

Land off Blackmoorfoot Road, Huddersfield

Bat Activity Report

**Vistry Yorkshire, Miller
Homes & Countryside
Partnerships
Limited**

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Ecus Ltd

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Executive Summary

Ecus Limited (Ltd) was commissioned by Vistry Yorkshire, Miller Homes and Countryside Partnerships Limited in March 2024 to undertake a suite of bat activity surveys in relation to the proposed development at land off Blackmoorfoot Road, Huddersfield (central Ordnance Survey National Grid Reference (OS NGR): SE 11370 14757), hereafter referred to as 'the Site'. These bat activity surveys comprised seasonal Night-time Bat Walkover (NBW) surveys accompanied by monthly remote static monitoring surveys, and autumn swarming surveys.

Proposals for the Site are taken from the Nineteen 47 '*Blackmoorfoot Road, Huddersfield – Technical Planning Layout*' (Drawing no. 2114_008D) and are understood to comprise of 700 domestic dwellings, a 70-bed care home, associated gardens, Public Open Space (POS), adoptable roads and sewers as well as a local centre and extra care facility. All buildings and structures at the Site will be demolished and the majority of habitats, including former quarry areas, broadleaved woodland, mature scrub, lowland heathland and grassland, will be lost to facilitate the development.

The bat activity surveys were recommended following a Preliminary Ecological Appraisal (PEA) undertaken by Ecus Ltd ('*Land off Blackmoorfoot Road, Huddersfield – Preliminary Ecological Appraisal*'. Report reference: 20899 V1.0, August 2023), in which the Site was assessed to display 'High' suitability for foraging and commuting bats. The autumn swarming surveys were recommended following an assessment of the Site to support swarming behaviour during the summer NBW survey, where two locations (hereafter referred to as 'the North Quarry' and 'the South Quarry') were considered suitable for autumn swarming.

During the PEA, habitats at the Site comprised grassland - other neutral grassland (g3c) and modified grassland (g4), areas of heathland and shrub – lowland heathland (h1a), mixed scrub (h3), blackthorn scrub (h3a), hazel scrub (h3b), bramble scrub (h3d) and willow scrub (h3j), woodland and forest – other broadleaved woodland types (w1g7), urban – other developed land (u1b6), artificial unvegetated; unsealed surface (u1c) and buildings (u1b5).

Ecus were also commissioned to undertake bat emergence surveys of buildings (Ecus Ltd, Bat Emergence Survey Report', V1.0, document reference: 20899, October 2024) and a Ground Level Tree Assessment (GLTA) (Ecus Ltd, '*Land off Blackmoorfoot, Huddersfield – GLTA*', V1.0, document refence: 20899, September 2024) (Ecus, 2024) at the Site, the results of which should be read in conjunction with this report.

The NBW surveys carried out at the Site in spring, summer and autumn 2024 have identified consistent low levels of bat activity at the Site, with the majority of activity focussed along the northern boundary of the Site notably close to areas of broadleaved woodland and mixed scrub, which is likely to provide

foraging opportunities and flightline resources between roosts and foraging territories in the wider area.

The static monitoring surveys have identified up to high levels of common pipistrelle *Pipistrellus pipistrellus* bat activity at the Site at some locations (i.e. up to moderate at Location A and up to high at Locations D and F; Figure 4), suggesting that the woodland and scrub habitats may be used as part of a core foraging ground and flightline resource for common pipistrelle bats, although there is availability of similar to higher quality habitat in the wider area off-Site. Low levels of bat activity have been recorded for all other species at all locations surveyed at the Site, suggesting that the Site is used by no more than low numbers of these species as a foraging and/or as a flightline resource.

Based on the common and widespread species assemblage associated with the Site and in consultation with the '*UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*' (2023) (Reason and Wray, 2023), the Site is considered to be of no more than local value to foraging and commuting bats.

The loss of the majority of broadleaved woodland, mature scrub and other vegetated habitats across the Site, including the loss of mature trees and buildings with suitable roosting features present as discussed in the bat emergence survey and GLTA reports (Ecus, 2024), is considered to result in a minor loss of roosting habitat, with up to local level impacts upon foraging and flightline resources for bats with habitats to be lost which are interconnected across the Site and with suitable habitat in the wider area off-Site.

The existing functional connectivity of the Site for bats should be maintained wherever possible. This would include the retention of vegetation along the northern boundary of the Site as well as the corridor of woodland running from north to south through the Site. It is understood however that retention of the corridor running from the north to the south is not possible due to the reduction in developable land that would conflict with the amount of POS that is required to be provided.

The creation of new habitats on Site as part of the proposals within areas of POS including a mix of neutral grassland (wildflower grassland), mixed scrub and native tree planting will help retain connectivity across the Site by providing alternative routes of suitable habitat for bats to forage and commute across the Site and would at least partially off-set habitat loss required to facilitate the development but only in the medium to long-term given that there will be a time lag between habitat loss and new planting reaching equivalent levels of maturity to what exists on-Site. It is recommended that the final landscaping scheme should aim to incorporate a high abundance and diversity of native trees and shrubs and incorporate flowering/fruited species as well as night scented flowers to improve the foraging resources available for bats.

Overall, it is acknowledged that the development will result in an overall reduction in the available foraging and flightline resources on Site from that which is currently available with impacts at up to the local level. Given the limited possibility for increased on Site retention and enhancement of key foraging and flightline

resources on Site for bats; it is recommended that any off-site Biodiversity Net Gain (BNG) delivery includes a range of opportunities for foraging and commuting bats locally (e.g. tree planting, hedgerow /scrub /woodland creation/enhancement).

It is recommended that the areas of woodland, trees and mixed scrub to be retained on Site are protected during the construction works to avoid physical damage (e.g. from machinery encroachment). This may be through the installation of temporary fencing to avoid direct access. This will enable foraging and commuting bats to continue to use the habitats during construction.

During construction and post-development, sensitive lighting should be implemented to avoid any unnecessary light spill onto retained and created habitats as well as off-site habitats. For post-development lighting, it is recommended that a sensitive lighting plan is produced by a lighting engineer in conjunction with a suitably experienced ecologist. It is also recommended that measures within the '*Bats and Artificial Lighting at Night*' document (Institution of Lighting Professionals, 2023) are implemented.

It is recommended that information packs are distributed to properties across the Site to inform residents about the value of the Site and wider area as a foraging and commuting resource for bats. Other information should be provided covering the other types of wildlife present in the surrounding area and should encourage residents to manage their gardens in a wildlife-friendly manner, such as through the inclusion of native shrub planting and wildflower meadow areas in gardens. These features would attract invertebrates such as moths, and subsequently provide foraging resources for bats.

Overall, based on the findings of the surveys and taking into account the habitat loss associated with development proposals for the Site, it is considered that impacts as a result of the proposed development are of local level importance to foraging and commuting bats where the mitigation outlined is followed in full.

Overall results from the autumn swarming surveys undertaken at the Site conclude that the Site is considered unlikely to be used as a swarming site for bats and no further survey or mitigation/compensation with regards to swarming bats is considered necessary.

1. Introduction

1.1 Background

- 1.1.1 Ecus Limited (Ltd) was commissioned by Vistry Yorkshire, Miller Homes and Countryside Partnerships Limited in March 2024 to undertake a suite of bat activity surveys in relation to the proposed development at land off Blackmoorfoot Road, Huddersfield (central Ordnance Survey National Grid Reference (OS NGR): SE 11370 14757), hereafter referred to as 'the Site'. These surveys comprised seasonal Night-time Bat Walkover (NBW) surveys accompanied by monthly remote static monitoring surveys, and autumn swarming surveys.
- 1.1.2 Proposals for the Site are taken from Nineteen 47 '*Blackmoorfoot Road, Huddersfield – Technical Planning Layout*' (Drawing no. 2114_008D) and are understood to comprise 700 domestic dwellings, a 70-bed care home, associated gardens, Public Open Space (POS), adoptable roads and sewers as well as a local centre and extra care facility. All buildings and structures at the Site will be demolished and the majority of habitats, including former quarry areas, broadleaved woodland, mature scrub, lowland heathland and grassland, will be lost to facilitate the development.
- 1.1.3 The bat activity surveys were recommended following a Preliminary Ecological Appraisal (PEA) undertaken by Ecus Ltd ('*Land off Blackmoorfoot Road, Huddersfield – Preliminary Ecological Appraisal*'). Report reference: 20899 V1.0, August 2023), in which the Site was assessed to display 'High' suitability for foraging and commuting bats. The autumn swarming surveys were recommended following an assessment of the Site to support swarming behaviour during the summer NBW survey, where two locations (North Quarry and South Quarry) were considered suitable for autumn swarming.
- 1.1.4 During the PEA, habitats at the Site comprised grassland - other neutral grassland (g3c) and modified grassland (g4), areas of heathland and shrub – lowland heathland (h1a), mixed scrub (h3), blackthorn scrub (h3a), hazel scrub (h3b), bramble scrub (h3d) and willow scrub (h3j), woodland and forest – other broadleaved woodland types (w1g7), urban – other developed land (u1b6), artificial unvegetated; unsealed surface (u1c) and buildings (u1b5).
- 1.1.5 Ecus were also commissioned to undertake bat emergence surveys (Ecus Ltd, Bat Emergence Survey Report', V1.0, document reference: 20899, October 2024) and a Ground Level Tree Assessment (GLTA) (Ecus Ltd, '*Land off Blackmoorfoot, Huddersfield – GLTA*', V1.0, document reference: 20899, September 2024) at the Site, the results of which should be read in conjunction with this report.
- 1.1.6 This report details the methodologies employed and the findings of the NBW surveys, static

