ESB Asset Development UK Limited

Millmoor Rig Wind Farm

Technical Annex 8.3 - Bats

2481817

NOVEMBER 2022

RSK GENERAL NOTES

Project No.: 2481817

Title: Millmoor Rig Wind Farm –Technical Annex 8.3 – Bats

Client: ESB Asset Development UK Limited

Date: November 2022

Office: Glasgow

Status: Rev 04

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EXECUTIVE SUMMARY

1. This Technical Annex has been prepared to accompany **Chapter 8: Ecology** of the Environmental Impact Assessment (EIA) Report for the proposed Millmoor Rig Wind Farm (hereafter the 'Proposed Development').
2. This Technical Annex presents detailed methodologies and results of the bat surveys carried out in conjunction with the protected species surveys. A suite of bat surveys were previously undertaken at the Proposed Development site by MacArthur Green in 2013 in relation to a windfarm proposal (Highlee Hill Wind Farm[1]) which has since been withdrawn from planning. Static bat detector surveys were carried out between May 2021 and September 2021 and a preliminary roost assessment survey carried out between June and July 2021. An additional survey was carried out in May 2022 following updates to the access area and turbine area.
3. Throughout the monitoring period, four species and two genera were recorded: common, soprano and Nathusius' pipistrelle, *Nyctalus* spp., *Myotis* spp. and brown long-eared bat.
4. A total of 23,797 bat registrations were recorded for the survey area with a mean registration rate of 6 B/h.
5. The majority of bat activity originated from common and soprano pipistrelles, which accounted for 84% of all activity within the Proposed Development followed by *Myotis* spp. (13.2%), brown-long eared (1.6%), *Nyctalus* spp. (1%) and Nathusius' pipistrelle. (0.1%).
6. The overall Ecobat risk assessment was undertaken for species considered to be at high collision risk within the survey area (i.e. common, soprano and Nathusius' pipistrelles, and *Nyctalus* spp.).
7. The overall Ecobat risk scores of the Proposed Development site for common and soprano pipistrelles were 'Medium' while the overall risk score for Nathusius' pipistrelle and *Nyctalus* spp were 'Low'. Based on the maximum percentiles, the Ecobat activity levels were 'High' (15) for common and soprano pipistrelle's and 'Medium' (6-12), for Nathusius' pipistrelle and *Nyctalus* spp.
8. The overall monthly risk score of the Proposed Development for common and soprano pipistrelle was 'High' (15) in June, July and September at monitoring points (MPs) 3, 4, 5, 8 and 10. Only two of these MPs, out of a total of 11(MP3 and MP4) are within close proximity to turbine locations T5 and T13 respectively.
9. Due to the high collision risk for common/soprano pipistrelles at MPs 3, 4, 5, 8 and 10 in June, July and September 2021, it is recommended that a post construction monitoring is conducted for proposed turbine locations T5 and T13 and if this indicates that collision is occurring, and bat mortality is identified then a Bat Mitigation and Monitoring Plan (BMMP)

[1] An application was submitted by RES in July 2016 for a Wind Farm situated at the same location, but with a different site boundary and the application was formally withdrawn in May 2016. Millmoor Rig Wind Farm is a wholly new project with no connection to the Highlee Hill Wind Farm proposal or to RES.

is implemented. A BMMP would be agreed with NatureScot in advance of commencement of construction. Further assessment and detail regarding the BMMP can be found in **Chapter 8: Ecology**.

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1 INTRODUCTION

1.1 Purpose of this Report

1.1.1 This Technical Annex has been prepared to accompany **Chapter 8: Ecology** of the Environmental Impact Assessment Report (EIA) Report for the proposed Millmoor Rig Wind Farm (hereafter ‘Proposed Development’).

1.1.2 This Technical Annex describes the results of a suite of bat surveys undertaken to obtain baseline ecological information to inform the Ecological Impact Assessment (EcIA) in support of the Proposed Development. RSK Biocensus was commissioned by the applicant to carry out the surveys.

1.1.3 The report presents the methods and results of the bat surveys undertaken between May 2021 and September 2021. An additional survey was carried out in May 2022 following updates to the access and turbine areas.

1.1.4 The purpose of the bat surveys was to obtain detailed information within the Proposed Development. Wind farm collisions, even at relatively low rates, have the potential to severely impact bat population levels. Therefore, the aims of the surveys were to:

- identify the bat species using the Proposed Development;
- assess activity levels;
- assess relative abundance;
- characterise habitat associations for species that were present; and,
- evaluate the potential collision risk level to those species.

1.1.5 The following terminology is used throughout this Technical Annex:

- The Proposed Development – The wind farm development outlined by the application boundary including all infrastructure, the turbine area and access area shown in Figure 8.2.1.
- The application boundary – the boundary of the Proposed Development site where field surveys were carried out including the turbine area and access area.
- Survey area – turbine area, all site infrastructure and access areas plus a 100 m buffer as shown in Figure 8.2.2. There are some areas within the Proposed Development which have not been surveyed as no turbines, infrastructure or access is planned within these areas.
- The turbine area – the area within the application boundary containing the wind turbine array.
- The access area – refers to access route from the A6088 to the turbine area within the application boundary.

1.2 Site Description

1.2.1 The Proposed Development is located just south of Hawick in the Scottish Borders (Ordnance Survey Grid reference: NT 61212 07010). The majority of the land within the application boundary consists of commercially stocked mature Sitka spruce (*Picea sitchensis*) in varying maturity along with large areas of clear-fell. There are numerous small watercourses which flow into Jed Water which is located in the east of the Proposed Development. Active forestry operations include felling which is ongoing throughout the Proposed Development.

1.2.2 Jed Water and its associated tributaries flow through the Proposed Development and form part of the River Tweed, which is designated as a Special Area of Conservation (SAC) Site of Special Scientific Interest (SSSI). The banksides are mostly vegetated with damp neutral grassland communities. Wolfehopelee Burn is located west of the application boundary and is a tributary to Catlee Burn which flows into the River Tweed SAC and SSSI. The banksides of this burn are steep with broadleaved woodland, scrub and bracken.

1.3 Proposed Development

1.3.1 The Proposed Development would consist of up to 13 turbines with a height of between 180 – 230 m. Ancillary infrastructure would include turbine hardstanding areas, internal access tracks, substation compound (including substation, control building and battery energy storage facility), underground cabling, two temporary construction compounds (including a main compound and a mobilisation compound) a turbine layover area and up to three borrow pit search areas. Site access is from the A6088 and predominantly follows existing forestry tracks. **Chapter 2: Proposed Development** of the EIA Report contains a more detailed description of the Proposed Development, and the site layout is shown on **Figure 2.2** of Volume 2 of the EIA Report.

1.4 Policy and Guidelines

1.4.1 All bat species found in Scotland are classed as European protected species. They receive full protection under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). Details on the legal status of bats are included within Annex A.

1.4.2 In the UK, guidelines have been produced with regards to assessing the ecological impact upon bats from wind farm developments. These guidelines help to inform survey and mitigation strategies and have been used in the preparation of this report:

- Collins, J. (ed) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London; and
- NatureScot[2], Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat

[2] Previously known as Scottish Natural Heritage (re-banded in 2020)

Conservation Trust. (2021). *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation*.

2 METHODS

2.1 Background Data Search

2.1.1 To provide context for the results of the bat surveys, a search for recent (0 – 10 years) biological records was carried out. The search was undertaken in May 2021 and included a 10 km radius from the application boundary for bat species of low to high collision risk vulnerability. The following groups were approached for data:

- The Wildlife Information Centre (Scotland) and due to the proximity of the English Border;
- Environmental Records Information Centre North East; and
- Northumberland Bat Group (unable to provide data requests at the time of writing).

2.1.2 There are no known statutory designated sites in Scotland with bats as a qualifying species and therefore a search for sites was not undertaken for the purpose of this report.

2.1.3 As part of the desk study, a search for existing wind farms within the surrounding area (10 km) was also undertaken in order to inform an assessment of the potential cumulative pressures.

2.1.4 A review of SiteLink[3], aerial imagery and Ordnance Survey (OS) maps was undertaken to identify any features of potential value to foraging, commuting, or roosting bats within the surrounding area or within proximity to any national or internationally designated sites.

2.2 Preliminary Roost Assessment

2.2.1 The preliminary roost assessment (PRA) followed the methodology as set out in Collins (2016), to identify potential roost features (PRFs) in trees, buildings, and structures, which could support roosting bats. Where PRFs were identified, they were assigned a suitability value of low, moderate or high suitability which indicated the likelihood of bat use, and informed the requirement for further survey work, such as a tree-climbing inspection and/or dusk and dawn bat emergence/re-entry surveys.

2.2.2 Surveys were carried out between 28 June 2021 and 02 July 2021 with an additional survey carried out between 23 and 25 May 2022 following updates to the access and turbine area. The PRA survey was carried out on all deciduous trees within the bat survey area as shown in Figure 8.3.1.

2.3 Initial Site Risk Assessment

2.3.1 Wind turbines have the potential to cause risk of death to bats by direct collision or death through barotrauma (internal injury due to a sudden drop in air pressure near blades),

[3] Sitelink - Map Search (nature.scot) (accessed June 2022)

although there is recent evidence indicating that injury through barotrauma is unlikely with impact trauma the likely cause of the majority of wind-turbine-related bat fatalities. (Lawson, et al., 2020).

2.3.2 Cumulative bat deaths have the potential to be significant to local, regional and even national populations. This is because bats are long-lived, and their reproductive rate is low.

2.3.3 A risk assessment was carried out in line with the current NatureScot Guidance (NatureScot, et al., 2021) in order to give an indication of the site risk to bats. Table 1 presents the current NatureScot parameters to be considered when assessing a site for its potential risk to bats. This table uses the habitat threat and the size of the development in order to derive an overall site risk score. The overall site risk score is used to determine the overall site risk to high collision risk species.

Table 1: Initial Site Risk Assessment

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

Habitat Threat	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. • Close to key roost and/or swarming site.
Project Size	**Description**

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

2.4 Bat Call Analysis

2.4.1 Recordings from the spring series (up to 15s long) were split into five-second files; in the subsequent deployment periods (summer and autumn), the maximum length of recordings was set to 5 seconds. This decision was made to optimise use of the British Trust for ornithology (BTO) Acoustic Pipeline analyses software, as set out below.

2.4.2 All recordings were analysed using specialised software (The BTO Acoustic Pipeline). The pipeline automatically identifies bat calls to species level by comparing recorded echolocation pulses to an integrated library of bat calls which then assigns a species label to every five-second registration file. Following the batch analysis, all non-*Pipistrellus* calls (excluding *Pipistrellus nathusii*), 'no ID' calls (which included noise), and low confidence calls were manually checked by an experienced bat ecologist using Kaleidoscope Viewer in order to confirm identification. A percentage of calls were also checked for quality assurance purposes, with 10% of pipistrelle calls (*Pipistrellus pipistrellus* and *Pipistrelles pygmaeus*) also manually checked.

2.4.3 This method of analysis is in line with current guidelines (Collins, 2016) for data analysis which recommends the manual checking of all non-*pipistrellus* calls when using automated methods. Guidance on call parameters was taken from Russ (2012).

2.4.4 Echolocation calls were identified down to species or genus level depending on the type of bat encountered. It was not always possible to reliably identify species belonging to the genera *Myotis* and *Nyctalus*, so these groups were analysed to genus level only.

2.4.5 The level of bat activity was quantified by the number of five-second files (registrations) recorded for each species. As night length varies between months, the number of bat registrations recorded was divided by the number of hours recorded, to provide an indication of relative bat activity – bat registrations per hour (B/h).

2.4.6 Further analysis of bat data was carried out using the secure online tool Ecobat (Mammal Society, 2017).

2.5 Static Detector Surveys

2.5.1 A map outlining the turbine area was provided by the applicant in 2021. This was used to define the extent of the survey area for static detector deployment.

2.5.2 Full spectrum Wildlife Acoustics Song Meter 4 (SM4) detectors with omnidirectional microphones were deployed within the survey area. Each microphone was mounted at a minimum of 2 m as per NatureScot, et al. (2021) either on wooden stakes or on standing conifer trees in clear fell in order to maximize the probability of recording bat calls in addition to reducing the likelihood of noise interference from insects and moving vegetation.

2.5.3 NatureScot, et al. (2021) states that the number of monitoring points (MPs) with bat detectors to be used should be in proportion to the number of proposed turbines, with a MP required for each turbine location up to ten turbines. Beyond this number, an additional MP is only required for every third turbine added. It is expected that the Proposed Development will consist of up to 13 turbines. Therefore 11 MPs were required. Eleven MPs were deployed within the application boundary throughout spring, with 12 MPs deployed throughout the summer.

