Asland Walks Energy Park

on behalf of GA Pet Food Partners Ltd.

Appendix 3: Bat Baseline Report

avianecology

Document Control				
Project Name:		Asland Walks Energy Park		
Project Number:		GAPet-794-4080		
Report Title:		Appendix 3: Bat Baseline Report		
Issue	**Date**	**Notes**	**Prepared**	**Reviewed**
V1	16/09/2024	Draft	L. Quarton *MSc* **Ecologist**	Dr. C. Garratt *PhD* **Principal Ecologist**
V2	14/11/2025	Draft	K. Love *MSc* **Ecologist**	T. Gaoter MSc, BSc, (hons), MCIEEM **Technical Director**

CONTENTS

1 INTRODUCTION

1.1 Background

1.1.1 Avian Ecology Ltd. (AEL) was commissioned by GA Pet Food Partners Ltd. to conduct bat activity surveys in relation to the proposed installation of a solar and wind energy park, together with associated infrastructure (the 'Proposed Development') on land at Plocks Farm, Liverpool Road, Bretherton, Leyland PR26 9AX (termed the 'Site'), as illustrated on the Site Location Plan (**Figure 1**).

1.1.2 This report provides baseline ecological information in relation to bat species relative to the Site, and presents detailed methodologies and results of static bat activity surveys undertaken on-Site.

1.1.3 Only the common names of bat species are used within this report; with scientific names provided in **Annex 4.1**.

1.2 Site Overview

1.2.1 The 'Survey Area', as shown in **Figure 1** comprises a parcel of arable land bordered with grassland strips and watercourses. The River Douglas runs directly along the eastern Site boundary, with the Leeds and Liverpool Canal located along the western Site boundary.

1.2.2 In the wider context, the Site is surrounded by further extensive areas of arable land and areas of woodland. Tarleton village is located north-west of the Site (separated by the Leeds and Liverpool Canal), with Bretherton village located within the Site's north-eastern proposed cable route.

2 LEGISLATION

2.1.1 All species of British bat are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Bats are further protected under the Conservation of Habitats and Species Regulations 2017 (as amended) and the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. The Act and Regulations make it an offence to:

- Kill, injure, or take any wild bat;
- Damage, destroy or obstruct access to any place that a wild bat uses for shelter or protection; and,
- Intentionally or recklessly disturb any wild bat while it is occupying a structure or place that it uses for shelter or protection.

2.1.2 Seven bat species in the UK are also listed as species of Principal Importance for the purpose of conserving biodiversity under Section 41 of the NERC Act 2006, whilst a total of eight bats are listed as priority species under the Lancashire Local Biodiversity Action Plan (LBAP)[1].

[1] https://www.lancashire.gov.uk/lern/services/ (Accessed 29th August 2025)

3 METHODOLOGY

3.1 Survey Guidelines

3.1.1 The approach to baseline information gathering and subsequent interpretation of results has been undertaken with reference to the following core guidance documents, as current at the time surveys were carried out:

- Collins *et al.* (ed) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines. 3rd edition,* The Bat Conservation Trust, London[2];
- Bat Workers Manual (Mitchell-Jones, A. J. & McLeish, A. P, 2004)[3];
- Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough[4].
- Natural England (2014*) Technical Information Note TIN051: Bats and onshore wind turbines interim guidance*. Natural England, Peterborough[5];
- NatureScot (2022) *General pre-application and scoping advice for onshore wind farms[6]*; and,
- Joint Agencies (2021) *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation[7].*

3.1.2 Baseline information gathering was carried out in relation to guidance current at the time of survey, although both BCT guidance (2016) and the Bat Mitigation Guidelines (2004)[8] have since been superseded during the closing stages of field surveys. However, as surveys were implemented using prior guidance, reference to these materials has been retained.

3.1.3 Additional pieces of guidance and peer reviewed literature have also been referred to and are referenced where relevant.

3.2 Objectives

3.2.1 With reference to Collins guidance (2016) the objectives of the baseline surveys were to:

---

[2] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rdth edn). The Bat Conservation Trust, London.