monitoring and autumn swarming surveys undertaken at the Site between April and October (inclusive) 2024, to determine the status and level of bat activity. This report also includes an assessment of potential ecological impacts resulting from construction and operational phases of the development with respect to foraging, commuting and swarming bats, together with recommendations to avoid, minimise and/or mitigate potential impacts on the bat species and assemblage associated with the Site and the requirement for further survey and assessment where appropriate.

2. Methodology

2.1 Night-Time Bat Walkover Surveys

- 2.1.1 The Ecus PEA (2023) assessed the Site habitats as displaying 'High' suitability for foraging and commuting bats taking into account good practice guidelines (Collins, 2023) due to the presence of woodland, mature scrub, grassland and trees which may be used by foraging bats or as part of commuting routes. As such, three Night-Time Bat Walkover (NBW) surveys were undertaken at dusk in April (spring), August (summer) and October (autumn) 2024 during best available weather conditions within those seasons for bats.
- 2.1.2 The surveys were carried out by two pairs of suitably experienced bat surveyors in each season, using handheld bat detectors to record bat echolocation calls. The NBW surveys commenced at sunset and the start locations were selected based on proximity to potential flight lines close to potential roost sources such as buildings or mature trees. Surveyors remained at the start location for a minimum of 30 minutes (depending on activity levels identified) to count, record and observe commuting and foraging bats.
- 2.1.3 After 30 minutes, each pair of surveyors walked a different pre-determined route around the Site taking acoustic recordings and documenting the number, species, apparent behaviour and location of any bats encountered onto a survey sheet and field map. The surveyors also made a note of the type of habitat features that were being used by bats. The predetermined routes were designed to incorporate all parts of the Site and gather data from a representation of all habitat types at the Site. Deviations from the routes were made in the field where appropriate to gain the most information on bat behaviour at the Site.
- 2.1.4 The predetermined NBW survey routes were walked at a consistent pace and continued for at least two hours after sunset. The NBW surveys were undertaken during weather conditions where the sunset temperature was a minimum of 9°C, wind speeds were low and conditions were predominantly dry. Details of the survey dates, timings and weather conditions are detailed in Table 1 below. The predetermined NBW routes and results of the NBW surveys are displayed in Figures 1-3.
- 2.1.5 After the survey all recorded bat echolocation calls were analysed using Kaleidoscope software with species identification confirmed with reference to bat call parameters presented in 'British Bat Calls: A Guide to Species Identification' (Russ, 2021).

Table 1. NBW Survey Details

Survey Date	Timings	Surveyors	Start-End Weather Conditions	Bat Detector
13.05.2024	Sunset: 20:57hrs Start: 20:57 hrs End: 22:57 hrs	James Storey, Thomas Lyons, Toby Haenfling and Arleya Baxter	18°C - 15°C, Beaufort Scale (BS) 3 wind speed, 100%-75% cloud cover, dry at start and end of survey	Anabat Scout X2
27.08.2024	Sunset: 20:07 hrs Start: 20:07 hrs End: 22:07 hrs	Dan Best, James Storey, Toby Haenfling and Adam Watts	16 °C-16 °C, BS 2 wind speed, 80%-70% cloud cover, very light drizzle at beginning and in the middle of the survey but dry towards the end	Anabat Scout X2
14.10.2024	Sunset: 18:11hrs Start: 18:11 hrs End: 20:11 hrs	James Storey, Aden Ovington, Arleya Baxter and Adam Watts	9 °C-9 °C, BS 1 wind speed, 90%- 90% cloud cover, dry at start and end of survey	Anabat Scout X2

2.2 Static Monitoring Surveys incl. Autumn Swarming Surveys

Survey Details

- 2.2.1 As the Site was identified as displaying ‘High’ suitability for foraging and commuting bats, six static bat detectors were deployed at the Site once per month, between April and October inclusive, for a period of five consecutive nights each month. These were Anabat Swift detectors with omnidirectional microphones attached with a 1.5 m long cable. The static bat detectors were deployed and left in-situ over a minimum of five consecutive nights in suitable weather conditions and set to record echolocation calls continuously between 30 minutes before sunset and 30 minutes after sunrise during this time period (Collins, 2023).
- 2.2.2 The static bat detectors were placed at six different locations within the Site. The same locations were used each month to obtain comparable survey data across the months of survey and to obtain an understanding of the use of the Site by bats. The static bat detector placement was selected based on habitats which were considered likely to be of higher value for bats, and habitats which are to be directly impacted as a result of the proposed development. Weather conditions for each survey period are provided in Appendix 1.
- 2.2.3 Two areas of the Site, the North and South Quarry, contained features that were considered to offer potential for autumnal swarming bats. Good practice guidance recommends that static detectors are deployed for at least five nights in each month of the swarming season of mid-August to the end of October (Collins, 2023). Given that the potential for swarming bats was not established until closer inspection of suitable features was undertaken during the summer NBW in late August,

two static bat detectors were placed at these locations and remained in-situ from late-August through to mid-October to allow continual recording during the entire survey period and provide a robust assessment of these features for swarming bats.

2.2.4 The static bat detectors were positioned on the ground or attached to the trunk/stem of vegetation with a microphone cable attached to a branch approximately 1.5 m higher up within the vegetation, facing outwards, so as to record bat activity from within proximity to their location. Specific locations are shown as Locations A – F and Swarming 1-2 in Figure 4 and are detailed in Table 2 below.

Table 2. Static Detector Locations

Location Reference	OS NGR	Location Description
Location A	SE 11092 14747	Located towards the north west of the Site within a former quarry now colonised by vegetation.
Location B	SE 11279 14871	Located towards the north of the Site within an area of broadleaved woodland and mixed scrub close to the northern boundary.
Location C	SE 11495 14889	Located towards the north east of the Site within an area of mixed scrub.
Location D	SE 11299 14611	Located towards the centre of the Site within an area of broadleaved woodland.
Location E	SE 11460 14635	This static detector was located towards the south east of the Site within an area of heathland and willow scrub.
Location F	SE 11584 14599	Located towards the south east of the Site within an area of shrubs adjacent to a vacant bungalow.
Swarming Location 1 – North Quarry	SE 11069 14751	Located towards the north west of the Site adjacent to a cliff face within the former quarry that was considered to have potential for swarming bats.
Swarming Location 2 – South Quarry	SE 11446 14563	Located towards the south of the Site adjacent to a cliff face within a quarried area of broadleaved woodland that was considered to have potential for swarming bats.

Static Data Analysis

2.2.5 Analysis of sound files collected during the static monitoring survey period was undertaken using Kaleidoscope software with bat calls determined to species level or genus, where appropriate (Russ, 2021). The Auto ID feature of the Kaleidoscope software was utilised and all sound files were manually checked to confirm species ID and to check whether bat calls had been recorded where the software had automatically identified sound files as ‘Noise’ (i.e. sounds recorded which do not pertain to bats).

2.2.6 To aid comparison between data collected during different survey periods, Bat Activity Indices (BAI) values were calculated using the formulas below:

1. $BAI \text{ (per night)} = \text{Bat sound files} / \text{total nights detector deployed}$.

2. $BAI \text{ (per hour)} = \text{Bat sound files} / \text{total survey night hours}$.