2.5.4 Detectors were deployed within 50 m of a number of proposed turbine locations. They were also positioned to cover a variety of habitats and topographical features including forestry edges, forestry rides, access routes, clear fell, watercourses, and immature plantation. Each detector recorded bats from dusk to dawn with detectors starting 30 minutes before dusk and finishing 30 minutes after dawn. The locations of the detectors, deployment dates, habitat type and complete operating nights at each MP are detailed in Table 10 and Table 11 of Annex B with the location of the MPs shown in Figure 8.3.1.

2.5.5 NatureScot, et al. (2021) stipulates that bat activity data be recorded for 10 consecutive nights of good weather. Therefore, detectors were deployed for a minimum of 14 nights in spring, summer and autumn (May to September 2021) in order to take into account fluctuations in weather patterns throughout the season. Survey dates were spaced out with a minimum gap of 14 nights between each deployment. In addition, detectors were deployed when the predicted weather forecast indicated suitable weather conditions for foraging and commuting bats (i.e., air temperature above 8°C, wind speed below 5 m/s and light or no precipitation).

2.6 Weather Data

2.6.1 Weather data were collected from one hour before dusk and one hour after dawn. The dusk and dawn times were collected from an online source[4] at a location close to the Proposed Development.

2.6.2 Weather data for each deployment were collected in five-minute increments from the nearest weather station to the Proposed Development (Bonchester Bridge – IHAWIC8)[5]. The parameters noted were; temperature (°C), wind speed (m/s) and rainfall (mm) from one hour before sunset and one hour after sunrise.

[4] Sunrise and sunset times in Hawick (timeanddate.com)

[5] Personal Weather Station Dashboard | Weather Underground (wunderground.com)

2.7 Ecobat Analysis

2.7.1 Following batch analysis and manual identification, the bat activity data was also analysed using the Ecobat online data processing tool[6]. Ecobat allows the comparison of bat activity data with sites in a similar geographic location allowing an assessment of whether levels are comparatively low, moderate or high to other sites within the reference data set.

2.7.2 In order to do this, Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of activity recorded across the Proposed Development site. These percentiles can then be assigned to activity levels to provide a quantifiable measure of bat activity. Table 2 below describes the percentile scores taken from NatureScot, et al. (2021) and the corresponding Ecobat activity score.

2.7.3 The static surveys were carried out in spring, summer and autumn. The spring deployment period extended into June with 9 nights recorded during this month. Therefore, there are site risk scores for May, June, July and September 2021.

2.7.4 The reference range was stratified to include the following: records within 30 days, within 100 km of the bat survey area and collected by any model of detector.

Table 2: Percentile Score and Categorised Level of Bat Activity

Ecobat Percentile	Ecobat Bat Activity	Ecobat Activity Score
81 - 100	High	5
61 - 80	Moderate to High	4
41 - 60	Moderate	3
21 - 40	Low to Moderate	2
0 - 20	Low	1
0	Nil	0

2.8 Constraints and Limitations

2.8.1 A map outlining the turbine locations was provided by the applicant in 2021. This was used to place MPs close to proposed turbine locations. The turbine layout has been revised since surveys were completed with MPs no longer adjacent to turbine locations. The revised turbine locations are not seen to be a limitation to the data collected as the MPs covered a range of habitats and topographical features typical to the Proposed Development, including clear-fell and forestry track, providing an indication of how bats may adapt to and use any new habitat created through turbine construction.

2.8.2 For some *Myotis* spp. calls, it was only possible to identify the call to genus level. It is possible that for *Myotis* spp. these recordings could represent species not identified in

[6] Mammal Society (2017). Ecobat. Available at: http://www.mammal.org.uk/science-research/ecostat http://www.ecobat.org.uk/

the analysis of the recorded data. For the purposes of this report and Ecobat analysis, *Myotis* species were grouped into their genus group.

2.8.3 There is some overlap between *Nyctalus* spp. calls (Leisler's bat (*N. leisleri*) and noctule (*N. noctula*)), with these calls recorded to genus level only. According to spatial modelling, the predicted occurrence probability of Leisler's in Southern Scotland is distributed in the south and west while the predicted occurrence for Noctule is in the south and east (Newson et al., 2017)[i]. Therefore, it is likely that the *Nyctalus* species recorded within the survey area was Noctule.

2.8.4 Due to passive (static) monitoring methodologies depending on sound reaching the microphone, the detection rate of bat calls varies with a bias towards loud bat calls; with quieter calls, notably brown long-eared bats (*Plecotus auritus*), potentially being under-recorded.

2.8.5 Eleven SM4 bat detectors were deployed throughout spring 2021; twelve detectors were deployed in summer and autumn 2021. Whilst one MP was not covered in spring, the survey deployment in all seasons met the minimum requirement.

2.8.6 That said, Detector 2 failed during the autumn deployment and Detector 3 failed during the spring deployment which meant that no data was collected at these two MPs throughout this time. The surrounding detectors were operational, and it is considered that sufficient data was collected from these operational detectors in order to identify species and activity levels for the Proposed Development during these deployment periods.

2.8.7 Due to an operational error, the detectors in spring stopped recording 2.5 hours before sunrise. As the overall survey effort exceeded the required number of MPs and survey nights required by guidance, this loss of data in the spring is not considered sufficient to have affected the overall site risk assessment.

2.8.8 Weather conditions were within the parameters recommended by NatureScot. In addition, detectors were deployed for an additional number of nights over the recommended 10 nights in order to take into account fluctuations in weather. Therefore, it is not considered that the changes in weather parameters have impacted adversely on the overall site risk assessment.

2.8.9 Ecobat is a requirement of NatureScot et al. (2021); this uses third-party data to provide a comparative risk rating for the relative bat activity of the Proposed Development site. It is possible that this third-party data may contain species identification errors.

2.8.10 The Ecobat tool does not correct for the length of a registration file when uploading the data. Therefore, it is not known if the data sets (reference ranges) used to calculate the percentiles for the Proposed Development had equivalent registration files (i.e. of 5s). Longer or shorter registration files could have resulted in the percentiles being overestimated or underestimated for the Proposed Development site.

2.8.11 RSK Biocensus contacted Ecobat on 14 October 2021 and 24 November 2021 due to a summing error found within the Ecobat report generated for the Proposed Development. The online Ecobat processing tool had incorrectly removed 3% (728 no.) of bat registrations. Ecobat were already aware that a summing error was present in their online data processing tool but were unable to resolve the issue. It is not known if the datasets (reference ranges) used to determine the percentiles for the Proposed Development, also contain these summing errors. As the number of registrations removed from the dataset were small (3% loss of bat registrations), it is unlikely that this loss of data has significantly altered the percentiles and the overall site risk.

2.8.12 To account for the potential inaccuracy of Ecobat, the mean bat registrations per hour (B/h) for the Proposed Development site were calculated by RSK Biocensus and then compared to the overall site risk generated by Ecobat. This comparison was carried out to determine if the B/h was sufficiently high or low to warrant an Ecobat 'High' site risk score.

3 RESULTS

3.1 Background Data Search

3.1.1 The desk study returned 215 records of bats within 10 km of the Proposed Development site for the past 10 years.

3.1.2 These species records were obtained from the Wildlife Information Centre and the Environmental Records Information Centre Northeast. The scientific and common names for species are given as well as their level of designation. If a species is not included in the table below, it does not necessarily mean the species is absent from the search area, but rather that data-holding organizations do not have records of it in these locations.

3.1.3 Records include *Pipistrellus* spp., *Myotis* spp., noctule and brown long-eared bat which are listed below in Table 3.

Table 3: Bat Records within 10 km

Latin Name	Common Name	Designation	Most Recent	No of Records	Within 2 km	Within 10 km
Myotis daubentonii	Daubenton's bat	HR-1994(Sch 2)	2017	11		
Myotis mystacinus / brandtii	whiskered / Brandt's bat	HR-1994(Sch 2)	2013	2		
Myotis nattereri	Natterer's bat	HR-1994(Sch 2)	2018	10	**P**	
Myotis sp.	*Myotis* sp.	HR-1994(Sch 2)	2019	19	**P**	
Nyctalus noctula	Noctule	HR-1994(Sch 2)	2019	10		
Pipistrellus pipistrellus	Common pipistrelle	HR-1994(Sch 2)	2019	63		
Pipistrellus pygmaeus	Soprano pipistrelle	HR-1994(Sch 2)	2019	61	**P**	
Pipistrellus sp.	Pipistrelle	HR-1994(Sch 2)	2018	21		
Plecotus auritus	Brown long-eared bat	HR-1994(Sch 2)	2019	18		

Note - **P** relates to records with 4 figure or tetrad grid references that could potentially be anywhere within a 1 km or 2 km square.

3.1.4 There are no operational wind farm developments within 10 km of the application boundary; however, Pines Burn Wind Farm is consented. Details on the Pines Burn development are provided in Table 4.

Table 4: Proposed Wind Farm Developments within 10 km

Wind Farm	Grid Reference	Number of turbines	Location and distance from the Proposed Development	Size
Pines Burn Wind Farm	NT 53795 06879	12	6 km west	36 MW

3.1.5 The closest operational wind farm to the Proposed Development is Langhope Rig Wind Farm which is located *c.*23 km northwest. Langhope Rig operates at a capacity of 16 MW with a total of 10 operational turbines.

3.2 Preliminary Roost Assessment

3.2.1 The majority of the land within the application boundary consists of commercially stocked mature Sitka spruce which typically have negligible bat roost suitability. A steading ruin at Westshiels is surrounded by a number of broadleaved trees with bat roost potential, ranging from low, moderate to high. Potential roost features (PRFs) that were recorded included knot holes, woodpecker holes, keyhole tears and wounds.

3.2.2 The ruin steading at Westshiels consists of two stone ruins. The stone ruins had no roofs with stone walls c.0.5 m in width and cavities between the brickwork which were clear of mortar. One of the stone ruins also had a chimney still attached. These ruins were classified as having low to moderate summer and hibernation potential.

3.2.3 These features are not within 200 m plus rotor radius of a turbine and were not subject to further investigation.

3.2.4 The results of the preliminary roost assessment are shown in Table 12 Preliminary Roost Assessment Survey ResultsTable 12 of Annex C and illustrated in Figure 8.3.2.

3.3 Initial Site Risk Assessment

3.3.1 The Proposed Development risk level, as derived in NatureScot et al. (2021) is determined by project size and habitat risk (see Table 1). As noted, the Proposed Development consists of 13 turbines with a height of between 180 m and 230 m, and so the Proposed Development risk level falls within the ‘Medium' category.

3.3.2 The habitat risk level of the Proposed Development site is determined by the availability of roosts, the suitability of foraging and commuting habitats and the connectivity of the Proposed Development site to the wider landscape bats. The majority of the Proposed Development site is conifer plantation and clear-fell, which is suboptimal for roosting bats. A small area of broadleaved trees and old stone ruins with PRF were located within the Proposed Development site at Westshiels which offer suitable foraging and roosting habitat.

3.3.3 There are farm steadings and residential buildings in the surrounding area which offer roosting potential for bats.

3.3.4 Recent research work has shown Sitka spruce plantations to be an important habitat type for foraging common and soprano pipistrelles (Kirkpatrick, et al., 2016). The Proposed

Development site is connected to the surrounding area by a network of burns and forestry rides. Considering these factors, the habitat risk of the Proposed Development site falls under the category of 'Moderate'.

3.3.5 A 'Medium' project size combined with a 'Moderate' habitat risk level results in an overall site risk assessment of 'Medium' (3).

3.4 Static Detector Surveys

3.4.1 A total of 23,797 bat registrations were recorded for the survey area with a mean registration rate of 6 B/h (bat passes per hour). Throughout this period, four species and two genera were recorded: common, soprano and Nathusius' pipistrelle, *Nyctalus* spp., *Myotis* spp. and brown long-eared bat. The relative activity of bats recorded within the Proposed Development is displayed in Chart 1, but it is important to note that species are detected at different distances, so this will over-represent louder bats and under-represent quiet bats. It is not appropriate to extrapolate relative abundance from relative activity.

3.4.2 The majority of bat activity, as illustrated on Chart 1, originated from common pipistrelle (48%) and soprano pipistrelle (36%) bats, which together accounted for 84% of all activity recorded followed by *Myotis* spp. (13.2%), brown long-eared bat (1.6%), *Nyctalus* spp. (1%) and Nathusius' pipistrelle. (0.1%).

3.4.3 The numbers of bat registrations recorded at each MP are provided in Table 5, with the mean registration rates (B/h) per survey season shown in Table 6. In each table, species are grouped into their level of collision risk and potential vulnerability as categorised in NatureScot, *et al*. (2021).

3.4.4 Common pipistrelle bats recorded the highest registration count, as shown in Table 5 and Table 6 and Chart 2 with an overall total of 11,454 registrations, followed by soprano pipistrelle with an overall total of 8,562 registrations. Common and soprano pipistrelle bats are classed as a high collision/medium population vulnerability species. They have a combined mean registration rate of 4.99 B/h for the survey area.

3.4.5 *Nyctalus* spp. recorded a registration count of 227 while Nathusius' pipistrelle recorded a registration count of 14. *Nyctalus* spp. and Nathusius' pipistrelle are classed as a high collision risk/high population vulnerability species which have a combined mean registration rate of 0.06 B/h for the survey area.

