davidson-watts ecology ltd

Bat Trapping and Radio-tracking
Baseline Report and Evaluation
For Land North of Long Copse Lane, Emsworth, Hampshire
For Land and Partners
9 August 2021

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Report	Prepared by:	Reviewed by:
Advanced Bat Survey Report V2 10 August 2021	Dr Ian Davidson-Watts MCIEEM	Diane Davidson-Watts MCIEEM

WORCESTER OFFICE (REGISTERED OFFICE)
Wyche Innovation Centre, Walwyn Road, Upper Colwall
Malvern, Herefordshire WR13 6PL

SALISBURY OFFICE
3 Hillside, Stapleford
Salisbury, Wiltshire SP3 4LG

tel 03333 031276 info@dwecology.co.uk www.dwecology.co.uk

Registered in England No. 8811109

1 Introduction

1.1 BACKGROUND

1.1.1 Residential development is proposed on approximately 16 ha of pastureland interspersed with small copses, north of Long Copse Lane, Emsworth, Hampshire. A study area has been defined that extends beyond the proposed development area (hereafter referred to as the 'Site') (see Figure 1 – indicative site boundary). The Site was found to support a Bechstein's *Myotis bechsteinii* bat population in 2009 following studies in the general area by Portsmouth Water (Unpublished data). As part of the 2009 studies, a large population of this species was also confirmed in Southleigh Forest, which directly borders the northern boundary of the Site (Figure 1).

1.1.2 Trapping surveys under Class Licence (Davidson-Watts Ecology Ltd) in late summer 2016 confirmed the presence of breeding Bechstein's bat in the Southleigh Forest area known as Long Copse adjacent to the northern boundary of the Site. As a result, the Site promoters ('Land & Partners Ltd'), with advice from the Hampshire County Council Ecologist, have recognised the need to gather further information on how Bechstein's bat use the Site and provide context of the Site's importance to the Southleigh population. This information will form part of an Ecological Impact Assessment to accompany an outline planning application for the proposed residential development.

1.1.3 Davidson-Watts Ecology Ltd were commissioned by Land and Partners Ltd to undertake the advanced surveys of the Site and adjacent areas, initially in 2016 and with further studies in 2017 and then again in 2021 to achieve the following objectives:

1.1.4 The aims of the advanced bat surveys are to:

- Further investigate the status of Bechstein's bats at the proposed Site with an emphasis on woodland habitat and tree lines during the breeding season in 2017 and 2021;
- To capture and radio-track key individuals using the Site to locate breeding roosts of Bechstein's bats and to determine activity patterns and habitat use; and
- Combined with the data from 2009 and 2016, present a robust baseline of the use of the Site and surrounding areas by Bechstein's bats, to provide for an effective impact assessment and development of mitigation measures, including appropriate roost protection measures.

2 Methodology

2.1 OVERVIEW

2.1.1 As Bechstein's bats roost in trees and are almost impossible to detect/identify using standard bat surveys the primary approach to meeting the project aims was to trap free-flying bats and to radio-track individual bats to locate maternity and other roost types and to investigate use of the Site by bats when active at night.

2.1.2 Currently three survey sessions of approximately one week duration each were undertaken in June and August 2017, June and July 2021. Each session began with the trapping of bats. Radio-tagged bats were simultaneously/subsequently followed by radio-tracking during the week to locate roost sites and to examine nocturnal activity of bats, with a focus on collecting activity data for bats within the development boundary. Where access was possible, emergence counts were undertaken at identified roosts to determine the function of the roost and to provide an estimate of population sizes.

2.1.3 The following methods were undertaken in line with Chapter 9 (Advanced licensed bat survey methods) in Collins, 2016.

2.2 TRAPPING METHODS

2.2.1 Bats were caught using up to seven 4 m^2 harp traps or 6-12m mist nests placed in woodlands and significant treelines within the land subject to investigation (the Site - see Figure 1). Acoustic lures (e.g. Sussex Autobats) were used to improve catch efficiency in woodland (Hill and Greenaway 2005). The lures emitted synthesised or pre-recorded bat social calls. Lures were placed next to harp traps and any bats captured were identified, sexed, aged and breeding status determined.

