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

For Land and Partners

6 October 2017

CONTENTS

Report	Prepared by:	Reviewed by:
Emsworth Bat Survey Report 23 October 2017	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 pasture land 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was found to support a Bechstein's bat population in 2009 following studies in the general area by Portsmouth Water (Unpublished data).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 have been commissioned by Land and Partners Ltd to undertake the advanced surveys of the Site and adjacent areas in 2017 to achieve the following objectives:

1.1.4 The aims of this project 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 (May – September 2017);
- 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 Two survey sessions of approximately one week duration each were undertaken, including one session in June 2017 and one session in August 2017. 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 placed in woodlands and significant treelines within the land subject to investigation (the Site - see Figure 1). Six acoustic lures (Sussex Autobats) were used to improve catch efficiency in woodland (Hill and Greenaway 2005). The lures emitted synthesised 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 hand held 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 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 at night to determine the extent of use of the Site 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 in the MemoryMap mobile application 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 in MemoryMap. 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 (90% 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 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 All trapping and tracking were undertaken under a project licence from Natural England number: 2017-28892-SCI-SCI obtained by Dr Ian Davidson-Watts MCIEEM with 24 years bat survey experience, who designed and coordinated the field surveys and undertook the analysis of the results. Field surveys were undertaken by Dr David Hill, Mike Bird, Alan Crane and Tom Foxley.

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.

2.7 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 Two bat trapping survey sessions were undertaken during mid and late summer of 2017. The primary aim of trapping was to capture rare tree dwelling Bechstein's for radio tracking. All trapping data is contained in Table 1 below. Three trapping areas were sampled during the surveys and are shown on Figure 1. 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', 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, that projects into the Site from Long Copse Road.

3.1.2 A total of 21 bats of six species were caught in the total of four nights of trapping in June and August 2017. Species included Natterer's bat (*Myotis nattereri*), small *Myotis* (possibly whiskered bat (*M. mystacinus)*/Brandt's bat (*M. brandtii)* or alcathoe bat *(Myotis alcathoe))*, Daubenton's bat (*Myotis daubentonii*), Bechstein's bat (*Myotis bechsteinii*), soprano pipistrelle (*P. pygmaeus))* and brown long-eared bat (*Plecotus auritus*). Breeding bats of Bechstein's, Natterer's, whiskered/Brandt's (small *Myotis*) and brown long-eared bat were all confirmed in the survey/trapping areas.

3.1.3 The majority of the bats were captured in trapping area 2. Bechstein's bat 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).

Table 1 – Details of all captured bats and the trapping area location (also refer to Figure 1).

Location	Date	Time	Species	Sex	Age	Breeding status	Ring No.	Bat ref
TA2	4th June 2017	22:50	*Pipistrellus pygmaeus*	Male	Adult			
TA2		00:23	*Myotis nattererii*	Male	Adult			
TA2		01:06	*Myotis mystacinus*	Male	Adult			
TA2		01:11	*Myotis* sp (W/B)	Female	Adult	Pregnant		
TA2		01:11	*Myotis bechsteinii*	Female	Adult	Pregnant	Z 4446	BAT 106
TA2		02:15	*Myotis nattererii*	Female	Adult	Pregnant		
TA2			No captures					
TA2	6th June 2017	22:36	*Myotis mystacinus*	Male	Adult			
TA2		22:41	*Myotis daubentonii*	Male	Adult			
TA2		23:01	*Myotis nattererii*	Female	Adult	Not pregnant		
TA2		00:54	*Myotis bechsteinii*	Female	Adult	Pregnant	Z 4446	BAT 106
TA1	4th June 2017		No captures					
TA1			No captures					
TA3		22:28	Myotis mystacinus	Male	Adult			
TA3		23:51	Myotis brandti	Male	Adult			
TA3		02:02	Myotis nattererii	Male	Adult			
TA1	6th June 2017		No captures					
TA1			No captures					
TA1			No captures					
TA2	6th August 2017	22:07	*Plecotus auritus*	Female	Adult	Post-lactating		
TA2		22:07	*Myotis nattererii*	Male	Juvenile			
TA2		22:14	*Myotis nattererii*	Female	Adult	Non-parous		
TA2		22:21	*Myotis* sp (W/B)	Female	Juvenile			
TA2		22:57	*Myotis* sp (W/B)	Female	Juvenile			
TA2		23:58	*Plecotus auritus*	Male	Adult			
TA2	7th August 2017	22:50	*Plecotus auritus*	Female	Adult	Post-lactating		
TA2			No captures (Harp)					
TA2			No captures (Net)					
TA2	7th August 2017	23:58	*Myotis bechsteinii*	Male	Juvenile		J5498	BAT108