2.2.7 The BAI (per night) measures the mean nightly rate of sound files attributed to bats that were recorded during the survey period. The BAI (per hour) measures the mean hourly rate of sound files attributed to bats that were recorded during the survey period. Analysis of the sound file data allowed the determination of how many bat calls there were over the five-night period (abundance), frequency of the bat calls and distribution of bat calls during each night.

2.2.8 BAI categories are based on professional judgement in the absence of published guidance. For this assessment, BAI (per hour) was categorised as:

- Low - 0-14 bat calls per hour.
- Medium - 15-29 bat calls per hour.
- High - 30-60 bat calls per hour.
- Very high - 60+ bat calls per hour.

2.2.9 For analysis of sound files collected from the potential swarming locations, sound files were converted to time in relation to sunset, rather than 24 hours. This allows greater comparison of the static monitoring data across the swarming period and allows for better understanding of potential trends attributable to swarming behaviour, which is considered to be repeated peaks in activity between 3 to 4 hours after sunset (Collins, 2023).

2.3 Survey Limitations

2.3.1 The detection range of a bat detector can be affected by atmospheric factors (including ambient temperature, relative humidity and air pressure), habitat factors (as a result of sound absorption and bat/habitat interactions) and the bat species being recorded. Bats with high frequency, quiet or directional calls, such as brown long-eared *Plecotus auritus* bats, may sometimes only be detected at distances less than 5 metres (m) whereas bats with low frequency and loud calls, such as noctule *Nyctalus noctula*, may be detected as far away as 100 m or more.

2.3.2 Identification of bat calls to species level is not always possible, as calls may be faint, of poor quality or contain sound elements (including echoes or ambient noise) which distort the recording. It is frequently difficult to differentiate calls of different bat species within the same genus due to overlapping bat call parameters. In particular there is considerable overlap between echolocation

calls of bat species in the *Myotis* genus. As such, in instances where *Myotis* bats have been recorded, it has only been possible to identify recordings to genus level only.

- 2.3.3 There were two brief periods of rainfall (<20 minutes) during the beginning and middle of the summer NBW survey in August, however, overall weather conditions during the remainder of survey were suitable for bat activity which was observed to resume shortly after the spells of rainfall.
- 2.3.4 Areas of the Site including the fields to the south west and north east were not chosen as locations for deploying static detectors given that there was a lack of suitable features to fix the detectors to and that these areas are subject to high footfall from local residents and dog walkers, meaning keeping the static detectors within the confines of the Site security fencing was the preferred option. This was not considered to have a significant impact on the conclusions drawn given that these areas contained habitat features considered to be of lower value to foraging and commuting bats (i.e. managed semi-improved grassland) compared to that present within the main area of the Site.
- 2.3.5 Static monitoring data was only able to be collected at Location C during the August and October survey periods due to faults with the Anabat swift whereby either; the Global Positioning System (GPS) location was unable to be acquired or an issue with the firmware, meaning recording did not take place. Any data successfully captured at this location has been removed from the analysis.
- 2.3.6 Static monitoring data was not able to be collected at Location B during the September survey period due to a fault with the Anabat Swift whereby the GPS location was unable to be acquired and recording did not take place. Given the presence of five other static detectors during the majority of survey months and three NBW surveys undertaken, it is not considered to have had any significant impact on the conclusions drawn.

3. Findings and Evaluation

3.1 Night-Time Bat Walkover Surveys

3.1.1 A summary of the findings of the NBW surveys is described below and illustrated in Figures 1-3. Note that individual points mapped on the figures represent individual registrations of echolocation calls emitted from a given bat species recorded during the NBW survey, and do not represent individual bats recorded at any given time.

Spring - May 2024

3.1.2 The start points for the spring NBW on 13th May 2024 were adjacent to the buildings within the east of the Site and within the area of broadleaved woodland within the south east of the Site to record any potentially emerging bats which may be roosting within these features.

3.1.3 Common pipistrelle *Pipistrellus pipistrellus* and noctule *Nyctalus noctula* bats were recorded foraging across the Site, with activity focussed along the northern boundary of the Site, notably close to areas of broadleaved woodland and mature scrub, with lower levels of activity recorded around the fields within the west and east of the Site, and nearby to buildings within the centre of the Site. Only very low activity was recorded for noctule bats with single bats observed above the main entrance to the Site in the south east and above the mature hedgerow on the south west boundary of the Site. The earliest bat was a common pipistrelle recorded at 21:10 hrs (13 minutes after sunset) foraging above the field within the east of the Site, with regular low levels of activity recorded throughout the survey until 23:00 hrs which included a noctule bat recorded above the main entrance within the south east.

Summer - August 2024

3.1.4 The start points for the summer NBW on 27th August 2024 were within the north quarry and adjacent to the disused farmhouse located outside the north boundary to the Site to record any potentially emerging bats that may be roosting within these features.

3.1.5 Common pipistrelle and noctule bats were recorded foraging across the Site, with common pipistrelle activity focused along the northern boundary and mature hedgerow on the south west boundary, and to a lesser extent across the woodland within the south east of the Site. Noctule activity was focussed above the buildings within the south east of the Site, with lower levels of activity recorded above the fields within the east of the Site. The earliest bat was a noctule bat recorded at 20:10 hrs (three minutes after sunset) above the fields within the north east of the Site. Activity reduced during two periods of light rainfall but remained regular throughout the remainder of the survey until 22:09 hrs which was a common pipistrelle bat recorded foraging around the buildings located near to the Site entrance within the south east of the Site.

Autumn - October 2024

- 3.1.6 The start points for the autumn NBW on 14th October 2024 were next to the Site entrance within the south east of the Site and next to the fields within the north east of the Site to record any bats that may be travelling to and from the housing estates located beyond the eastern boundary.
- 3.1.7 Common pipistrelle and noctule bats were recorded foraging, with common pipistrelle activity focused along the northern boundary, within and adjacent to the north quarry, above the buildings adjacent to the broadleaved woodland within the south east of the Site, and to a lesser extent above the fields within the south east of the Site. Very low activity was recorded for noctule which was observed above the main entrance to the Site in the south east. The earliest bat was a common pipistrelle bat recorded at 18:28 hrs (17 minutes after sunset) foraging above the mixed scrub on the northern boundary of the Site, with consistent but relatively low levels of activity recorded throughout the survey until 20:13 hrs which was a noctule bat recorded commuting across the Site above the main entrance within the south east.

3.2 Static Monitoring Surveys

- 3.2.1 A summary of the findings of the remote static monitoring surveys along with detailed survey dates during each survey month is provided in Appendix 2 and the findings are described in more detail below. Figure 4 shows the static detector locations.
- 3.2.2 In total, at least five species of bat and 12,760 sound files attributable to bats were recorded during the static monitoring surveys undertaken between April and October (inclusive).

April 2024

- 3.2.3 A total of 762 sound files were recorded during the April survey period, 98.5% of which were attributable to common pipistrelle (751 sound files), 1% to noctule (eight sound files), 0.3% to soprano pipistrelle *Pipistrellus pygmaeus* (two sound files) and 0.2% to Myotis species *Myotis spp.* (one sound file).
- 3.2.4 The most frequently recorded species was common pipistrelle over each of the five nights with the number of sound files highest at Location D, demonstrated by a BAI per hour of 14.16 which is indicative of consistent low activity levels. Common pipistrelle was recorded at all other locations where data was obtained, however only at very low activity levels. Noctule and soprano pipistrelle were only recorded at Location D with low activity levels, demonstrated by a BAI per hour of 0.17 and 0.04 respectively. Myotis species were only recorded at Location A with very low activity levels, demonstrated by a BAI per hour of 0.02.

May 2024

3.2.5 A total of 3223 sound files were recorded during the May survey period, 94.3% of which were attributable to common pipistrelle (3,040 sound files), 3.1% to soprano pipistrelle (99 sound files), 1.6% to noctule (52 sound files) and 1% to Myotis species (32 sound files).

3.2.6 The most frequently recorded species was common pipistrelle with the number of sound files highest at Location F, demonstrated by a BAI per hour of 54.82 which is indicative of high activity levels. Common pipistrelle was recorded at all other locations where data was recorded but with low activity levels only. Soprano pipistrelle, noctule and Myotis species were all recorded at all locations where data was obtained with the highest number of sound files for these species and species groups at Location F, demonstrated by a BAI per hour of 2.06, 0.39 and 0.37 respectively, which is indicative of low activity levels.

