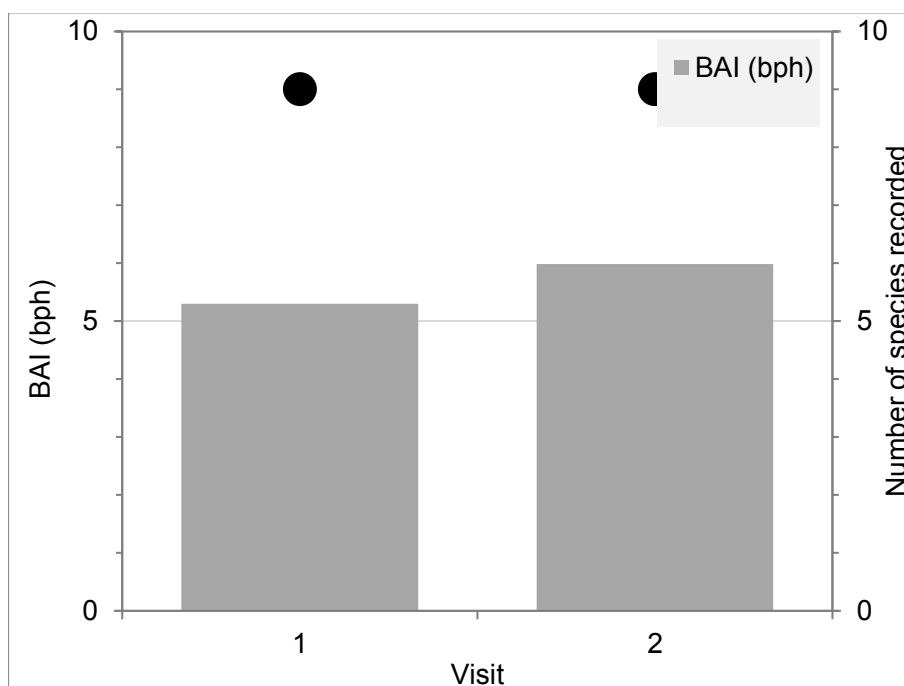
Figure 5: Species assemblage by location



### Seasonal Trends

- 3.14 Figure 6 illustrates the species assemblage BAI and species diversity by monthly visit. There is no significant variation in the bat assemblage BAI between survey visits ( $\chi^2_4 = 0.042$   $P > 0.05$ ) suggesting that the importance of the site for the local bat population does not vary through the season.

*Figure 6: Species assemblage by month*



### Foraging Calls

- 3.15 No foraging calling was recorded during the static surveys.

### Social Calls

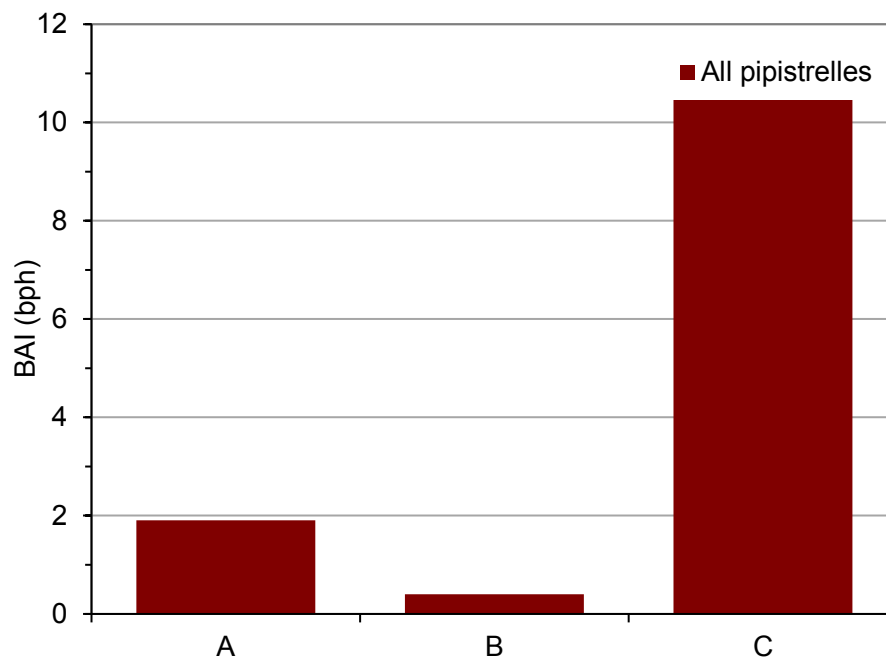
- 3.16 No social calling was recorded during the static surveys.

