TECHNICAL APPENDIX 6.3

BAT SURVEY AND BASELINE REPORT

LYNEMORE WIND FARM, HIGHLAND

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EXECUTIVE SUMMARY

This report presents the results of bat surveys undertaken by FDM Ecology Ltd in 2023 at the proposed Lynemore Wind Farm, Highland ('the Proposed Development'). Surveys were undertaken in line with multi-agency guidelines issued in January 2021 (NatureScot *et al.,* 2021). The assessment was undertaken using FDM Ecology Ltd's own database of bat records, as the Ecobat website was unavailable.

Equipment failures notwithstanding, very low levels of activity by bats were recorded on the site, with only 165 bat contacts recorded over 422 sample nights.

Static detector surveys of the site identified the presence of four species of bat. Two of these species are considered to be at high risk from wind turbines (NatureScot *et al* 2021): common pipistrelle and soprano pipistrelle. These species are considered widespread and common species.

In line with survey guidelines, the Site is assessed as being of potentially low risk for habitats and the project size is Large. This translates as a site risk value of Medium (3) for a large-sized project with low habitat risk level.

The overall site-risk to bats is **Low**, when taking the median values of activity across the site. The range of risks across the site are investigated and in general the site is considered to have **Low** or **Medium** overall risk to soprano pipistrelle and common pipistrelle bats.

1. INTRODUCTION

1.1. Terms of Reference and Scope of Study

1.1.1. This report presents the results of bat survey work undertaken in 2023 at the proposed Lynemore Wind Farm in the Highland Council area. Surveys were commissioned by Avian Ecology Ltd on behalf of the Applicant and included a daytime walkover survey for potential bat roosts and fixed position monitoring of bat activity.

1.1.2. The following terminology is used within this report:

- Proposed Development - the proposed wind farm development (i.e. the physical infrastructure);
- The Site - everything within the application boundary. The area within the Application Boundary where turbines and associated infrastructure will be located;
- The Application Boundary - the application red line boundary comprising of the Site and Site Access; and
- Survey Area – the area within which surveys were carried out, relating to an initially considered (since superseded) red line boundary and earlier iterations of design of the Proposed Development.

1.1.3. Surveys were undertaken within the red line boundary which was current at the time surveys commenced (hereafter termed 'the Survey Area' within this report). Note that the Application Boundary has been extended since surveys were undertaken and so the Survey Area covers a smaller area than the Site and does not include the Site Access between the A9 and approximate National Grid reference NH 74891 33535. The Survey Area and how it relates to the Proposed Development and Application Boundary is shown on **Figure 6.5** and **6.6a-c**, **Chapter 6: Ecology and Biodiversity**.

1.1.4. This report provides a baseline assessment of the Site for bat activity. Information is presented in order to inform the design process of the development in respect of bat activity on-Site.

1.1.5. All bat species occurring in Scotland are strictly protected by law under the Conservation (Natural Habitats, &c.) Regulations 1994 (the Habitats Regulations) as amended (details of this legislation and the protection it affords are given in Appendix III).

1.2. Site Summary

1.2.1. The Proposed Development is located approximately 2 km west of the A9 at Moy in the Highland Council area. The Site is at an altitude of between 400 m and 616 m above ordnance datum (AOD). Habitats are typical of upland areas in this part of Scotland, being an open, exposed heathland managed for sporting purposes, principally for stalking and grouse shooting. There is an area of plantation woodland on the north-western edge of the Application Boundary and surrounding the northern-most extent of the Site Access, and very open, mature birch woodland with rank heather understorey on the lower slopes along the Site Access at the north of the Application Boundary. Four watercourses rise within the Site, flowing to the north. Of these, three are tributaries of the River Findhorn and one flows into the River Nairn. On the upper blanket bog habitat within the Site there is severe peat hagging and areas of exposed peat.

1.2.2. Land to the south of the Application Boundary is open moorland managed for grouse shooting, extending to Farr/Glen Kyllachy Wind Farm, *c.* 2 km to the southwest of the Site.

1.3. Proposals

1.3.1. The Proposed Development includes the construction and operation of a wind farm with associated infrastructure. The survey was conducted prior to infrastructure design and was based on an indicative proposal of 14 turbines.

2. SURVEY METHODOLOGY

2.1.1. Surveys were undertaken in May/June, July/August and September 2023. Methods were based on current best practice guidance (NatureScot *et al.,* 2021) and included a walkover survey and an automated static detector survey.

2.2. Search for Desk Based Records

2.2.1. Distribution maps (Harris, *et al* 2008, Crawley *et al* 2020) and records from FDM Ecology Ltd's previous surveys in this part of Scotland were reviewed to identify the potential species present in the area.

2.3. Walkover Survey

2.3.1. Walkovers of the Survey Area were undertaken in May, June, August, September and October 2023 by experienced ecologist Dr Jonathan Fairbairn to identify and assess the value of the Site habitats for bats. Notes were taken where any habitat suitable for roosting was encountered, as well as any areas likely to provide key foraging or commuting habitat. The survey did not constitute a detailed roost survey and was restricted to habitats within the Survey Area.

2.4. Activity Surveys

2.4.1. An automated static detector survey was completed within the Site, following current survey guidance (NatureScot *et al.,* 2021).

2.4.2. A transect survey was not carried out. Alongside obvious health and safety concerns of carrying out a transect survey on an upland site it was not considered that transect surveys would provide valuable comparative data above those provided by static surveys (see Section 2.5).

2.4.3. No automated surveys at height were undertaken and no infrastructure or met mast was available within the site on which to erect a bat detector microphone.

Automated Static Detector Survey

2.4.4. A total of 11 Titley Scientific Anabat Swift full spectrum bat detectors were deployed at sample locations (Monitoring Stations: 'MS') for a minimum of 10 nights in each of May/June and July/August and September 2023. **Figure 6.6a-c , Chapter 6: Ecology and Biodiversity** shows the distribution of sample points across the Survey Area. Detectors were placed at a minimum of 1 m above the ground, on fences or wooden stakes.

2.4.5. MSs were selected as per survey guidelines, nearby to indicative turbine locations (current at the time of survey), and in habitats typical of the Site. All MSs were deployed simultaneously in order to allow direct comparisons of bat activity.

2.4.6. Detectors were programmed to commence recording from 30 minutes before sunset and continue until 30 minutes after sunrise, to cover the active period for all UK bat species. A summary of MSs and deployment periods is detailed in **Table 1** below.