June 2024

3.2.7 A total of 2,681 sound files were recorded during the June survey period, 97.8% of which were attributable to common pipistrelle (2,622 sound files), 1.5% to noctule (40 sound files), 0.5% to Myotis species (13 sound files) and 0.2% to soprano pipistrelle (six sound files),

3.2.8 The most frequently recorded species was common pipistrelle with the number of sound files highest at Location D, demonstrated by a BAI per hour of 60.57 which is indicative of very high activity levels. Common pipistrelle was recorded at all other locations, where data was recorded, but with low activity levels only. Noctule was recorded at Locations A, D, E and F with low activity levels, with the highest number of sound files at Location F demonstrated by a BAI per hour 0.74 (equating to only 26 sound files over the recording period). Myotis species were only recorded at Locations A and D with low activity levels, demonstrated by a BAI per hour of 0.34 and 0.03 respectively. Soprano pipistrelle was only recorded at Locations D, E and F with low activity levels, with the highest number of sound files at Location E demonstrated by a BAI per hour of 0.11 (equating to only four sound files over the recording period).

July 2024

3.2.9 A total of 1,476 sound files were recorded during the July survey period, 74.2% of which were attributable to common pipistrelle (1,096 sound files), 25.4% to noctule (375 sound files), 0.2% to Myotis species (3 sound files) and 0.2% to soprano pipistrelle (2 sound files).

3.2.10 The most frequently recorded species was common pipistrelle with the number of sound files highest at Location A, demonstrated by a BAI per hour of 16.04 which is indicative of medium activity levels. Common pipistrelle was recorded at all other locations where data was recorded but with low activity levels only. Noctule was recorded at all locations where data was recorded with low activity levels, with the highest number of sound files at Location F demonstrated by a BAI per hour of 7.30. Myotis species were recorded at Locations A and E with low activity levels,

demonstrated by a BAI per hour of 0.03 and 0.05 respectively. Soprano pipistrelle was only recorded at Locations B and F with low activity levels, demonstrated by a BAI per hour of 0.03 for both locations.

August 2024

3.2.11 A total of 3,396 sound files were recorded during the August survey period, 97.9% of which were attributable to common pipistrelle (3,326 sound files), 1.5% to noctule (52 sound files), 0.5% to soprano pipistrelle (16 sound files) and 0.1% to Myotis species (three sound files).

3.2.12 The most frequently recorded species was common pipistrelle with the number of sound files highest at Location D, demonstrated by a BAI per hour of 73.02 which is indicative of very high activity levels. Common pipistrelle was recorded at all other locations where data was recorded apart from Location A but with low activity levels. Noctule was recorded at Locations A, B, D and E with low activity levels, with the highest number of sound files at Location B demonstrated by a BAI per hour of 0.78. Soprano pipistrelle was only recorded at Locations D and E with low activity levels, demonstrated by a BAI per hour of 0.02 and 0.35 respectively. Myotis species were only recorded at Location D with low activity levels, demonstrated by a BAI per hour of 0.07.

September 2024

3.2.13 A total of 834 sound files were recorded during the September survey period, 87.8% of which were attributable to common pipistrelle (733 sound files), 7.9% to noctule (66 sound files), 2% to soprano pipistrelle (17 sound files), 1.7% to Myotis species (13 sound files) and 0.6% brown long-eared bat *Plecotus auritus* bat (5 sound files). Data was not able to be collected at Location B during the September monitoring period due to a fault with the Anabat Swift.

3.2.14 The most frequently recorded species was common pipistrelle with the number of sound files highest at Location A, demonstrated by a BAI per hour of 9.87 which is indicative of low activity levels. Common pipistrelle was recorded at all other locations where data was recorded with low activity levels. Noctule and Myotis species were recorded at all locations where data was recorded with low activity levels, with the number of sound files highest for noctule at Location E demonstrated by a BAI per hour of 0.62, and the number of sound files highest for Myotis species at Location A demonstrated by a BAI per hour of 0.11. Soprano pipistrelle was only recorded at Locations E and F with low activity levels, demonstrated by a BAI per hour of 0.07 and 0.24 respectively. Brown long-eared bat was only recorded at Location A with low activity levels, demonstrated by a BAI per hour of 0.09 (equating to only five sound files recorded during the survey period).

October 2024

- 3.2.15 A total of 388 sound files were recorded during the October survey period, 93.3% of which were attributable to common pipistrelle (362 sound files), 5.2% to noctule (20 sound files), 0.8% to Myotis species (three sound files), 0.5% to brown long-eared bat (two sound files) and 0.2% to soprano pipistrelle (one sound file).
- 3.2.16 The most frequently recorded species was common pipistrelle with the number of sound files highest at Location B, demonstrated by a BAI per hour of 4.44 which is indicative of low activity levels. Common pipistrelle was recorded at all other locations where data was recorded with low activity levels. Noctule was recorded at all locations apart from Location B with low activity levels, with the highest number of sound files recorded at Location F demonstrated by a BAI per hour of 0.14 (equating to nine sound files). Myotis species was only recorded at Locations B and D with low activity levels, demonstrated by a BAI per hour of 0.02 and 0.03 respectively. Brown long-eared bat was only recorded at Locations D and E with low activity levels, demonstrated by a BAI per hour of 0.01 for both locations (only one sound file at each location). Soprano pipistrelle was only recorded at Location F with low activity levels, demonstrated by a BAI per hour of 0.02 (equating to only one sound file).

Summary

- 3.2.17 At least five different bat species were recorded using the Site during the static monitoring surveys undertaken across the 2024 survey season, with the exact number of species recorded uncertain given that Myotis species could only be identified to genus level, meaning that either one species or several species of Myotis may have been recorded across the Site. Common pipistrelle bat was the most frequently recorded bat species at all locations across the entire survey period (apart from noctule at Location F during July) with high levels of activity identified at Location F (adjacent to area of broadleaved woodland) during May and Location D (within area of broadleaved woodland) during June and August, and medium levels of activity identified at Location A (within north quarry) during July and borderline medium levels at Location D in April and Location A in May. No more than low levels of activity for this species were recorded at all other locations at the Site across the survey period. The activity levels recorded show consistent use of the Site by bats throughout the season, however with variable patterns of usage of different locations on Site recorded across months.
- 3.2.18 No more than low levels of activity were identified for all other species across the entire survey period. Noctule, soprano pipistrelle and Myotis species were recorded at all locations where data was obtained during certain months of the survey period, whereas brown long-eared bat was only recorded at Location A (within north quarry) in September and Location D (within broadleaved woodland) in October.

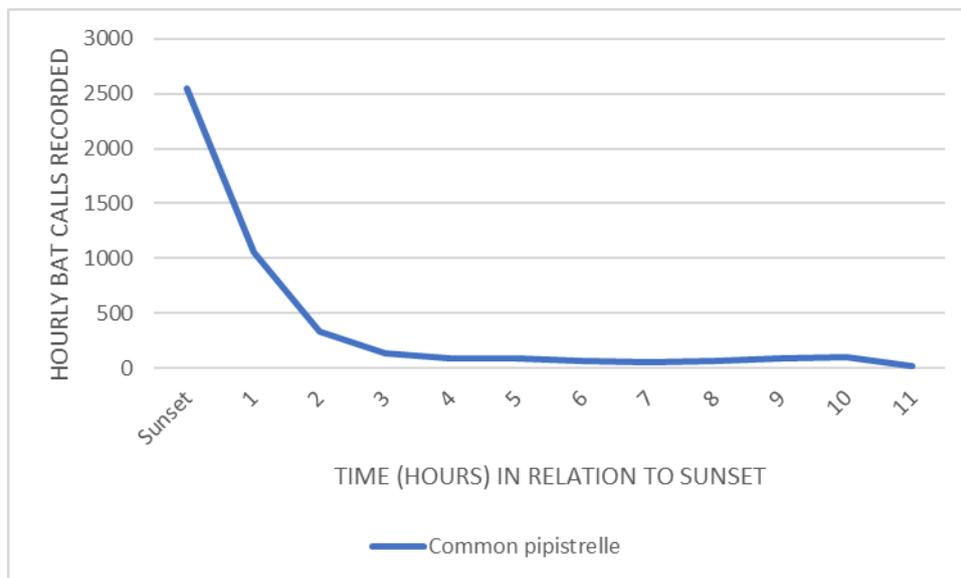
3.3 Autumn Swarming Surveys

3.3.1 A summary of the findings of the remote static monitoring autumn swarming surveys throughout the surveyed period is described in detail below. Static locations are displayed on Figure 4. Weather conditions for the survey period are provided in Appendix 1.