### **Pipistrelles**

### Spatial Trends

- 3.17 Figure 7 shows pipistrelle species BAI by location. No significant variation in BAI between survey locations was found for pipistrelle bats ( $K_2=4.57$   $P > 0.05$ ).

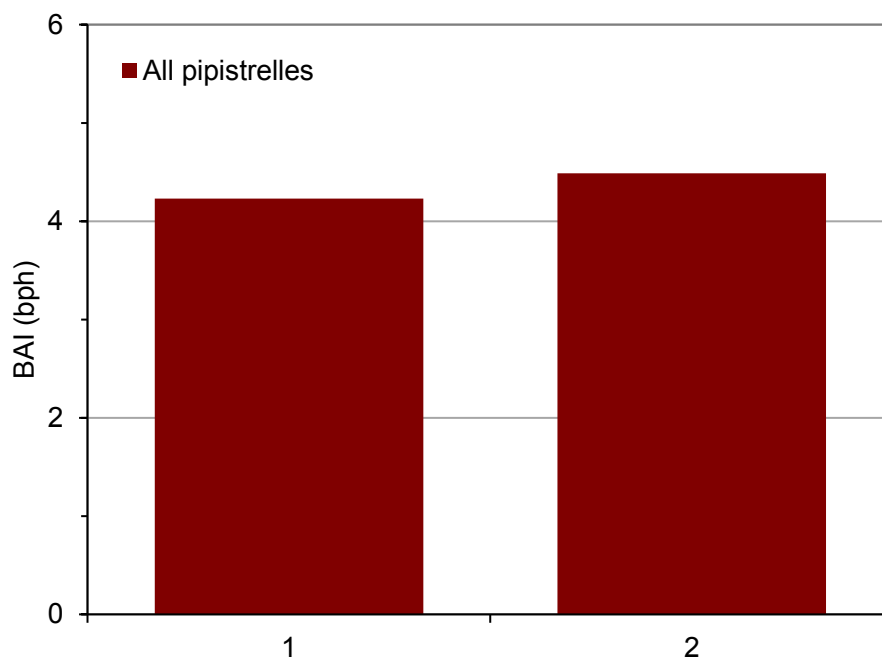
*Figure 7: BAIs recorded at each location by pipistrelle bats*



### Seasonal Trends

- 3.18 Figure 8 shows the pipistrelle species BAI and diversity by visit. No significant variation in BAI between survey visits was found for pipistrelle bats ( $K_2=0.05$   $P>0.05$ ).

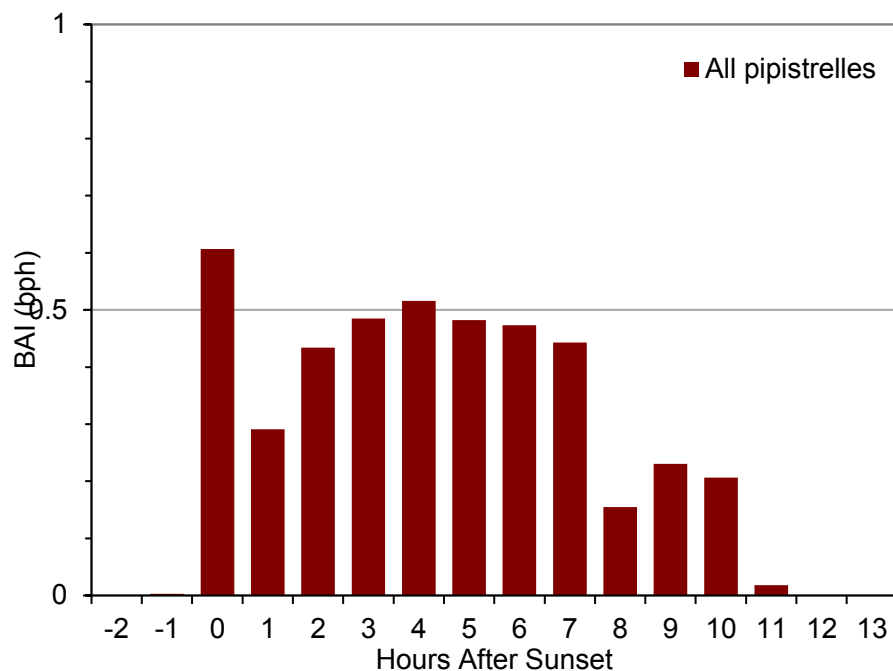
*Figure 8: BAIs recorded across the site each visit by pipistrelle bats*



### Nightly Activity

- 3.19 Figure 9 illustrates nightly activity patterns of pipistrelle bats utilising the site. Activity by pipistrelle bats is relatively consistent throughout the night although there is a small peak at sunset.