Table 1: Static detector sample locations and deployment summary

Sample location (MS)	Grid reference	Habitat description	Total sample nights and survey dates
1	NH7478331471	Open moorland by access track at an altitude of *c*. 580m aod. The detector was placed on a fence.	38 nights: 23rd May to 4th June, 20th July to 8th August and 17th to 24th September
2	NH7441931793	Open moorland by access track at an altitude of *c*. 580m aod. The detector was placed on a fence.	45 nights: 23rd May to 4th June, 20th July to 8th August and 17th September to 1st October
3	NH7431932127	Open moorland by cairn at an altitude of *c*. 610m aod. The detector was placed on a fence.	35 nights: 23rd May to 4th June, 20th July to 8th August and 17th to 21st September
4	NH7375732281	Open moorland by access track at an altitude of *c*. 590m aod. The detector was placed on a fence.	45 nights: 23rd May to 4th June, 20th July to 8th August and 17th September to 1st October
5	NH7350532407	Open moorland at an altitude of *c*. 550m aod. The detector was placed on a fence.	39 nights: 23rd May to 4th June, 20th July to 8th August and 17th to 25th September
6	NH7316132913	On a wooden stake in open, hagged moorland at an altitude of *c*. 510m aod.	44 nights: 23rd May to 4th June, 20th July to 8th August and 17th to 30th September
7	NH7332833500	On a boulder in open, hagged moorland at an altitude of *c*. 510m aod.	35 nights: 23rd May to 4th June, 20th July to 8th August and 17th to 21st September

Sample location (MS)	Grid reference	Habitat description	Total sample nights and survey dates
8	NH7360533268	On a stake in an area of open moorland at an altitude of *c.* 500m aod.	45 nights: 23rd May to 4th June, 20th July to 8th August and 17th September to 1st October
9	NH7404433039	On a stake in an area of open moorland at an altitude of *c*. 480m aod.	26 nights: 23rd May to 4th June and 17th September to 1st October. Detector failed to record during the summer deployment.
10	NH7465532873	On a wooden stake in open, hagged moorland at an altitude of *c*. 540m aod.	32 nights: 23rd May to 4th June, 20th July to 8th August and 17th September
11	NH7499932984	On the edge of a hagged area by a borrow pit in open moorland at an altitude of *c*. 520m aod.	38 nights: 23rd May to 4th June, 20th July to 8th August and 17th to 24th September

Data Analysis

2.4.7. Bat call analysis was carried out within the Titley Scientific Analook Insight software programme. All bat call analysis was carried out by surveyors with >19 years of bat call analysis experience. Where species could not be determined from bat calls an attempt was made to assign these to genus level.

2.4.8. Activity levels were established from the survey data, based on the number of 'bat contacts' recorded at sample locations. Bat contacts are defined here as a 15 second recording file which contains at least one bat call of a given species. Where a single 15 second data file contains more than one species, a 'contact' was recorded for each species present. However, no attempt was made to determine whether a 15 second data file contained more than one individual of the same species and in these instances a single contact of the species was recorded.

2.4.9. Although the guidance recommends that data outputs from the static detectors are assessed in the Ecobat website tool, this website has been unavailable for over a year at the time at which analysis was carried out. Therefore, a similar assessment was made using a database of FDM Ecology Ltd's own static detector survey records for proposed wind farm sites in Scotland. This represents 5,693 nights of data collected from 22 sites across Scotland by FDM Ecology Ltd and used to assess bat activity levels. The data is derived from rural, mainly upland habitats similar to Lynemore distributed in Dumfries and Galloway, Scottish Borders, South Ayrshire, East Ayrshire, North Lanarkshire,

Perthshire, Argyll and Bute, Angus, Aberdeenshire, Moray and Highland. The dataset is referred to in this report as the 'FDM Ecology Ltd. dataset'.

2.4.10. Activity at the site was categorised into low, moderate and high levels when compared to records held within the FDM Ecology Ltd dataset, in the same way as Ecobat does. A percentile rank was generated for the FDM Ecology Ltd dataset and the values are presented as low, low/moderate, moderate, moderate/high or high activity based on the percentile ranges of 0-20%, 21-40%, 41-60%, 61-80% and 81-100%. In this situation, the 50th percentile represents the median.

2.4.11. Data was used to compare activity between sample locations on-Site for each species. This was compared with weather data to identify any nights of poor weather that influenced the results.

2.4.12. Early records (i.e. within a defined period around species-specific emergence times) were highlighted to gain insight into potential nearby roosts.

2.4.13. Seasonal patterns of activity were investigated to allow for seasonal mitigation if required.

2.4.14. Finally, the activity levels were run through the NatureScot *et al* (2021) matrix to identify the site risk to species with high and medium population vulnerability to wind farms in Scotland.

2.5. Weather

A weather station was installed on the site at NH7608333798 near to Lynemore to the north of the Site. It was set to record wind speed, rainfall and temperature at fifteen-minute intervals throughout each of the automated static detector survey periods. Due to equipment malfunction, the anemometer failed to log wind speed readings in the spring period.

2.6. Survey Limitations

2.6.1. Due to changes in the Application Boundary over the evolution of the Proposed Development the Survey Area covers a smaller area than the Site and does not include the Site Access between the A9 and approximate National Grid reference NH 74891 33535. The Survey Area is shown on **Figure 6.5** and **6.6a-c, Chapter 6: Ecology and Biodiversity**. These areas were surveyed for bat roosting habitat as part of other survey types (E.g., extended habitat survey, protected mammals). Further, the Proposed Development commits to measures including pre-construction surveys and Species Protection Plans. As such this is not considered a limitation to the assessment.

2.6.2. Following NatureScot *et al* (2021) guidance, "Survey effort [of ground level static detectors] should be focused in those parts of the development site where turbines are most likely to be located" and does not require an assessment of proposed site access areas; as such the Survey Area is not considered a significant limitation in relation to the bat activity survey.

2.6.3. The lack of features within the Site to which detectors could be attached meant that MSs had to be located where such features were available, as close to indicative turbine locations as possible. Additionally, the Application Boundary and locations of proposed turbines within the Site have evolved since surveys were carried out, and as such the MSs are not located where turbines for the Proposed Development are now sited. However, the homogeneous nature of the habitats present within the Site means that the data collected is representative of the turbine locations included in the Proposed Development.

2.6.4. Although transect surveys were not carried out, this is not considered to be a significant limitation to the assessment of the site and transect surveys are no longer automatically expected for all sites under the current NatureScot guidance (2021). Mathews *et al* (2016) describes a set of surveys undertaken to model the predictive power of ground-based surveys to determine the mortality risk to bats from onshore wind turbines. Despite methods including both a static detector survey and weekly transect surveys only data from the static detector survey were included in the predictive models. Our own experience of transect surveys of proposed wind farm sites is that they do not provide a useful method of obtaining information on the spatial use of a wind farm site by bats, nor a robust comparison of bat activity on a site. Transect data is from a linear route for which locations along the transect route are sampled for a tiny period of time (periods of seconds, or up to five minutes at some points if spot counts are used), and non-concurrently. In comparison, static detectors record continuously, and concurrently with other detectors on site for longer periods of time (over 3,000 hours in this study). Given the large volume of high quality and comparative data generated from the static detector survey a transect survey of the site was considered unnecessary.

2.6.5. All surveys were conducted from ground level and no at-height surveys were carried out. Surveys at height were not considered necessary because there is no proposed keyholing for turbines within woodland and there was no supporting evidence to indicate that there would be a high level of bat activity within the height of the rotor-swept area. The site is also outside the known range for the rarest species with high risk of collision with wind turbines (noctule and Leisler's bat).

2.6.6. It is not always possible to identify a bat call to species level, especially for *Myotis* species, or if the recording is not clear. Files may contain only fragments of a call, or else the bat may be calling from a distance from the detector in which case it may be too faint or incomplete to assign to a specific species. Where species cannot be determined bat calls are assigned to genus level.

2.6.7. Some caution must be taken when comparing activity levels between species, as bias can be shown towards those species with louder or lower frequency echolocation calls. Although this bias needs to be considered, it is unlikely to have had any significant bearing on the overall results and assessment.

2.6.8. As bat contacts are defined as single 15 second detector recording files containing at least one bat call, multiple contacts at any given detector location do not necessarily indicate the presence of more than one bat. Number of contacts recorded should therefore only be interpreted as a level of activity at a location and never as a representation of number of individual bats.