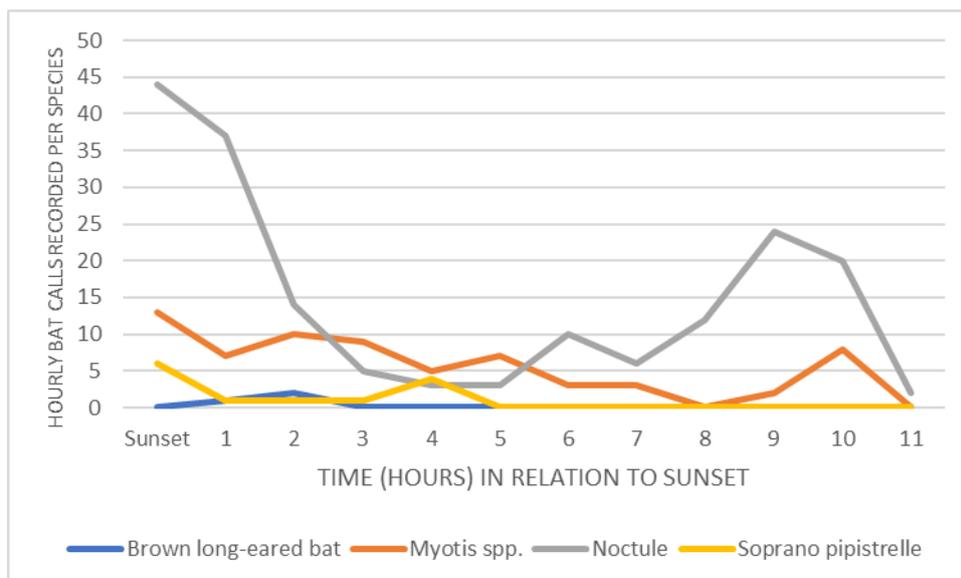
Swarming Location 1 – North Quarry

3.3.2 The static detector left in-situ at the North Quarry between 27th August and 14th October recorded a total of 4,924 sound files attributable to common pipistrelle (4,658 sound files), noctule (183 sound files), Myotis species (67 sound files), soprano pipistrelle (13 sound files), and brown long-eared bat (three sound files). These results are displayed below in Graph 1 and Graph 2 below, where species have been split due to the dominance of common pipistrelle calls.

Graph 1: Common pipistrelle passes per hour in relation to sunset for the North Quarry



Graph 2: Other bat species passes per hour in relation to sunset for the North Quarry

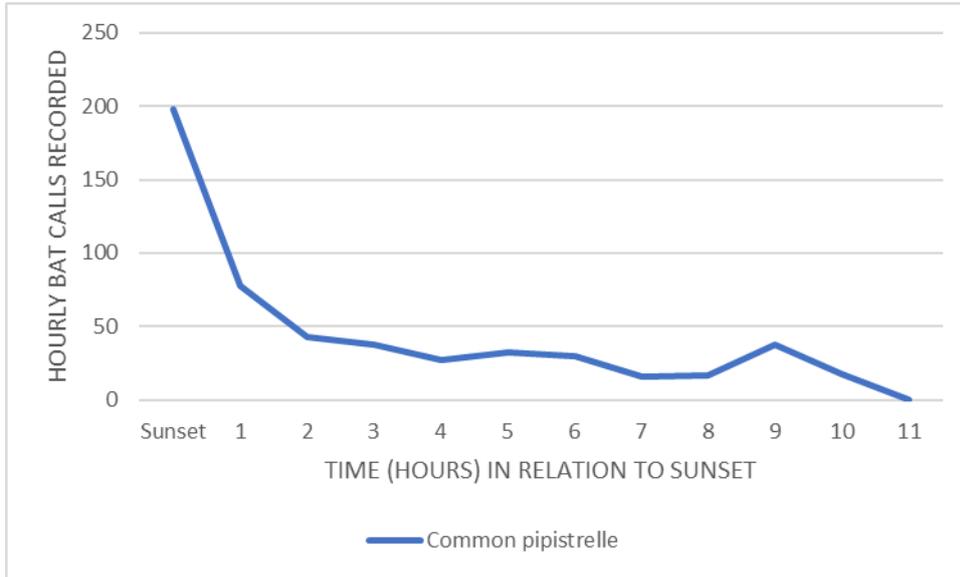


3.3.3 Common pipistrelle, noctule and Myotis species recorded their greatest peak hourly counts within two hours of sunset with a smaller peak for the latter two between nine and eleven hours after sunset. Soprano pipistrelle and brown long-eared bat had such small samples size that no significant trends could be concluded. No species saw a peak in activity between approximately 3 and 4 hours after sunset, which would be typical of swarming bats.

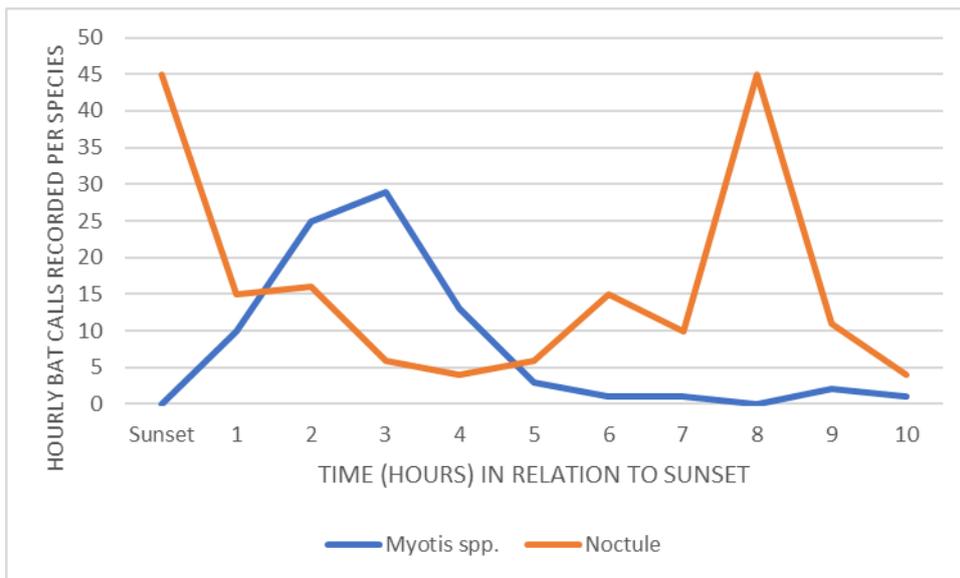
Swarming Location 2 – South Quarry

3.3.4 The static detector left in-situ at the South Quarry between 27th August and 14th October recorded a total of 807 sound files attributable to common pipistrelle (535 sound files), noctule (181 sound files) and Myotis species (91 sound files). These results are displayed below in Graph 3 and Graph 4 below, where species have been split due to the dominance of common pipistrelle calls.

Graph 3: Common pipistrelle passes per hour in relation to sunset for the South Quarry



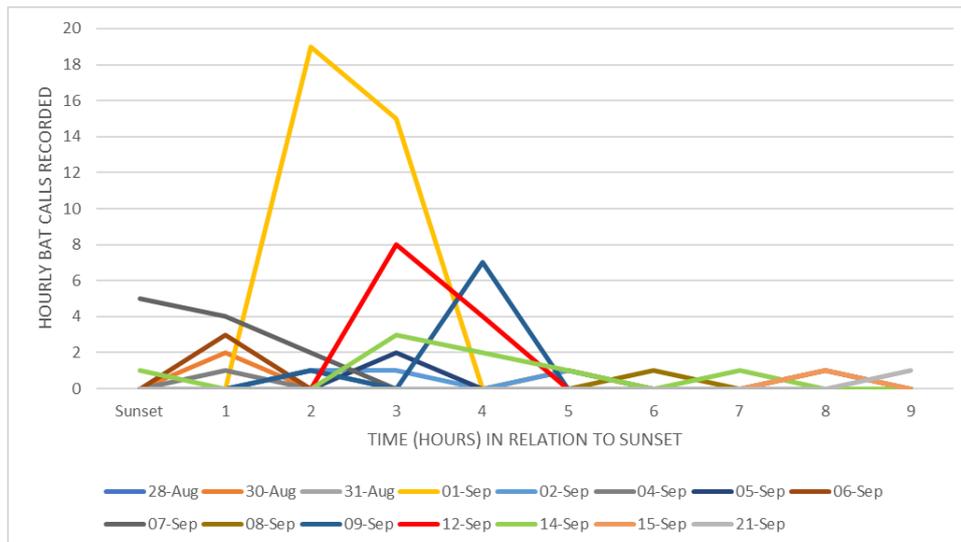
Graph 4: Other bat species passes per hour in relation to sunset for the South Quarry



3.3.5 The greatest peak hourly counts for common pipistrelle and noctule were within one hour after sunset with another peak for noctule between seven and eight hours after sunset, with no peak in activity between approximately 3 and 4 hours after sunset observed, which would be typical of swarming bats. Myotis species had a greatest peak hourly count between two and four hours after sunset, which warrants further investigation.