2.2.2 Generally trapping teams monitored trap sites with handheld bat detectors (Pettersson 240x or Elekon Batlogger M) during the trapping survey, mainly to assess bat activity in the vicinity of the traps.

2.3 TRACKING METHODS

2.3.1 Target bats were fitted with lightweight radio-transmitter tags (Biotrack Ltd, Wareham, Dorset, United Kingdom) weighing <5 % of the weight of the bat using skin bond or similar proven adhesive. Tagging of female bats in advanced stages of pregnancy was avoided. Lactating bats were tagged if they met the target weight and were in good condition, although early lactating bats were not tagged for welfare reasons. Bats were processed quickly and released within 30 minutes of capture provided the glue attaching the transmitter had cured sufficiently.

2.3.2 All tagged bats were tracked using a Sika receiver (Biotrack Ltd., Wareham, United Kingdom) and a 3-element Yagi antenna (Biotrack Ltd). Tagged bats were located during the day to find roost sites and tracked from suck until dawn to determine the extent of use of the Site and surrounding areas for commuting and foraging. The primary aim at night was to record positional fixes that enabled determination of key areas of activity within the Site. Bats were tracked using the "homing-in" method (White and Garrott 1990) either on foot or by vehicle. Radio-tracking fixes for each individual bat were plotted in the field on digitised 1:25,000 scale Ordinance Survey maps and subsequently transferred into Ranges 9 radio tracking software (Anatrak Ltd). Aerial images in the Google Earth mobile application were used in the field as an additional visual guide when plotting fixes. Digitised radio-tracking data were analysed in Ranges 9 (Anatrack Ltd., Wareham, United Kingdom) to calculate home range areas (100% minimum convex polygons (MCPs)) and core activity areas (cluster core polygons) (Davidson-Watts et al 2006; Zeale et al 2012).

2.4 ROOST EMERGENCE

2.4.1 When tagged bats were tracked to accessible roost sites, subsequent roost exit counts were undertaken using infrared cameras (Canon XA10) with infrared illuminators to determine roost size and

status (e.g. maternity roost). Roost attributes such as location, type of structure and other descriptors were recorded where possible.

2.5 LICENSING

2.5.1 In 2016 trapping was undertaken by experienced bat surveyor and level 3 and 4 Natural England Class Licence holder Dr Ian Davidson-Watts (2015-12289/12287-CLS-CLS). In 2017 and 2021, all trapping and tracking surveys were undertaken under a project licence from Natural England numbers 2017-28892-SCI-SCI and 2021-52094-SCI-SCI obtained by Dr Ian Davidson-Watts, with 27 years bat survey experience, who designed and coordinated the field surveys and undertook the analysis of the results. Field surveys in 2017 and 2021 were undertaken by Dr David Hill, Mike Bird, Alan Crane, Tom Foxley and Dom Hill.

2.6 ADJUSTMENTS AND LIMITATIONS

2.6.1 Bats are mobile species and may use a variety of roosts, commuting routes and foraging areas during their yearly lifecycle, which is influenced by a range of factors such as breeding status, energetic requirements and the availability of prey. The survey techniques described in this report involve a sampling effort that is considered appropriate for obtaining valuable information on the location of roosts and foraging areas potentially affected by the development proposals while ensuring that local bat populations are not disturbed adversely. The methods used here do not provide a full account of all bat activity in the area or activity at other times of the year outside of the survey periods (i.e. outside of the summer early to mid-breeding period) which is focussed on identifying key maternity populations.

2.6.2 Weather conditions were appropriate throughout both survey sessions and so the results of trapping and radio-tracking were not constrained or affected by weather in so far as expected bat activity at that time of year.

2.6.3 A number of day roost sites located via radio tracking occurred on private land where access was not possible. It was usually possible to determine whether the roost was likely to be a tree or building from triangulation, however it was not possible to undertake emergence surveys and determine population sizes. In such cases professional judgement was used to determine likely roost status, informed by the status of the tagged bat, time of year and the length of use of the day roost.