[3] Mitchell-Jones, A. J. & McLeish, A. P. (2004). *Bat Workers Manual*. 3rd Edition. Joint Nature Conservation Committee, Peterborough.
[4] Mitchell-Jones, A.J. (2004) Bat Mitigation Guidelines English Nature, Peterborough.
[5] Natural England (2014) Technical Information Note TIN051: Bats and onshore wind turbines interim guidance. Natural England, Peterborough.
[6] Nature Scot (2022) *General pre-application and scoping advice for onshore wind farms. Version: August 2022.*
[7] Joint Agencies (2021) Bats and onshore wind turbines: survey, assessment and mitigation. Version: August 2021. This document has been prepared jointly by NatureScot (Scottish Natural Heritage (SNH)), Natural England, Natural Resources Wales, RenewableUK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (BCT) with input from other key stakeholders.
[8] Collins 3rd Edition (2016) and the Bat Mitigation Guidelines (2004) have since been superseded by Collins, J. (ed.) (2023) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (4th Edition). The Bat Conservation Trust, London Available at: https://cdn.bats.org.uk/uploads/pdf/Resources/For-professionals/Bat-Survey-Guidelines-4th-edition-AMENDED-27.03.24.pdf?v=1711530492&_gl=1*w2mz4c*_ga*MzkxMzk4MjUzLjE3NDAwNDc1Nzg.*_ga_G28378TB9V*MTc0MDA0NzU3OC4xLjAuMTc0MDA0NzU4MS4wLjAuMA.. (Accessed: 2nd October 2025), and Reason, P.F. and Wray, S. (2025). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Version 1.2. Chartered Institute of Ecology and Environmental Management, Ampfield. Available at: https://cieem.net/resource/uk-bat-mitigation-guidelines-2025/ (Accessed: 2nd October 2025).

- Identify the bat assemblage present within the Site;
- Identify temporal and spatial variations of use; and,
- Identify relative activity levels of bats within the Site.

3.3 Field Surveys

3.3.1 The following surveys/baseline assessments have been completed in relation to the Site:

- Automated/Static Activity Surveys.

3.3.2 A preliminary roost assessment, in accordance with Collins *et al.* (2023), was also carried out as part of the extended habitat survey validation walkover carried out in September 2023, as well as extended habitat surveys in August 2025. For further details see 'Asland Walks Energy Park Ecological Assessment Report' (Avian Ecology, 2025)[9].

Static Activity Surveys

3.3.3 Bat activity surveys, comprising three automatic/static surveys, were undertaken on a seasonal basis, with recording periods consisting of spring (April - May), summer (June – mid-August) and autumn (late-August - October), in line with Joint Agencies guidance (2021).

3.3.4 Two automated monitoring stations (MS) were deployed within the Site, with MS locations chosen specifically to sample activity from different representative habitats present within the study area, including habitats of potentially higher interest. MS locations on-Site are illustrated in **Figure 2** and detailed in **Table 3.1** below, with accompanying images of monitoring location habitats shown in **Annex 4.2**.

Table 3.1: *Static monitoring station locations.*

Monitoring Station	Grid Reference	Habitat
MS1	SD 46337 19245	Located in association with willow scrub based on other neutral grassland strip, within 30m to linear boundary feature (i.e., River Douglas).
MS2	SD 46076 19533	Located within cereal crop, attached to small electrical compound; situated 100m to linear feature (e.g., Rufford Branch)

3.3.5 Each monitoring station comprised either a single Songmeter 2 (SM2), Songmeter 4 (SM4) or Songmeter Mini bat detector[10] fitted with a single omnidirectional microphone attached to a 1m high wooden stake or suitable on-Site feature.

3.3.6 Monitoring was undertaken between the time periods spanning approximately thirty minutes before sunset to thirty minutes after sunrise, with equipment set up to record simultaneously, to allow comparison of activity recorded at monitoring stations located within different habitats.

3.3.7 Bat activity was sampled over the course of three recording periods (spring, summer and autumn), for a minimum of 10 nights per period, throughout the 2023 bat activity season, as outlined in Joint

[9] Avian Ecology Ltd. (2025) *Asland Walks Energy Park Ecological Assessment Report*.
[10] Note that the same detector type was not necessarily used at each location for each deployment period.