3.4.6 The third highest number of bat registration recorded for the survey area was for *Myotis* species with an overall total of 3,148 registrations recorded. Brown long-eared recorded 392 registrations. Both *Myotis* species and brown long-eared are classed as a low collision risk/medium-high population vulnerability species which have a combined mean risk of 0.88 B/h for the survey area.

3.4.7 The MP that recorded the highest registration count was MP 8 which recorded 6,164 registrations during the monitoring periods with a mean registration rate of 17.81 B/h. Registration numbers peaked at this MP during the summer deployment period as shown in Table 6. This MP was situated near a stone wall and plantation edge overlooking the

Jed water. The species composition at this MP was primarily pipistrelle spp. accounting for 80% of the registrations recorded. The genus recording the second-highest relative activity level at this MP was *Myotis* accounting for 18% of the registrations, which was the highest number of *Myotis* spp. registrations recorded at any MP. Other species recorded here included brown long-eared bats and *Nyctalus* spp.

3.4.8 MP 3 recorded the second highest registration count with 4,065 registrations recorded and a mean registration rate of 13.16 B/h. Registration numbers peaked at this MP during the summer deployment period as shown in Table 5 and Table 6. However, it should be noted that the detector at this MP failed during the spring deployment which meant that no data was collected. This MP was situated along the edge of mature plantation overlooking a forestry track. The species composition at this MP was primarily pipistrelle spp. accounting for 92% of the registrations recorded. Other species recorded at this MP(listed in accordance with their relative activity from highest to lowest) were *Myotis* spp., brown long-eared bats and *Nyctalus* spp.

3.4.9 The third highest registration count was recorded at MP 10 with 4,087 registrations recorded and a mean registration rate of 11.08 B/h. Registration numbers peaked at this MP during the summer deployment period as shown in Table 7. This MP was situated along the edge of mature plantation overlooking a forestry track. The species composition at this MP was primarily pipistrelle spp. accounting for 86% of the registrations recorded. Other species recorded at this MP which are listed in accordance with their abundance from highest to lowest were *Myotis* spp., *Nyctalus* spp., brown long-eared bats and Nathusius' pipistrelle.

3.4.10 The fourth highest registration count was recorded at MP 4 with 3,087 registrations recorded and a mean registration rate of 8.66 B/h. Registration numbers peaked at this MP during the spring deployment period due to pipistrelle numbers with all other species recorded at this MP peaking in the summer as shown in Table 6. This MP was situated within clear-fell. The species composition at this MP was primarily pipistrelle spp. accounting for 96% of the registrations recorded. Other species recorded at this MP which are listed in accordance with their abundance from highest to lowest were *Myotis* spp., brown long-eared bats and *Nyctalus* spp.

3.4.11 The fifth highest registration count was recorded at MP 5 with 2,070 registrations recorded and a mean registration rate of 6.10 B/h. Registration numbers peaked at this MP during the summer deployment period as shown in Table 6. This MP was situated along the edge of mature plantation overlooking forestry track. The species composition at this MP was primarily pipistrelle spp. accounting for 82% of the registrations recorded. Other species recorded at this MP which are listed in accordance with their abundance from highest to lowest were *Myotis* spp., brown long-eared bats, *Nyctalus* spp and Nathusius' pipistrelle. The highest number of Nathusius' pipistrelle registrations recorded during monitoring was at this MP with a total number of 8 registrations recorded. Nathusius' pipistrelle were also recorded in low number at MP 2, 5, 6, 10, 11 and 12.

3.4.12 After MP 5, all other MPs recorded < 2,000 registrations and <5 B/h, dominated by common and soprano pipistrelle species with registration numbers for these species peaking during the summer deployment period.

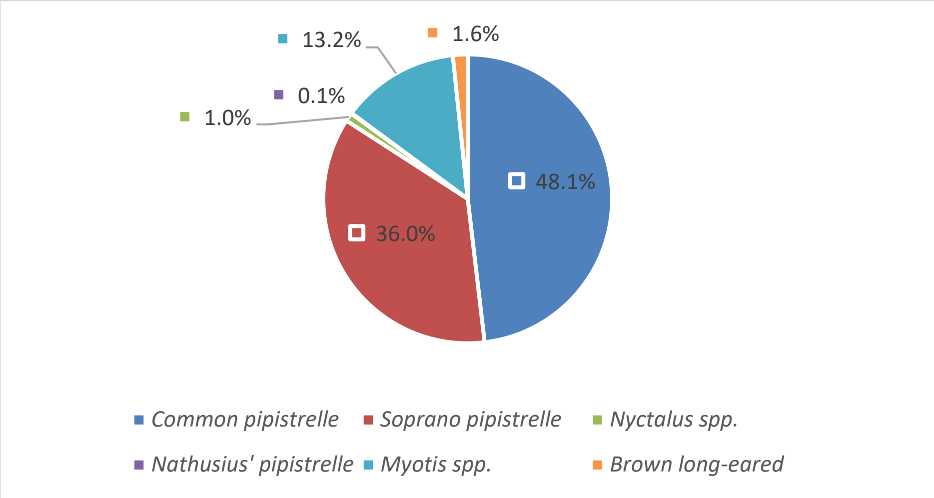

Chart 1: Static Results: Species Composition (%) of the Survey Area

Table 5 Summary of Static Survey Results for the Survey Area. Species which are grouped into Collision Risk/ Population Vulnerability Categories

	High Collision Risk/medium population vulnerability				High Collision Risk/High Population Vulnerability				Low Collision Risk/Low-Medium Population Vulnerability					
Mon. Point	*C.pip*	*S.pip*	Total	B/h	*Nyctalus spp.*	*N.pip*	Total	B/h	*Myotis spp.*	BLE	Total	B/h	Grand total	B/h
1	231	137	368	**1.25**	3		3	**0.01**	179	24	203	**0.69**	574	**1.95**
2	89	41	130	**0.62**	8	1	9	**0.04**	53		53	**0.25**	192	**0.91**
3	1959	1771	3730	**12.08**	11		11	**0.04**	293	31	324	**1.05**	4065	**13.16**
4	1884	1090	2974	**8.34**	8		8	**0.02**	85	20	105	**0.29**	3087	**8.66**
5	1175	514	1689	**4.98**	13	8	21	**0.06**	340	20	360	**1.06**	2070	**6.10**
6	403	205	608	**1.69**	3	1	4	**0.01**	124	21	145	**0.40**	757	**2.10**
7	180	104	284	**0.79**	26		26	**0.07**	111	62	173	**0.48**	483	**1.34**
8	2360	2595	4955	**14.32**	32		32	**0.09**	1090	87	1177	**3.40**	6164	**17.81**
10	1951	1585	3536	**9.59**	43	2	45	**0.12**	471	35	506	**1.37**	4087	**11.08**
11	265	111	376	**1.07**	44	1	45	**0.13**	211	23	234	**0.67**	655	**1.87**
12	544	315	859	**2.41**	16	1	17	**0.05**	116	53	169	**0.47**	1045	**2.93**
13	413	94	507	**1.42**	20		20	**0.06**	75	16	91	**0.26**	618	**1.74**
Total	**11454**	**8562**	**20016**	**4.99**	**227**	**14**	**241**	0.06	**3148**	**392**	**3540**	**0.88**	**23797**	**5.94**

*Mon. Point. (Monitoring Point), C.pip (Common pipistrelle), S.pip (Soprano pipistrelle), N.pip (Nathusius' pipistrelle) and BLE (Brown long-eared bat)

Table 6 Summary of Static Survey Results (mean B/h) for the Survey Area which are grouped into Collision Risk/ Population Vulnerability Categories

	High Collision Risk/medium population vulnerability			High Collision Risk/High Population Vulnerability			Low Collision Risk/Low-Medium Population Vulnerability		
Mon. Point	Spring	Summer	Autumn	Spring	Summer	Autumn	Spring	Summer	Autumn
1	n/a	1.80	0.81	n/a	0.02	0.00	n/a	0.26	1.03
2	0.42	0.72	n/a	0.00	0.07	n/a	0.01	0.38	n/a
3	n/a	22.75	2.57	n/a	0.06	0.01	n/a	1.04	1.05
4	36.35	2.17	0.34	0.00	0.03	0.02	0.18	0.29	0.349
5	7.73	8.25	1.68	0.00	0.20	0.00	0.47	1.40	1.114
6	1.55	3.41	0.43	0.00	0.01	0.02	0.10	0.36	0.569
7	0.92	1.22	0.40	0.00	0.21	0.00	0.19	0.25	0.783
8	5.40	22.56	12.28	0.00	0.26	0.01	0.56	4.42	3.880
10	1.29	21.51	3.06	0.00	0.30	0.02	0.06	2.12	1.291
11	0.63	2.43	0.28	0.00	0.37	0.01	0.25	0.93	0.655
12	0.58	5.03	1.19	0.00	0.14	0.00	0.04	0.36	0.740
13	2.95	2.10	0.27	0.00	0.15	0.01	0.06	0.09	0.465
Grand Total	**5.90**	**8.00**	**2.12**	**0.00**	**0.15**	**0.01**	**0.19**	**0.97**	**1.08**

*Mon. Point. (Monitoring Point). Shaded areas indicating peak activity (B/h)

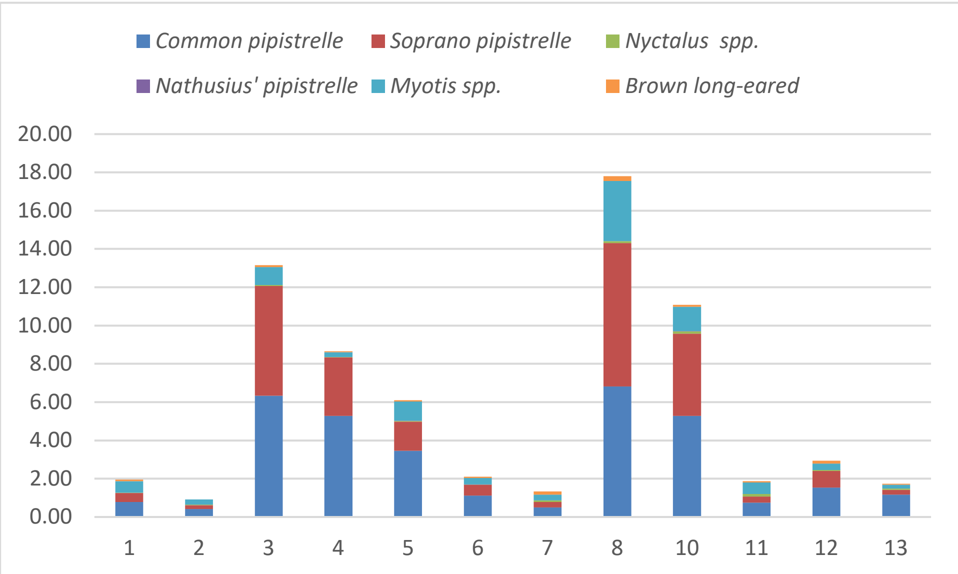

Chart 2: Summary of Static Survey Results (mean B/h) for the Survey Area

3.5 Weather Data

3.5.1 The detectors were deployed for a total of 49 nights throughout the surveys (spring, summer and autumn 2021 inclusive). On 21 of these nights, there were instances where the weather conditions were deemed unsuitable for bats (temperature below 8°C, wind over 5 m/s and rainfall). In some cases, the weather was only considered unsuitable for a short period of time (one or two hours throughout the night) and therefore, unsuitable nights were calculated based on whether the majority of the night had suitable weather conditions for bat activity. Only eight nights had weather conditions that were deemed unsuitable for bats throughout. Due to the large amount of weather data collected, it has not been provided in detail within this report, but can be upon request.

3.6 Ecobat Analysis

3.6.1 Bat activity data were also analysed against Ecobat data. This online data processing tool allows the comparison of bat activity data collected within the survey area to be compared with data collected from similar sites in the same geographical region. This helps to provide some level of context to the results, i.e. whether activity levels are comparatively high, moderate or low in comparison to the reference dataset.

3.6.2 Table 7 shows the key metrics for each bat species recorded within the survey area. The reference range is the number of nights for each species that the data were compared to using Ecobat's database. A recommended reference range of at least 200 is required to be confident in the relative activity levels of species recorded. This reference range was only achieved for soprano pipistrelle, common pipistrelle and *Myotis* spp.

Table 7 Ecobat Percentiles and Bat Activity Levels

Species	Median Percentile	Median Activity Level	95% CI	Maximum Percentile	Maximum Activity Range	Nights recorded
Pipistrellus pipistrellus	57	Moderate	73 - 87	99	High	378
Pipistrellus pygmaeus	46	Moderate	77.5 - 88	99	High	373
Pipistrelle nathusii	0	Nil	19 - 19	39	Low – Moderate	8
Nyctalus spp.	19	Low	9.5 – 9.5	77	Moderate – High	77
Myotis spp.	39	Low - Moderate	59.5-74.5	94	High	318
Plecotus auritus	19	Low	39.5 - 65	73	Low	113

*cl (confidence interval)

3.6.3 The overall risk assessment is undertaken for high collision-risk species which were identified within the survey area (i.e. common, soprano and Nathusius' pipistrelles and *Nyctalus* spp.). Low risk species (*Myotis* spp. and brown long-eared bat) are low collision-risk and medium-high population vulnerability species and are therefore not considered in the overall risk assessment.