2.7 EVALUATION CRITERIA

2.7.1 Ecological features and resources have been evaluated based on the approach described in 'Guidelines for Ecological Impact Assessment in the United Kingdom' published by the Chartered Institute of Ecology and Environmental Management (2016) whereby the value of an ecological feature or resource is determined within a defined geographical context using the following criteria:

- International,
- National (England),
- Regional (South-East),
- County/District (Havant),
- Local (or Parish) (Emsworth); and
- At the site level only.

3 Results

3.1 BAT TRAPPING

3.1.1 One bat trapping survey was undertaken on the 31 August 2016. This was followed by four bat trapping survey sessions in mid and late summer of 2017 and summer 2021. The primary aim of the 2017 and 2021 trapping was to capture rare tree dwelling Bechstein's bats for radio tracking. All 2017 and 2021 trapping data is detailed in Table 1 below. In 2016 only one trapping area was sampled (T2). Four trapping areas were sampled during the surveys and are shown on Figure 1 in 2017 and 2021. Trapping Area 1 included the south-eastern boundary of the site adjacent to the grounds of Hollybank House. Trapping Area 2 was located on the southern boundary of 'Long Copse Hill', which is on the north and north-eastern boundary of the Site, and forms part of the Southleigh Forest Complex. Trapping Area 3 is the small copse located on the southern boundary of the Site known as Colman's copse, that projects into the Site from Long Copse Road. Trapping Area 4 was located on the eastern boundary of the site.

3.1.2 The single survey on 31 August 2016 captured a total of 10 bats of six species. Bat species captured that were of particular note included a female Bechstein's bat captured in trapping area 2 (the boundary of Southleigh Forest). The other bat species included common and soprano pipistrelle (*Pipistrellus pipistrellus and P. pygmaeus*), brown long-eared (*Plecotus auritus*), Natterer's (*Myotis nattererii*) and whiskered (*M. mystacinus*) bats.

3.1.3 A total of 21 bats of six species were caught in the total of four nights of trapping in June and August 2017. 27 bats of seven species were captured in June/July 2021 over six nights of trapping.

3.1.4 Species recorded included Natterer's, small *Myotis* (possibly whiskered/Brandt's (*M. brandtii)* or alcathoe bat *(Myotis alcathoe))*, Daubenton's bat (*Myotis daubentonii*), Bechstein's, soprano pipistrelle, brown long-eared bat and noctule (*Nyctalus noctula*). Breeding bats of Bechstein's, Natterer's, Daubenton's, whiskered/Brandt's (small *Myotis*), soprano pipistrelle and brown long-eared bat were all confirmed in the survey/trapping areas.

3.1.5 The majority of the bats, including all Bechstein's bats, were captured in trapping area 2 which is the northern boundary of the site on the end of Southleigh Forest. Bechstein's Bat 106 was captured and found to have been previously marked with a ring Z4446. Reviewing previous data from 2009 (Portsmouth Water surveys 2009), this bat was originally captured in July 2009 in Long Copse (Southleigh Forest). T3 and T4 recorded no Bechstein's bats and very few bat captures overall.

3.2 RADIO TRACKING AND ROOSTING PATTERNS

3.2.1 A total of five target Bechstein's bats were fitted with radio transmitters to primarily locate roost sites and determine broad activity areas including foraging sites.

3.2.2 For each bat, their roosting location was confirmed (where access was permitted) or estimated through triangulation of the radio signal (where access was not permitted). Each tagged bat was followed as described in the methods section for at least two to three nights. The fixes of all tracking nights for each bat were pooled (see Figure 2 and 3), from which it was possible to determine the main area of activity (home range/Minimum Convex Polygon- MCP). Ranges 9 was used to mathematically determine core areas of activity (usually associated with roosting or foraging areas). Objective cluster polygons (Kenward 1987) were considered the most appropriate minimum-linkage estimators to define the core areas bats were using, because the bats spent most of their time in relatively small areas, moving quickly between them.