Agencies guidance (Joint Agencies, 2021). Recording periods for each monitoring station are detailed within **Table 3.2.**

Table 3.2: *Automated monitoring survey effort.*

Monitoring Station	Season	Start	End	Nights	Recording Hours
MS1	Spring	11/05/2023	24/05/2023	13	104
	Summer	19/07/2023	02/08/2023	14	112.25
	Autumn	04/09/2023	15/09/2023	11	118.25
MS2	Spring	11/05/2023	Failed	Failed	N/A
	Summer	19/07/2023	02/08/2023	14	112.25
	Autumn	04/09/2023	04/09/2023	11	118.25

3.4 Weather Data

3.4.1 Weather data were sourced using the World Weather Online website[11].

3.4.2 Weather parameters collected included temperature (OC), rainfall (mm) and wind speed at dusk (mps) and data were analysed to account for any periods of poor weather which could have affected bat activity. Weather conditions are summarised in **Annex 4.3**. Nights of unsuitable weather that also recorded no bats were removed from the dataset.

3.5 Data Analysis and Assumptions of Bat Activity

3.5.1 Data analysis and interpretation of results followed the principles presented in the BCT guidance (Collins, 2016). Bat sound analysis has been undertaken by L Quarton *MSc*, a suitably qualified and experienced ecologist.

3.5.2 Bat detectors recorded data onto digital media for subsequent analysis using Kaleidoscope Pro (Wildlife Acoustics) software. All data was initially processed through Kaleidoscope Pro in order to separate out 'noise' files. The remaining sonograms were then automatically identified to species by the software. A selection of sonograms from each species or species group was manually checked with particular attention given to non-pipistrelle species.

3.5.3 Bat species were identified using characteristic diagnostic features associated with echolocation calls of different species, including e.g. frequency, slope, call duration and time between calls.

3.5.4 Whilst the use of the Ecobat tool is common practice in relation data analysis relative to wind developments, it is not an essential assessment in relation to single wind turbine developments(Joint Agencies, 2021). As such, the use of a Bat Activity Index (BAI) based on Collins (2016) guidance has been adapted.

[11] https://www.worldweatheronline.com [Accessed October 2023].

3.5.5 Bat detectors record the passage of echolocating bats during surveys, enabling an estimation of relative bat activity levels for assessment. It is recognised, however, that there are limitations to the use of this method for determining bat activity levels.

3.5.6 An individual bat can pass a particular feature on several occasions while foraging and therefore it was not possible to estimate the number of individual bats or to allow a fair comparison where survey time differs. As such, bat activity is recorded as an index. The Bat Activity Index (BAI), based on BCT guidance (Collins, 2016), is defined as follows:

BAI (per hour) = Total number of bat 'registered calls' / number of hours of recording

3.5.7 For analysis purposes, bat activity was recorded as the number of 'bat registered calls' (a sequence of echolocation calls consisting of two or more call notes (pulse of frequency) from one bat, not separated by more than one second (White and Gehrt, 2001[12], Gannon *et al*., 2003[13]) with a minimum call note length of >= two milliseconds (Weller *et al*., 2009[14]) from which the activity index is calculated.

3.6 Limitations

Static Monitoring Surveys

3.6.1 A recording failure occurred at MS2 during the spring (May) recording period. Consequently, baseline information on spring bat activity is currently unavailable for habitat located at MS2 (i.e., the proposed wind turbine location).

3.6.2 Guidance from the Bat Conservation Trust[15] recommends static monitoring surveys be carried out in the following conditions: temperature above 10°C at dusk, wind speed not exceeding 5m/s and no, or very light, rainfall. Weather was deemed unsuitable in the context of these criteria during 5 out of a total of 38 nights. However, only 30 nights of recording in suitable weather are required by guidance, and bat activity was recorded on all of the 38 nights sampled, notwithstanding unsuitable weather conditions. As such, all nights that recorded bats have been included within the analysis and unsuitable weather conditions are not considered to represent a major limitation to static activity surveys undertaken on-Site.