*Figure 9: Nightly activity patterns of pipistrelle bats*

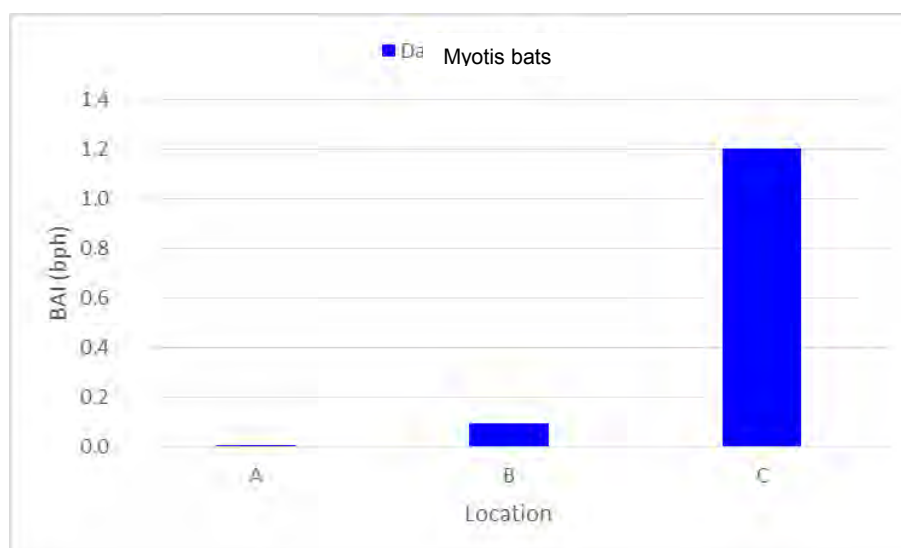


### **Myotis Bats**

#### Spatial Trends

- 3.20 Figure 10 shows Myotis bat BAI by location. No significant variation in BAI between survey locations was found for Myotis bats ( $K_2=3.50$   $P>0.05$ ).

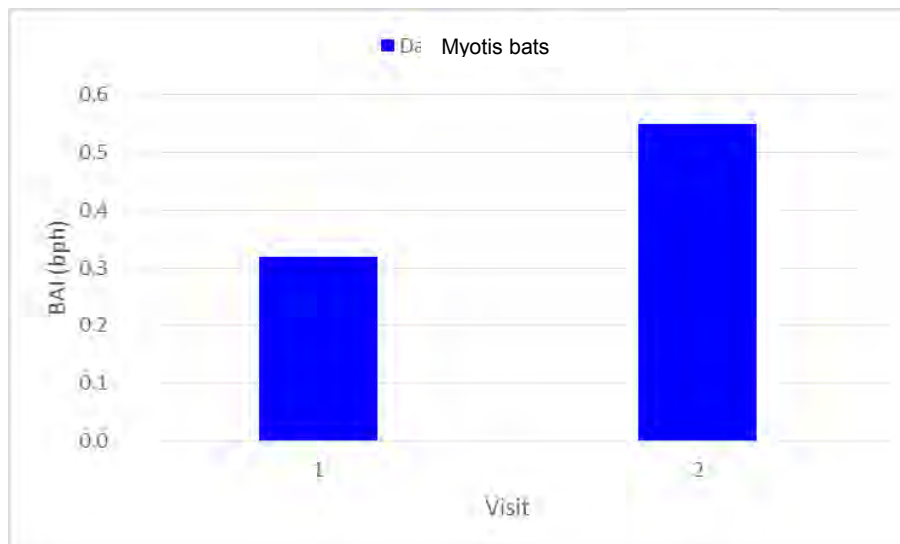
*Figure 10: BAIs recorded at each location by Myotis bats*



### Seasonal Trends

- 3.21 Figure 11 shows the Myotis bat BAI by visit. No significant variation in BAI between survey visits was found for Myotis bats ( $K_2=1.19$   $P>0.05$ ).