3.3.6 Myotis species were only recorded for a total of 15 nights across the survey period, with the number of passes per hour in relation to sunset based on night recorded shown in Graph 5 below.

Graph 5: Myotis species passes per hour in relation to sunset based on night recorded



3.3.7 The greatest peak hourly counts for Myotis species were on the night of the 1st September between two and three hours after sunset, followed by the 9th September around four hours after sunset, the 12th September around three hours after sunset. No significant trends can be drawn from the other nights when Myotis species were recorded given the relatively low sample size for these nights.

4. Assessment and Mitigation

4.1 Proposals

- 4.1.1 Proposals for the Site are taken from Nineteen 47 '*Blackmoorfoot Road, Huddersfield – Technical Planning Layout*' (Drawing no. 2114_008D) and are understood to comprise a residential development of 700 properties, a care home and local centre with associated landscaping for gardens and areas of Public Open Space (POS).
- 4.1.2 The majority of habitats on Site will require removal to facilitate the development, including former quarry areas, broadleaved woodland, mature scrub, lowland heathland and grassland. It is understood that existing woodland habitat at the northern extent, which also includes an area of lowland heathland, and a small area of woodland within the southern extents of the Site, and some of the existing trees along the western and eastern boundaries of the Site, will be retained. All other habitats will be lost as part of the development. The proposals also include the provision of soft landscaping around the Site boundaries and through the centre of the Site.

4.2 Legislation

- 4.2.1 All species of bat occurring within the UK are included in Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). Under regulation 41 bats are protected from deliberate capture, injury or killing, from deliberate disturbance and from deliberate damage or destruction of a breeding site or resting place (roost)¹.
- 4.2.2 All UK bats are also included on Schedule 5 of the Wildlife and Countryside Act (WCA) 1981 (as amended)¹ where it is an offence to intentionally or recklessly disturb bats while they are occupying a structure or place used for shelter or protection, or to obstruct access to any such place.
- 4.2.3 Barbastelle *Barbastella barbastellus*, Bechstein's *Myotis bechsteinii*, brown long-eared bat, greater horseshoe *Rhinolophus ferrumequinum*, lesser horseshoe *Rhinolophus hipposideros*, noctule and soprano pipistrelle bats are included as priority species under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006¹.

4.3 Assessment and Recommendations

Foraging and Commuting Bats

- 4.3.1 The NBW surveys carried out at the Site in spring, summer and autumn 2024 have identified overall low levels of bat activity at the Site, with the majority of activity focussed along the northern boundary to the Site notably close to areas of broadleaved woodland and mixed scrub, which is

¹ See www.legislation.gov.uk for full legislative details

likely to provide foraging opportunities and commuting routes between roosts and foraging territories in the wider area.

- 4.3.2 The static monitoring surveys have identified up to high levels of common pipistrelle bat activity at Locations A, D and F (i.e. up to moderate at A and up to high at D and F), suggesting that the woodland and scrub habitats immediately surrounding these locations may be used as a core foraging ground and/or flightline resource for common pipistrelle bats, although there is availability of similar to higher quality habitat in the wider area off-Site including woodland, mature scrub, grassland and heathland to the north, west and south. Low levels of bat activity have been recorded for all other species at all locations surveyed at the Site, suggesting that the Site is used by no more than low numbers of these species for foraging and/or for commuting across the Site.
- 4.3.3 Based on the common and widespread species assemblage associated with the Site and in consultation with the '*UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*' Reason, P.F. and Wray, S. (2023) (Reason and Wray, 2023), the Site is considered to be of no more than local value to foraging and commuting bats.
- 4.3.4 The loss of the majority of broadleaved woodland, mature scrub and other vegetated habitats across the Site, including the loss of mature trees and buildings with suitable roosting features present as discussed in the bat emergence survey and GLTA reports (Ecus, 2024), is considered to result in a minor loss of roosting habitat, with up to local level impacts upon foraging and flightline resources for bats with habitats to be lost which are interconnected across the Site and with suitable habitat in the wider area off-Site.
- 4.3.5 The existing functional connectivity of the Site for bats should be maintained wherever possible. This would include retention of vegetation along the northern boundary of the Site as well as the corridor of woodland running from north to south through the Site. It is understood however that retention of the corridor running from the north to the south is not possible due to the reduction in developable land that conflicts with the amount of POS that is required to be provided.
- 4.3.6 The creation of new habitats on Site as part of the proposals within areas of POS including a mix of neutral grassland (wildflower grassland), mixed scrub and native tree planting will help retain connectivity across the Site by providing alternative routes of suitable habitat for bats to forage and commute across the Site and would at least partially off-set habitat loss required to facilitate the development but only in the medium to long-term given that there will be a time lag between habitat loss and new planting reaching equivalent levels of maturity to what exists on-Site.
- 4.3.7 The landscaping scheme should aim to incorporate a high abundance and diversity of native trees

and shrubs and incorporate flowering/fruitlet species as well as night scented flowers to improve the foraging resources available for bats.

- 4.3.8 Overall, it is acknowledged that the development will result in an overall reduction in the available foraging and flightline resource on Site for bats from that which is currently available with impacts at up to the local level.
- 4.3.9 As detailed, Ecus have recommended that more habitat are ideally retained and protected, however it is understood that this will not be possible at this stage in the planning process due to several other development considerations. Where no further options are available for on Site retention/enhancement for bats; it is therefore recommended that any off-site Biodiversity Net Gain (BNG) delivery includes a range of opportunities for foraging and commuting bats locally (e.g. tree planting, hedgerow /scrub /woodland creation/enhancement).
- 4.3.10 It is recommended that the areas of woodland, trees and mixed scrub to be retained are protected during the construction works to avoid physical damage from activities such as machinery or personnel encroachment. This may be through the installation of temporary fencing to avoid direct access. This will enable foraging and commuting bats to continue to use the habitats during construction.
- 4.3.11 There is existing artificial lighting across the Site from security lighting affixed to a number of existing buildings and along Standard Drive at the entrance to the Site, and from adjacent street lighting and housing beyond the south and east boundaries of the Site, although the remainder of the Site including the majority of vegetated habitats are currently unlit. Levels of artificial lighting are anticipated to be increased as a result of the proposed development, which is likely to impact foraging and commuting bats at the Site. Common pipistrelle was the most frequently recorded bat at the Site and was recorded predominantly in areas where artificial lighting was present, particularly at Locations D and F which were lit by security or street lighting, apart from the along the northern boundary which was unlit. Light sensitive species such as brown long-eared bats were recorded in very low numbers and it is considered that the Site is not a particular important resource for this species, although any overall increase of lighting implemented through either the construction phase or post-development may reduce the suitability of foraging and flightline resources on Site for this species.
- 4.3.12 To mitigate impacts resulting from increased levels of artificial lighting at the Site, it is recommended that sensitive lighting measures are implemented during both the construction phase of the development and also designed into the post-development proposals. It is recommended that measures within the '*Bats and Artificial Lighting at Night*' guidance document (Institution of Lighting Professionals, 2023) are implemented. This includes actions such as

avoidance of lighting on key habitats, particularly retained woodland and mature scrub habitats and newly created habitats within areas of POS post-development and habitats bounding the Site.