2.6.9. The weather station deployed to record wind, rain and temperature at thirty-minute intervals during each of the survey periods experienced a malfunction. The anemometer did not correctly record wind speed during the spring survey period. Wind data for nearby Moy obtained from the 'Time and Date' website shows that overnight wind speeds at that location exceeded 5 m/s on 23/24 May, 24 May and 27 May 2023. As Moy sits at lower altitude than the Site it is likely that wind speeds on-Site were also greater than 5m/s on these nights. It is acknowledged that there may be other nights during the spring deployment where wind speeds were below 5 m/s at Moy, but may have exceeded this threshold on-Site. However, the wind speed data provided on the Time and Date website shows that overall, overnight conditions late May and early June 2023 at Moy were relatively calm and settled, and so it is considered unlikely that conditions at the Site differed substantially.

2.6.10. Wind speed exceeded 5 ms^{-1} throughout three nights in the summer. There were two nights where wind speed was in excess of 5ms^{-1} during part of the night in summer and one in autumn. This means that there were a minimum of nine nights in spring and more than ten nights (though not necessarily consecutive) in the summer and autumn deployments where wind speed did not exceed the 5ms^{-1} specified in guidance, and so it is considered that there were no notable limitations to the validity of the data associated with excessive wind speed.

2.6.11. Temperatures at dusk fell below 8°C on 1 of the 12 survey nights in spring and on 4 of the 14 survey nights in the autumn deployment. The temperatures did not drop below 7.7°C at dusk on any evening. This meant that there were a minimum of ten nights for each deployment (not necessarily consecutive) where temperatures at dusk exceeded 8°C.

2.6.12. Rainfall was very low in the spring and summer deployments, with no rainfall in the spring and three nights affected in the summer. On each of the three nights with rainfall in the summer, rain fell within a maximum three 30 minute sample periods. The autumn deployment had six nights with rainfall, out of the 14 survey nights. Only two of these were considered to be significant, with in excess of 10mm rainfall throughout the night.

2.6.13. The conclusions are therefore that overall the weather remained calm, dry and mild enough to provide suitable conditions for bats during the survey, and it is considered that the weather experienced is likely to representative of prevailing conditions in this location hence the analysis of impacts on bats uses sufficient appropriate data to inform the assessment.

2.6.14. During the autumn deployment period six of the static detectors (MS1, MS3, MS5, MS7, MS10 and MS11) failed to record for the minimum of 10 nights, due to battery failure. However, when all three deployment periods are combined, the minimum 30-night total is still surpassed for all locations except MS9, for which the detector malfunctioned and failed to record at all during the summer deployment, and consequently only achieved 26 nights of recording in total. Due to the homogeneity of the habitat within the Survey Area, habitats and altitudes at the locations where detectors failed are the same as those at sample locations where data was successfully collected in all three deployment periods. As such it is considered that activity levels at the MSs that failed will not be notably different to the activity recorded at the MSs that did record. Failures, and so differences in sampling effort, are addressed via use of a 'Bat Activity Index' (BAI) which corrects for

number of nights of data obtained. As such, it is not considered that detector failures represent a notable limitation to the validity of the data collected, and that in the context of the character of the Site the data collected is sufficient to characterise the baseline and to inform impact assessment.

3. SURVEY RESULTS AND EVALUATIONS

3.1. Desk Based Records

3.1.1. This area of Scotland is within the known range of the following species:

- Common pipistrelle *Pipistrellus pipistrellus*
- Soprano pipistrelle *P. pygmaeus*
- Nathusius' pipistrelle *P. nathusii*
- Natterer's bat *Myotis nattereri*
- Daubenton's bat *M. daubentonii*
- Brown long-eared bat *Plecotus auritus*

3.1.2. Brown long-eared bat and soprano pipistrelle bat were UK BAP Priority species.

3.1.3. All of the bat species above are listed on the Scottish Biodiversity List[1].

3.1.4. Desk study records relating to bats obtained from Highland Biological Recording Group (HBRG) as part of the wider desk study for the Proposed Development are included in Annex 1.

3.2. Daytime Walkover Survey

3.2.1. The walkover identified areas within the Survey Area where tree roosts may be present in mature broadleaved woodland. The Survey Area encompasses ground outside the developable area, and therefore groups of trees rather than individual trees were assessed for potential value to roosting bats.

3.2.2. Potential roost sites and features recorded during the walkover survey, and also during the course of Protected Mammal baseline surveys carried out by FDM in 2023 and by Heritage Ecological Ltd., in 2024, are identified in Table A.2 in Annex 2. No features with potential for maternity or hibernation roosts were identified within 200 m of the proposed turbine locations. The habitats within the Survey Area are exposed, open moorland. Outside the Survey Area, in other parts of the Application Boundary there are more sheltered areas within woodland cover on the north-eastern slopes down to the A9 trunk road.

3.2.3. Connectivity to the wider landscape is considered to be low given the very open nature of the habitats in the Survey Area. Where linear features do exist (fence lines,

[1] The Scottish Biodiversity List is a list of flora, fauna and habitats considered by the Scottish Ministers to be of principle importance for biodiversity conservation. More information can be found at: https://www.nature.scot/doc/scottish-biodiversity-list

watercourses and tracks) that link the Survey Area to the wider landscape, these are not sheltered.

3.2.4. The habitat risk for the site is considered to be **Low**.

3.3. Automated Detector Survey

Species Presence and Abundance

3.3.1. Data collected during the static detector survey yielded a total of 165 bat contacts from a total of 422 detector nights at 11 sample locations and the following species were confirmed:

Common pipistrelle	108 contacts
Soprano pipistrelle	50 contacts
Unidentified *Myotis* species	4 contacts
Brown long-eared bat	3 contacts

3.3.2. Common pipistrelle was the most frequently recorded species, accounting for 65% of the total bat contacts recorded during the survey. Soprano pipistrelle was the second most frequently recorded species with 30% of the total bat contacts. *Myotis* species of bats made up 2% of contacts. Given the geographic location and call parameters, the unconfirmed calls assigned to this genus were considered to be made up of either (or both) Daubenton's bat and Natterer's bat. Brown long-eared bat was the only other species recorded, and comprised 2% of the total bat calls recorded.