Sonogram Analysis

3.6.3 Analysing bat sonograms using Kaleidoscope can clearly identify certain species. However, some genus groups (such as *Myotis spp. and Nyctalus 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

[12] White, E. & Gehrt, S. (2001). *Effects of recording media on echolocation data from broadband bat detectors*. Wildlife Society Bulletin 29: 974-978

[13] Gannon, W., Sherwin, R. & Haymond, S. (2003). *On the importance of articulating assumptions when conducting acoustic studies of habitat use by bats*. Wildlife Society Bulletin 31: 45-61

[14] Weller, T., Cryan, P. & O'Shea, T. (2009). *Broadening the focus of bat conservation and research in the USA for the 21st century. Endangered Species Research*. 8: 129-145

[15] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

circumstances, due to partial calls being heard or due to distortion from, for example passing cars, rain or wind.

3.6.4 The detectability of some bat species, such as brown long-eared bat, is lower than that of, for example, noctule and pipistrelle species. The echolocation calls of brown long-eared bats are comparatively more difficult to detect with bat detectors, and their particular hunting strategies take them into less open habitats. It should also be noted that physical and environmental factors as well as a bats age, sex or behaviour can all influence the echolocation calls (e.g., a social call of a soprano pipistrelle has been known to display similar characteristics to a low clarity noctule call).

3.6.5 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. The identification of those calls assigned to individual species is done so on the basis of judgement and experience. Careful interpretation has been applied when comparing survey results across species.

4 RESULTS

4.1 Site Overview

4.1.1 Bats were detected on 38 out of 38 nights sampled between spring, summer and autumn recording periods, using a total of two static bat detectors. Throughout this period, bat calls indicative of a minimum of five species/genus were recorded, as follows:

- Common pipistrelle;
- Soprano pipistrelle;
- Noctule;
- Brown long-eared bat; and,
- Myotis *spp*.

4.1.2 Species identified are presented in **Table 4.1** along with potential collision risk and population vulnerability as described in Table 2 of Joint Agencies guidance (2021).

Table 4.1: *Bat species recorded, collision risk and population vulnerability.*

Species	Collision Risk	Population Vulnerability
Common pipistrelle	High	Medium
Soprano pipistrelle	High	Medium
Noctule	High	High
Brown long-eared	Low	Low
Myotis species	Low	Low/Medium

4.1.3 **Table 4.2** below summarises the overall number of passes recorded (per species) throughout the combined survey periods.

4.1.4 Common pipistrelle was the most frequently recorded species detected on-Site throughout the overall survey period (i.e., 12,346 passes), accounting for 94.53% of total call registrations.

Table 4.2: *Total number of passes recorded per species[16].*

Species	Count (No)	Percentage of total (%)
Common pipistrelle	12,346	94.53%
Soprano pipistrelle	24	0.18%
Noctule	197	1.51%
Brown long-eared	30	0.23%
Myotis *spp*.	463	3.55%
Total	**13,060**	**100%**

[16] The 'Total' percentage may be slightly above 100% due to rounding of the percentages per species.

4.1.5 **Table 4.3** summarises the total number of passes (per species) recorded at each individual monitoring station throughout the combined survey periods.

4.1.6 Of the monitoring stations deployed, MS1 (located in the higher value reference habitat) featured the highest number of call registrations (8,870 bat passes), accounting for 71.71% of total bat passes recorded on-Site.

4.1.7 All five species/genus recorded over the recording periods were detected across both monitoring station locations, although some variation was observed at each location seasonally.

Table 4.3: *Total number of passes per monitoring station (per species).*

Bat Species	Monitoring Stations		Total No. (Per Species)
	MS1	MS2	
Common pipistrelle	8870	3476	**12346**
Soprano pipistrelle	12	12	**24**
Noctule	152	45	**197**
Brown long-eared	10	20	**30**
Myotis *spp*.	321	142	**463**
Total No. Passes (Per MS)	**9365**	**3695**	**13060**

4.1.8 **Table 4.4** below summarises the BAI for individual bat species recorded across monitoring stations, in addition to the overall BAI for each monitoring station, and for the overall Site.

4.1.9 Bat activity was noted to be highest at MS1, accounting for a BAI of 28.00 calls per hour over the combined survey period.