- 4.3.13 During the construction phase the use of any security lighting during darkness should be minimised where possible, should be on short Passive Infrared (PIR) timers to minimise light spill, and should be directed away from retained habitats within the Site and suitable habitats bounding the Site.
- 4.3.14 For post-development lighting, it is recommended that a sensitive lighting plan is produced by a lighting engineer in conjunction with suitably experienced ecologist and. The lighting plan would depict habitats and parts of the Site where artificial lighting should be avoided or be very low to avoid impacts to bats, and areas within the Site where higher levels of artificial lighting may be acceptable. Additionally, the Institution of Lighting Professionals guidance document (2023) should also be used to refer to appropriate specifications for luminaries to ensure those used are suitable for bats and minimise impacts as far as practicable. It is recommended that security lighting on houses post-development (where required) use downward directional light fittings on short PIR timers to minimise light spill and the time that lighting is on.
- 4.3.15 It is recommended that information packs are distributed to properties across the Site to inform residents about the value of the Site and wider area as a foraging and commuting resource for bats. Other information should be provided covering the other types of wildlife present in the surrounding area and should encourage residents to manage their gardens in a wildlife-friendly manner, such as through the inclusion of native shrub planting and wildflower meadow areas in gardens. These features would attract invertebrates such as moths, and subsequently provide foraging resources for bats.
- 4.3.16 Overall, based on the findings of the surveys and taking into account the habitat loss associated with development proposals for the Site, it is considered that impacts as a result of the proposed development are of local level importance to foraging and commuting bats where mitigation is followed in full.

Swarming Bats

- 4.3.17 During the autumn swarming survey undertaken at the North Quarry, no species recorded had a peak in activity between approximately 3 and 4 hours after sunset, which would be typical of swarming bats.
- 4.3.18 During the autumn swarming survey undertaken at the South Quarry, *Myotis* species had a peak in activity between 2 and 4 hours after sunset on the 1st, 9th and 12th October. The weather on the 1st and 9th was dry with overnight temperatures not dropping below 11 degrees, but despite being dry on the 12th, overnight temperatures dropped to 3 degrees. The overnight temperature on the

1st did not drop below 15 degrees, which was one of the warmest nights during the survey period and when the greatest peak hourly count for Myotis species was recorded. Bat activity at swarming sites has been noted to vary from night to night but is known to be suppressed by rainfall and positively correlated with maximum ambient air temperature.

4.3.19 Although peaks in activity have been recorded on three nights in October; the number of sound files during these nights did not surpass 19 passes/bat calls in any given hour, which is indicative of low activity levels and considered likely to be from low numbers of individual bats foraging around or close to the features associated with the South Quarry (or possibly single bats travelling to a swarming site elsewhere off-Site). Swarming sites for Myotis species typically exhibit high activity levels from high numbers of individual bats over several nights with suitable weather conditions. Significantly more calls over several nights would therefore be anticipated. As such, the South Quarry is considered unlikely to be used as a swarming site for bats and no further survey or mitigation/compensation is considered necessary.

5. References

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Figure 1: Spring Night-time Bat Walkover Results (13.05.24)



Key

- Site Boundary
- ★ Start and Finish
- Common pipistrelle
- Noctule
- Route A
- - - Route B



Vistry Yorkshire, Miller Homes & Countryside Partnerships Limited

Land off Blackmoofoot Road, Huddersfield

Figure 1
Spring Night-time Bat Walkover Results

Rev	Date	Drawn by	Checked by	Revision Comments
A	15.10.2024	JS	DB	NA

Unit 4 President Buildings, Savile Street,
Sheffield, S4 7UQ
T: 0114 2669292 www.ecustd.co.uk

Figure 2: Summer Night-time Bat Walkover Results (27.08.2024)



Key

- Site Boundary
- ★ Start and Finish
- Common pipistrelle
- Noctule
- - - Route A
- - - Route B



Vistry Yorkshire, Miller Homes & Countryside Partnerships Limited

Land off Blackmoofoot Road, Huddersfield

Figure 2
Summer Night-time Bat Walkover Results

Rev	Date	Drawn by	Checked by	Revision Comments
A	15.10.2024	JS	DB	NA

Unit 4 President Buildings, Savile Street,
Sheffield, S4 7UQ
T: 0114 2669292 www.ecustd.co.uk

Figure 3: Autumn Night-time Bat Walkover Results (14.10.2024)



Key

- Site Boundary
- ★ Start and Finish
- Noctule
- Common pipistrelle
- Route A
- Route B



Vistry Yorkshire, Miller Homes & Countryside Partnerships Limited

Land off Blackmoofoot Road, Huddersfield

Figure 3
Autumn Night-time Bat Walkover Results

Rev	Date	Drawn by	Checked by	Revision Comments
A	15.10.2024	JS	DB	NA

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Figure 4. Static Bat Detector Locations



Key

- Site Boundary
- ★ Location A
- ★ Location B
- ★ Location C
- ★ Location D
- ★ Location E
- ★ Location F
- ▲ Swarming 1
- ▲ Swarming 2



Vistry Yorkshire, Miller Homes & Countryside Partnerships Limited

Land off Blackmoofoot Road, Huddersfield

Figure 4
Static Bat Detector Locations

Rev	Date	Drawn by	Checked by	Revision Comments
A	15.10.2024	JS	DB	NA

Unit 4 President Buildings, Savile Street,
Sheffield, S4 7UQ
T: 0114 2669292 www.ecustd.co.uk

Appendix 1. Survey Weather Conditions

Table A1.1. Weather Conditions During Remote Static Monitoring Surveys

Date	Mean wind speed (mph)	Min overnight temp (°C)	Max overnight temp (°C)	Rainfall	Humidity (%)
April					
23/04/2024	7	3	6	Dry	81
24/04/2024	8	2	5	Dry	87
25/04/2024	6	0	2	Dry	93
26/04/2024	3	2	3	Dry	100
27/04/2024	7	4	4	Dry	93
May					
13/05/2024	12	13	16	Dry	82
14/05/2024	9	12	13	Dry	94
15/05/2024	5	11	13	Dry	100
16/05/2024	9	11	12	Dry	100
17/05/2024	3	10	13	Dry	88
June					
12/06/2024	6	5	6	Dry	87
13/06/2024	10	10	11	Dry	94
14/06/2024	5	9	10	Dry	88
15/06/2024	5	7	8	Dry	93
16/06/2024	10	11	12	Light drizzle	94
July					
11/07/2024	1	10	11	Dry	82
12/07/2024	7	11	11	Light rain	88
13/07/2024	9	11	12	Dry	88
14/07/2024	8	13	14	Dry	94
15/07/2024	3	13	14	Light rain	94
August					
07/08/2024	14	14	15	Light rain	82
08/08/2024	15	16	18	Dry	94
09/08/2024	12	14	15	Dry	82
10/08/2024	3	11	13	Dry	88
11/08/2024	10	13	15	Dry	88
September					
10/09/2024	13	7	8	Light rain	82
11/09/2024	10	5	7	Dry	80
12/09/2024	7	3	5	Dry	88
13/09/2024	7	9	10	Dry	80
14/09/2024	11	9	12	Dry	82
October					
08/10/2024	4	11	12	Light rain	95
09/10/2024	15	5	7	Dry	82
10/10/2024	9	1	3	Dry	84

11/10/2024	6	4	5	Dry	83
12/10/2024	17	3	6	Dry	80

Table A1.2. Weather Conditions During Swarming Static Monitoring Surveys

Date	Mean wind speed (mph)	Min overnight temp (°C)	Max overnight temp (°C)	Rainfall	Humidity (%)
27/08/2024	3	14	15	Dry	72
28/08/2024	7	11	13	Dry	89
29/08/2024	10	12	10	Dry	88
30/08/2024	3	10	9	Dry	85
31/08/2024	8	12	13	Dry	91
01/09/2024	6	15	15	Dry	97
02/09/2024	11	12	15	Light rain	95
03/09/2024	9	11	12	Dry	92
04/09/2024	12	11	13	Dry	94
05/09/2024	16	14	15	Light rain	99
06/09/2024	11	15	15	Dry	100
07/09/2024	6	14	15	Dry	96
08/09/2024	13	11	15	Light rain	93
09/09/2024	11	11	12	Dry	93
10/09/2024	13	7	8	Light rain	82
11/09/2024	10	5	7	Dry	80
12/09/2024	7	3	5	Dry	88
13/09/2024	7	9	10	Dry	80
14/09/2024	11	9	12	Dry	82
15/09/2024	9	8	10	Dry	98
16/09/2024	2	7	10	Dry	96
17/09/2024	4	9	10	Dry	95
18/09/2024	7	10	11	Dry	94
19/09/2024	7	12	12	Dry	93
20/09/2024	10	13	13	Dry	91
21/09/2024	12	12	13	Dry	93
22/09/2024	12	11	11	Light rain	100
23/09/2024	11	10	11	Dry	94
24/09/2024	5	7	8	Dry	95
25/09/2024	4	10	11	Light rain	99
26/09/2024	21	8	9	Light rain	87
27/09/2024	9	3	5	Dry	85
28/09/2024	6	6	8	Dry	92
29/09/2024	14	9	10	Dry	84

