

**BALGRAY WINDFARM SITE,
LOCKERBIE**

BAT SURVEY
Passive Monitoring



APRIL – SEPTEMBER 2024



TABLE OF CONTENTS

TABLE OF CONTENTS.....	2
1. INTRODUCTION.....	3
2. SUMMARY.....	4
3. BAT SPECIES IN SCOTLAND	5
1.1. Bat Ecology.....	5
1.2. Bat Species	5
4. LEGAL PROTECTION.....	7
4.1. Protection of bats under Scots law	7
4.2. Possible offences	7
4.3. Avoiding committing an offence.....	7
4.4. Disclaimer	8
5. SURVEY METHODS.....	9
5.1. Desk study	9
5.2. Passive monitoring.....	9
5.3. Survey limitations	9
5.4. Site plan.....	11
6. RESULTS.....	11
6.1. Desk study	11
6.1.1 Designated sites.....	11
6.1.2 Biological records.....	12
6.1.3 Surrounding habitat.....	12
6.2. Spring passive monitoring.....	13
6.3. Summer passive monitoring.....	14
6.4. Autumn passive monitoring.....	17
7. DISCUSSIONS & CONCLUSIONS	20
8. REFERENCES.....	27
9. APPENDIX I – LOCATION MAP.....	28
10. APPENDIX II – SATELLITE VIEW OF THE SURROUNDING HABITAT	29
11. APPENDIX III – NATURESCOT RISK ASSESSMENT TABLES.....	30



1. INTRODUCTION

This report refers to surveys carried out at a potential wind farm site at Balgray Farm, Lockerbie between April and September 2024. DDAL was commissioned for these surveys by Locogen Consulting Ltd. The surveys aimed to discover the extent to which the site is used by bats, and to identify which species use the site, and in what ways they use it.

The following report describes the methods used and the results of the surveys, together with an interpretation of this data.

Further information may be obtained from:

Sam Hughes BSc (Hons)
Assistant Ecologist
(NatureScot Bat Roost licence 252286)

David Dodds Associates Ltd, 2 Caley Cottages, Caledonian Road, Peebles EH45 9DW

Email: Sam@daviddoddsassociates.com
Tel: 0131 608 0012

Report version	1.1
Issue date	27 th November 2024
Expiry date	30 th March 2024



2. SUMMARY

Three periods of passive monitoring were conducted at this site, as well as a thorough desk study of the site and surrounding habitat. The survey investigates the extent to which bats are using the site.

During the survey the following observations were made:

- Six bat species have been recorded within 5km of the site.
- The surrounding habitat was found to have a high suitability to be used by bats for roosting, foraging, and commuting.
- Nine species of bats have been found to be using the site.
- Deployment location 6 (Turbine 6) has the most bat activity, whereas location 2 has the least.

This survey report is valid until 30th March 2026.



3. BAT SPECIES IN SCOTLAND

1.1. Bat Ecology

There are 17 species of bat currently resident in the UK. Nine species are known from Scotland. All are believed to have declined as they face many threats to their highly developed and specialised life cycles. In general, their dependence on insects has left them vulnerable to habitat destruction, land drainage, habitat fragmentation, agricultural intensification, and increased use of pesticides. Their reliance on buildings and decaying trees has also made them vulnerable to felling, repairs, and the use of timber treatment chemicals.

In the UK, bats are generally active from late March to mid-October, hibernating from late October to mid-March. In early summer, females gather in maternity roosts to give birth, normally producing a single offspring per year. This slow rate of reproduction inhibits repopulation in areas of rapid decline. Bats are generally born in June/ July and are dependent on their mothers for about six weeks. In autumn and winter, male and females gather for mating. The females are able to store sperm until spring when an egg may be fertilized. In winter, bats hibernate in sites that have a cool, humid, and stable climate.

Bats generally return to the same roost sites every year which makes them particularly vulnerable to disturbance or destruction of these sites. Some species of bat move roost frequently and use a number of different roost sites.

1.2. Bat Species



Figure 1 - Soprano pipistrelle

Soprano Pipistrelle (*Pipistrellus pygmaeus*) is the most frequently encountered species in Central Scotland. They roost mostly in modern buildings, but occasionally in trees or other crevices. They range up to 4km from their roosts, using hedgerows and woodland edges to provide commuting routes to foraging sites and eat small flying insects and midges, with an affinity for habitats with a riparian element.

Common Pipistrelle (*Pipistrellus pipistrellus*) is less common in Scotland than further south, but still frequently encountered. Its habits are very similar to the Soprano Pipistrelle, but uses more generalised habitats.

Nathusius' Pipistrelle (*Pipistrellus nathusii*) is one of Britain's rarest bat species, with only a handful of records in Scotland. They tend to roost in tree-holes or buildings and are most commonly associated with large water bodies, such as reservoirs.



Brown Long-eared Bat (*Plecotus auritus*) is a relatively common, but rarely seen woodland bat. Primarily gleaners, they pick larger insects and arachnids off shrubs and trees, mostly in dense woodland. They roost in hollow trees or in the roof spaces of older buildings or barns, always very close to woodland.



Figure 2 - Brown Long-eared Bat

Natterer's Bat (*Myotis nattereri*) is primarily a woodland bat, catching insects in flight and occasionally gleaned from trees and shrubs, though they also forage low over pasture. They most commonly roost in hollow trees, occasionally also in buildings near to woodland.



Figure 3 - Cluster of Daubenton's bats

Whiskered Bat (*Myotis mystacinus*) is known in Central Scotland from a small number of records, though it is easily confused with Natterer's Bat and may be under-recorded. They forage in a variety of habitats, including hedgerows, woodland, and parkland. They roost in old stone buildings, and in tree crevices.

Daubenton's Bat (*Myotis daubentonii*) forages almost exclusively over water, eating insects and other arthropods

gaffed from the water surface or caught in flight just above it. Their roosts tend to be close to water, usually in hollow trees or cavities in bridges or other waterside structures.