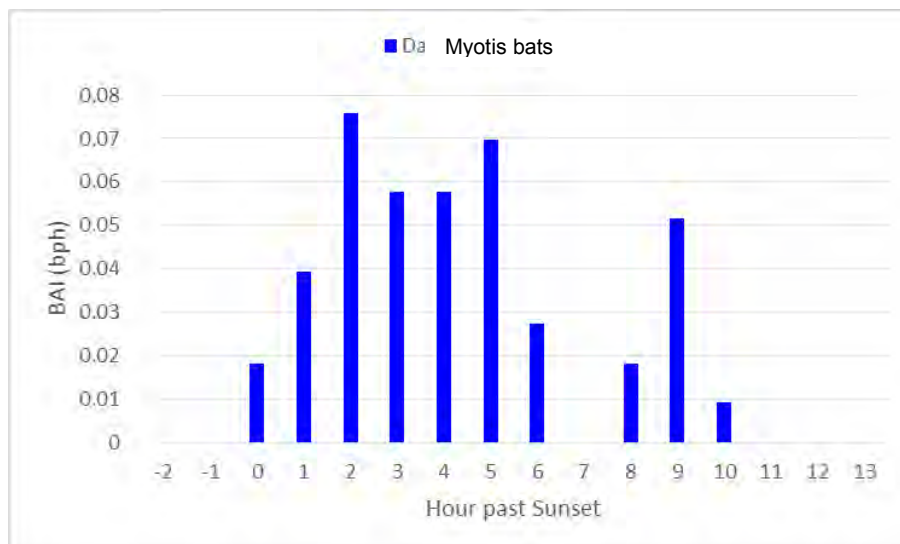
*Figure 11: BAIs recorded across the site each month by Myotis bats*



### Nightly Activity

- 3.22 Figure 12 illustrates nightly activity patterns of Myotis bats utilising the site. Activity is relatively consistent throughout the night.

*Figure 12: Nightly activity patterns of Myotis bats*

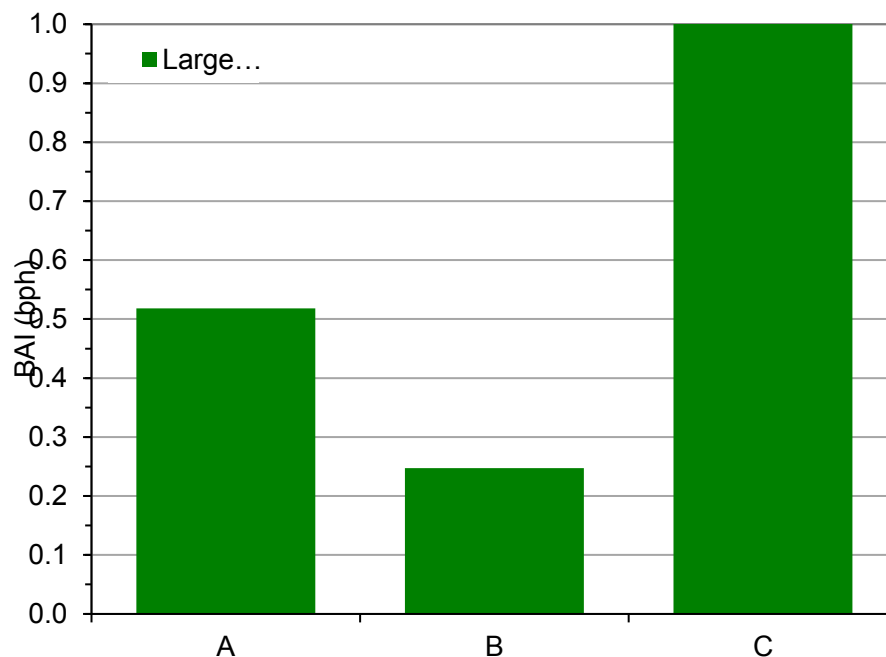


## **Large Bats**

### Spatial Trends

- 3.23 Figure 13 shows large bats BAI by location. No significant variation in BAI between survey locations was found for large bats ( $K_2=4.57$   $P>0.05$ ).

Figure 13: BAIs recorded at each location by large bats



### Seasonal Trends

- 3.24 Figure 14 shows the large bats BAI by visit. No significant variation in BAI between survey visits was found for large bats ( $K_2=0.05$   $P>0.05$ ).