Table 4.4: *Total BAI per monitoring station (per species).*

Bat Species	Monitoring Stations		Total BAI (Per Species)
	MS1	MS2	
Common pipistrelle	26.52	15.08	**21.85**
Soprano pipistrelle	0.04	0.05	**0.04**
Noctule	0.45	0.20	**0.35**
Brown long-eared	0.03	0.09	**0.05**
Myotis *spp*.	0.96	0.62	**0.82**
Total BAI (Per MS)	**28.00**	**16.03**	**23.12**

4.1.10 Additionally, **Table 4.5** presents the total number of passes (per species) recorded at both detectors during each recording period.

4.1.11 The highest number of overall call registrations (*i.e.*, 8,617) were recorded during the autumn recording period (i.e., September) accounting for 65.98% of overall call registration recorded on-Site, though noctule and Myotis *spp*. registrations were highest in spring and summer respectively.

4.1.12 All five species/genus were also recorded on-Site across all three survey periods.

Table 4.5: *Total number of passes per recording period (per species).*

Bat Species	Recording Period			Total No. (Per Species)
	Spring	Summer	Autumn	
Common pipistrelle	1435	2493	8418	12346
Soprano pipistrelle	7	3	14	24
Noctule	95	64	38	197
Brown long-eared	2	2	26	30
Myotis *spp.*	46	296	121	463
Total No. Passes (Per Recording Period)	**1585**	**2858**	**8617**	**13060**

4.1.13 **Table 4.6** below presents the BAI (per species) across recording periods, in addition to the overall BAI (species combined) across recording periods.

4.1.14 Overall, bat activity was noted to be highest during the autumn recording period, accounting for a BAI of 36.44 calls per hour across Site.

Table 4.6: *Total BAI per recording period (per species).*

Bat Species	Recording Period			Total BAI (Per Species)
	Spring	Summer	Autumn	
Common pipistrelle	13.80	11.10	35.59	21.85
Soprano pipistrelle	0.07	0.01	0.06	0.04
Noctule	0.91	0.29	0.16	0.35
Brown long-eared	0.02	0.01	0.11	0.05
Myotis *spp*.	0.44	1.32	0.51	0.82
Total BAI (Per Recording Period)	**15.24**	**12.73**	**36.44**	**23.12**

4.2 Species Summary

Common pipistrelle

4.2.1 Common pipistrelle was the most frequently recorded species detected during static activity surveys (also reflective of overall BAI: 21.85 passes per hour), accounting for 91.53% of total call registrations.

A BAI summary of common pipistrelle calls (i.e., registered calls per hour) for individual monitoring stations across Site, and during individual recording periods, is presented in **Table 4.7**.

4.2.2 Common pipistrelle activity was highest at MS1 overall (i.e., neutral grassland and scrub habitat adjacent a riparian linear feature), and during the autumn recording period. Activity was lowest during the summer recording period, most notably at MS2 (BAI: 2.98 calls per hour).

Table 4.7: *A summary of common pipistrelle BAI (calls per hour) for each recording period.*

Monitoring Station	Recording Period			Total BAI (Per Location)
	Spring	Summer	Autumn	
MS1	13.80	19.23	44.62	**26.52**
MS2	N/A	2.98	26.57	**15.08**
Total BAI (Per Recording Period)	**13.80**	**11.10**	**35.59**	**21.85**

Soprano pipistrelle

4.2.3 Soprano pipistrelle was the least frequently recorded species detected during static activity surveys (also reflective of overall BAI; 0.04 passes per hour), accounting for 0.18% of total call registrations. A BAI summary of soprano pipistrelle calls for individual monitoring stations across Site, and during individual recording periods, is presented in **Table 4.8**.

4.2.4 Soprano pipistrelle activity was highest at MS2 overall, and during the spring recording period (equipment failure means no seasonal comparisons can be made between MS locations for spring). However, the number of total call registrations detected across Site was noted to be comparable low for this species (i.e., 24 passes overall).