3.2 RADIO TRACKING AND ROOSTING PATTERNS

3.2.1 A total of two target Bechstein's bats were fitted with radio transmitters to primarily locate roost sites and as a secondary objective 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 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). Following examination of utilisation distributions, 90% 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.

Table 2 - Summary data of tagged bats and their home range statistics (refer to Figures 4 and 5)

ID	Species	Sex *breeding	Date captured	Location of capture	Range span (m)	MCP (ha)	Mean core area (ha)
106	*M. bechsteinii*	Female*	04/06/17	TA2	1537	27.8	3.76
108	*M. bechsteinii*	Male**	07/08/17	TA2	2185	154.8	3.34

**Breeding bat. ** Juvenile bat.*

Table 3 – Roost locations and summary roost attributes of tagged bats (refer to Figures 4 and 5 and Appendix A for photographs of roosts).

ID	Species	Date	Roost				
			ID	Type	Location	Feature	Count
106	*M. bechsteinii*	08/06/17	1	Ash Tree*	SU7557607238	Poss Cavity	8
106	*M. bechsteinii*	07/06/17	2	Oak Tree	SU7517508351	Poss Cavity	1
108	*M. bechsteinii*	10/08/17	3	Oak Tree	SU7503308371	Poss Cavity	1
108	*M. bechsteinii*	11/08/17	4	Ash Tree*	SU7555607735	Poss Cavity	3

*Maternity roost.

Adult female Bechstein's bat (bat 106) (refer to Figure 4)

3.2.3 Bat 106 was captured in survey area TA2 Long Copse on the northern boundary of the site on 4th June 2017, and was radio-tracked/monitored for three days.

3.2.4 Although the bat was located and tracked when flying/active on the 5th and 6th June (i.e. after roost emergence), the roost could not be pinpointed until the 7th June 2017. Its roost was a mature oak within Long Copse (R2). An emergence survey on the 7th June could not locate the actual roost site and only Bat106 appeared to have been using the tree. Bat 106 then moved to a roost in an ash tree beside a public right of way to the south of Westbourne Road (R1) on the 8th June 2017. A roost emergence survey was undertaken on the 8th June, however despite infrared cameras the roost feature could not be determined. A dawn survey on the 9th June was able to confirm 8+ bats 'swarming' in the canopy of the tree before returning to a suspected cavity roost out of view.

3.2.5 Bat 106's foraging areas (core areas) remained predominantly in the south-east part of Long Copse and the north east boundary of the Site. Its home range span (i.e. distance from roost to furthest edge of home range area) was approximately 1.5km. was the maximum range span for the bat. The

home range area was large (~27 ha) and the bat used treelines in a generally undeveloped corridor between its roost south of Westbourne Road and Long Copse (Southleigh Forest) for commuting. Cluster analysis revealed that within the home range area the Bat 106 used smaller core areas comprising on average 3.7 ha.

Juvenile male Bechstein's bat (108) (refer to Figure 5)

3.2.6 Bat 208 was captured on the evening of the 7th August in survey area TA2 Long Copse, and following its release was tracked to an ash tree roost (R3) located in a hedgerow north of the Wren Centre on Westbourne Road. An emergence survey on the 8th August 2017 could not determine the exact roost location, however three bats were observed emerging from the tree canopy.

3.2.7 Bat 108 moved roost on the 9th August 2017 to an oak tree within Long Copse approximately 100m north of the Site. A subsequent emergence survey revealed no obvious roosting site (there were multiple roosting features), although the radio tracking survey showed that bat 108 emerged at dusk from the tree and no other bats were observed.

3.2.8 At night, Bat 108 ventured over 2.5km south from its roosting area and had a very large home range area of around 250ha based on a north south axis from Long Copse to the A27. This included areas of New Brighton, however no fixes were recorded in the suburban or urban areas, the bat used the no developed areas between New Brighton and Westbourne to travel to the A27 area. Core areas were predominantly woodland and treeline habitats mainly in Long Copse, south east of the Site and a strip of young deciduous woodland adjacent to the A27.