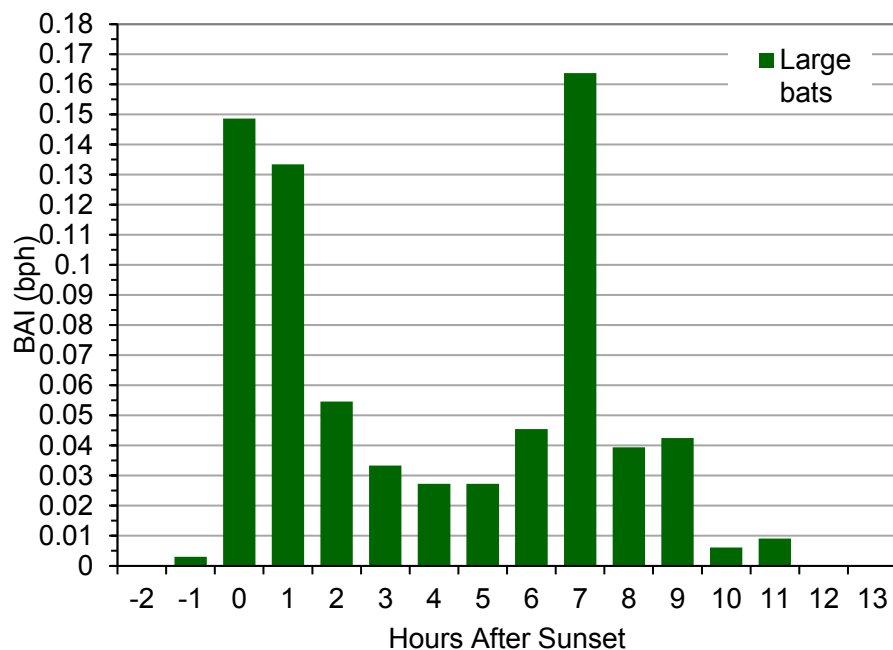
Figure 14: BAIs recorded across the site each visit by large bats



### Nightly Activity

- 3.25 Figure 15 illustrates nightly activity patterns of large bats utilising the site. Activity peaks at 0, 1 and 7 hours after sunset.

*Figure 15: Nightly activity patterns of large bats*

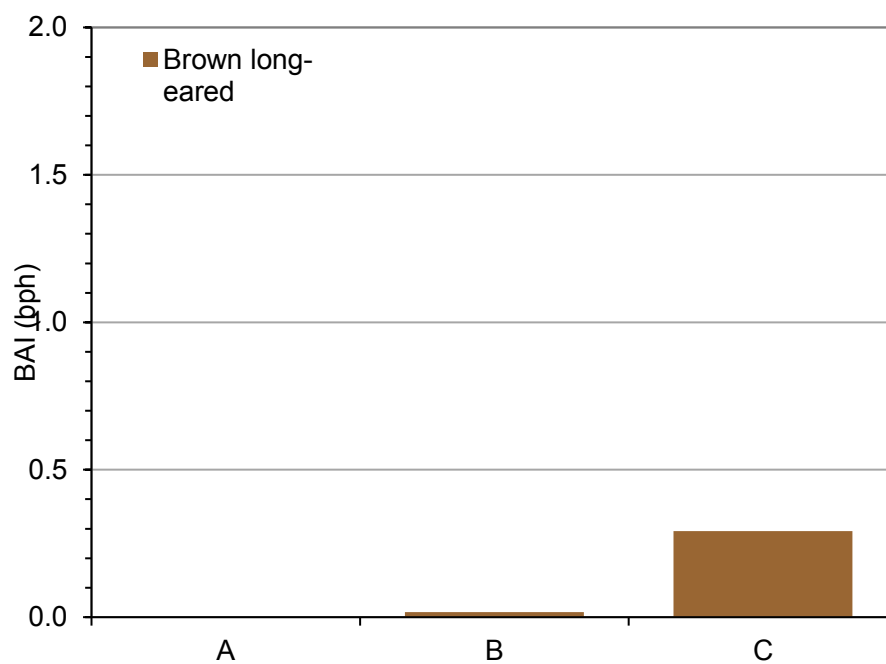


## Long-eared Bats

### Spatial Trends

- 3.26 Figure 16 shows long-eared bats BAI by location. No significant variation in BAI between survey locations was found for long-eared bats ( $K_2=4.57$   $P>0.05$ ).