Noctule (*Nyctalus noctula*) is the largest bat in Scotland and only rarely found north of the Borders. They mostly roost in hollow trees and emerge, often before dark to forage high over parkland, woodland and pasture on large flying insects.



Figure 4 - Noctule bat

NB: All images of bats are for illustrative purposes only, including image on front cover.



4. LEGAL PROTECTION

4.1. Protection of bats under Scots law

All bat species were designated as European Protected Species (EPS) by Article 12 of **The European Habitats Directive 92/43/EEC (1992)**. This was enshrined in Scots Law by **The Conservation (Natural Habitats etc) Regulations (1994)**.

4.2. Possible offences

The following actions constitute criminal offences:

- **Capturing or killing bats.** This is an absolute offence – there is no need for the prosecution to demonstrate an intention to commit the offence to secure conviction.
- **Harassing bats.**
- **Disturbing bats:**
 - a. **Affecting their ability to survive, breed or rear young.**
 - b. **Affecting their local distribution or abundance.**
 - c. **Whilst rearing or caring for their young.**
 - d. **Whilst occupying a structure or place used for shelter or protection.**
- **Obstructing bats from accessing a breeding site or resting place.**
- **Damaging or destroying a breeding site or resting place used by bats.**
- **Possessing any live bat, dead bat, or part of a dead bat.**

In addition, the following are also offences:

- **Attempting to commit one of the above offences.**
- **Knowingly causing or permitting someone else to commit one of the above offences.**

Maximum fines for committing one of the above offences are £5,000 per animal.

4.3. Avoiding committing an offence

Most of these offences (excluding 1) can be committed recklessly as well as deliberately, meaning that ignorance of the presence of bats is not a defence: you are expected to do all you can to find out whether bats (or other protected species) are present and whether you are at risk of committing an offence. In practice this means instructing a consultant ecologist to carry out surveys and taking account of their professional advice.



4.4. Disclaimer

DDAL are not lawyers and cannot offer a legal opinion. It is strongly recommended that legal advice be sought before taking any action which might expose you to a risk of prosecution. DDAL can recommend a specialist environmental lawyer.



5. SURVEY METHODS

5.1. Desk study

Records of bats within a 10km radius were obtained from DDAL biological records. 1:25 000 and 1:10 000 Ordnance Survey maps, together with satellite pictures drawn from Google Earth (www.earth.google.co.uk) and Bing (www.bing.com/maps) were consulted to assess the site habitat, in accordance with NS guidelines. Understanding of this was validated with the project architect.

The DEFRA Magic Map and NatureScot websites were consulted, to establish whether the site lay within or close to any designated sites.

5.2. Passive monitoring

Monitoring was carried out in accordance with NatureScot guidelines for onshore windfarm. Passive monitoring was carried out at each of the proposed turbine locations; automated recording of bat activity for ten days where possible at each location in spring, summer, and autumn. The three periods of monitoring were carried out in different seasons to clarify and differences in behaviour in differing life cycle stages.

Detectors were deployed at sample locations of highest value habitat close to the proposed turbines. This approach was adopted so that a worst-case scenario could be assessed and peak bat activity within the vicinity of turbine locations could be recorded.

For these surveys, a Wildlife Acoustics Song Meter Mini Bat, which can be paired with a smartphone app to determine GPS location, was mounted on a mast near to each proposed location at approximately 2m height. These detectors were angled towards open areas, in order to pick up the activity of bats flying overhead, which may bring them into contact with turbine blades. Elitech RC-5+ Reusable USB Temperature Data loggers were also set up at these locations to monitor the temperature on each survey night.

The recordings were subsequently uploaded to the BTO acoustic pipeline for analysis. With the analytic data received from the BTO, the percentage threshold used for totaling bat passes was a likelihood of 50%, low confidence recordings below 50% were discounted. Where possible calls were identified to species. Collision risk to species using the site was assessed using NS guidelines for risk assessment which can be found in appendix iii.

5.3. Survey limitations

All British bats are peripatetic and move between different roosting sites through the seasons and sometimes within seasons. The absence of bats on a particular occasion does not necessarily rule out their presence at other times.



Unfavourable weather during Spring monitoring resulted in sparse data for this period that is not necessarily representative of typical bat activity for this time of year.

No wind speed data was collected, number of nights suitability has been based from weather temperatures only.

The designations and locations for some of the turbines was amended between the spring and summer monitoring periods. This means that the turbine location currently designated as Location 6 is missing data for the spring monitoring period.

NatureScot guidelines recommend the Ecobat software for assessing the level of bat activity at monitoring sites. However, this software has been down for maintenance for the duration of this survey. BTO pipeline and the consultant ecologist's professional judgment were used in its place.