3.6.4 The overall risk assessment involves multiplying the site's risk level (Medium: see Section 3.3) with the median and the maximum Ecobat activity levels to calculate both the 'typical' site risk level, and the maximum site risk level.

3.6.5 The overall risk scores are shown in Table 8. The overall risk scores of the Proposed Development for both common and soprano pipistrelles were ‘Medium’ while the overall risk score for Nathusius’ pipistrelle and *Nyctalus* spp were ‘Low’. Based on the maximum percentiles, the Ecobat activity levels were ‘High’ (15) for common and soprano pipistrelles and ‘Medium’ (6-12) for Nathusius’ pipistrelle and *Nyctalus* spp.

Table 8 Overall Risk Scores for High Collision Risk Species

Species	Risk Score based on Median Percentile	Risk Score based on Max. Percentile
Pipistrellus pipistrellus	Medium (9)	High (15)
Pipistrellus pygmaeus	Medium (9)	High (15)
Pipistrelle nathusii	Low (3)	Medium (6)
Nyctalus spp.	Low (3)	Medium (12)

3.6.6 In order to determine when high collision risk species might be at greater risk, the monthly data were examined in more detail. A table of the monthly median risk scores per MP for high-risk collision risk species recorded within the survey area is provided in Table 13 of Annex D and shown in Figures 8.3.3 – 8.3.6. Taken from this table is a summary of the ‘High monthly risk scores’ which are shown in Table 9. This table shows that a ‘High’ risk score for common and soprano pipistrelle was recorded in June, July and September 2021 at MPs 3, 4, 5, 8 and 10, with July 2021 recording the highest number of high-risk scores. No high-risk monthly scores were recorded for Nathusius’ pipistrelle and *Nyctalus* spp.

3.6.7 These five MPs recorded the highest registration counts and mean registration rates calculated by RSK Biocensus across the monitoring periods with a B/h ranging from 6.1 to 17.81.

3.6.8 Whilst acknowledging the inaccuracy of Ecobat (see Section 2.8), the risk scores generated by Ecobat were seen to be accurate when comparing the mean B/h calculated by RSK Biocensus.

Table 9 High Monthly Risk Scores for High Collison Risk Species

Monitoring Points	Species	Month	Median Percentile	Ecobat Bat Activity	Max Percentil e	Median Risk Score
3	*Pipistrellus pipistrellus*	Jul	92	High	98	High (15)
3	*Pipistrellus pygmaeus*	Jul	90	High	97	High (15)
4	*Pipistrellus pipistrellus*	Jun	98	High	99	High (15)

Monitoring Points	Species	Month	Median Percentile	Ecobat Bat Activity	Max Percentile	Median Risk Score
4	*Pipistrellus pygmaeus*	Jun	89	High	99	High (15)
5	*Pipistrellus pipistrellus*	Jul	86	High	92	High (15)
8	*Pipistrellus pipistrellus*	Jul	94	High	99	High (15)
8	*Pipistrellus pygmaeus*	Jul	92	High	97	High (15)
8	*Pipistrellus pygmaeus*	Sep	93	High	98	High (15)
10	*Pipistrellus pipistrellus*	Jul	91	High	99	High (15)
10	*Pipistrellus pygmaeus*	Jul	85	High	99	High (15)

4 ASSESSMENT OF THE POTENTIAL RISK TO BATS

4.1 Assessment of Effects

4.1.1 A steading ruin at Westshiels located within the turbine area is surrounded by a number of mature broadleaved trees with bat roost potential, ranging from low to high. Potential roost features (PRFs) that were recorded included knot holes, woodpecker holes, keyhole tears and wounds. The steading consists of two stone ruins with low to moderate summer and hibernation potential. These features are not within a distance of 200 m plus rotor radius of a turbine and were not subject to further investigation. If the trees identified with PRFs or the steading ruins require felling, demolition or substantive pruning works to facilitate access track upgrade and widening works, then further survey work will be required to determine if disturbance to a bat roost will occur.

4.1.2 Throughout the monitoring period, four species and two additional genera were recorded: common pipistrelle, soprano, Nathusius' pipistrelle, brown long-eared bat, *Nyctalus* spp. and *Myotis* spp.

4.1.3 A total of 23,797 bat registrations were recorded for the survey area with a mean registration rate of 6 B/h.

4.1.4 The majority of bat activity, originated from common and soprano pipistrelles which accounted for 84% of all activity within the Proposed Development site followed by *Myotis* spp. (13.2%), brown-long eared (1.6%), *Nyctalus* spp. (1%) and Nathusius' pipistrelle. (0.1%).

4.1.5 Common and soprano pipistrelle bats are classed as a high collision/medium population vulnerability species. They have a combined registration rate of 4.99 B/h for the survey area.

4.1.6 *Nyctalus* spp. and Nathusius' pipistrelle are classed as a high collision risk/high population vulnerability species which have a combined registration rate of 0.06 B/h for the survey area.

4.1.7 Both *Myotis* species and brown long-eared bat are classed as a low collision risk/medium-high population vulnerability species which have a combined risk of 0.88 B/h for the survey area.

4.1.8 The overall Ecobat risk assessment was undertaken for high collision risk species which were identified within the bat survey area (i.e. common, soprano and Nathusius' pipistrelle; *Nyctalus* spp.).

4.1.9 The overall median risk scores of the Proposed Development for Nathusius pipistrelle and *Nyctalus* spp were 'Low'. Based on the maximum percentiles, the Ecobat activity levels were 'Medium' (6-12) for Nathusius pipistrelle and *Nyctalus* spp.

4.1.10 The overall risk scores of the Proposed Development for common and soprano pipistrelles were 'Medium'. Based on the maximum percentiles, the Ecobat activity levels reached 'High' (15) for these species at certain times/locations. In order to determine when high collision risk species might be at greater risk, the monthly data were examined in more detail. The monthly median risk scores per MP showed a 'High' risk score for common and soprano pipistrelle in June, July and September at MPs 3, 4, 5, 8 and 10 with July recording the highest number of high-risk scores for common/soprano pipistrelles, therefore indicating that there is a high collision risk for common/soprano pipistrelles at these MPs in June, July and September. No 'High' risk monthly scores were recorded for Nathusius' pipistrelle and *Nyctalus* spp. Note only MPs 3 and 4 are in close proximity to proposed turbines.

4.2 Cumulative Effects

4.2.1 Pines Burn Wind Farm is the only cumulative wind farm development within 10 km of the Proposed Development. It consists of up to 11 wind turbines, with tip heights of between 130 m and 149.9 m. The site consists of open areas of moorland and grassland habitats with blocks of conifer planation and broadleaved woodland. The most recorded bat species at the site was common and soprano pipistrelle. Bat activity for these species was mainly recorded around edge habitat such as burns and plantation edges. Surveys for the site also recorded two roosts supporting common and soprano roost pipistrelles and a possible Myotis spp. roosts located at Lurgiescleuch house as well as an unknown bat roost located in a tree.

4.2.2 Newson et al. (2017)7 estimated through spatial modelling that between 16% and 24% of the regional populations of high-risk species (Nyctalus. and Nathusius pipistrelle) in southern Scotland overlap with existing and approved wind farms, with 50% of this overlap concentrated at just 10% of wind farms. The Proposed Development is on the edge of the main area of noctule predicted activity and is outwith the main area of predicted occurrence for Leisler's bat. Reliable population estimates for Nyctalus spp. in Scotland are currently not available.

4.2.3 The dispersed spatial pattern of distribution and activity of Nathusius' pipistrelle indicates that cumulative impacts from wind farm developments, even where lower activity rates occur, could be significant in regard to potential cumulative effects (Newson et al. 2017)8. There is very little data available on the population of this species in the UK.

4.2.4 Taking into account the median risk scores for Nyctalus species and Nathusius' pipistrelle and the currently available distribution data of these species and nearby Wind farms within 10 km, the cumulative effects are predicted to be negligible.

4.2.5 Taking into account the overall 'Medium' and the 'High' monthly median risk scores for common and soprano pipistrelle species, their species distribution (widespread in

[7] Newson, S.E., Evans, H.E., Gillings, S., Jarrett, D. & Wilson, M.W. (2017), A survey of high risk bat species across southern Scotland. Scottish Natural Heritage Commissioned Report No. 1008.

[8] Ibid.

Scotland) and cumulative wind farm development within 10 km, the cumulative effects predicted for common pipistrelle and soprano pipistrelle bats are minor.

4.3 Recommendations

4.3.1 Due to the high collision risk for common/soprano pipistrelles at MPs in June, July and September, it is recommended that post construction monitoring is conducted for proposed turbine locations T5 and T13 and, if this indicates that collision is occurring, and bat mortality is identified, then a Bat Mitigation and Monitoring Plan (BMMP) is implemented. The BMMP would be agreed with NatureScot in advance of commencement of construction. Further assessment and detail regarding the BMMP can be found in **Chapter 8: Ecology**.

REFERENCES

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

Kirkpatrick, L., Maher, SJ., Lopez, Z., Lintott, PR., Bailey, S., Dent, D., & Park, K. (2017). Bat use of commercial coniferous plantations at multiple spatial scales: Management and conservation implications, Biological Conservation, 206, pp. 1-10.

Lawson, M., Jenne, D., Thresher, R., Houck, D., Wimsatt, J., & Straw, B. (2020). An investigation into the potential for wind turbines to cause barotrauma in bats. PloS one, 15(12), e0242485. https://doi.org/10.1371/journal.pone.0242485

Mammal Society (2017). Ecobat. Available at: http://www.mammal.org.uk/science-research/ecostat/

Newson, S.E., Evans, H.E., Gillings, S., Jarrett, D. & Wilson, M.W. (2017). A survey of high risk bat species across southern Scotland. Scottish Natural Heritage Commissioned Report No. 1008.

Russ, J. (2012). *British Bat Calls: A Guide to species Identification*. Pelagic Publishing.

Scottish Natural Heritage, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter & Bat Conservation Trust. (2021). Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.

FIGURES

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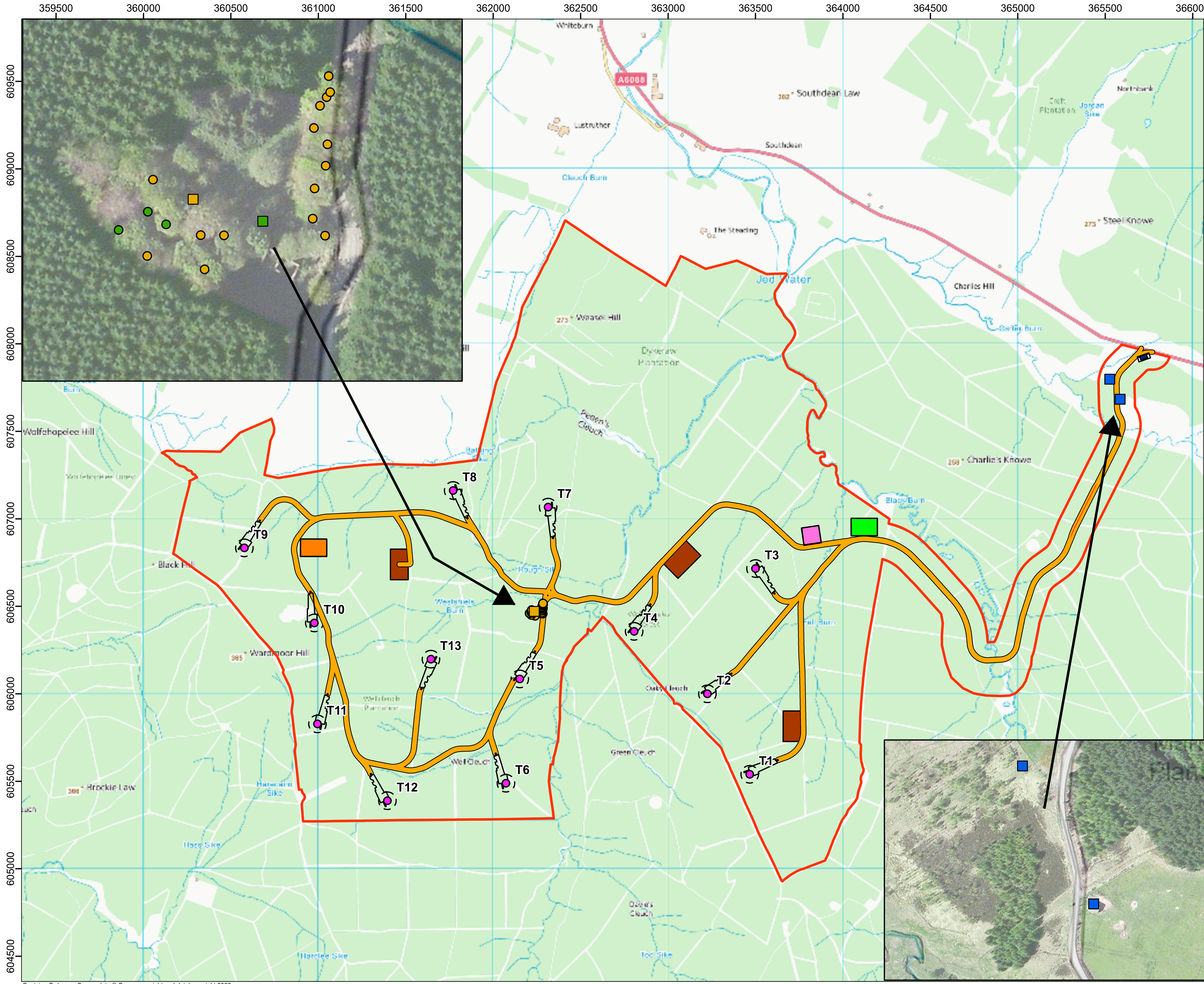
Technical Appendix 8.3 - Bats
Site and Static Detector Locations