Table 2: Contacts by bat species at each detector sample location

Sample location (MS)	**Total sample nights**	Common pipistrelle *Pipistrellus pipistrellus*	Soprano pipistrelle *Pipistrellus pygmaeus*	Unidentified *Myotis* bat *Myotis sp.*	Brown long-eared bat *Plecotus auritus*	**Total contacts**
1	38	10	1	0	0	**11**
2	45	1	2	0	0	**3**
3	35	13	5	0	0	**18**
4	45	25	10	0	0	**35**

Sample location (MS)	Total sample nights	Common pipistrelle *Pipistrellus pipistrellus*	Soprano pipistrelle *Pipistrellus pygmaeus*	Unidentified *Myotis* bat *Myotis sp.*	Brown long-eared bat *Plecotus auritus*	Total contacts
5	39	17	5	1	0	**23**
6	44	22	8	1	1	**32**
7	35	11	7	1	0	**19**
8	45	4	8	1	1	**14**
9	26	0	3	0	1	**4**
10	32	3	1	0	0	**4**
11	38	2	0	0	0	**2**
Total contacts	**422**	**108**	**50**	**4**	**3**	**165**

3.3.3. Both common pipistrelle and soprano pipistrelle are widespread and commonly occurring species in the UK with an estimated population of 3 million individuals for common pipistrelle and 4.7 million individuals for soprano pipistrelle (Bat Conservation Trust, 2024). Common pipistrelle bats have a broad habitat preference, typically foraging along treelines, hedgerows and rivers. Soprano pipistrelle bats have similar habitat preferences to common pipistrelle bats, although they tend to favour riparian and are more likely to be found in more cluttered habitats (Dietz *et al.,* 2009). Common pipistrelle bats are not as common as soprano pipistrelle bats across Scotland as a whole (Harris and Yalden, 2008) and there are an estimated 875,000 individuals in Scotland compared to 1.2 million soprano pipistrelle bats (Bat Conservation Trust, 2024). The common pipistrelle bat population in Scotland is considered to be stable in the long term and the short term (Bat Conservation Trust, 2024). The soprano pipistrelle bat population in Scotland is considered to have increased in the long term and be stable in the short term (Bat Conservation trust, 2024).

3.3.4. Daubenton's bat is a widespread and relatively common species in the UK, with an estimated Scottish population of 235,000 (with a range of 6,220 – 1,020,000) individuals (Bat Conservation trust 2024). It is predominantly associated with riparian habitats, foraging over ponds or slow flowing rivers, however; individuals will also forage in forests, parks or woodland meadows (Dietz *et al*, 2009). In recent years this species has been recorded frequently on open moorland during surveys at wind farm sites across Scotland.

The Scottish population of Daubenton's bat is considered to have been stable in the long- and short-term (Bat Conservation Trust, 2024).

3.3.5. Natterer's bat is also a widespread and relatively common species in the UK, with an estimated Scottish population of 52,000 individuals (with a range of 1,490 – 260,000), although this estimate is considered to have low confidence (Bat Conservation Trust 2024). It is typically a woodland species, although it does fly over pasture where it catches midges and dung-flies. The Scottish population of Natterer's bat is considered to be stable in the short term, since 2011 (Bat Conservation Trust, 2024).

3.3.6. Brown long-eared bat is a widespread and relatively common species in the UK, with an estimated Scottish population of 230,000 (with a range between 12,800 – 543,000) individuals (Mathews *et al*, 2018). It is associated with woodland, particularly deciduous woodland, and gleans prey from the surfaces of leaves. The Scottish population of brown long-eared bats is considered to be stable in the short-term and long-term (Bat Conservation Trust, 2024).

3.3.7. Bat contacts were not recorded on every night of survey. **Table 3** shows the percentage of survey nights where bat species were recorded and compares these with the FDM Ecology Ltd dataset. Comparative analysis is therefore based only on those survey nights when bats were recorded.

Table 3: Percentage of sample nights on which bat contacts were recorded

Species	Lynemore	FDM Ecology Ltd dataset
Common pipistrelle *Pipistrellus pipistrellus*	9%	48%
Soprano pipistrelle *Pipistrellus pygmaeus*	12%	52%
Unidentified Myotis species *Myotis sp.*	1%	11%
Brown long-eared bat *Plecotus auritus*	1%	4%

3.4. Activity Levels and Distribution

3.4.1. The Ecobat output reports state that the analysis is considered unsafe when the reference range in the comparative database is below 200+ nights of data[2]. This was achieved for

[2] When Ecobat website was operational this value was written as 2,000+ individual datapoints. However, Lintott *et al* (2018) states "As a minimum we recommend that a reference range dataset is comprised of 200 nights of surveying

all of the species groups recorded at Lynemore (see **Table 4** below), including the two species with high collision risk common pipistrelle and soprano pipistrelle).

Table 4:Details of the FDM Ltd dataset using 5693 survey nights from 22 wind farm sites across Scotland

Species	Median	<20th percentile	21st < 40th percentile	41st < 60th percentile	61st < 80th percentile	> 81st percentile	Reference Range
Common pipistrelle *Pipistrellus pipistrellus*	6	<3	3-4	6-10	11-39	>39	2725
Soprano pipistrelle *Pipistrellus pygmaeus*	8	<3	3-5	6-14	15-54	>54	2973
Unidentified *Myotis* *Myotis sp.*	1	1	1	1-2	2-3	> 3	626
Brown long-eared bat *Plecotus auritus*	1	1	1	1	2	> 2	228

3.4.2. Unidentified myotis and brown long-eared bat are both assessed to be at **Low** risk from wind farms in Scotland. Therefore, due to the **Low** risk posed to these species and the complications with assessing the percentile ranges for comparison with the FDM Ltd dataset due to limited contacts, these bat contacts are not considered in **Table 5** below.

...". Having contacted the report's authors we have been informed that the typographic error exists in the Ecobat report outputs, and that the correct reference range dataset is 200+ nights.

Table 5: Summary table showing the number of survey nights that the recorded bat activity fell into each activity band for each high collision risk species.

Sample location (MS)	Species	Nights of high activity	Nights of moderate / high activity	Nights of moderate activity	Nights of low / moderate activity	Nights of low activity
1	Common pipistrelle	0	0	1	0	1
1	Soprano pipistrelle	0	0	0	0	1
2	Common pipistrelle	0	0	0	0	1
2	Soprano pipistrelle	0	0	0	0	2
3	Common pipistrelle	0	0	1	1	1
3	Soprano pipistrelle	0	0	0	1	0
4	Common pipistrelle	0	1	0	1	3
4	Soprano pipistrelle	0	0	1	0	3
5	Common pipistrelle	0	0	2	0	4
5	Soprano pipistrelle	0	0	0	0	3
6	Common pipistrelle	0	1	0	1	4
6	Soprano pipistrelle	0	0	1	0	2
7	Common pipistrelle	0	0	0	3	2

Sample location (MS)	Species	Nights of high activity	Nights of moderate / high activity	Nights of moderate activity	Nights of low / moderate activity	Nights of low activity
8	Common pipistrelle	0	0	0	0	4
8	Soprano pipistrelle	0	0	0	1	3
9	Soprano pipistrelle	0	0	0	0	3
10	Common pipistrelle	0	0	0	0	3
10	Soprano pipistrelle	0	0	0	0	1
11	Common pipistrelle	0	0	0	0	2

3.5. Seasonality in results

3.5.1. The seasonality of bat records for all detectors combined shows the following patterns. Bats were recorded on:

- 16 nights of the 132 survey nights (12% of surveyed nights) in spring,
- 35 of the 190 nights in summer (18% of surveyed nights) and
- 1 of the 100 nights in autumn (1% of surveyed nights).

3.5.2. The real terms numbers of bat contacts between the seasons was notably different, with 19 contacts in spring, 145 contacts in summer and a single contact in autumn. Brown long-eared bat was the only species recorded in all three seasons (individual contacts in each season) and all *Myotis* bat contacts were recorded in the summer deployment. Even when corrected for the number of nights recorded to provide a site index of bat activity (the 'BAI'), this equates to 0.14 contacts per night in spring, 0.76 contacts per night in summer and 0.01 contacts per night in autumn when averaged across the whole site.