5.4. Site plan

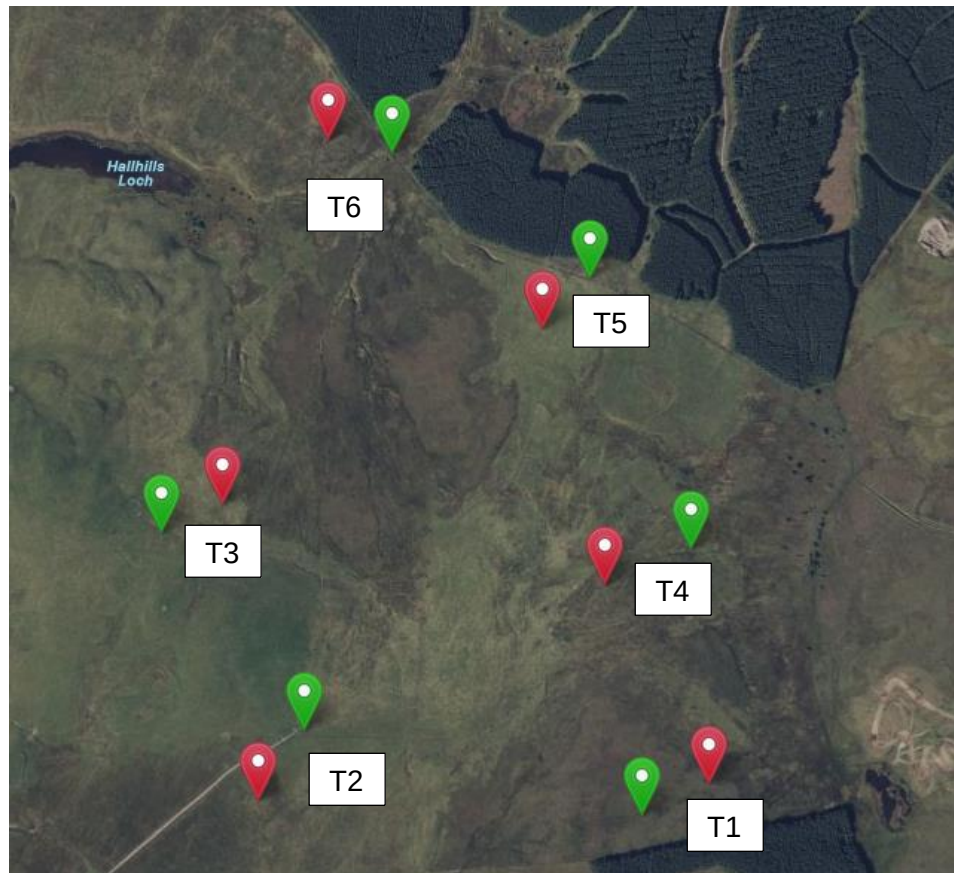


Fig. 5 – Satellite picture of the site, showing the locations of monitoring equipment in relation to the proposed turbine locations.

KEY



Proposed turbine locations



Passive monitoring locations

6. RESULTS

6.1. Desk study

6.1.1 Designated sites



The survey site does not lie within or adjacent to any designated site.

The nearest designated site is Perchall Loch Site of Special Scientific Interest (SSSI). This is a 10ha area located approximately 5km to the west of the site that was designated in 1990 to protect its beetle assemblage and basin fen habitat.

Other designated sites in the area include Dryfe Water SSSI, and Castle Loch SSSI, Special Protection Area (SPA), Ramsar site (Wetlands of International Importance), and Local Nature Reserve. Dryfe Water is a 12ha area located approximately 6km to the northeast that was designated in 1986 to protect its upland mixed ash woodland. Castle Loch is a 107ha located approximately 10km to the southwest of the site. It was first designated as an SSSI in 1988 to protect its non-breeding populations of Goosander (*Mergus merganser*), Greylag Goose (*Anser anser*), and Pink-footed Goose (*Anser brachyrhynchus*). It was designated as an SPA and Ramsar site in 1996 to add further protections to its Pink-footed Goose population.

The nearest woodlands of note are a 5ha woodland of semi-natural origin at the north end of the site, 400m to the west of Hallhill Loch along Hewke Burn, and a 6ha woodland of semi-natural origin 1km to the southeast of the site at Stobohill Linn.

6.1.2 Biological records

DDAL holds flight records for eight species which have been recorded within 10km of the site: Common and Soprano Pipistrelle, Daubenton's bat, Natterer's bat, Whiskered bat, Noctule, Leisler's bat and Brown long-eared bat.

6.1.3 Surrounding habitat

The site lies approximately 6km to the northeast of the residential town of Lockerbie. The site itself is an upland area comprised mostly of marsh and pasture with numerous small burns. A small loch is located at the northern edge of the site. The surrounding area is predominantly more of the same, but with the addition of coniferous plantations.

Small patches of mixed woodland along Hewke burn to the north of the site and around the farm complex to the west are likely to provide foraging and roosting opportunities for woodland specialists, such as Natterer's bats.

Open valleys and pasture fields may provide foraging opportunities for Noctule bats and Natterer's, as well as providing commuting opportunities for a range of bat species.

Nearby coniferous plantations are less likely to be used by foraging bats, but the edge habitat surrounding them is likely to be used by foraging Pipistrelle species, as are woodland edges, burns etc. Farm buildings in the area and mature deciduous trees are likely to provide roosting opportunity for these crevice-roosting species.

Hallhills Loch at the north end of the site may be suitable to support Daubenton's bats which are riparian specialists, as well as a number of other bat species that may use loch edges for foraging and commuting.



There are two other windfarms within 10km of the site: a 10 turbine windfarm at Pleamoss Hill, 8km to the east of the site, and a 16 turbine windfarm at Risp Hill, 8km to the southeast of the site.

6.2. Spring passive monitoring

Location 1

Dates: 10th April 2024 – 19th April 2024
NGR: NY 17200 87407
Elevation: 236m

Passive monitoring at this location within these dates returned nil results for bat activity.

Location 2

Dates: 1st April 2024 – 10th April 2024
NGR: NY 16575 87574
Elevation: 239m

	<i>Nyctalus noctula</i>	Total
07/04/2024	1	1
Total	1	1

Location 3

Dates: 1st April 2024 – 10th April 2024
NGR: NY 16328 87943
Elevation: 225m

Passive monitoring at this location within these dates returned nil results for bat activity.

Location 4

Dates: 10th April 2024 – 19th April 2024
NY 17299 87895
Elevation: 220m

	<i>Myotis nattereri</i>	Total
13/04/24	1	1
17/04/24	2	2
Total	3	3

Location T5

Dates: 10th April 2024 – 19th April 2024
NY 17122 88393
Elevation: 219m

	<i>Myotis nattereri</i>	Total
13/04/2024	1	1



Total	1	1
--------------	----------	----------

Location T6

No monitoring was set up at this location for the spring monitoring period due to changes in proposed turbine locations between the spring and summer monitoring periods.