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- Turbine Locations
- 50m Turbine Buffer
- Access Tracks
- Hardstands
- Borrow Pit Search Areas
- Temporary Turbine Layover Area
- Mobilisation Compound (70m x 30m)
- Construction Compound (100m x 100m)

Substation (150m x 100m)
- Preferred Substation Option
- Alternate Substation Option

Preliminary Bat Roost Assessment
- Tree with Moderate Bat Roost Potential
- Tree with Low Bat Roost Potential
- Building with Moderate Bat Roost Potential
- Building with Low Bat Roost Potential
- Building with Negligible Bat Roost Potential

Rev	Date	Description	Drn	Chk	App
00	11/11/2022	2481817	TG	SP	KF

Millmoor Rig Wind Farm

RSK biocensus
EXPERTS IN ECOLOGY

TITLE: Figure 8.3.2:
Technical Appendix 8.3 - Bats
Preliminary Roost
Assessment Survey Results

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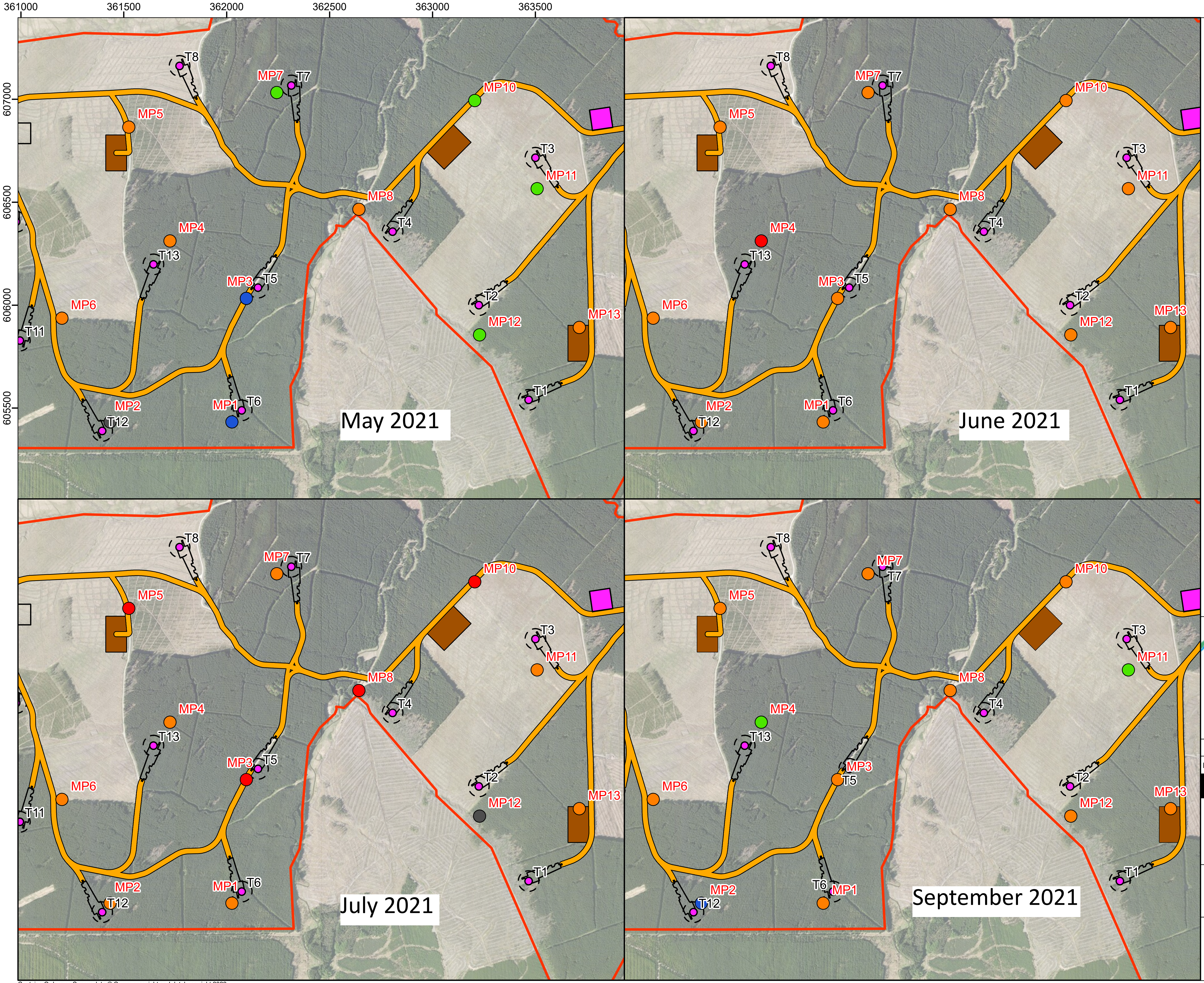
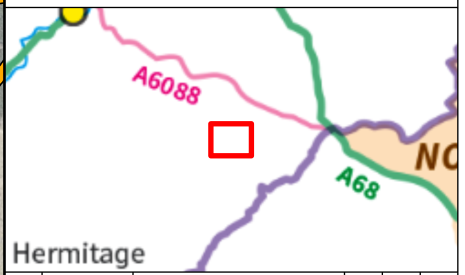


Legend:

- Application Boundary
- Turbine Locations
- 50m Turbine Buffer
- Access Tracks
- Hardstands
- Borrow Pit Search Areas
- Construction Compound (100m x 100m)

Monthly Median Risk Scores (calculated by Ecobat)

- Not Deployed / Failed
- No Activity
- Low
- Medium
- High



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Millmoor Rig Wind Farm

RSK biocensus EXPERTS IN ECOLOGY

TITLE: Figure 8.3.3
Technical Appendix 8.3 - Bats
Overall Monthly Risk Scores from May to September - Common Pipistrelle

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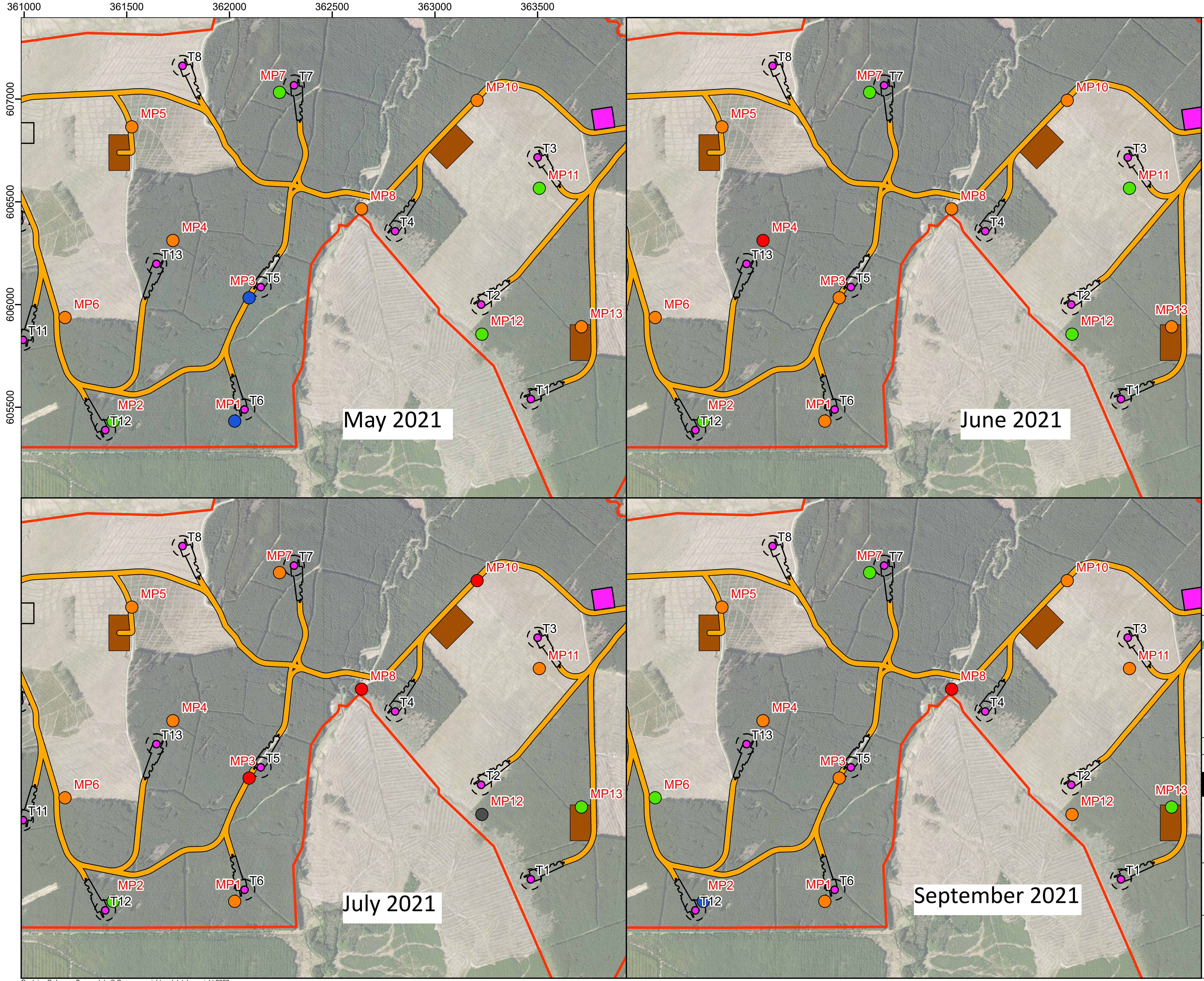
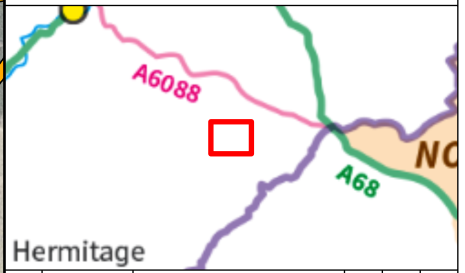


Legend:

- Application Boundary
- Turbine Locations
- 50m Turbine Buffer
- Access Tracks
- Hardstands
- Borrow Pit Search Areas
- Construction Compound (100m x 100m)

Monthly Median Risk Scores (calculated by Ecobat)

- Not Deployed / Failed
- No Activity
- Low
- Medium
- High



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Millmoor Rig Wind Farm

RSK biocensus
EXPERTS IN ECOLOGY

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Technical Appendix 8.3 - Bats
Overall Monthly Risk Scores from May to September - Soprano Pipistrelle