3.5.3. **Table 6** shows the relative BAI between seasons at each sample location, based on the number of contacts per night, per location. The BAI is calculated as the mean average of bat passes per night per location for each season. This calculation does not fully describe the range in the values between nights, which is why it is not used in the calculations comparing the data to the FDM Ecology Ltd. dataset that follow. Nevertheless, it provides a valuable insight to compare the data where detectors were operating for different numbers of nights. This data is also mapped on **Figure 6.6a-c, Chapter 6: Ecology and Biodiversity**.

Table 6: Seasonal activity index by bat species at each detector sample location (MS)

Sample location (MS)	Season	Common pipistrelle *Pipistrellus pipistrellus*	Soprano pipistrelle *Pipistrellus pygmaeus*	Unidentified *Myotis* bat *Myotis sp.*	Brown long-eared bat *Plecotus auritus*	Total contacts
1	Spring	0.0	0.0	0.0	0.0	0.0
1	Summer	0.53	0.05	0.0	0.0	0.58
1	Autumn	0.0	0.0	0.0	0.0	0.0
2	Spring	0.08	0.17	0.0	0.0	0.0
2	Summer	0.0	0.0	0.0	0.0	0.0
2	Autumn	0.0	0.0	0.0	0.0	0.0
3	Spring	0.0	0.0	0.0	0.0	0.0
3	Summer	0.68	0.26	0.0	0.0	0.94
3	Autumn	0.0	0.0	0.0	0.0	0.0
4	Spring	0.0	0.0	0.0	0.0	0.0
4	Summer	1.32	0.53	0.0	0.0	1.85
4	Autumn	0.0	0.0	0.0	0.0	0.0
5	Spring	0.17	0.0	0.0	0.0	0.17
5	Summer	0.79	0.26	0.05	0.0	1.1
5	Autumn	0.0	0.0	0.0	0.0	0.0
6	Spring	0.25	0.08	0.0	0.0	0.33
6	Summer	1.0	0.37	0.05	0.05	1.47
6	Autumn	0.0	0.0	0.0	0.0	0.0
7	Spring	0.0	0.0	0.0	0.0	0.0
7	Summer	0.58	0.37	0.05	0.0	1.0

Sample location (MS)	Season	Common pipistrelle *Pipistrellus pipistrellus*	Soprano pipistrelle *Pipistrellus pygmaeus*	Unidentified *Myotis* bat *Myotis sp.*	Brown long-eared bat *Plecotus auritus*	Total contacts
7	Autumn	0.0	0.0	0.0	0.0	0.0
8	Spring	0.17	0.17	0.0	0.0	0.34
8	Summer	0.11	0.32	0.05	0.0	0.48
8	Autumn	0.0	0.0	0.0	0.07	0.07
9	Spring	0.25	0.0	0.0	0.08	0.33
9	Summer	-	-	-	-	-
9	Autumn	0.0	0.0	0.0	0.0	0.0
10	Spring	0.0	0.0	0.0	0.0	0.0
10	Summer	0.17	0.05	0.0	0.0	0.22
10	Autumn	0.0	0.0	0.0	0.0	0.0
11	Spring	0.17	0.0	0.0	0.0	0.17
11	Summer	0.0	0.0	0.0	0.0	0.0
11	Autumn	0.0	0.0	0.0	0.0	0.0

3.6. Spatial distribution of results

3.6.1. Bats were recorded across the Survey Area, with common pipistrelle and soprano pipistrelle recorded at ten MSs each. *Myotis* contacts were recorded less frequently, at four MSs, and brown long-eared bat was recorded at three MSs.

3.6.2. The highest number of contacts by pipistrelle species of bats were recorded at MSs placed at higher elevations within the Site, with fewer records on the lower slopes. This may appear counterintuitive, however it is possible that once on site these bats were navigating along the linear fence-line on which some of the high altitude MSs were positioned. However, given the very low level of bat activity on the Site overall, it is possible that the observed patterns are not correlated to any causal factors and do not represent a real pattern and rather are an artifact of low numbers for comparison.

3.7. Bat Activity in Relation to Emergence Times

3.7.1. One indication that bats may be roosting on or near to the site would be records of bat contacts at, or soon after, the typical emergence time of a species. Pipistrelle bats tend to emerge within the first 10-30 minutes after sunset. *Myotis* bats will typically emerge later than pipistrelle bats, with Daubenton's bat emerging up to an hour after sunset and Natterer's bat peaking at approximately one hour after sunset. In order to investigate the likelihood of nearby bat roosts, we have investigated the earliest and latest recording of bats at each sample location and compared them to published emergence times for each species (Russ, 2012).

3.7.2. No bats were recorded within the published emergence times, meaning that there is no evidence from the recordings on Site that there are nearby bat roosts.

3.8. Bat Activity in Relation to Weather

3.8.1. The following outputs show the rain, wind and temperature plots for the spring, summer and autumn periods, recorded from the on-site weather stations. As discussed in 'Limitations', the weather station suffered a malfunction during the spring deployment, meaning that no wind-speed data was recorded in the spring season.

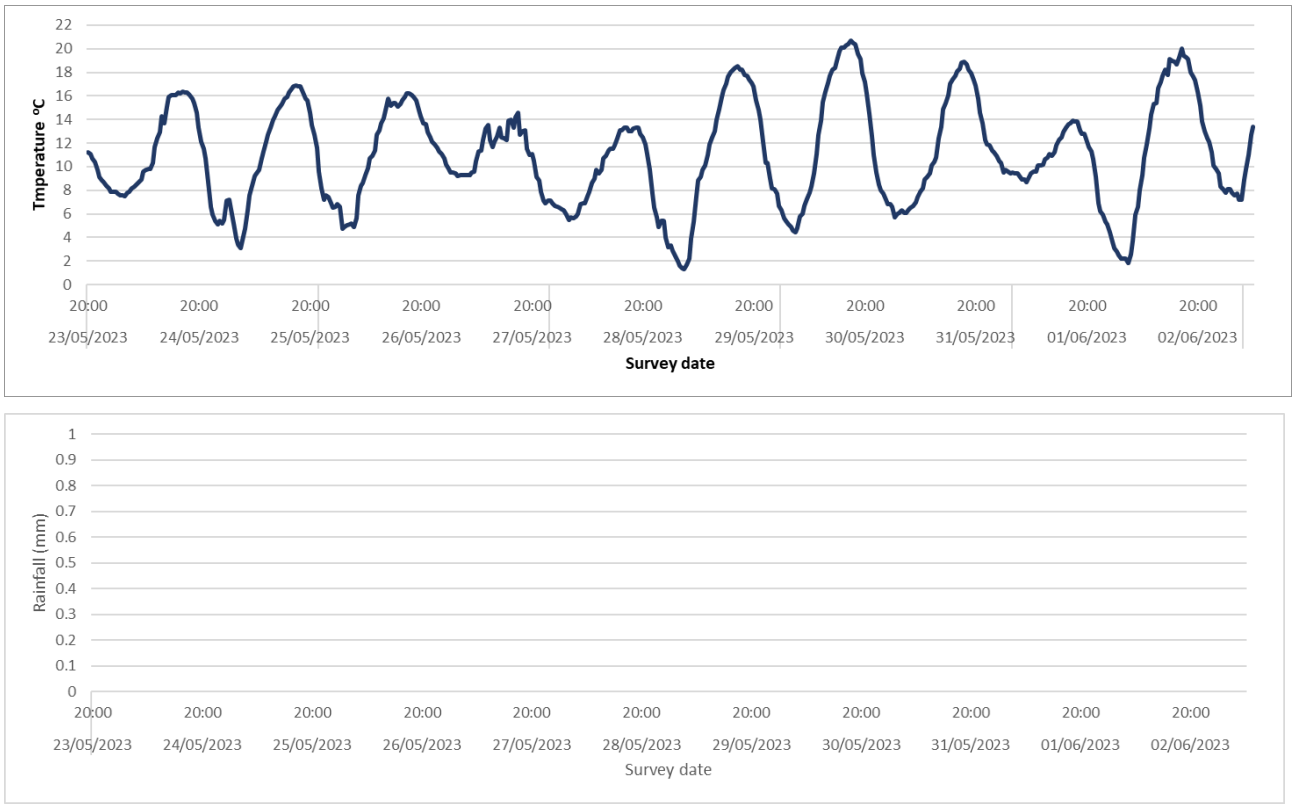

Figure 1a. Temperature (°C) and rainfall records (mm) for the spring survey period. Note that there was no rainfall during the spring deployment. Records are made over 30-minute intervals. The anemometer failed to record during the spring period.