Table 4.8: *A summary of soprano pipistrelle BAI (calls per hour) for each recording period.*

Monitoring Location	Recording Period			Total BAI (Per Location)
	Spring	Summer	Autumn	
MS1	0.07	0.02	0.03	**0.04**
MS2	N/A	0.01	0.09	**0.05**
Total BAI (Per Recording Period)	**0.07**	**0.01**	**0.06**	**0.04**

Noctule

4.2.5 Noctule was the third most frequently recorded species detected during static activity surveys (also reflective of overall BAI: 0.35 passes per hour), with noctule activity accounting for 1.51% of total call registrations. A BAI summary of noctule for individual monitoring stations across Site, and during individual recording periods, is presented in **Table 4.9**.

4.2.6 Noctule activity was noted to be highest at MS1, and during the spring recording period (although no comparisons can be made between locations for spring due to equipment failure) and lowest during the autumn recording period, with little difference in activity levels in between monitoring locations in summer and autumn.

Table 4.9: *A summary of noctule BAI (calls per hour) for each recording period.*

Monitoring Location	Recording Period			Total BAI (Per Location)
	Spring	Summer	Autumn	
MS1	0.91	0.34	0.16	**0.45**
MS2	N/A	0.32	0.16	**0.20**
Total BAI (Per Recording Period)	**0.91**	**0.29**	**0.16**	**0.35**

Myotis spp.

4.2.7 Myotis bat species were the second most frequently recorded species detected during static activity surveys, with Myotis activity accounting for 3.55% of total call registrations (also reflective of overall BAI: 0.82 calls per hour). A BAI summary of Myotis bats for individual monitoring stations across Site, and during individual survey periods, is presented in **Table 4.10**.

4.2.8 Myotis bat activity was highest at MS1 overall, and during the summer recording period1.

Table 4.10: *A summary of Myotis species BAI (calls per hour) for each recording period.*

Monitoring Location	Recording Period			Total BAI (Per Location)
	Spring	Summer	Autumn	
MS1	0.44	2.32	0.13	**0.96**
MS2	N/A	0.32	0.90	**0.62**
Total BAI (Per Recording Period)	**0.44**	**1.32**	**0.51**	**0.82**

Brown long-eared

4.2.9 Brown long-eared bat was the second least frequently recorded species detected during static activity surveys, accounting for 0.23% of total call registrations. A BAI summary of brown long-eared bat for individual monitoring stations across Site, and during individual recording periods, is presented in **Table 4.11**.

4.2.10 Brown long-eared bat activity was highest at MS2 overall and during the autumn recording period.

Table 4.11: *A summary of brown long-eared bat BAI (calls per hour) for each recording period.*

Monitoring Location	Recording Period			Total BAI (Per Location)
	Spring	Summer	Autumn	
MS1	0.02	0.02	0.05	**0.03**
MS2	N/A	0.00	0.17	**0.09**
Total BAI (Per Recording Period)	**0.02**	**0.01**	**0.11**	**0.05**

5 SUMMARY

5.1.1 Two static detectors were deployed during spring (May), summer (July-August) and autumn (September) monitoring periods, in a representative sample of habitats on-Site (**Figure 2)**. Habitats sampled included a neutral grassland strip located along the Site boundary, adjacent to the River Douglas (i.e., MS1), and an open area of cereal crop (i.e., MS2).

5.1.2 A minimum of five species were detected on-Site throughout survey periods, which included common pipistrelle, soprano pipistrelle, noctule, Myotis species, and brown long-eared bat. All five species/genus were recorded consistently at MS1 during each survey period. The majority of species recorded were also detected consistently across summer and autumn recording periods at MS2, with the exception of brown long-eared bat, which went unrecorded during the summer recording period. However, due to equipment failure, no data for MS2 during the spring recording period is available.

5.1.3 Overall, collective bat activity across the Site accounted for 13060 bat passes, equating to an overall Site BAI of 23.12 calls per hour over the total survey period; common pipistrelle was identified as the most frequently recorded species on-Site, with an overall BAI of 21.85 call per hour over the combined survey period. Relatively, additional bat species recorded accounted for a notably lower number of registrations, with overall BAI for each species equating to <1 call per hour over the combined survey period.