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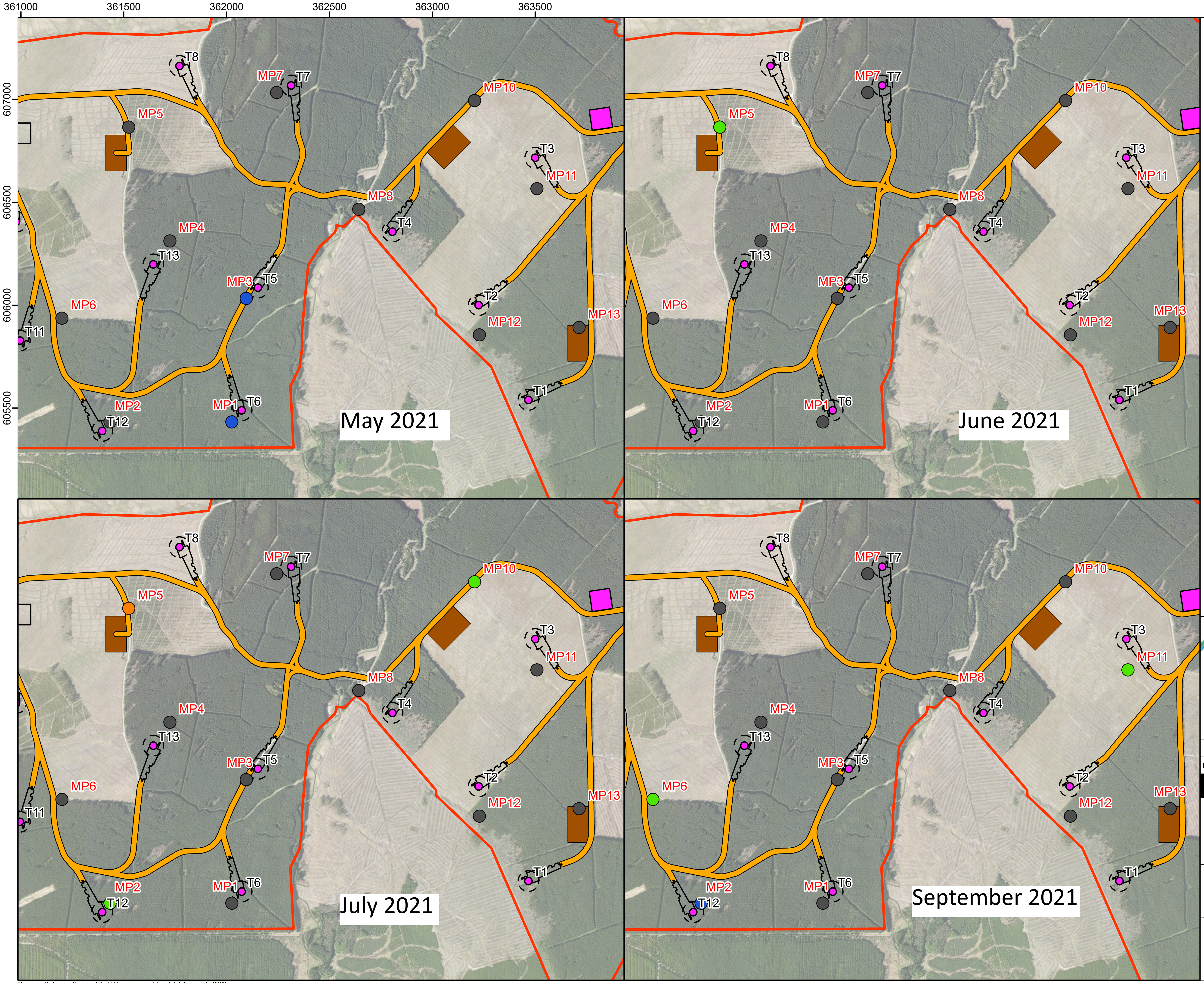
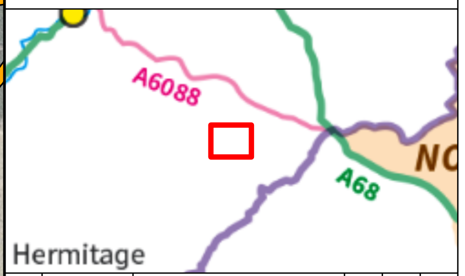


Legend:

- Application Boundary
- Turbine Locations
- 50m Turbine Buffer
- Access Tracks
- Hardstands
- Borrow Pit Search Areas
- Construction Compound (100m x 100m)

Monthly Median Risk Scores (calculated by Ecobat)

- Not Deployed / Failed
- No Activity
- Low
- Medium
- High



Rev	Date	Description	Drn	Chk	App
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Millmoor Rig Wind Farm

RSK biocensus

EXPERTS IN ECOLOGY

TITLE: Figure 8.3.5
Technical Appendix 8.3 - Bats
Overall Monthly Risk Scores from May to September - Nathusius's Pipistrelle

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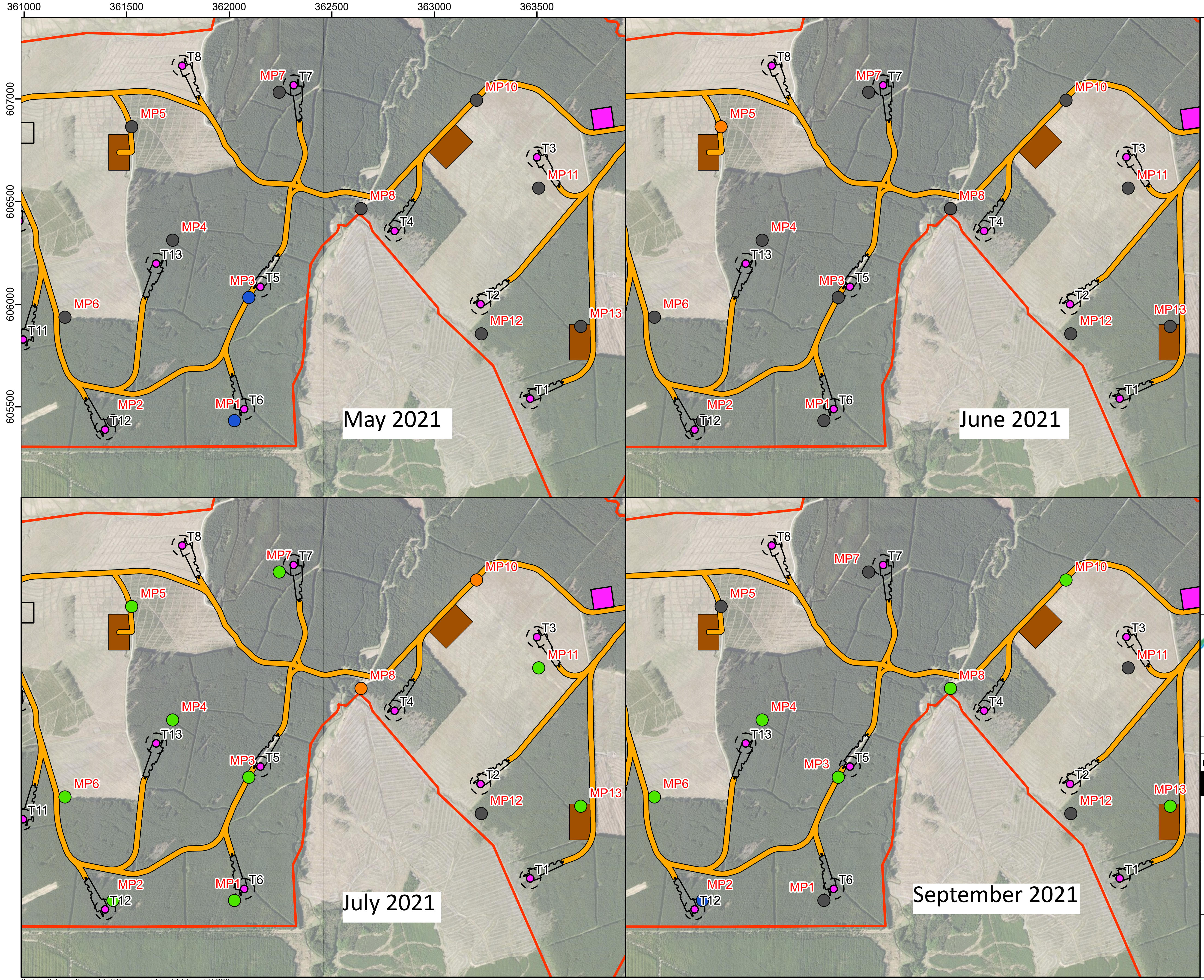
Document Path: C:\OneDrive\RSK Group\RSK Biocensus - 06 GIS - 2481817 - Millmoor Rig Wind Farm EIA Dykeraw\2481817-Millmoor rig - Figure 5- Overall Monthly Risk Scores - Nathusius's pipistrelle.aprx

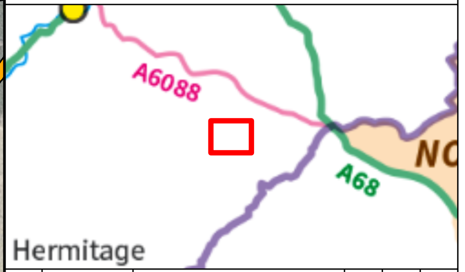


Legend:

- Application Boundary
- Turbine Locations
- 50m Turbine Buffer
- Access Tracks
- Hardstands
- Borrow Pit Search Areas
- Construction Compound (100m x 100m)

Monthly Median Risk Scores (calculated by Ecobat)

- Not Deployed / Failed
- No Activity
- Low
- Medium
- High



Rev	Date	Description	Drn	Chk	App
00	11/11/2022	2481817	TG	SP	KF

Millmoor Rig Wind Farm

RSK biocensus EXPERTS IN ECOLOGY

TITLE: Figure 8.3.6
Technical Appendix 8.3 - Bats
Overall Monthly Risk Scores from May to September - Nyctalus Species

0 210 420 630
Metres
SCALE: 1:17,000 @ A3

N E S W

REV 00

Document Path: C:\OneDrive\RSK Group\RSK Biocensus - 06 GIS - 2481817 - Millmoor Rig Wind Farm EIA Dykeraw\2481817-Millmoor rig - Figure 6- Overall Monthly Risk Scores - Nyctalus species.aprx

ANNEX A – PROTECTED SPECIES LEGISLATION

This section briefly describes the legal protection afforded to the protected species referred to in this report. It is for information only and is not intended to be comprehensive or to replace specialised legal advice. It is not intended to replace the text of the legislation but summarises the salient points. More information on bats and the law can be found on the NatureScot website https://www.nature.scot/professional-advice/protected-areas-and-species/protected-species/protected-species-z-guide/protected-species-bats

All bat species and their roosts are afforded full protection in Scotland by the Conservation (Natural Habitats, & c.) Regulations 1994 (as amended, notably by the Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007).

For any wild bat species, it is an offence to deliberately or recklessly:

- capture, injure or kill a bat;
- harass a bat or group of bats;
- disturb a bat while it is occupying a structure or place which it uses for shelter or protection
- disturb a bat while it is rearing or otherwise caring for its young;
- obstruct access to a breeding site or resting place of a bat or otherwise deny an animal use of the breeding site or resting place;
- disturb a bat in a manner or in circumstances likely to significantly affect the local distribution or abundance of the species;
- disturb a bat in a manner or in circumstances likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young; or
- disturb a bat while it is migrating or hibernating.

It is also an offence to:

- damage or destroy a breeding site or resting place of such an animal (whether or not deliberately or recklessly);
- keep, transport, sell or exchange, or offer for sale or exchange any wild bat (or any part or derivative of one) obtained after 10 June 1994
- for any person on or after 1 May 2007 to possess, control, or transport a live or dead wild bat or any part of a wild bat.

ANNEX B – STATIC DETECTOR LOCATIONS AND OPERATING TIMES

Table 10 Static Detector Monitoring Points and Operating times

Monitoring Point	Survey Period	Deployment Period	Nights operative
1	Spring (May & June)	Not deployed	-
	Summer (July)	30/06/21 – 19/07/21	19
	Autumn (September)	14/09/21 – 28/09/21	14
2	Spring (May & June)	25/05/21 - 10/06/21	16
	Summer (July)	29/06/21 – 19/07/21	17
	Autumn (September)	Failed	-
3	Spring (May & June)	Failed	-
	Summer (July)	30/06/21 – 19/07/21	18
	Autumn (September)	14/09/21 – 28/09/21	14
4	Spring (May & June)	25/05/21 - 10/06/21	16
	Summer (July)	01/07/21 – 19/07/21	17
	Autumn (September)	14/09/21 – 28/09/21	14
5	Spring (May & June)	25/05/21 - 10/06/21	16
	Summer (July)	29/06/21 – 19/07/21	15
	Autumn (September)	14/09/21 – 28/09/21	14
6	Spring (May & June)	25/05/21 - 10/06/21	16
	Summer (July)	01/07/21 – 19/07/21	18
	Autumn (September)	14/09/21 – 28/09/21	14
7	Spring (May & June)	25/05/21 - 10/06/21	16
	Summer (July)	01/07/21 – 19/07/21	18
	Autumn (September)	14/09/21 – 28/09/21	14
8	Spring (May & June)	26/05/21 - 10/06/21	15
	Summer (July)	30/06/21 – 19/07/21	14
	Autumn (September)	14/09/21 – 28/09/21	14
10	Spring (May & June)	26/05/21 - 10/06/21	15
	Summer (July)	01/07/21 – 19/07/21	17

Monitoring Point	Survey Period	Deployment Period	Nights operative
	Autumn (September)	14/09/21 – 28/09/21	14
11	Spring (May & June)	26/05/21 - 10/06/21	15
	Summer (July)	01/07/21 – 19/07/21	17
	Autumn (September)	14/09/21 – 28/09/21	14
12	Spring (May & June)	26/05/21 - 10/06/21	15
	Summer (July)	01/07/21 – 19/07/21	18
	Autumn (September)	14/09/21 – 28/09/21	14
13	Spring (May	26/05/21 - 10/06/21	15
	Summer	01/07/21 – 19/07/21	18
	Autumn (September)	14/09/21 – 28/09/21	14