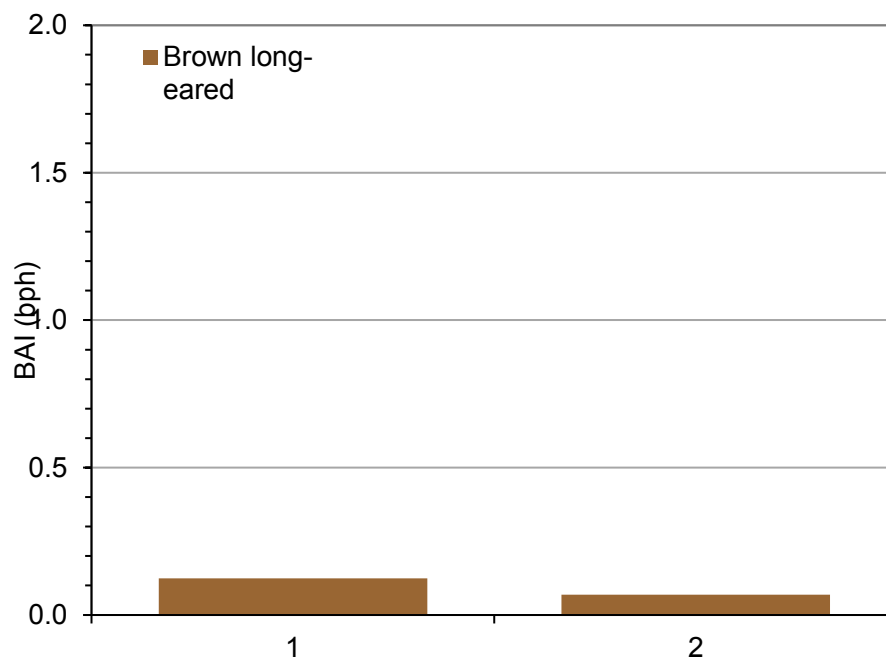
*Figure 16: BAIs recorded at each location by long-eared bats*



### Seasonal Trends

- 3.27 Figure 17 shows the long-eared bats BAI by visit. No significant variation in BAI between survey visits was found for long-eared bats ( $K_2=0.05$   $P>0.05$ ).

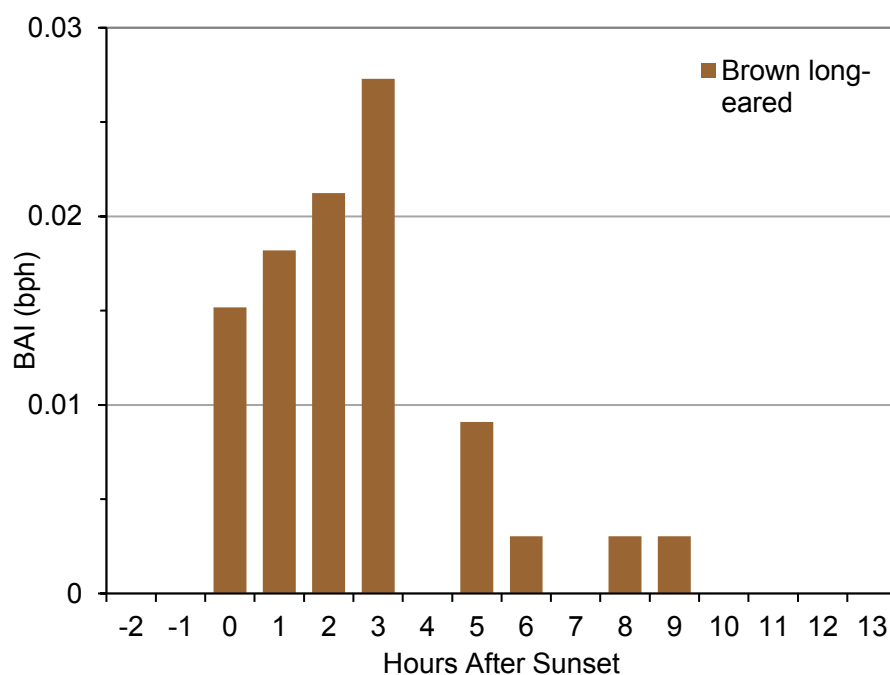
*Figure 17: BAIs recorded across the site each visit by long-eared bats*



### Nightly Activity

- 3.28 Figure 18 illustrates nightly activity patterns of long-eared bats utilising the site. Activity peaks at 3 hours after sunset.

*Figure 18: Nightly activity patterns of long-eared bats*



## 4.0 Evaluation

- 4.1 Of those trees down for removal to facilitate construction trees T43, T45 and G5 were assessed as having low suitability to support roosting bats. These trees will need to be removed using Reasonable Avoidance Measures and this will include section felling of these trees under the supervision of a Natural Resources Wales licensed bat ecologist.
- 4.2 Tree T10 was assessed as having high suitability to support roosting bats. Following discussions with the arboricultural consultant and C4 Projects it was concluded that the tree can now be safely retained within the proposed development. There are currently no implications for this tree and the proposed development. If this tree requires removal in the future then this tree will require three nocturnal surveys between May and September to determine if it supports roosting bats. If roosting bats are found then a license from Natural Resources Wales will be required to permit it to be felled.
- 4.3 The hedgerows, ponds and woodland edge habitats on site provide valuable resources for foraging and commuting bats including for common, soprano and Nathusius' pipistrelle, noctule, brown long-eared, whiskered, Natterer's, Brandt's and Daubenton's bat.
- 4.4 The site is of Local importance for commuting bats. Evaluation of commuting data is summarised at Table 11.
- 4.5 The site is of Local importance for foraging bats. Evaluation of foraging data is summarised at Table 12.