6.3. Summer passive monitoring

Location 1

Dates: 2nd July 2024 – 11th July 2024

NGR: NY 17200 87407

Elevation: 236m

	<i>Myotis nattereri</i>	<i>Nyctalus leisleri</i>	<i>Nyctalus noctula</i>	<i>Pipistrellus nathusii</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	Total
02/07/2024	0	0	1	0	3	0	4
03/07/2024	0	0	0	0	0	0	0
04/07/2024	0	0	3	0	1	0	4
05/07/2024	0	0	0	0	1	0	1
06/07/2024	0	0	0	0	0	4	4
07/07/2024	4	0	0	0	5	1	10
08/07/2024	0	2	0	4	31	3	40
09/07/2024	0	0	9	0	0	0	9
10/07/2024	0	0	7	0	92	19	118
11/07/2024	2	0	5	3	32	9	51
Total	6	2	25	7	165	36	241

Location 2

Dates: 2nd July 2024 – 11th July 2024

NGR: NY 16575 87574

Elevation: 239m

	<i>Myotis daubentonii</i>	<i>Myotis nattereri</i>	<i>Nyctalus noctula</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	Total
02/07/2024	0	0	0	3	0	3
03/07/2024	0	0	3	0	0	3
04/07/2024	0	0	0	1	2	3
05/07/2024	0	0	0	4	1	5
06/07/2024	0	0	0	3	0	3
07/07/2024	0	0	0	3	1	4
08/07/2024	0	0	8	5	2	15
09/07/2024	0	0	0	0	0	0
10/07/2024	0	1	54	13	7	75
11/07/2024	1	0	31	17	6	55
Total	1	1	96	49	19	166

Location 3



Dates: 12th July 2024 – 21st July 2024
 NGR: NY 16328 87943
 Elevation: 225m

	<i>M. daubentonii</i>	<i>M. nattereri</i>	<i>N. noctula</i>	<i>P. nathusii</i>	<i>P. pipistrellus</i>	<i>P. pygmaeus</i>	<i>P. auritus</i>	Total
12/07/2024	0	0	18	0	67	15	0	100
13/07/2024	0	4	42	0	116	47	0	209
14/07/2024	1	9	69	0	63	34	0	176
15/07/2024	0	3	19	0	63	37	0	122
16/07/2024	0	5	27	0	15	10	0	57
17/07/2024	0	1	0	0	15	10	0	26
18/07/2024	0	2	1	0	96	75	0	174
19/07/2024	0	1	29	0	3	2	0	35
20/07/2024	0	1	14	13	343	207	1	579
21/07/2024	1	1	0	0	44	31	0	77
Total	2	27	219	13	825	468	1	1555

Location 4

Dates: 2nd July 2024 – 11th July 2024
 NY 17299 87895
 Elevation: 220m

	<i>Myotis mystacinus</i>	<i>Nyctalus noctula</i>	<i>Pipistrellus nathusii</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	Total
02/07/2024	0	0	0	2	0	2
03/07/2024	0	3	0	0	0	3
04/07/2024	0	0	0	1	0	1
05/07/2024	0	0	0	0	1	1
06/07/2024	0	0	0	4	1	5
07/07/2024	0	0	0	3	0	3
08/07/2024	0	0	0	12	3	15
09/07/2024	0	4	0	4	0	8
10/07/2024	1	4	0	84	24	113
11/07/2024	0	2	38	138	25	203
Total	1	13	38	248	54	354

Location 5

Dates: 2nd July 2024 – 11th July 2024
 NY 17122 88393
 Elevation: 219m

	<i>M. daubentonii</i>	<i>M. nattereri</i>	<i>N. leisleri</i>	<i>N. noctula</i>	<i>P. nathusii</i>	<i>P. pipistrellus</i>	<i>P. pygmaeus</i>	<i>P. auritus</i>	Total
02/07/2024	0	0	0	2	0	2	1	0	5
03/07/2024	0	0	0	1	0	0	0	0	1
04/07/2024	0	0	0	7	0	2	2	0	11
05/07/2024	0	0	0	3	0	40	11	1	55
06/07/2024	0	0	0	2	0	27	6	0	35
07/07/2024	0	0	0	5	3	53	6	0	67
08/07/2024	3	0	11	46	0	40	21	0	121
09/07/2024	0	0	0	4	0	27	0	0	31
10/07/2024	0	1	0	23	5	303	55	0	387
11/07/2024	4	8	0	4	0	195	42	0	253
Total	7	9	11	97	8	689	144	1	966



Location 6

Dates: 12th July 2024 – 21st July 2024

NY 16762 88631

Elevation: 219m

	<i>M. daubentonii</i>	<i>M. mystacinus</i>	<i>M. nattereri</i>	<i>N. lesileri</i>	<i>N. noctula</i>	<i>P. nathusii</i>	<i>P. pipistrellus</i>	<i>P. pygmaeus</i>	<i>P. auritus</i>	Total
12/07/2024	1	0	0	0	55	0	26	10	0	92
13/07/2024	1	0	0	0	3	0	18	10	1	33
14/07/2024	1	0	2	0	34	2	340	317	1	697
15/07/2024	6	1	3	0	27	0	108	52	2	199
16/07/2024	1	0	2	0	36	0	31	38	0	108
17/07/2024	11	4	0	0	0	0	262	160	0	437
18/07/2024	4	0	2	0	4	0	143	97	4	254
19/07/2024	0	0	1	2	6	0	152	52	3	216
20/07/2024	3	1	1	0	7	0	65	43	6	126
21/07/2024	9	0	0	0	14	0	35	33	1	92
Total	37	6	11	2	186	2	1180	812	18	2254



6.4. Autumn passive monitoring

Note: Extra days were added to the autumn monitoring period due to poor weather conditions for data collection.