Table 11 Static Detector Monitoring Point and Habitat Descriptions

Monitoring Point	Grid Reference	Habitat	Photograph
1	NT 62025 05433	Mounted on a tree in clear-fell	
2	NT 61433 05433	Mounted on a tree in clear-fell	

Monitoring Point	Grid Reference	Habitat	Photograph
3	NT 62095 06033	Mounted on a tree overlooking the access track	
4	NT 61724 06312	Mounted on a tree in clear-fell	
5	NT 61524 06865	Mounted on a stake along plantation edge overlooking the access track	
6	NT 61199 05937	Mounted on a tree in plantation ride	

Monitoring Point	Grid Reference	Habitat	Photograph
7	NT 62243 07033	Mounted on a tree overlooking old clear-fell	
8	NT 62642 06466	Mounted on a stake near stone wall and adjacent to plantation edge overlooking Jed Water	
10	NT 63205 06994	Plantation edge overlooking access road	
11	NT 63508 06566	Mounted on a stake within plantation ride	

Monitoring Point	Grid Reference	Habitat	Photograph
12	NT 63167 05892	Mounted on a stake along plantation edge overlooking small tributary	
13	NT 63713 05719	Mounted on a stake along edge of immature restock overlooking clear-fell	

ANNEX C – TARGET NOTES

Table 12 Preliminary Roost Assessment Survey Results

TN	Type	Tree Species	PRA Suitability	Grid Reference	Description
1	Structure	-	Low	NT6226006463	Building: Old stone ruin with no roof. Solid stone walls which are 0.5 m in width with cavities between stones. Stone walls of a sufficient width to be classed as a low summer and hibernation PRF.
2	Tree	*Acer pseudoplatanus*	Moderate	NT6228306458	Tree with south-facing cavity on branch at 2.5 m which can be reached from the ground with an endoscope. Cavity is small and looks to extend along branch.
3	Tree	*Sorbus aucuparia*	Moderate	NT6227806464	South-facing split on main trunk starting at 0.5 m and extending to 2.5 m. Feature exposed and assessed as low to moderate PRF suitability. Numerous areas of thin rolled loose bark on tree which were assessed as low PRF suitability
4	Tree	*Fagus sylvatica*	Moderate	NT6227906475	Beech tree with south-facing cavity at 1.2 m. Cavity looks like it could be shallow but requires an endoscope search. Other PRF could be present higher up, but none seen from the ground. Safe to climb
5	Tree	*Fagus sylvatica*	Moderate	NT6228306484	East-facing large knot hole at 2 m. Feature is facing up and may fill with water. Requires endoscope survey to determine suitability. Other PRF could be present higher up on tree but none seen from the ground.
6	Tree	*Fagus sylvatica*	Moderate	NT6228406492	Tree with three main stems, two of which have east-facing knot hole cavities with three on one stem and one cavity on other stem which had been cut (pollarded). Lowest knot hole at 3 m and highest knot hole at 5 m. Branch union at 8 m and east-facing small knot hole on branch at 6 m which looks to be shallow.
7	Tree	*Fagus sylvatica*	Moderate	NT6229006493	East-facing knot hole and keyhole tear at 2 m. Feature is facing up and may fill with water. Requires endoscope survey to determine suitability. Branch union at 3 m and small east-facing knot hole at 5 m that is facing up. Other PRFs could be present higher up on the tree but none seen from the ground.
8	Tree	*Fagus sylvatica*	Moderate	NT6229206501	Large cavity at 2 m. Feature is facing up and may fill with water. Requires endoscope survey to determine suitability. Other PRFs could be

TN	Type	Tree Species	PRA Suitability	Grid Reference	Description
					present higher up on the tree, but none seen from the ground.
9	Tree	*Fagus sylvatica*	Moderate	NT6229506504	East-facing large knot hole at 2 m. Feature is facing up and may fill with water. Requires endoscope survey to determine suitability. Cut branches at 5 m with some loose bark with low PRF suitability. Underside of overhanging branch across track at 6m with cavity feature and given precautionary moderate suitability as feature cannot be seen this clearly. Feature could be difficult to reach during a climbing survey. Union feature at 7 m. Some dead wood in tree which could be avoided but care required.
10	Tree	*Fagus sylvatica*	Moderate	NT6229606506	East-facing large knot hole at 2 m. Feature is facing up and may fill with water. Requires endoscope survey to determine suitability. Could be other PRFs higher up on the tree but none seen from the ground.
11	Tree	*Fagus sylvatica*	Moderate	NT6229706507	Numerous PRF on beech tree. Side of east-facing main branch with no bark and numerous cavities at 2 m. Cut overhanging branch with horizontal splits at 4 m. Fresh keyhole tear on western side at 4 m. Heavy epicormic growth made it difficult to see PRF.
12	Tree	*Acer pseudoplatanus*	Moderate	NT6224606458	Large tree with west-facing knot holes with broken branch still present high up on tree at 6-7 m.
13	Tree	*Acer pseudoplatanus*	Moderate	NT6223706458	Tree with dead branch at 6 m to 7 m with numerous woodpecker holes. Bird nest in features.
14	Tree	*Fagus sylvatica*	Moderate	NT6223906446	Beech tree with thick epicormic growth made it difficult to see PRF. South-facing underside of large branch with cavities at 3 m. Could be other PRF higher up on the tree but none seen from the ground.
15	Tree	*Acer pseudoplatanus*	Moderate	NT6221806451	Broken branch on tree with cavities facing west at 4 m.
16	Tree	*Acer pseudoplatanus*	Low	NT6220706460	Tree with loose bark and superficial cavities. Assessed as low PRF suitability
17	Tree	*Acer pseudoplatanus*	Low	NT6221806467	Tree with loose bark high up in tree at 5 m. Could have other PRFs in the tree but none seen from the ground. Large piece of deadwood in the tree that could easily be displaced.

TN	Type	Tree Species	PRA Suitability	Grid Reference	Description
18	Tree	*Acer pseudoplatanus*	Low	NT6222506462	Tree with small knot holes and broken branches with superficial cavities. Unlikely to offer the protection required for a bat roost. Assessed as precautionary low PRF suitability
19	Tree	*Fagus sylvatica*	Moderate	NT6222006479	Large beech tree with west-facing scars at 6 m and 7 m which look to have cavities. Dead branches at 4 m and 5 m with some cavities present.
20	Structure	-	Moderate	NT6223506471	Old stone ruin with large stone walls which have moderate potential for summer and hibernation bat roost. Loose and crumbling mortar between brickwork, but some clear cavities around the top of chimney which is still present.

ANNEX D – MONTHLY RISK SCORES PER LOCATION

Table 13 Monthly Risk Scores Per Monitoring Point

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
2	*Pipistrellus pygmaeus*	May	3	0	Nil	0	19 - 35.5	0	0	Low
4	*Myotis*	May	3	0	Nil	0	29 - 44.5	0	0	Low
4	*Pipistrellus pipistrellus*	May	3	77	Moderate to High	4	53.5 - 74	95	12	Medium
4	*Pipistrellus pygmaeus*	May	3	78	Moderate to High	4	45 - 66.5	95	12	Medium
5	*Myotis*	May	3	19	Low	1	39 - 57	19	3	Low
5	*Pipistrellus pipistrellus*	May	3	43	Moderate	3	68.5 - 80	87	9	Medium
5	*Pipistrellus pygmaeus*	May	3	32	Low to Moderate	2	48.5 - 65.5	77	6	Medium
6	*Myotis*	May	3	0	Nil	0	32 - 53	0	0	Low
6	*Pipistrellus pipistrellus*	May	3	32	Low to Moderate	2	47.5 - 64	70	6	Medium
6	*Pipistrellus pygmaeus*	May	3	57	Moderate	3	36.5 - 51	60	9	Medium

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
7	*Myotis*	May	3	0	Nil	0	29 - 48	0	0	Low
7	*Pipistrellus pipistrellus*	May	3	19	Low	1	36.5 - 51.5	32	3	Low
7	*Pipistrellus pygmaeus*	May	3	10	Low	1	29 - 39	39	3	Low
8	*Myotis*	May	3	19	Low	1	53.5 - 79.5	54	3	Low
8	*Pipistrellus pipistrellus*	May	3	32	Low to Moderate	2	68 - 84.5	51	6	Medium
8	*Pipistrellus pygmaeus*	May	3	47	Moderate	3	74 - 88.5	60	9	Medium
10	*Pipistrellus pipistrellus*	May	3	0	Nil	0	58.5 - 83	32	0	Low
10	*Pipistrellus pygmaeus*	May	3	29	Low to Moderate	2	61.5 - 80.5	39	6	Medium
11	*Myotis*	May	3	0	Nil	0	42 - 57	0	0	Low
11	*Pipistrellus pipistrellus*	May	3	10	Low	1	41 - 56	32	3	Low
11	*Pipistrellus pygmaeus*	May	3	19	Low	1	32 - 48.5	19	3	Low
12	*Myotis*	May	3	0	Nil	0	46 - 64.5	0	0	Low

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
12	*Pipistrellus pipistrellus*	May	3	19	Low	1	25.5 - 51	32	3	Low
12	*Pipistrellus pygmaeus*	May	3	0	Nil	0	35.5 - 66.5	19	0	Low
13	*Myotis*	May	3	19	Low	1	32.5 - 52.5	19	3	Low
13	*Pipistrellus pipistrellus*	May	3	58	Moderate	3	41.5 - 67	96	9	Medium
13	*Pipistrellus pygmaeus*	May	3	23	Low to Moderate	2	25.5 - 46	46	6	Medium
1	*Pipistrellus pipistrellus*	Jun	3	39	Low to Moderate	2	48 - 65.5	39	6	Medium
1	*Pipistrellus pygmaeus*	Jun	3	32	Low to Moderate	2	36.5 - 54	32	6	Medium
2	*Myotis*	Jun	3	0	Nil	0	50 - 63	0	0	Low
2	*Pipistrellus pipistrellus*	Jun	3	36	Low to Moderate	2	35 - 55.5	71	6	Medium
2	*Pipistrellus pygmaeus*	Jun	3	0	Nil	0	19 - 35.5	32	0	Low
3	*Myotis*	Jun	3	32	Low to Moderate	2	47.5 - 63	32	6	Medium

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
3	*Pipistrellus pipistrellus*	Jun	3	77	Moderate to High	4	73 - 87	77	12	Medium
3	*Pipistrellus pygmaeus*	Jun	3	39	Low to Moderate	2	77.5 - 88	39	6	Medium
4	*Myotis*	Jun	3	32	Low to Moderate	2	29 - 44.5	46	6	Medium
4	*Pipistrellus pipistrellus*	Jun	3	98	High	5	53.5 - 74	99	15	High
4	*Pipistrellus pygmaeus*	Jun	3	89	High	5	45 - 66.5	99	15	High
5	*Myotis*	Jun	3	32	Low to Moderate	2	39 - 57	73	6	Medium
5	*Nyctalus*	Jun	3	42	Moderate	3	19 - 35	51	9	Medium
5	*Pipistrellus nathusii*	Jun	3	19	Low	1	19 - 19	19	3	Low
5	*Pipistrellus pipistrellus*	Jun	3	74	Moderate to High	4	68.5 - 80	93	12	Medium
5	*Pipistrellus pygmaeus*	Jun	3	54	Moderate	3	48.5 - 65.5	86	9	Medium
5	*Plecotus auritus*	Jun	3	0	Nil	0	29 - 45	0	0	Low

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
6	*Myotis*	Jun	3	19	Low	1	32 - 53	32	3	Low
6	*Pipistrellus pipistrellus*	Jun	3	39	Low to Moderate	2	47.5 - 64	65	6	Medium
6	*Pipistrellus pygmaeus*	Jun	3	39	Low to Moderate	2	36.5 - 51	67	6	Medium
7	*Myotis*	Jun	3	10	Low	1	29 - 48	39	3	Low
7	*Pipistrellus pipistrellus*	Jun	3	51	Moderate	3	36.5 - 51.5	57	9	Medium
7	*Pipistrellus pygmaeus*	Jun	3	19	Low	1	29 - 39	57	3	Low
7	*Plecotus auritus*	Jun	3	0	Nil	0	29 - 60	0	0	Low
8	*Myotis*	Jun	3	19	Low	1	53.5 - 79.5	46	3	Low
8	*Pipistrellus pipistrellus*	Jun	3	71	Moderate to High	4	68 - 84.5	84	12	Medium
8	*Pipistrellus pygmaeus*	Jun	3	71	Moderate to High	4	74 - 88.5	86	12	Medium
8	*Plecotus auritus*	Jun	3	0	Nil	0	39.5 - 65	0	0	Low
10	*Myotis*	Jun	3	0	Nil	0	59.5 - 74.5	0	0	Low