4 Discussion and Evaluation

4.1 USE OF THE SITE BY BECHSTEIN' S BAT

4.1.1 The trapping surveys in the present (2017) study managed to capture two Bechstein's bats and both bats were tagged with some good movement and roost location data obtained. The results of the tracking data show that in 2017 no roosts appear to be within the Site. The majority of foraging/flying activity took place beyond the proposed development site in Long Copse (part of the Forestry Commission managed areas), or in discreet woodlands/treelines to the south and north east of the Site.

4.1.2 Two maternity roosts were confirmed during the 2017 surveys and both of these were located in relatively open habitats, single trees either near a small copse. Neither fell within the Site. In the case of bat 106, the maternity roost was located within 50m of suburban areas with streetlights. The field surveyor reported the roost location was relatively shielded from artificial light, although a house garden was within 25m of the roost tree.

4.1.3 The radio tracking surveys of 2017 appears to support the model of Bechstein's bats use of the landscape elsewhere in the Havant area. For instance, research on Bechstein's bat conducted in the Horndean/Rowlands Castle area in 2014 (updated in 2015 and in prep) (Davidson-Watts 2014), found that foraging habitat use of Bechstein's bat focussed on the large forested areas (generally owned and managed by the Forestry Commission). However, roosting habitat within these areas was considered sub optimal, and contrary to studies of this species elsewhere (Davidson-Watts, 2008), breeding populations at Horndean were found roosting in small outlying copses usually within 1km of a major forest. In this situation, bats from the Horndean/Rowland Castle area used a range of treelines and hedges occurring around horse, cattle and sheep grazed pasture, to commute to the forestry areas to forage. This appears to be the same pattern of behaviour for the population using Long Copse (part of Southleigh Forest adjoining the norther boundary of the Site) and the rest of the Southleigh Forest complex.

4.1.4 Furthermore, in the case of the proposed development north of Long Copse Lane, the Portsmouth Water data (2009) also supports the same roosting behaviour in respect of the site and its relationship with Southleigh Forest, in that the roosting site found in the south-west part of the site in 2009 is not in the main forest area and bats use relatively open (i.e. not closed canopy) habitats to commute to foraging areas in the main forest.

4.2 EVALUATION

4.2.1 In conclusion, the previous presence of a maternity population of Bechstein's located on the Site in 2009 and the continued presence of breeding Bechstein's bats on the northern and eastern boundaries from both the trapping survey in 2016 (Davidson-Watts Ecology 2017) and the present study, suggests that the Site has an important role for local Bechstein's bats using the Southleigh Forest complex during the breeding season, primarily as a commuting route.

4.2.2 Bechstein's bats are one of the rarest bat species in the UK and Europe, and the population at Southleigh Forest is one of only three known meta populations in Hampshire (Hampshire being central to the known range of this species in the UK), the role of the Site, primarily for commuting bats is therefore considered of **National** significance for this species.

5 Impacts and Mitigation

5.1 POTENTIAL IMPACTS

5.1.1 Although there appears to be some element of foraging behaviour in the north east of the Site and likely use of the eastern boundary, the data gathered so far suggests that the main role of the Site for the local Bechstein's bat breeding population centred around Long Copse and the wider Southleigh Forest is primarily for commuting bats. The 2009 and 2017 data have found key maternity roosts located either at the southern boundary of the Site (2009 data) or up to 1km further south to the east of New Brighton (2017 data).

5.1.2 Treelines and woodland copses linking the roosting areas on the proposed development site as well as those found further south of the Long Copse/Southleigh Forest complex are therefore of high conversation value for commuting and possible roosting Bechstein's bats using Long Copse to the north.

5.1.3 Without any mitigation, direct impacts during construction from the removal of roost trees, potential roost trees and the creation of gaps within existing/used treelines supporting commuting habitat would be certain to have a significant adverse effect at the National level. In addition, noise, dust and general construction activity may deter bats from using the proposed development site during this phase.