Location 1

Dates: 5th September 2024 – 17th September 2024

NGR: NY 17200 87407

Elevation: 236m

	<i>Myotis nattereri</i>	<i>Nyctalus leisleri</i>	<i>Nyctalus noctula</i>	<i>Pipistrellus nathusii</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	<i>Plectus auritus</i>	Total
06/09/24	1	0	8	0	1	1	1	12
07/09/24	3	2	5	5	387	111	0	513
08/09/24	3	0	7	0	121	53	0	184
09/09/24	1	0	13	0	0	0	0	14
10/09/24	2	0	4	0	0	0	0	6
11/09/24	2	0	0	0	0	0	2	4
12/09/24	0	0	3	0	0	3	0	6
13/09/24	0	0	7	13	554	107	0	681
14/09/24	0	0	2	0	0	0	0	2
15/09/24	2	0	10	0	264	49	2	327
16/09/24	5	4	11	0	661	50	0	731
Total	19	6	70	18	1988	374	5	2480

Location 2

Dates: 5th September 2024 – 17th September 2024

NGR: NY 16575 87574

Elevation: 239m

	<i>Myotis daubentonii</i>	<i>Myotis nattereri</i>	<i>Nyctalus noctula</i>	<i>Pipistrellus nathusii</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	<i>Plecotus auritus</i>	Total
05/09/24	0	0	3	0	0	0	0	3
07/09/24	0	3	16	4	81	37	0	141
08/09/24	3	0	11	0	43	20	0	77
09/09/24	0	0	3	0	3	3	0	9
10/09/24	0	1	0	0	0	0	0	1
11/09/24	0	1	0	0	0	0	0	1
12/09/24	0	1	0	0	0	0	0	1
13/09/24	0	0	0	0	37	9	0	46
14/09/24	0	0	0	0	1	0	0	1
15/09/24	1	0	3	0	33	2	2	41
16/09/24	0	0	12	0	46	20	0	78
Total	4	6	48	4	244	91	2	399

Location 3



Dates: 17th September 2024 – 30th September 2024
 NGR: NY 16328 87943
 Elevation: 225m

	<i>M. daubentonii</i>	<i>M. nattereri</i>	<i>N. noctula</i>	<i>P. nathusii</i>	<i>P. pipistrellus</i>	<i>P. pygmaeus</i>	Total
17/09/24	0	1	19	6	58	42	127
18/09/24	0	0	0	0	20	12	32
19/09/24	1	0	0	0	8	0	9
20/09/24	0	0	1	0	4	2	7
23/09/24	0	1	6	4	206	73	290
24/09/24	0	0	3	0	55	22	80
27/09/24	0	1	0	0	3	1	5
28/09/24	0	3	6	0	6	0	15
Total	1	6	36	10	360	152	565

Location 4

Dates: 5th September 2024 – 17th September 2024
 NY 17299 87895
 Elevation: 220m

	<i>Myotis daubentonii</i>	<i>Myotis nattereri</i>	<i>Nyctalus noctula</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	Total
13/09/24	2	0	0	83	15	100
15/09/24	1	1	5	9	8	24
16/09/24	1	4	3	175	61	244
Total	4	5	8	267	84	368

Location 5

Dates: 17th September 2024 – 30th September 2024
 NY 17122 88393
 Elevation: 219m

Note: Interference by livestock adjusted to the microphone to face a wall rather than open space.

	<i>Myotis daubentonii</i>	<i>Myotis nattereri</i>	<i>Nyctalus noctula</i>	<i>Pipistrellus nathusii</i>	<i>Pipistrellus pipistrellus</i>	<i>Pipistrellus pygmaeus</i>	<i>Plecotus auritus</i>	Total
17/09/24	4	7	53	0	38	13	0	115
18/09/24	0	2	6	0	103	27	0	138
19/09/24	0	0	21	0	20	11	0	52
20/09/24	0	1	9	0	9	4	0	23
21/09/24	0	0	14	0	4	2	1	21
22/09/24	0	0	7	0	5	4	0	16
23/09/24	0	1	41	11	37	5	0	95
24/09/24	0	1	2	0	5	1	0	9
25/09/24	0	0	6	0	0	0	0	6
26/09/24	0	0	2	0	0	0	0	2
27/09/24	0	0	8	0	14	7	0	29
28/09/24	0	3	7	5	39	4	0	58
29/09/24	0	1	1	0	0	1	0	3
Total	4	16	177	16	274	79	1	567

Location 6

Dates: 17th September 2024 – 30th September 2024
 NY 16762 88631



Elevation: 219m

	<i>M. daubentoni</i>	<i>M. nattereri</i>	<i>N. leisleri</i>	<i>N. noctula</i>	<i>P. pipistrellus</i>	<i>P. pygmaeus</i>	<i>P. auritus</i>	Total
17/09/24	3	2	60	468	2	8	2	545
18/09/24	2	1	0	109	73	39	0	224
19/09/24	0	2	0	73	24	24	0	123
20/09/24	3	2	0	59	30	12	0	106
21/09/24	0	1	0	15	12	12	0	40
22/09/24	0	4	0	23	4	5	0	36
23/09/24	2	7	0	168	35	15	0	227
24/09/24	0	3	5	25	16	10	0	59
25/09/24	0	0	0	14	0	2	0	16
26/09/24	0	0	0	0	0	1	0	1
27/09/24	0	0	0	112	10	21	2	145
28/09/24	0	5	0	93	63	14	0	175
29/09/24	0	2	0	20	3	1	0	26
Total	10	29	65	1179	272	164	4	1723



7. DISCUSSIONS & CONCLUSIONS

This survey has been carried out to a suitable standard, using methods which comply with current guidelines.

No designated sites are relevant to this site with regard to bats.

Four species have been recorded within 5km of the site: Common and Soprano Pipistrelles, Daubenton's bats, and Brown Long-eared bats.

The area surrounding the site has high suitability to be used by a wide range of bat species for roosting, foraging, and commuting.

It is understood by the author that it is proposed to erect six wind turbines on the site, which may impact bats that use the land for hunting and commuting.