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
10	*Pipistrellus pipistrellus*	Jun	3	51	Moderate	3	58.5 - 83	70	9	Medium
10	*Pipistrellus pygmaeus*	Jun	3	32	Low to Moderate	2	61.5 - 80.5	65	6	Medium
11	*Myotis*	Jun	3	16	Low	1	42 - 57	46	3	Low
11	*Pipistrellus pipistrellus*	Jun	3	32	Low to Moderate	2	41 - 56	39	6	Medium
11	*Pipistrellus pygmaeus*	Jun	3	10	Low	1	32 - 48.5	32	3	Low
12	*Pipistrellus pipistrellus*	Jun	3	32	Low to Moderate	2	25.5 - 51	51	6	Medium
12	*Pipistrellus pygmaeus*	Jun	3	19	Low	1	35.5 - 66.5	32	3	Low
12	*Plecotus auritus*	Jun	3	0	Nil	0	29 - 59.5	0	0	Low
13	*Myotis*	Jun	3	19	Low	1	32.5 - 52.5	19	3	Low
13	*Pipistrellus pipistrellus*	Jun	3	32	Low to Moderate	2	41.5 - 67	80	6	Medium
13	*Pipistrellus pygmaeus*	Jun	3	46	Moderate	3	25.5 - 46	57	9	Medium

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
1	*Myotis*	Jul	3	26	Low to Moderate	2	32 - 58.5	39	6	Medium
1	*Nyctalus*	Jul	3	0	Nil	0	0 - 0	0	0	Low
1	*Pipistrellus pipistrellus*	Jul	3	63	Moderate to High	4	48 - 65.5	80	12	Medium
1	*Pipistrellus pygmaeus*	Jul	3	39	Low to Moderate	2	36.5 - 54	73	6	Medium
1	*Plecotus auritus*	Jul	3	0	Nil	0	32.5 - 48.5	19	0	Low
2	*Myotis*	Jul	3	54	Moderate	3	50 - 63	72	9	Medium
2	*Nyctalus*	Jul	3	19	Low	1	32.5 - 32.5	46	3	Low
2	*Pipistrellus nathusii*	Jul	3	0	Nil	0	0	0	0	Low
2	*Pipistrellus pipistrellus*	Jul	3	33	Low to Moderate	2	35 - 55.5	60	6	Medium
2	*Pipistrellus pygmaeus*	Jul	3	19	Low	1	19 - 35.5	51	3	Low
3	*Myotis*	Jul	3	51	Moderate	3	47.5 - 63	80	9	Medium
3	*Nyctalus*	Jul	3	19	Low	1	19 - 19	32	3	Low
3	*Pipistrellus pipistrellus*	Jul	3	92	High	5	73 - 87	98	15	High

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
3	*Pipistrellus pygmaeus*	Jul	3	90	High	5	77.5 - 88	97	15	High
3	*Plecotus auritus*	Jul	3	0	Nil	0	25.5 - 41.5	32	0	Low
4	*Myotis*	Jul	3	19	Low	1	29 - 44.5	57	3	Low
4	*Nyctalus*	Jul	3	0	Nil	0	0 - 0	19	0	Low
4	*Pipistrellus pipistrellus*	Jul	3	54	Moderate	3	53.5 - 74	90	9	Medium
4	*Pipistrellus pygmaeus*	Jul	3	39	Low to Moderate	2	45 - 66.5	79	6	Medium
5	*Myotis*	Jul	3	52	Moderate	3	39 - 57	77	9	Medium
5	*Nyctalus*	Jul	3	19	Low	1	19 - 35	19	3	Low
5	*Pipistrellus nathusii*	Jul	3	29	Low to Moderate	2	19 - 19	39	6	Medium
5	*Pipistrellus pipistrellus*	Jul	3	86	High	5	68.5 - 80	92	15	High
5	*Pipistrellus pygmaeus*	Jul	3	74	Moderate to High	4	48.5 - 65.5	89	12	Medium
5	*Plecotus auritus*	Jul	3	0	Nil	0	29 - 45	0	0	Low

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
6	*Myotis*	Jul	3	32	Low to Moderate	2	32 - 53	68	6	Medium
6	*Nyctalus*	Jul	3	0	Nil	0	9.5 - 9.5	0	0	Low
6	*Pipistrellus pipistrellus*	Jul	3	68	Moderate to High	4	47.5 - 64	87	12	Medium
6	*Pipistrellus pygmaeus*	Jul	3	50	Moderate	3	36.5 - 51	83	9	Medium
7	*Myotis*	Jul	3	19	Low	1	29 - 48	39	3	Low
7	*Nyctalus*	Jul	3	19	Low	1	19 - 46	46	3	Low
7	*Pipistrellus pipistrellus*	Jul	3	51	Moderate	3	36.5 - 51.5	68	9	Medium
7	*Pipistrellus pygmaeus*	Jul	3	32	Low to Moderate	2	29 - 39	57	6	Medium
7	*Plecotus auritus*	Jul	3	0	Nil	0	29 - 60	32	0	Low
8	*Myotis*	Jul	3	83	High	5	53.5 - 79.5	94	15	High
8	*Nyctalus*	Jul	3	32	Low to Moderate	2	25.5 - 39	39	6	Medium
8	*Pipistrellus pipistrellus*	Jul	3	94	High	5	68 - 84.5	99	15	High

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
8	*Pipistrellus pygmaeus*	Jul	3	92	High	5	74 - 88.5	97	15	High
8	*Plecotus auritus*	Jul	3	0	Nil	0	39.5 - 65	0	0	Low
10	*Myotis*	Jul	3	73	Moderate to High	4	59.5 - 74.5	88	12	Medium
10	*Nyctalus*	Jul	3	46	Moderate	3	39 - 54	60	9	Medium
10	*Pipistrellus nathusii*	Jul	3	0	Nil	0	0 - 0	0	0	Low
10	*Pipistrellus pipistrellus*	Jul	3	91	High	5	58.5 - 83	99	15	High
10	*Pipistrellus pygmaeus*	Jul	3	85	High	5	61.5 - 80.5	99	15	High
10	*Plecotus auritus*	Jul	3	0	Nil	0	29 - 45	19	0	Low
11	*Myotis*	Jul	3	51	Moderate	3	42 - 57	70	9	Medium
11	*Nyctalus*	Jul	3	19	Low	1	19 - 46	77	3	Low
11	*Pipistrellus pipistrellus*	Jul	3	60	Moderate	3	41 - 56	81	9	Medium
11	*Pipistrellus pygmaeus*	Jul	3	39	Low to Moderate	2	32 - 48.5	73	6	Medium

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
11	*Plecotus auritus*	Jul	3	19	Low	1	19 - 39.5	19	3	Low
13	*Myotis*	Jul	3	19	Low	1	32.5 - 52.5	39	3	Low
13	*Nyctalus*	Jul	3	19	Low	1	19 - 41	63	3	Low
13	*Pipistrellus pipistrellus*	Jul	3	51	Moderate	3	41.5 - 67	93	9	Medium
13	*Pipistrellus pygmaeus*	Jul	3	19	Low	1	25.5 - 46	77	3	Low
1	*Myotis*	Sep	3	71	Moderate to High	4	32 - 58.5	87	12	Medium
1	*Pipistrellus pipistrellus*	Sep	3	39	Low to Moderate	2	48 - 65.5	81	6	Medium
1	*Pipistrellus pygmaeus*	Sep	3	39	Low to Moderate	2	36.5 - 54	74	6	Medium
1	*Plecotus auritus*	Sep	3	0	Nil	0	32.5 - 48.5	51	0	Low
3	*Myotis*	Sep	3	60	Moderate	3	47.5 - 63	82	9	Medium
3	*Nyctalus*	Sep	3	0	Nil	0	19 - 19	0	0	Low
3	*Pipistrellus pipistrellus*	Sep	3	65	Moderate to High	4	73 - 87	82	12	Medium

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
3	*Pipistrellus pygmaeus*	Sep	3	73	Moderate to High	4	77.5 - 88	86	12	Medium
3	*Plecotus auritus*	Sep	3	19	Low	1	25.5 - 41.5	51	3	Low
4	*Myotis*	Sep	3	46	Moderate	3	29 - 44.5	57	9	Medium
4	*Nyctalus*	Sep	3	0	Nil	0	0 - 0	19	0	Low
4	*Pipistrellus pipistrellus*	Sep	3	19	Low	1	53.5 - 74	68	3	Low
4	*Pipistrellus pygmaeus*	Sep	3	26	Low to Moderate	2	45 - 66.5	54	6	Medium
4	*Plecotus auritus*	Sep	3	36	Low to Moderate	2	19 - 51	51	6	Medium
5	*Myotis*	Sep	3	68	Moderate to High	4	39 - 57	83	12	Medium
5	*Pipistrellus pipistrellus*	Sep	3	63	Moderate to High	4	68.5 - 80	88	12	Medium
5	*Pipistrellus pygmaeus*	Sep	3	36	Low to Moderate	2	48.5 - 65.5	78	6	Medium
5	*Plecotus auritus*	Sep	3	29	Low to Moderate	2	29 - 45	51	6	Medium
6	*Myotis*	Sep	3	57	Moderate	3	32 - 53	73	9	Medium

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
6	*Nyctalus*	Sep	3	19	Low	1	9.5 - 9.5	19	3	Low
6	*Pipistrellus nathusii*	Sep	3	0	Nil	0	0	0	0	Low
6	*Pipistrellus pipistrellus*	Sep	3	46	Moderate	3	47.5 - 64	76	9	Medium
6	*Pipistrellus pygmaeus*	Sep	3	16	Low	1	36.5 - 51	39	3	Low
6	*Plecotus auritus*	Sep	3	19	Low	1	19 - 60	60	3	Low
7	*Myotis*	Sep	3	54	Moderate	3	29 - 48	72	9	Medium
7	*Pipistrellus pipistrellus*	Sep	3	42	Moderate	3	36.5 - 51.5	65	9	Medium
7	*Pipistrellus pygmaeus*	Sep	3	19	Low	1	29 - 39	46	3	Low
7	*Plecotus auritus*	Sep	3	43	Moderate	3	29 - 60	65	9	Medium
8	*Myotis*	Sep	3	84	High	5	53.5 - 79.5	91	15	High
8	*Nyctalus*	Sep	3	19	Low	1	25.5 - 39	19	3	Low
8	*Pipistrellus pipistrellus*	Sep	3	78	Moderate to High	4	68 - 84.5	97	12	Medium

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
8	*Pipistrellus pygmaeus*	Sep	3	93	High	5	74 - 88.5	98	15	High
8	*Plecotus auritus*	Sep	3	51	Moderate	3	39.5 - 65	73	9	Medium
10	*Myotis*	Sep	3	65	Moderate to High	4	59.5 - 74.5	85	12	Medium
10	*Nyctalus*	Sep	3	16	Low	1	39 - 54	32	3	Low
10	*Pipistrellus pipistrellus*	Sep	3	32	Low to Moderate	2	58.5 - 83	89	6	Medium
10	*Pipistrellus pygmaeus*	Sep	3	72	Moderate to High	4	61.5 - 80.5	89	12	Medium
10	*Plecotus auritus*	Sep	3	19	Low	1	29 - 45	51	3	Low
11	*Myotis*	Sep	3	57	Moderate	3	42 - 57	71	9	Medium
11	*Pipistrellus nathusii*	Sep	3	0	Nil	0	0	0	0	Low
11	*Pipistrellus pipistrellus*	Sep	3	19	Low	1	41 - 56	74	3	Low
11	*Pipistrellus pygmaeus*	Sep	3	39	Low to Moderate	2	32 - 48.5	54	6	Medium

Monitoring Point	Species/Species Group	Month	Site Risk Level	Median Percentile	Ecobat Bat Activity	Ecobat Bat Activity Score	95% CIs	Max Percentile	Median Overall Risk Assessment Score	Median Overall Risk Assessment
11	*Plecotus auritus*	Sep	3	19	Low	1	19 - 39.5	60	3	Low
12	*Myotis*	Sep	3	57	Moderate	3	46 - 64.5	72	9	Medium
12	*Pipistrellus pipistrellus*	Sep	3	50	Moderate	3	25.5 - 51	82	9	Medium
12	*Pipistrellus pygmaeus*	Sep	3	60	Moderate	3	35.5 - 66.5	79	9	Medium
12	*Plecotus auritus*	Sep	3	39	Low to Moderate	2	29 - 59.5	68	6	Medium
13	*Myotis*	Sep	3	49	Moderate	3	32.5 - 52.5	68	9	Medium
13	*Nyctalus*	Sep	3	0	Nil	0	19 - 41	0	0	Low
13	*Pipistrellus pipistrellus*	Sep	3	32	Low to Moderate	2	41.5 - 67	65	6	Medium
13	*Pipistrellus pygmaeus*	Sep	3	19	Low	1	25.5 - 46	57	3	Low
13	*Plecotus auritus*	Sep	3	26	Low to Moderate	2	19 - 39	46	6	Medium