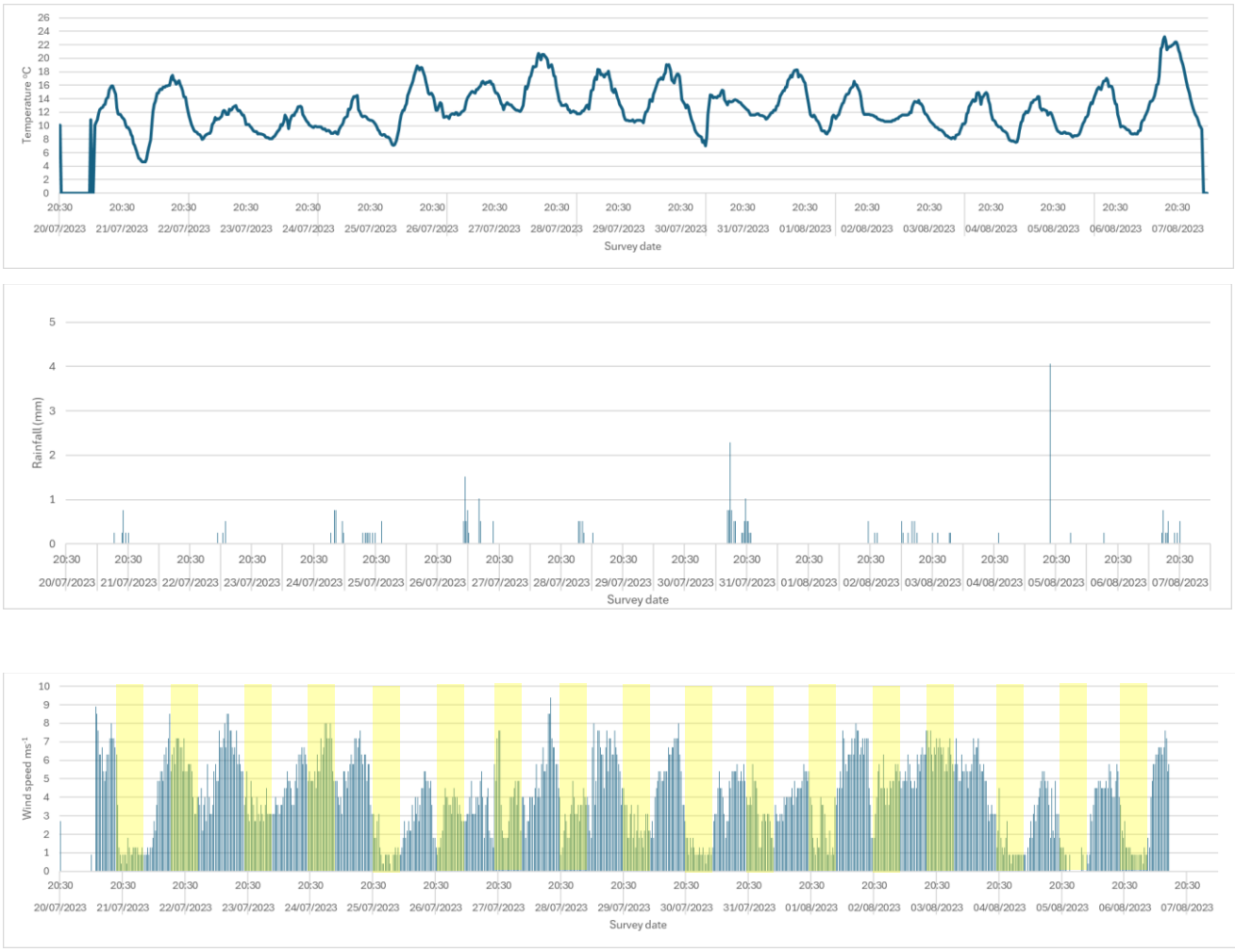

Figure 1b. Temperature (°C), rainfall records (mm) and wind speed (ms^{-1}) for the summer survey period. Records are made over 30-minute intervals. Shaded sections represent night-time periods.

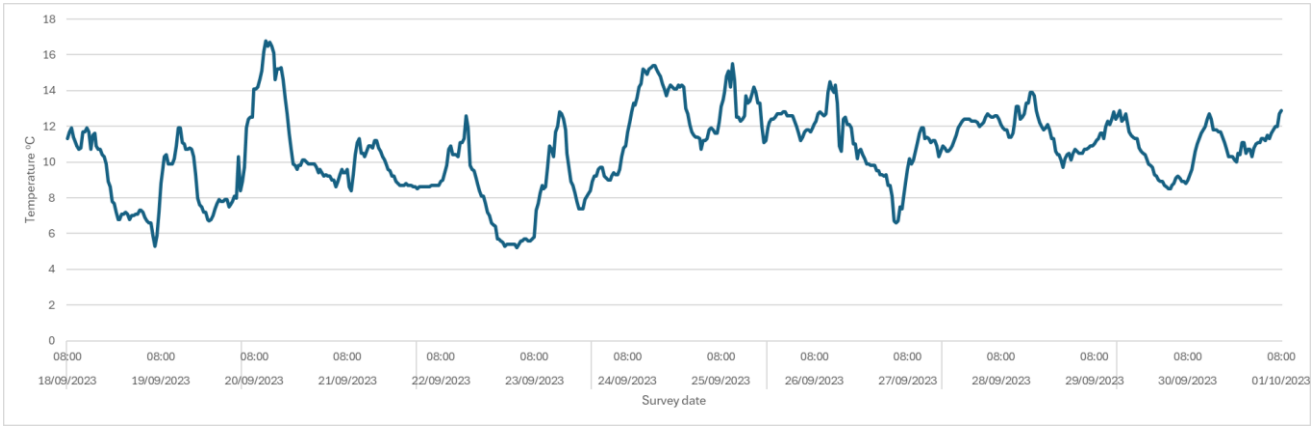

Figure 1c. Temperature (°C), rainfall records (mm) and wind speed (ms^{-1}) for the autumn survey period. Records are made over 30-minute intervals. Shaded sections represent night-time periods.

3.8.2. Temperatures remained above the threshold of 8°C at dusk on all but one evening in spring (28th May) and four in autumn (18th, 19th, 22nd and 23rd September), although the temperature was never below 7.7°C at dusk on any evening. Given the rounding error, it is considered that for all intents and purposes, the temperate did remain above the threshold of 8°C at dusk on all evenings.