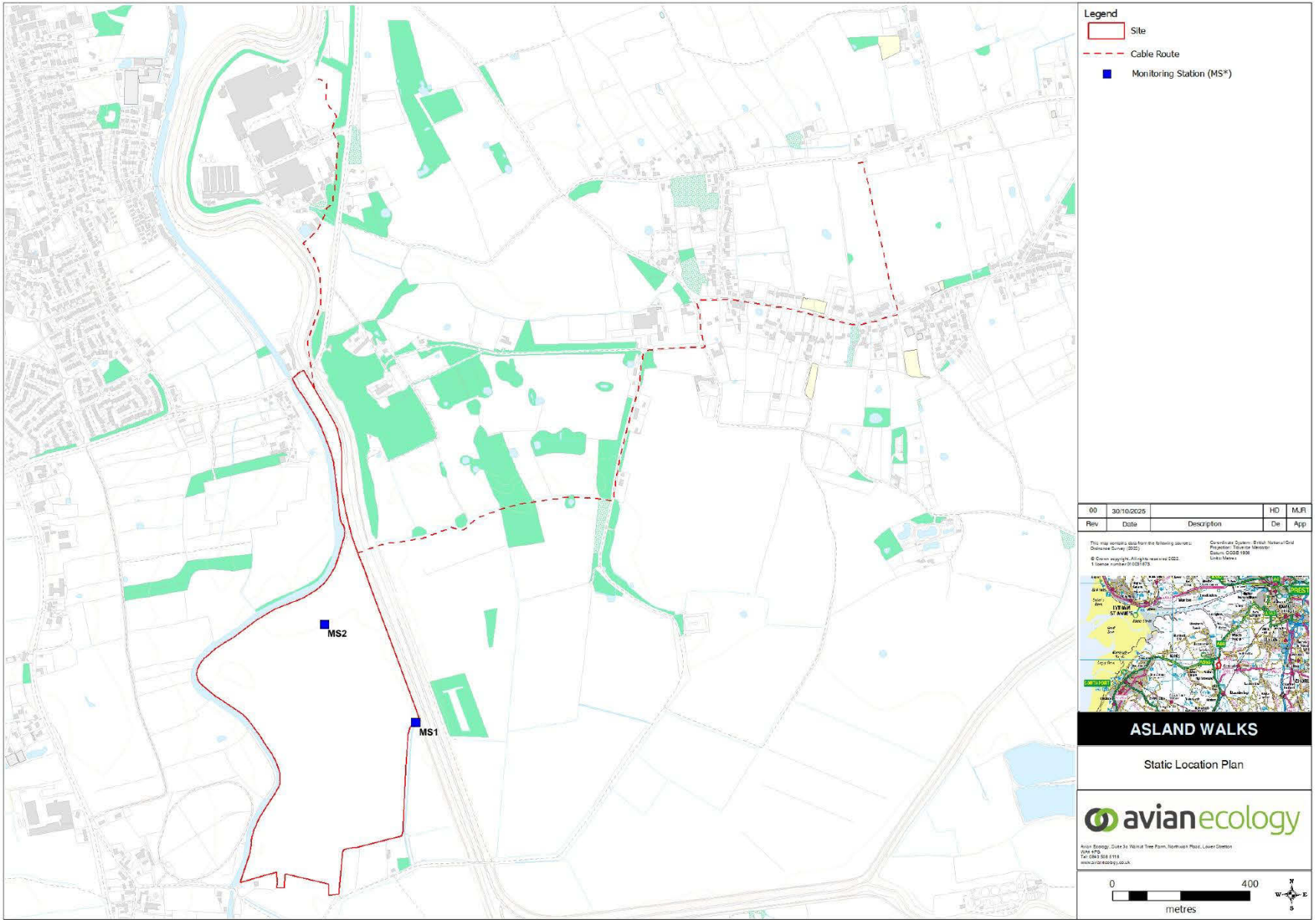
5.1.4 Collective bat activity was also noted to be greater at MS1 overall, accounting for 9365 call registrations overall, equating to 71.7% of passes recorded on-Site, and an overall BAI of 28.00 calls per hour. Likewise, individual bat activity was noted to be greater at MS1 (i.e., in association with wooded/riparian habitat) for common pipistrelle, noctule, and Myotis bats. In contrast, soprano pipistrelle and brown long eared bat activity was noted to be relatively higher at MS2 overall; however, given the comparably low number of passes recorded, variation in activity between MS1 and MS2 in unlikely to be significantly different.