30/09/2024	15	11	11	Dry	93
01/10/2024	12	10	11	Dry	94
02/10/2024	7	7	9	Dry	92
03/10/2024	4	6	8	Dry	97
04/10/2024	7	6	8	Dry	91
05/10/2024	6	8	8	Dry	87
06/10/2024	8	8	11	Dry	95
07/10/2024	4	10	11	Dry	96
08/10/2024	4	11	12	Light rain	95
09/10/2024	15	5	7	Dry	82
10/10/2024	9	1	3	Dry	84
11/10/2024	6	4	5	Dry	83
12/10/2024	17	3	6	Dry	80
13/10/2024	4	4	5	Dry	92
14/10/2024	8	8	8	Dry	87

Appendix 2. Static Monitoring Data Summary Results

13/05/2024	18/05/2024	Location D	Myotis species	3	2	40.75	20:59	05:08	0.6	0.07
			Noctule	4	2	40.75	20:59	05:08	0.8	0.10
			Common pipistrelle	178	5	40.75	20:59	05:08	35.6	4.37
			Soprano pipistrelle	5	2	40.75	20:59	05:08	1	0.12
13/05/2024	18/05/2024	Location E	Myotis species	1	1	40.75	20:59	05:08	0.2	0.02
			Noctule	12	3	40.75	20:59	05:08	2.4	0.29
			Common pipistrelle	49	5	40.75	20:59	05:08	9.8	1.20
			Soprano pipistrelle	2	2	40.75	20:59	05:08	0.4	0.05
13/05/2024	18/05/2024	Location F	Myotis species	15	2	40.75	20:59	05:08	3	0.37
			Noctule	16	5	40.75	20:59	05:08	3.2	0.39
			Common pipistrelle	2234	5	40.75	20:59	05:08	446.8	54.82
			Soprano pipistrelle	84	5	40.75	20:59	05:08	16.8	2.06
June										
12/06/2024	17/06/2024	Location A	Myotis species	12	3	35	21:37	04:37	2.4	0.34
			Noctule	6	1	35	21:37	04:37	1.2	0.17
			Common pipistrelle	354	5	35	21:37	04:37	70.8	10.11
12/06/2024	17/06/2024	Location B	Common pipistrelle	34	3	35	21:37	04:37	6.8	0.97
12/06/2024	17/06/2024	Location C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12/06/2024	17/06/2024	Location D	Myotis species	1	1	35	21:37	04:37	0.2	0.03
			Noctule	2	2	35	21:37	04:37	0.4	0.06
			Common pipistrelle	2120	5	35	21:37	04:37	424	60.57
			Soprano pipistrelle	1	1	35	21:37	04:37	0.2	0.03
12/06/2024	17/06/2024	Location E	Noctule	6	3	35	21:37	04:37	1.2	0.17
			Common pipistrelle	113	5	35	21:37	04:37	22.6	3.23
			Soprano pipistrelle	4	3	35	21:37	04:37	0.8	0.11
12/06/2024	17/06/2024	Location F	Noctule	26	4	35	21:37	04:37	5.2	0.74
			Common pipistrelle	1	1	35	21:37	04:37	0.2	0.03
			Soprano pipistrelle	1	1	35	21:37	04:37	0.2	0.03

July										
11/07/2024	16/07/2024	Location A	Myotis species	1	1	36.6	21:32	04:51	0.2	0.03
			Noctule	24	4	36.6	21:32	04:51	4.8	0.66
			Common pipistrelle	587	5	36.6	21:32	04:51	117.4	16.04
11/07/2024	16/07/2024	Location B	Noctule	34	4	36.6	21:32	04:51	6.8	0.93
			Common pipistrelle	125	5	36.6	21:32	04:51	25	3.42
			Soprano pipistrelle	1	1	36.6	21:32	04:51	0.2	0.03
11/07/2024	16/07/2024	Location C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
11/07/2024	16/07/2024	Location D	Noctule	17	3	36.6	21:32	04:51	3.4	0.46
			Common pipistrelle	104	5	36.6	21:32	04:51	20.8	2.84
11/07/2024	16/07/2024	Location E	Myotis species	2	2	36.6	21:32	04:51	0.4	0.05
			Noctule	33	4	36.6	21:32	04:51	6.6	0.90
			Common pipistrelle	241	5	36.6	21:32	04:51	48.2	6.58
11/07/2024	16/07/2024	Location F	Noctule	267	5	36.6	21:32	04:51	53.4	7.30
			Common pipistrelle	39	5	36.6	21:32	04:51	7.8	1.07
			Soprano pipistrelle	1	1	36.6	21:32	04:51	0.2	0.03
August										
07/08/2024	12/08/2024	Location A	Noctule	2	1	43.4	20:51	05:32	0.4	0.05
07/08/2024	12/08/2024	Location B	Noctule	34	3	43.4	20:51	05:32	6.8	0.78
			Common pipistrelle	103	5	43.4	20:51	05:32	20.6	2.37
07/08/2024	12/08/2024	Location C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
07/08/2024	12/08/2024	Location D	Myotis species	3	1	43.4	20:51	05:32	0.6	0.07
			Noctule	1	1	43.4	20:51	05:32	0.2	0.02
			Common pipistrelle	3169	5	43.4	20:51	05:32	633.8	73.02
			Soprano pipistrelle	1	1	43.4	20:51	05:32	0.2	0.02
07/08/2024	12/08/2024	Location E	Noctule	15	4	43.4	20:51	05:32	3	0.35
			Common pipistrelle	52	5	43.4	20:51	05:32	10.4	1.20
			Soprano pipistrelle	15	5	43.4	20:51	05:32	3	0.35

07/08/2024	12/08/2024	Location F	Common pipistrelle	1	1	43.4	20:51	05:32	0.2	0.02
September										
10/09/2024	15/09/2024	Location A	Myotis species	6	2	54.5	19:34	06:33	1.2	0.11
			Noctule	9	2	54.5	19:34	06:33	1.8	0.17
			Common pipistrelle	538	5	54.5	19:34	06:33	107.6	9.87
			Brown long eared	5	2	54.5	19:34	06:33	1	0.09
10/09/2024	15/09/2024	Location B	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10/09/2024	15/09/2024	Location C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10/09/2024	15/09/2024	Location D	Myotis species	1	1	54.5	19:34	06:33	0.2	0.02
			Noctule	2	2	54.5	19:34	06:33	0.4	0.04
			Common pipistrelle	67	4	54.5	19:34	06:33	13.4	1.23
10/09/2024	15/09/2024	Location E	Myotis species	2	2	54.5	19:34	06:33	0.4	0.04
			Noctule	34	3	54.5	19:34	06:33	6.8	0.62
			Common pipistrelle	89	4	54.5	19:34	06:33	17.8	1.63
			Soprano pipistrelle	4	2	54.5	19:34	06:33	0.8	0.07
10/09/2024	15/09/2024	Location F	Myotis species	4	3	54.5	19:34	06:33	0.8	0.07
			Noctule	21	2	54.5	19:34	06:33	4.2	0.39
			Common pipistrelle	39	3	54.5	19:34	06:33	7.8	0.72
			Soprano pipistrelle	13	3	54.5	19:34	06:33	2.6	0.24
October										
08/10/2024	13/10/2024	Location A	Noctule	2	2	64	18:28	07:21	0.4	0.03
			Common pipistrelle	22	4	64	18:28	07:21	4.4	0.34
08/10/2024	13/10/2024	Location B	Myotis species	1	1	64	18:28	07:21	0.2	0.02
			Common pipistrelle	284	4	64	18:28	07:21	56.8	4.44
08/10/2024	13/10/2024	Location C	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
08/10/2024	13/10/2024	Location D	Brown long eared	1	1	64	18:28	07:21	0.2	0.02
			Myotis species	2	2	64	18:28	07:21	0.4	0.03
			Noctule	6	3	64	18:28	07:21	1.2	0.09

			Common pipistrelle	33	5	64	18:28	07:21	6.6	0.52
08/10/2024	13/10/2024	Location E	Brown long eared	1	1	64	18:28	07:21	0.2	0.02
			Noctule	3	1	64	18:28	07:21	0.6	0.05
			Common pipistrelle	2	1	64	18:28	07:21	0.4	0.03
08/10/2024	13/10/2024	Location F	Noctule	9	2	64	18:28	07:21	1.8	0.14
			Common pipistrelle	21	4	64	18:28	07:21	4.2	0.33
			Soprano pipistrelle	1	1	64	18:28	07:21	0.2	0.02



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