3.8.3. Rainfall was not a significant factor during any of the deployments, with the spring remaining dry and the small amount of rainfall in the summer generally occurring at daytime. The exceptions were the 24th (total of 1.77 rainfall within one 30 minute period), 25th (total of 0.51 mm rainfall within three 30 minute periods) and 29th July (total of 1.27 mm rainfall within three 30 minute periods). The rainfall in the autumn period fell through the night time on six survey dates (19th, 23rd, 24th, 27th, 28th and 30th). This was generally light rainfall of 0.25 mm per half hour, with shorter periods of heavy rain, however two nights were did have more persistent, heavier rainfall (19th and 27th September):

- 19th September = 13.73 mm through the night
- 23rd September = 2.53 mm through the night, covering dusk
- 24th September = 7.1 mm though the night, covering dusk
- 27th September = 14.96 mm through the night, covering dusk
- 28th September = 1.78 mm through the night
- 30th September = 3.05 mm through the night.

3.8.4. Wind measurements did not record during the spring deployment, and data from 'Time and Date' website for nearby Moy shows that overnight wind speeds at that location exceeded 5 m/s on 23/24 May, 24 May and 27 May 2023. Bats were recorded on Site on the 24th, but not on the 23rd May. Other nights where bats were not recorded in spring were the 26th, 27th, 28th May and 1st June. As only the 28th May had concurrent lower temperature at dusk, and no other limiting weather factors were recorded for these nights, the pattern of activity on Site in spring appears to be genuinely low level.

3.8.5. Wind speed exceeded 5 ms^{-1} throughout the night on the 22nd and 24th July and 3rd August, and during some parts of the nights of the 27th July, 2nd August and 18th September. Whilst no bats were recorded during the three survey dates with higher wind speeds throughout the night, five bats were recorded on the 27th July when wind speeds exceeded 5 ms^{-1} for only part of the nighttime. It is possible that wind speeds may have impacted on bat activity on the nights of the 22nd, 24th July and 2nd and 3rd August. By comparison, however, no bats were recorded at any locations on the 20th and 31st July and the 7th August when the weather conditions were suitable for bat activity.

3.9. SUMMARY EVALUATION

3.9.1. Bat survey of the Proposed Development comprised a static detector survey and a daytime walkover survey of the Survey Area to identify roost-suitability, or potential bat roost features. Survey methods were in accordance with current survey guidelines. The static detector survey covered three sample periods in May/June, July/August and September. A total of eleven sample locations were used to record bat activity nearby to indicative turbine locations.

3.9.2. Three confirmed bat species were recorded at sample locations during the static detector survey: common pipistrelle, soprano pipistrelle, and brown long-eared bat. Bat calls assigned to *Myotis* genus were also recorded, and in all cases the species were considered to be either Daubenton's bat or Natterer's bat. In Scotland, common pipistrelle and soprano pipistrelle bats are common species at high risk of collision from turbine blades (SNH *et al*, 2021). Natterer's bat, Daubenton's bat and brown long-eared bat are considered to be low risk species (SNH, *et al*, 2021) and are therefore not considered further.

3.9.3. In general, the level of bat activity on the site was very low, with a total of 165 bat contacts over 423 survey nights. There was no notable spatial pattern to where bats were recorded, although sample locations in the higher areas of the site (MS1, MS3, MS4, MS5 and MS7 on the ridge along the south and west of the site) did record higher numbers of bats than the lower slopes to the north of the ridge during the summer survey period.

3.9.4. Lowest levels of activity were recorded in autumn (1 contact), with the highest number of contacts recorded in the summer (145 contacts) and spring (19 contacts) survey periods.

3.9.5. Whilst areas with potential roost sites were identified during the daytime walkover, no specific roost locations were confirmed. Analysis of the results of the static detector survey did not show records of bats close to the typical published species emergence

times throughout the survey. In combination with the daytime walkover, it is considered that there are no bat roosts within (or within 200m of) the Survey Area.

4. IMPACT ASSESSMENT

4.1. Initial site risk assessment

4.1.1. The following matrix is Table 2 from NatureScot *et al* (2021) and depicts the species population vulnerability where yellow = low population vulnerability, orange = medium population vulnerability and red = high population vulnerability. Of the species recorded by the survey at the Proposed Development common pipistrelle and soprano pipistrelle are considered the most sensitive with regard to potential collision risk with wind turbines. These two species are then taken forward in the assessment as the only species present with medium or high collision risk.

Relative abundance	Scotland	Collision risk		
		Low collision risk	**Medium collision risk**	**High collision risk**
	Common species			Common pipistrelle Soprano pipistrelle
	Rarer species	Brown long eared bat Daubenton's bat Natterer's bat		
	Rarest species	Whiskered bat Brandt's bat		Nathusius' pipistrelle Noctule Leisler's bat

4.1.2. In line with guidance (NatureScot *et al*, 2021), the project is considered to be of medium size because it is between 10 and 40 turbines, with other wind farms within 5 km. However, due to the turbine dimensions being in excess of 100 m in height, the development is considered to be large-sized.

4.1.3. The habitat risk is considered to be low. There are not considered to be any potential roost features on site, and there are no strong linear features linking the site to the surrounding habitat. Due to the exposed nature of habitats and the lack of potential roost locations the foraging resource within the Site is assessed to be low, and limited to evenings with calm weather conditions.

4.1.4. This translates as a Site Risk value of Medium (3) for a large-sized project with low habitat risk level.

4.2. Overall risk assessment

4.2.1. The risk assessment is split for each of the high-risk species recorded on site, following guidance. The following matrix is used as a baseline for the assessment:

Site risk level	Master Dataset activity category					
	Nil (0)	Low (1)	Low / moderate (2)	Moderate (3)	Moderate / high (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Medium (3)	0	3	6	9	12	15
High (4)	0	4	8	12	15	18
Highest (5)	0	5	10	15	20	25

Overall assessment:

Low (green)	0-4
Medium (amber)	5-12
High (red)	15-25

4.2.2. The overall median percentile values for both common pipistrelle and soprano pipistrelle across the whole survey was 1 contact, placing them each within the low activity category (<20th percentile). This would produce a score of 2 on the above matrix, producing an overall assessment of Low risk for both species.

4.2.3. There were 43 nights with low site risk level (scores of 3 or less), 16 nights with medium site risk (scores between 8 and 12) and no nights with high site risk. 368 nights did not record any bat contacts, meaning that there was no site risk at those times.