5.1.4 Without mitigation, operational impacts of the development include light spill from the proposed development, which is likely to have a detrimental impact on Bechstein's bats that use the flight lines as well as known and potential roosting areas. This is particularly relevant for Bechstein's as they are generally considered as species associated with darker rural areas.

5.1.5 Furthermore, without mitigation, recreational and general human activity from an increase in the local population is likely to have an indirect negative impact on these tree roosting bats if potential roosts trees are felled or topped as a result of health and safety concerns relating to dead trees or limbs and increase proximity and frequency of disturbance events, as well as use of the woodland areas for recreation generally.

5.2 MITIGATION

5.2.1 The primary objective of mitigation from the potential impacts associated with the proposed development is the protection and/or enhancement of known and/or potential bat commuting routes and the protection of known roosting areas on or adjacent to the Site.

5.2.2 As part of the masterplan development process for this development, Bechstein's bat mitigation (and other bats species) have been the starting point for creating a Green Infrastructure-led masterplan which retains and enhances the existing environmental assets. Based on the Portsmouth Water bat data and the radio tracking data from 2017 key native treelines are being retained and enhanced within the inherent design of the masterplan (see Figure 6). In particular, two significant bat corridors of at least 25-30m in width are being provided on the eastern boundary and from the small copse adjacent to Long Copse Lane (TA3) linking with woodlands around Hollybank House.

5.2.3 Further treelines within the centre of the Site will be retained and/or created to provide smaller bat corridors, and the southern and northern boundaries will consist of buffers of 25m to ensure bats can use these east-west corridors as well as buffer the Long Copse boundary to the north.

5.2.4 There will be no roads constructed within the main bat corridor on the eastern boundary. Where other corridors are bisected by road access, high canopy vegetation will be retained adjacent to these roads where possible to retain bat flight corridors, even if it means damaging tree roots as part of the construction as the effected trees will have some further life as a bat crossing feature. Semi-mature tree

plantings to replace these features should be planted as soon as possible. There will be no lighting in these areas.

5.2.5 The copse located adjacent to Long Copse Lane (TA3), identified by the Portsmouth Water surveys in 2009 as a known roosting site, will be protected from the development through 20-25m buffers. Working with other stakeholders, a bat box scheme on and off Site providing short to medium term roosting opportunities for these bats should be developed. Ideally this scheme should extend to the Southleigh Forest areas and collaboration with the Forestry Commission will be required.

5.2.6 Bechstein's bats are considered to be a light adverse species, and the management of lighting impacts will be critical as part of the mitigation strategy. The two main commuting corridors on the eastern boundary and near Hollybank House copse should be primarily managed to maintain or reduce existing light levels. Further lighting studies/assessments should be undertaken to inform this key objective, given the width and design of the buffers, this should be achievable.

5.2.7 Management is required to ensure long term provision of these measures and the appropriate management of potential buffers and human related disturbance/activities. It is therefore recommended that a management plan be developed to identify key areas for bats and recreational use and proactively manage these areas to achieve both objectives in conserving potential bat roosts/dark corridors and providing safe recreational use of the woodland areas for the public.

5.2.8 Monitoring of the effectiveness of these mitigation measures should be undertaken through undertaking baseline assessment one year prior to construction and for year's 1 to 3 post construction, at year 5 and at years 8 and 12.

5.3 RESIDUAL IMAPCTS ON BECHSTEIN'S BATS

5.3.1 Subject to the implementation of the full range of these mitigation measures, it is considered that the residual impact of the proposed development will be neutral.

6 References

Bat Conservation Trust (2016). National Bat Monitoring Programme Report. London.

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

Davidson-Watts, I.F. (2008). Isle of Wight Woodland Bat Project. Final Report of the Peoples Trust for Endangered Species. London.

Davidson-Watts Ecology Ltd (2014). Bechstein's bat survey report for the development of Land East of Horndean. Report for WYG. Davidson-Watts Ecology Ltd. Gloucester.

Davidson-Watts Ecology Ltd (2017). Land at Hollybank Farm. Bat Trapping Survey and Bechstein's Bat Assessment for Land and Partners Lt. Gloucester.

Hill, D. A. and Greenaway, F.G. (2005). Effectiveness of an acoustic lure for surveying bats in British woodlands. Mammal Review, 35, 116-122.

White, G. C. and Garrott, R.A. (1990). Analysis of wildlife radio-tracking data. Academic Press, San Diego, California.