*Table 11: Evaluation of the site for commuting bats*

| Species (Score)           | Number Of Bats (Score)    | Roosts Nearby (Score) | Type And Complexity Of Linear Features (Score)                | Value (Score) |
|---------------------------|---------------------------|-----------------------|---------------------------------------------------------------|---------------|
| Common pipistrelle (2)    | Small number of bats (10) | Not known (4)         | Well-grown and well connected hedgerows, small field size (4) | Local (20)    |
| Soprano pipistrelle (2)   | Small number of bats (10) | Not known (4)         | Well-grown and well connected hedgerows, small field size (4) | Local (20)    |
| Nathusius pipistrelle (5) | Individual bats (5)       | Not known (4)         | Well-grown and well connected hedgerows, small field size (4) | Local (18)    |
| Noctule (5)               | Individual bats (5)       | Not known (4)         | Well-grown and well connected hedgerows, small field size (4) | Local (18)    |

| Species (Score)          | Number Of Bats (Score) | Roosts Nearby (Score) | Type And Complexity Of Linear Features (Score)                | Value (Score) |
|--------------------------|------------------------|-----------------------|---------------------------------------------------------------|---------------|
| Brown long-eared bat (2) | Individual bats (5)    | Not known (4)         | Well-grown and well connected hedgerows, small field size (4) | Local (15)    |
| Whiskered bat (5)        | Individual bats (5)    | Not known (4)         | Well-grown and well connected hedgerows, small field size (4) | Local (18)    |
| Brandt's bat (5)         | Individual bats (5)    | Not known (4)         | Well-grown and well connected hedgerows, small field size (4) | Local (18)    |
| Daubenton's bat (5)      | Individual bats (5)    | Not known (4)         | Well-grown and well connected hedgerows, small field size (4) | Local (18)    |
| Natterer's bat (5)       | Individual bats (5)    | Not known (4)         | Well-grown and well connected hedgerows, small field size (4) | Local (18)    |

*Table 12: Evaluation of the site for foraging bats*

| Species (Score)           | Number Of Bats (Score)    | Roosts Nearby (Score) | Type And Complexity Of Linear Features (Score)                                         | Value (Score) |
|---------------------------|---------------------------|-----------------------|----------------------------------------------------------------------------------------|---------------|
| Common pipistrelle (2)    | Small number of bats (10) | Not known (4)         | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) | Local (20)    |
| Soprano pipistrelle (2)   | Small number of bats (10) | Not known (4)         | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) | Local (20)    |
| Nathusius pipistrelle (5) | Individual bats (5)       | Not known (4)         | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) | Local (18)    |
| Noctule (5)               | Individual bats (5)       | Not known (4)         | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) | Local (18)    |

| Species (Score)          | Number Of Bats (Score) | Roosts Nearby (Score) | Type And Complexity Of Linear Features (Score)                                         | Value (Score) |
|--------------------------|------------------------|-----------------------|----------------------------------------------------------------------------------------|---------------|
| Brown long-eared bat (2) | Individual bats (5)    | Not known (4)         | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) | Local (15)    |
| Whiskered bat (5)        | Individual bats (5)    | Not known (4)         | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) | Local (18)    |
| Brandt's bat (5)         | Individual bats (5)    | Not known (4)         | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) | Local (18)    |
| Daubenton's bat (5)      | Individual bats (5)    | Not known (4)         | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) | Local (18)    |
| Natterer's bat (5)       | Individual bats (5)    | Not known (4)         | Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4) | Local (18)    |

## Drawings

G8304.007 Bat Activity Transect and Static Detector Locations  
G8304.008 Bat Activity Transect Visit 1  
G8304.009 Bat Activity Transect Visit 2  
G7215.002 Bat Tree Survey Plan



**KEY**

- Site boundary
- Static detector
- Transect route

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| Rev | Description | Drawn | Approved | Date |
|-----|-------------|-------|----------|------|
|     |             |       |          |      |



**THE ENVIRONMENT PARTNERSHIP**

Genesis Centre, Birchwood Science Park, Warrington WA3 7BH  
Tel 01925 844004 e-mail [tep@tep.uk.com](mailto:tep@tep.uk.com) www.[tep.uk.com](http://tep.uk.com)