Table 7: Summary table showing the number of nights recorded bat activity fell into each activity band for each species

Sample location	Species	Nights of high activity = high risk	Nights of moderate / high activity = medium or high risk	Nights of moderate activity = medium risk	Nights of low / moderate activity = medium risk	Nights of low activity = low risk
1	*Pipistrellus pipistrellus*	0	0	1	0	1
1	*Pipistrellus pygmaeus*	0	0	0	0	1

Sample location	Species	Nights of high activity = high risk	Nights of moderate / high activity = medium or high risk	Nights of moderate activity = medium risk	Nights of low / moderate activity = medium risk	Nights of low activity = low risk
2	*Pipistrellus pipistrellus*	0	0	0	0	1
2	*Pipistrellus pygmaeus*	0	0	0	0	2
3	*Pipistrellus pipistrellus*	0	0	1	1	1
3	*Pipistrellus pygmaeus*	0	0	0	1	0
4	*Pipistrellus pipistrellus*	0	1	0	1	3
4	*Pipistrellus pygmaeus*	0	0	1	0	3
5	*Pipistrellus pipistrellus*	0	0	2	0	4
5	*Pipistrellus pygmaeus*	0	0	0	0	3
6	*Pipistrellus pipistrellus*	0	1	0	1	4
6	*Pipistrellus pygmaeus*	0	0	1	0	2
7	*Pipistrellus pipistrellus*	0	0	0	3	2
8	*Pipistrellus pipistrellus*	0	0	0	0	4
8	*Pipistrellus pygmaeus*	0	0	0	1	3
9	*Pipistrellus pygmaeus*	0	0	0	0	3
10	*Pipistrellus pipistrellus*	0	0	0	0	3
10	*Pipistrellus pygmaeus*	0	0	0	0	1
11	*Pipistrellus pipistrellus*	0	0	0	0	2

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Annex 1 – Desk Study Records

Table A.1: Bat records provided by Highland Biological Recording Group (HBRG) within 10 km of the Site.

Common Name	Number of Records	Notes	Record Date Range	Closest Record to Site	Status
Brown long-eared bat	1	Single dead bat.	2016	8.85 km southwest	WCA, HabDir, HabReg, Bern-A2, SBL, UKBAP, CMS
Daubenton's bat	2	Both records dated from 2017, of which one was of a maternity roost in Moy.	2017	1.16 km north	WCA, HabDir, HabReg, Bern-A2, SBL, CMS
Soprano pipistrelle	1	Maternity roost at Farr.	2019	3.75 km west	WCA, HabDir, HabReg, Bern-A2, SBL, UKBAP, CMS,

WCA: Wildlife and Countryside Act (1981); HabDir: The Conservation (Natural Habitats, &c.) Regulations 2010; HabReg: The Conservation (Natural Habitats, &c.) Regulations 2010; Bern-A2: Bern Convention Appendix 2; SBL: Scottish Biodiversity List; UKBAP: UK Biodiversity Action Plan; CMS: Convention of Migratory Species.

Annex 2 – Potential Roost Feature Records

A series of trees within the Survey Area were assessed as supporting features suitable for roosting bats; ranging from PRF-I to PRF-M roost suitability in accordance with Collins (2023), including some areas considered potentially suitable for maternity roosts. (see **Table A.2** and **Figure 6.5, Chapter 6: Ecology and Biodiversity**). Cracks and crevices in rock exposures/cliffs provide suitability for individuals or low numbers of roosting bats, including for hibernating bats. Photographs are provided in **Table A.3.**

Table A.2: Potential roost features (PRFs) recorded during the walkover survey and during other baseline protected mammal and extended Phase 1 habitat surveys.

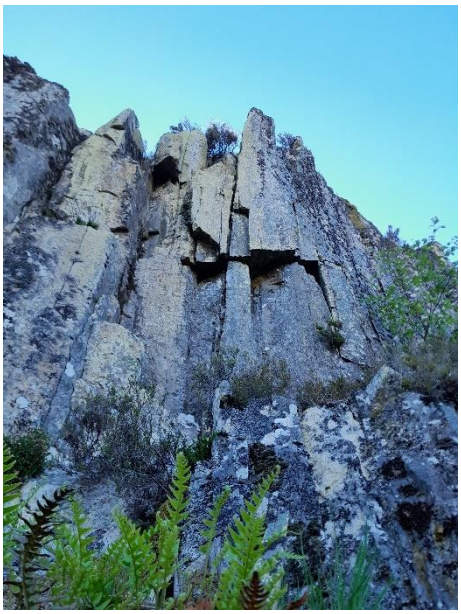
Grid Reference	Suitability	Description	Photograph
NH 75651 32784	PRF-I	Downstream of this location there are some birch trees that are of a size and age they could contain bat roost features for small numbers of bats (potentially PRF-I). They are not considered suitable for maternity or hibernation roosts.	n/a
NH 75385 33223	PRF-I	Birch with rot hole providing low/moderate bat roost potential (potentially PRF-I). The tree is more than 200m from any of the proposed turbines.	1
NH 75293 33293	PRF-I	Mature birch with rot hole in leaning stem. Provides low bat roost potential.	2
NH 74785 33597	PRF-I	Stand of mature birch. Some trees have small rot holes and splits providing low bat roost potential.	3
NH 74470 33642	PRF-I	Stand of mature birch. Some trees have small rot holes and splits providing low bat roost potential.	4
NH 73435 33859	PRF-I	Granny birch with lifting bark providing low bat roost potential.	5
NH 74185 33076	PRF-I	Dead standing birch tree in open moorland. Some lifting bark provides low bat roost potential. Given the exposed nature, the likelihood of bats using the tree to roost are negligible to low (Potentially PRF-I).	6
NH 73120 33982	Moderate, including hibernating	Occasional cracks and crevices in rock exposures/cliffs provide suitability for roosting bats, including hibernating bats. Recorded during Protected Terrestrial Mammals survey (see Technical Appendix 6.2 for survey dates and personnel).	7
NH 75143 33799	PRF-M, including maternity	Stands of mature downy birch on upper slopes of study area and along riparian corridors provide numerous suitable potential roost features. Overall, these are considered potentially suitable for maternity roosts.	8

Grid Reference	Suitability	Description	Photograph
		Recorded during Protected Terrestrial Mammals survey (see **Technical Appendix 6.2** for survey dates and personnel).	
NH 74211 32234	Negligible/Low	Shooting hut and toilet. The timber framed and clad shelter is located on the ridge, adjacent to the track. It has a pitched roof of corrugated metal sheeting over sheet boarding. Part of the roof has suffered storm damage and rainwater is damaging the internal timbers and roofing. There are large windows on the northern aspect, and the space can be heated using a small wood burning stove. There are gaps behind the gutters, and at some wallheads. Due to the very exposed nature of the building, the unsuitable nature of the roof covering and the absence of any signs, the building is considered to be negligible to low bat roost potential. The toilet building is similarly constructed and had no evidence of roosting bats. It too was considered to have negligible to low bat roost potential. Neither structure is considered suitable for hibernating roosting or maternity roosting bats.	9-12

Table A.3: Photographs of Potential roost features (PRFs) recorded within the Survey Area.

No.	Photo	Description
1		Birch with rot hole; PRF-I. NH 75385 33223
2		Mature birch with rot hole in leaning stem; PRF-I. NH 75293 33293

3		Stand of mature birch, some of which have small rot holes and splits; PRF-I. NH 74785 33597
4		Stand of mature birch, some of which have small rot holes and splits; PRF-I. NH 74470 33642
5		Granny birch with lifting bark; PRF-I. NH 73435 33859

6		Dead standing birch with some lifted bark, located at an exposed location; PRF-I. NH 74185 33076
7		Occasional cracks and crevices in rock exposures/cliffs provide suitability for roosting bats (moderate suitability), including hibernating bats. NH 73120 33982
8		Example of stand of mature downy birch on upper slopes of study area and along riparian corridors providing numerous potential roost features (PRF – M), including for maternity roosts. NH 75143 33799

9		Shooting hut offering negligible/low bat roost potential. NH7421132234
10		Shooting hut offering negligible/low bat roost potential. NH7421132234
11		Shooting hut offering negligible/low bat roost potential. NH7421132234
12		Toilet offering negligible/low bat roost potential. NH7421132234