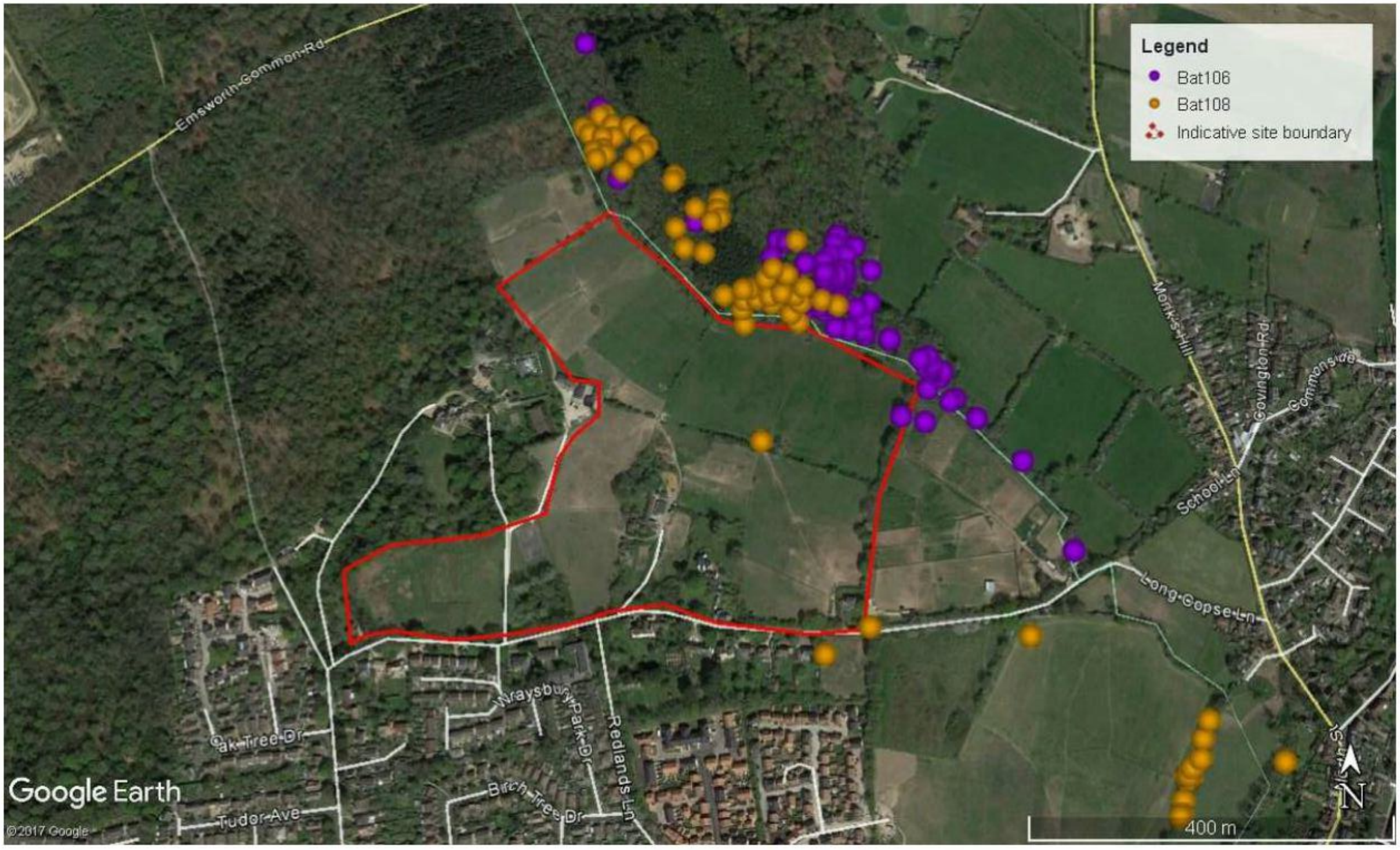
Figure 1 Trapping Locations and survey areas (red line)