Project  
**Bryn Lane, Wrexham**

Title  
**Bat Transect Route and Static Detector Locations**

Drawing Number  
**G8304.007**

| Drawn | Checked | Approved | Scale        | Date       |
|-------|---------|----------|--------------|------------|
| CW    | SA      | LP       | 1:2,500 @ A3 | 23/09/2020 |



**KEY**

- Site boundary
- Static detector
- Transect route

**Bat Transect Survey Results**

- Common pipistrelle
- Soprano pipistrelle
- Brown long-eared bat
- Myotis species
- Noctule
- Bat flightline (colour denotes bat species)

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Site Map

1:40,000

| Rev | Description | Drawn | Approved | Date |
|-----|-------------|-------|----------|------|
|     |             |       |          |      |



**THE ENVIRONMENT PARTNERSHIP**

Genesis Centre, Birchwood Science Park, Warrington WA3 7BH  
Tel 01925 844004 e-mail [tep@tep.uk.com](mailto:tep@tep.uk.com) www.[tep.uk.com](http://tep.uk.com)

Project  
Bryn Lane, Wrexham

Title  
Bat Transect Survey  
Visit 1 - 12<sup>th</sup> September 2018

Drawing Number  
G8304.008

|             |               |                |                       |                    |
|-------------|---------------|----------------|-----------------------|--------------------|
| Drawn<br>CW | Checked<br>SA | Approved<br>LP | Scale<br>1:2,500 @ A3 | Date<br>23/09/2020 |
|-------------|---------------|----------------|-----------------------|--------------------|



**KEY**

Site boundary

Static detector

Transect route

**Bat Transect Survey Results**

Common pipistrelle

Noctule

Bat flightline (colour denotes bat species)

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Site Map

1:40,000

| Rev | Description | Drawn | Approved | Date |
|-----|-------------|-------|----------|------|
|     |             |       |          |      |



**THE ENVIRONMENT PARTNERSHIP**

Genesis Centre, Birchwood Science Park, Warrington WA3 7BH  
Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project  
Bryn Lane, Wrexham

Title  
Bat Transect Survey  
Visit 2 - 20<sup>th</sup> July 2020

Drawing Number  
G8304.009

|             |               |                |                       |                    |
|-------------|---------------|----------------|-----------------------|--------------------|
| Drawn<br>CW | Checked<br>SA | Approved<br>LP | Scale<br>1:2,500 @ A3 | Date<br>23/09/2020 |
|-------------|---------------|----------------|-----------------------|--------------------|



**KEY**

Site boundary

**Bat Potential Assessment**

- High
- Medium
- Low
- Negligible
- Not assessed

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Site Map

| Rev | Description | Drawn | Approved | Date |
|-----|-------------|-------|----------|------|
|     |             |       |          |      |

**TEP** | **THE ENVIRONMENT PARTNERSHIP**

Genesis Centre, Birchwood Science Park, Warrington WA3 7BH  
Tel 01925 844004 e-mail tep@tep.uk.com www.tep.uk.com

Project  
Bryn Lane, Wrexham

Title  
Tree Bat Potential Assessment

Drawing Number  
G7215.002

| Drawn | Checked | Approved | Scale        | Date       |
|-------|---------|----------|--------------|------------|
| MK    | JS      | FW       | 1:2,200 @ A3 | 01/10/2018 |



**HEAD OFFICE**

Genesis Centre,  
Birchwood Science Park,  
Warrington  
WA3 7BH

Tel: 01925 844004  
E-mail: [tep@tep.uk.com](mailto:tep@tep.uk.com)

**MARKET  
HARBOROUGH**

Harborough Innovation  
Centre,  
Airfield Business Park,  
Leicester Road,  
Market Harborough  
Leicestershire  
LE16 7WB

Tel: 01858 383120  
E-mail: [mh@tep.uk.com](mailto:mh@tep.uk.com)

**GATESHEAD**

Office 26, Gateshead  
International Business  
Centre,  
Mulgrave Terrace,  
Gateshead  
NE8 1AN

Tel: 0191 605 3340  
E-mail: [gateshead@tep.uk.com](mailto:gateshead@tep.uk.com)

**LONDON**

8 Trinity Street,  
London  
SE1 1DB

Tel: 020 3096 6050  
E-mail: [london@tep.uk.com](mailto:london@tep.uk.com)

**CORNWALL**

4 Park Noweth,  
Churchtown,  
Cury,  
Helston  
Cornwall  
TR12 7BW

Tel: 01326 240081  
E-mail: [cornwall@tep.uk.com](mailto:cornwall@tep.uk.com)

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