5.1.5 Seasonally, overall bat activity was noted to be higher during the autumn recording period in comparison to summer, accounting for 8617 collective bat passes, and an overall BAI of 36.44 calls per hour. Whilst collective bat passes were also comparably lower during the spring recording period, due to the variation in survey effort (i.e., the failure of MS2), a reliable comparison of bat passes with addition seasons cannot be made. However, overall BAI is noted to be comparably lower during both spring and summer relative to autumn (i.e., 13.80 and 11.10 passes per hour, respectively).

5.1.6 Overall, seasonal bat activity varied between species, with overall seasonal BAI being greatest for common pipistrelle and brown log-eared bat during the autumn recording period, noctule during spring, and Myotis bats during summer. Soprano pipistrelle showed a relatively equal BAI between autumn and spring (although slightly higher during the latter period). However, BAI scores for brown long-eared bat and soprano pipistrelle are both derived from very low relative activity on-Site, therefore, activity should be interpreted as relative even between survey periods.

Figure 1: Site Location Plan

Figure 2: Static Detector Deployment Plan



ANNEX 4.1: SCIENTIFIC NAMES

Table A4.1.1 provides scientific names of bat species mentioned within the report.

Table A4.1.1: **Scientific Names.**

Common Name	Scientific Name
Brown long-eared bat	*Plecotus auritus*
Common pipistrelle	*Pipistrellus pipistrellus*
Myotis species	*Myotis spp.*
Noctule	*Nyctalus noctula*
Soprano pipistrelle	*Pipistrellus pygmaeus*

ANNEX 4.2: PHOTOGRAPHIC PLATE

Table A4.2.1: *Static Detector Locations.*

Photograph	Description
	**Photo 1:** Deployment location of MS1 within other neutral grassland strip attached to standalone willow scrub, forming a linear Site boundary adjacent to the River Douglas.
	**Photo 2**: Deployment location of MS2, attached to electrical compoundwithin open cereal crophabitat.

ANNEX 4.3: WEATHER CONDITIONS

Table A4.3.1 below provides weather conditions for Bat Activity Survey periods. Text in red highlights unsuitable weather dates according to guidance.

Table A4.3.1: *Weather Conditions.*

Date	Temp at Dusk (°C)	Rainfall (mm)	Maximum Wind Speed (m/s)[17]
11/05/2023	10	0.1	3.06
12/05/2023	11	0	2.50
13/05/2023	12	0	1.67
14/05/2023	10	0	4.17
15/05/2023	9	0	3.89
16/05/2023	10	0	3.33
17/05/2023	10	0	1.11
18/05/2023	10	0	1.94
19/05/2023	12	0	0.28
20/05/2023	12	0	3.33
21/05/2023	13	0	3.33
22/05/2023	12	0	2.50
23/05/2023	10	0	3.33
19/07/2023	14	0	2.50
20/07/2023	13	0	3.33
21/07/2023	13	0.3	3.61
22/07/2023	16	0.5	1.67
23/07/2023	13	1.6	5.00
24/07/2023	13	0	2.78
25/07/2023	13	0	2.22
26/07/2023	15	2.9	5.56
27/07/2023	16	0	1.67
28/07/2023	15	0.1	4.17
29/07/2023	14	0.1	5.28
30/07/2023	14	1.9	2.50
31/07/2023	14	1.1	5.00
01/08/2023	14	0	1.67
04/09/2023	19	0	2.50
05/09/2023	16	0	3.89
06/09/2023	18	0	2.22

[17] Converted from km/h

Date	Temp at Dusk (°C)	Rainfall (mm)	Maximum Wind Speed (m/s)[17]
07/09/2023	20	0	1.39
08/09/2023	19	0.1	1.11
09/09/2023	19	0	1.94
10/09/2023	18	0.1	1.39
11/09/2023	14	1	0.83
12/09/2023	13	0	2.50
13/09/2023	14	0	3.89
14/09/2023	12	0	2.22