In total, nine species of bats were recorded during the passive monitoring surveys: Nathusius's, Common, and Soprano Pipistrelles, Daubenton's bats, Natterer's bats, Whiskered bats, Leisler's bats, Noctules, and Brown Long-eared bats.

The total number of bat passes at each location during the monitoring periods are listed in the table below:

Surveying Period	Nights of appropriate weather	Detector ID	Max. bat passes per night	Average bat activity per night	Bat activity level
Spring	4	1	0	0	Nil
Spring	4	2	1	0	Low
Spring	4	3	0	0	Nil
Spring	5	4	2	0	Low
Spring	5	5	1	0	Low
Spring	N/A	6	N/A	N/A	N/A
Summer	7	1	118	24	Low
Summer	7	2	75	17	Low
Summer	8	3	579	156	High
Summer	7	4	203	35	Moderate
Summer	8	5	387	97	High
Summer	8	6	697	225	High
Autumn	10	1	731	207	High
Autumn	10	2	141	33	Moderate
Autumn	11	3	290	43	Moderate
Autumn	10	4	244	28	Low
Autumn	11	6	138	44	Moderate
Autumn	11	7	545	133	High

There were very few recorded bat passes during April, likely due to the unseasonably cold weather for the time of year.

High levels of activity were recorded at detector locations 3, 5 and 6 during the summer. Detector locations 3 and 6 are in valley locations and therefore likely used as commuting routes. Detector locations 5 and 6 are located adjacent to a woodland edge that is clearly favoured for roosting, foraging, and commuting. Detector location 6 is also located in a marshy area with plentiful foraging.



Detector location 1 recorded high levels of activity in September for common pipistrelles. The spike in activity during the autumn deployment could be due to a number of factors including the establishment of a courtship territory by a male common pipistrelle or use of the habitat by foraging bats prior to hibernation.

Deployment location 2 was comparatively quiet for bat activity, most likely due to being at a higher elevation, thus being more exposed, and also being further away from woodland edges and having fewer insects due to better drainage.

The breakdown of how different bat species are using each location is detailed below:

Location 1

	Spring	Summer	Autumn	Risk
Daubenton's bat (<i>Myotis daubentonii</i>)	0	0	0	Low
Whiskered bat (<i>Myotis mystacinus</i>)	0	0	0	Low
Natterer's bat (<i>Myotis nattereri</i>)	0	6	19	Low
Leisler's bat (<i>Nyctalus leisleri</i>)	0	2	6	Low
Noctule (<i>Nyctalus noctula</i>)	0	25	70	Low
Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>)	0	7	18	Low
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	0	165	1988	Medium
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	0	36	374	Medium
Brown Long-eared bat (<i>Plecotus auritus</i>)	0	0	5	Low

There was no activity from Daubenton's or Whiskered bats at this location. There were some low levels of activity from Natterer's and Brown Long-eared bats, as is to be expected due to these being woodland specialists and the location being adjacent to a woodland area.

Detector location 1 is located in the middle of marshland, this is likely to provide substantial insect activity that would attract hunting Pipistrelle species. Pipistrelles do not typically travel far from their roosts for foraging, which suggests that the neighbouring woodland areas are where they are roosting. The increase in activity in September could be due increased foraging activity prior to hibernation or the establishment of a male common pipistrelle breeding territory. Further analysis has determined it is unlikely to be a common pipistrelle breeding territory (see Environmental Impact Assessment Chapter 6: Ecology).



Nathusius's Pipistrelles are an uncommon species, but wetlands and woodland fringes such as this location are their favoured habitat. Pipistrelle species classify as high risk for collision.

There are a low number of passes from *Nyctalus* species: Leisler's bats, and Noctules. This the edge of the range for these species, as they are not typically recorded further north than the Forth river catchment. These are long distance flyers and can cover large distances in a night. They navigate landscapes using valleys, flying at higher altitudes comparative to other species, often 10-50m, subsequently these are also classified as having a high risk of collision.

Location 2

	Spring	Summer	Autumn	Risk
Daubenton's bat (<i>Myotis daubentonii</i>)	0	1	4	Low
Whiskered bat (<i>Myotis mystacinus</i>)	0	0	0	Low
Natterer's bat (<i>Myotis nattereri</i>)	0	1	6	Low
Leisler's bat (<i>Nyctalus leisleri</i>)	0	0	0	Low
Noctule (<i>Nyctalus noctula</i>)	1	96	48	Low
Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>)	0	0	4	Low
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	0	49	244	Medium
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	0	19	91	Low
Brown Long-eared bat (<i>Plecotus auritus</i>)	0	0	2	Low

There was no activity recorded from Whiskered or Leisler's bats at this location. There was also very little activity recorded from Daubenton's, Natterer's, and Brown Long-eared bats nor Nathusius's Pipistrelles. These species are low in numbers due to the lack of waterbodies (preferred by Daubenton's), woodland (preferred by Natterer's and Brown Long-eared bats), and wetland (preferred by Nathusius's Pipistrelle). The activity recorded from these species is most likely to be individual passes of commuting bats.

This location recorded noctule activity across all three deployments, these are high altitude bats that travel long distances and were recorded across the Site. The highest levels of activity come from Common and Soprano Pipistrelles; these are likely using this area both for commuting and foraging.

The comparatively low levels of activity at this location are mostly likely to it being an exposed position at the highest altitude of the suggested turbine locations.



Location 3

	Spring	Summer	Autumn	Risk
Daubenton's bat (<i>Myotis daubentonii</i>)	0	2	1	Low
Whiskered bat (<i>Myotis mystacinus</i>)	0	0	0	Low
Natterer's bat (<i>Myotis nattereri</i>)	0	27	6	Low
Leisler's bat (<i>Nyctalus leisleri</i>)	0	0	0	Low
Noctule (<i>Nyctalus noctula</i>)	0	219	36	Low
Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>)	0	13	10	Low
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	0	825	360	Medium
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	0	468	152	Medium
Brown Long-eared bat (<i>Plecotus auritus</i>)	0	1	0	Low

There is no recorded activity from Whiskered or Leisler's bats at this location. There is little activity from Daubenton's bats (riparian specialists) or from Brown Long-eared bats due to lack of their favoured habitats. Activity from Natterer's bats is likely attributed foraging from a low number of individuals the same can be said for Nathusius's Pipistrelles.