Figure 2 All Radio Tracking Locations

Emsworth Bat Tracking
Land and Partners

davidson-watts ecology ltd

Figure 3 Radio Tracking Locations near to the Site



Emsworth Bat Tracking
Land and Partners

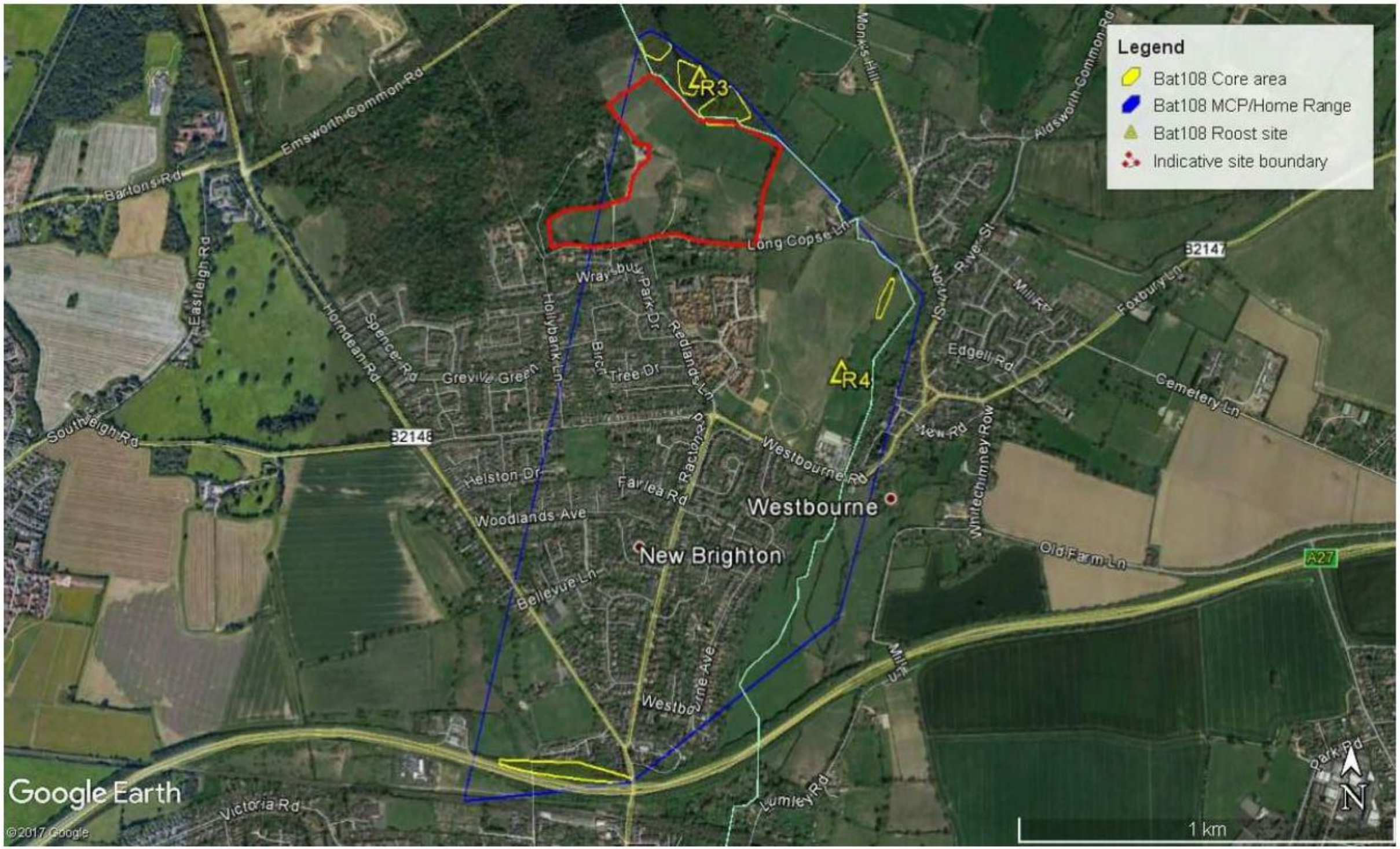
davidson-watts ecology ltd

Figure 4 Female Bechstein's bat (106) radio-tracking data

Emsworth Bat Tracking
Land and Partners

davidson-watts ecology ltd

Figure 5 Male juvenile Bechstein's bat (108) radio-tracking data



Emsworth Bat Tracking
Land and Partners

davidson-watts ecology ltd

Figure 6 Proposed Masterplan