Again, noctules were recorded, with the highest levels of activity in the summer, in addition relatively high levels of activity from Pipistrelle species were recorded during the summer deployment. Location 3 is located mid-way down Firtree Hill and is used for livestock grazing. The presence of livestock is likely to increase insect presence, resulting in more available foraging for bats. The higher number of Pipistrelles in summer compared to autumn, suggests that there may be maternity roosts somewhere in the area of the site that is commuting past location 3.

Location 4

	Spring	Summer	Autumn	Risk
Daubenton's bat (<i>Myotis daubentonii</i>)	0	0	4	Low
Whiskered bat (<i>Myotis mystacinus</i>)	0	1	0	Low



Natterer's bat (<i>Myotis nattereri</i>)	3	0	5	Low
Leisler's bat (<i>Nyctalus leisleri</i>)	0	0	0	Low
Noctule (<i>Nyctalus noctula</i>)	0	13	8	Low
Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>)	0	38	0	Low
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	0	248	267	Medium
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	0	54	84	Low
Brown Long-eared bat (<i>Plecotus auritus</i>)	0	0	0	Low

No Leisler's or Brown Long-eared bats were recorded in the vicinity of Location 4. There were low levels of activity from Myotis species, Noctules, and Nathusius's Pipistrelles. Common and Soprano Pipistrelles were the most active species in this location. It is mostly likely that bats are commuting past this location between the two woodland areas to the south and east.

Location 5

	Spring	Summer	Autumn	Risk
Daubenton's bat (<i>Myotis daubentonii</i>)	0	7	4	Low
Whiskered bat (<i>Myotis mystacinus</i>)	0	0	0	Low
Natterer's bat (<i>Myotis nattereri</i>)	1	9	16	Low



Leisler's bat (<i>Nyctalus leisleri</i>)	0	11	0	Low
Noctule (<i>Nyctalus noctula</i>)	0	97	177	Medium
Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>)	0	8	16	Low
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	0	689	274	Medium
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	0	144	79	Low
Brown Long-eared bat (<i>Plecotus auritus</i>)	0	1	1	Low

No Whiskered bats were recorded at this location. There were low levels of other *Myotis* species which are most likely commuting past the location. Leisler's bats were detected commuting past this location, as they were also picked up on monitoring at Location 1 and Location 6, indicating that they may be navigating the site using edges of the woodlands. This location is also adjacent to the eastern woodland and is clearly being used in some capacity (foraging/commuting) by Pipistrelles. Again, there are peaks in Pipistrelle activity in July, suggesting that a maternity roost may be present within the woodlands. There is also a strong Noctule presence, as they may be circumnavigating the hill or following the treeline.

Location T6

	Spring	Summer	Autumn	Risk
Daubenton's bat (<i>Myotis daubentonii</i>)	N/A	37	10	Low
Whiskered bat (<i>Myotis mystacinus</i>)	N/A	6	0	Low
Natterer's bat (<i>Myotis nattereri</i>)	N/A	11	29	Low
Leisler's bat (<i>Nyctalus leisleri</i>)	N/A	2	65	Low



Noctule (<i>Nyctalus noctula</i>)	N/A	186	1179	Medium
Nathusius's Pipistrelle (<i>Pipistrellus nathusii</i>)	N/A	2	0	Low
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	N/A	1180	272	Medium
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	N/A	812	164	Medium
Brown Long-eared bat (<i>Plecotus auritus</i>)	N/A	18	4	Low

The highest level of bat activity within the site was recorded at this location, with all nine species identified on site present at this location. The monitor was placed in a valley between two hills that runs between the adjacent woodland and the lock. It is marshy terrain with a burn running through the centre. These factors make this location suitable for all species noted on site. It provides roosting opportunities in the woodland, as well as plentiful foraging opportunities in the woodland edges and wetland, as well as providing a commuting route directly between the woodland and loch.

The large number of Noctules imply that this is a major commuting route, the high autumn numbers could indicate that it is on a path between summer and hibernation roosts.

This location also shows a similar pattern of Pipistrelle activity as both location 6 and location 3, with increased activity in proximity to the woodland.



8. REFERENCES

CIEEM (ed) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland. CIEEM.

Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th ed.). The Bat Conservation Trust, London

Dietz, C, von Helverson, O. & Nill, D. (2007) Bats of Britain, Europe and Northwest Africa. A & C Black, London

Gunnell, K., Murphy, B., William, C. (2013) Designing for Biodiversity: a technical guide for new and existing buildings (2nd ed.). R.I.B.A. Publishing, London

Mitchell-Jones, A.J., & McLeish, A.P. (ed.) (2004) The Bat Workers Manual (3rd ed.). The Joint Nature Conservation Committee, Peterborough

Nature Scot (ed) (2021) Bats and Onshore Wind Turbines – Survey, Assessment and Mitigation. [Online] Available at: <https://www.nature.scot/doc/bats-and-onshore-wind-turbines-survey-assessment-and-mitigation#:~:text=At%20sites%20where%20the%20proposed,less%20than%20ten%20proposed%20turbines> (Accessed 15th October 2024)

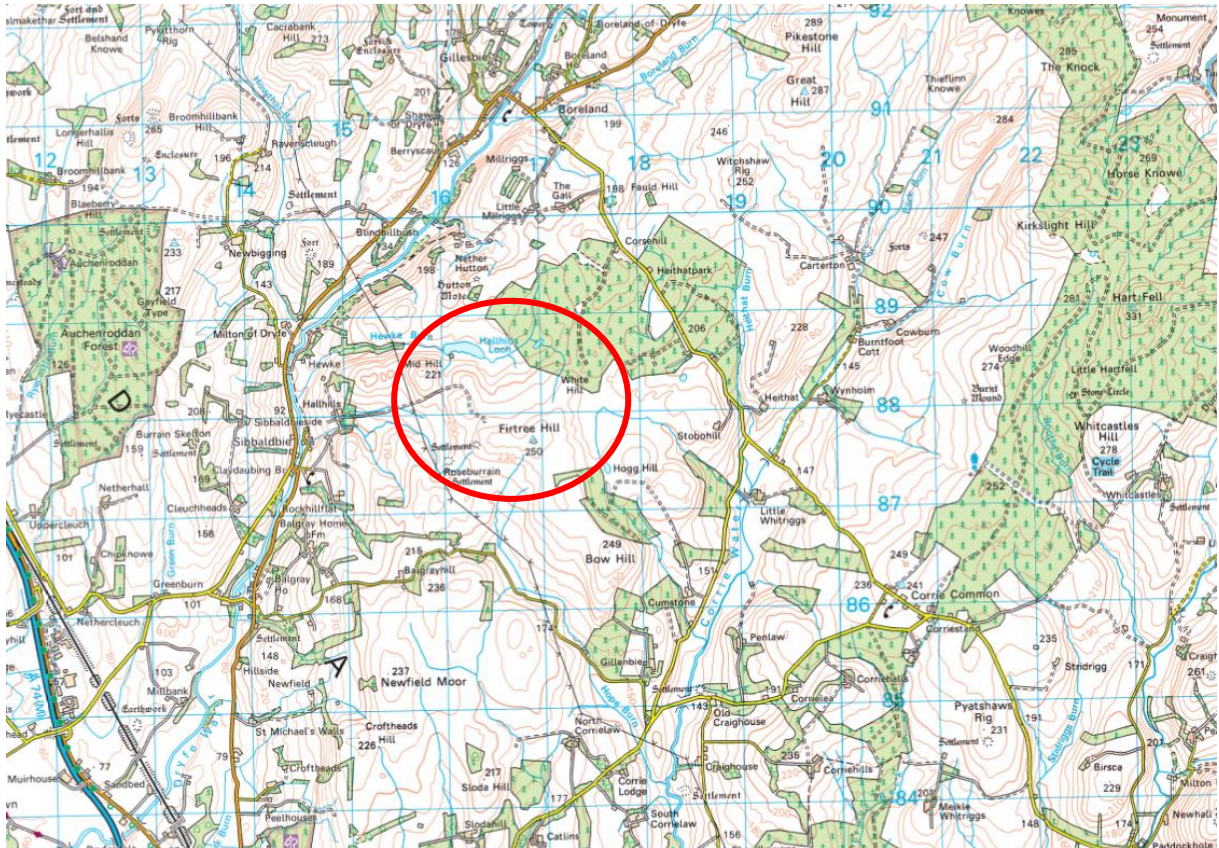
Russ, J. (2012) British Bat Calls: A Guide to Species Identification. Pelagic Press, Exeter



9. APPENDIX I – LOCATION MAP

National Grid Reference (NGR): NY167879, site centroid.

Site location marked in red.



(Ordnance Survey cartography reproduced under licence number AC0000823066)



10. APPENDIX II – SATELLITE VIEW OF THE SURROUNDING HABITAT

The site location is marked in red.





11. APPENDIX III – NATURESCOT RISK ASSESSMENT TABLES

Table 3a: Stage 1 - Initial site risk assessment

Site Risk Level (1-5)*	-	Project Size	Project Size	Project Size
-	-	Small	Medium	Large
Habitat Risk	Low	1	2	3
Habitat Risk	Moderate	2	3	4
Habitat Risk	High	3	4	5

Key: 1-2=low site risk, 3=medium site risk, 4-5=high site risk

* Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.

Habitat Description	Description
Low	Small number of potential roost features, of low quality. Low quality foraging habitat that could be used by small numbers of foraging bats. Isolated site not connected to the wider landscape by prominent linear features
Moderate	Buildings, trees or other structures with moderate-high potential as roost sites on or near the site. Habitat could be used extensively by foraging bats. Site is connected to the wider landscape by linear features such as scrub, tree lines and streams.
High	Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site. Extensive and diverse habitat mosaic of high quality for foraging bats. Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows. At/near edge of range and/or on an important flyway.



Project Size	Description
Small	Small scale development (≤ 10 turbines). No other wind energy developments within 10km. Comprising turbines $< 50\text{m}$ in height.
Medium	Larger developments (between 10 and 40 turbines). May have some other wind developments within 5km. Comprising turbines 50-100m in height.
Large	Largest developments (> 40 turbines) with other wind energy developments within 5km. Comprising turbines $> 100\text{m}$ in height.

Table 3b: Stage 2 - Overall risk assessment

Ecobat activity category (or equivalent justified categorisation)

Site risk level (from Tale 3a)	Nil (0)	Low (1)	Low-moderate (2)	Moderate (3)	Moderate-high (4)	High (5)
Lowest (1)	0 Low	1 Low	2 Low	3 Low	4 Low	5 Medium
Low (2)	0 Low	2 Low	4 Low	6 Medium	8 Medium	10 Medium
Med (3)	0 Low	3 Low	6 Medium	9 Medium	12 Medium	15 High
High (4)	0 Low	4 Low	8 Medium	12 Medium	15 High	18 High
Highest (5)	0 Low	5 Medium	10 Medium	15 High	20 High	25 High

The scores in the table are a product of multiplying site risk level and the Ecobat activity category (or equivalent). The activity categories equate to those given in Table 1 for high collision risk species. Nil (0) means no bat activity was recorded across the whole site, but caution is needed here, because although the values given in this column are "0", at sites where pre-construction surveys found no bat activity, there remains the possibility that new turbines could attract some bat species, thereby altering the level of risk that applies in reality.

Overall Assessment: Low = 0-4, Medium = 5-12, High = 15-25