

Assessment of Bat Activity 2019

Barton Meadows



Agatha Thompson
November 2019

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1. INTRODUCTION

1.1. Site Description

Barton Meadows is an area of former arable land covering 32 hectares north of Winchester, see Map 1. It consists of two large meadows surrounded by areas of rough grassland, hedgerow and trees. The reserve was created during the planning process as part of the Kings Barton housing development to support displaced wildlife and to provide a recreation space. The formerly arable land has now been converted into wildflower meadows and is starting to establish species including bird's-foot-trefoil, meadow buttercup, oxeye daisy and knapweed.

1.2. Aim of Survey

To assess bat activity at Barton Meadows, focussing on the treeline on the southern boundary, connecting the west of the site to the residential area to the east.

2. Ecology and Legislation

2.1. Ecology

In the UK there are 17 resident species of bat, ranging from the smallest and most widespread species, the common pipistrelle *Pipistrellus pipistrellus* to the rare woodland specialist, the Bechstein's bat *Myotis bechsteinii*.

Bats are nocturnal, emerging from their roosts from around sunset to 90 minutes after sunset. Bats typically initially forage around their roost before dispersing into the wider landscape. The distance bats travel to feed can vary greatly, from brown long-eared bats *Plecotus auritus* that typically feed within 1 to 2km of their roost, to Leisler's bat *Nyctalus leisleri* that can travel up to 14km from the roost.

Bats forage during the night with different species feeding on a range of invertebrates including midges, mosquitoes, moths and dung beetles. Most bats use linear features in the landscape for orientation to foraging areas, such as lanes, hedgerows and rivers.

Bats detect prey using echolocation. Echolocation is the emission of ultrasonic frequencies either through the nose (horseshoe bats) or mouth (all other bat species). Each species echolocates at a different frequency and calls can be modified depending on the habitat they are in.

Bats catch prey by a number of methods including hawking (catching prey whilst in flight), gleaning, (picking prey off vegetation), stooping/ pouncing (steep dives to catch prey flying below them or on the ground) or trawling (picking prey from the surface of water).

Bats may use feeding and night roosts whilst out foraging. These provide somewhere to feed, shelter from the weather or rest temporarily. Bats will return to the main roost before sunrise.

Bats hibernate from November to March. On emerging from hibernation, bats will start to feed on warmer evenings to recover weight lost during hibernation, before the females form maternity colonies in May. Pups are born and reared during June and July, and the first pups will start to emerge from August, when the maternity colonies will disperse. During September and October, mating roosts will form. As the days get shorter and evenings cooler, bats will spend more time in torpor. During torpor and hibernation, bats will still wake on warmer evenings to feed.

The location of bat roosts varies depending on species and time of year, but can be found in buildings, bat boxes, trees and caves. Hibernation roosts typically have a cool, constant temperature, and are humid, as bats are susceptible to desiccation whilst in hibernation.

2.2. Status

UK bats suffered severe declines in the second half of the twentieth century. This has been due to loss of roosting locations and fragmentation of the habitat. Bat species with more specialist habitat requirements, such as Bechstein's bat which is only found in woodlands, are particularly vulnerable.

Artificial lighting has also had an impact, as it is known to affect the behaviour of feeding bats and can also disrupt or sever important commuting routes, which can lead to desertion of roost sites. It has also been shown to be particularly harmful when present along river corridors, near woodland edges and near hedgerows (Institution of Lighting Professionals 2018).

Projects such as the National Bat Monitoring Programme (NBMP) co-ordinated by the Bat Conservation Trust, are important in monitoring species trends. The NBMP data for 2014 has indicated that some species, for example lesser horseshoe bat *Rhinolophus hipposideros*, common pipistrelle and soprano pipistrelle *Pipistrellus pygmaeus* are demonstrating increases in population.

2.3. Legislation

All bat species are listed on Schedule 5 of the Wildlife & Countryside Act 1981, and protected under Part 1 Section 9, meaning it is an offence to:

- Intentionally or recklessly kill, injure or take a bat
- Intentionally or recklessly damage or destroy any structure or place used for shelter or protection
- Disturb a bat while it is occupying a structure or place which it uses for shelter or protection
- Obstruct access to any structure or place used for shelter or protection
- Possess or control any live or dead bat, or any part of, or anything derived from a bat

In addition, all bat species are listed under Schedule 2 of the Conservation of Habitats & Species Regulations 2010, meaning it is an offence to:

- Deliberately capture, injure or kill a bat
- Deliberately disturb a bat; in particular that is likely to impair their ability:
 - (i) To survive, to breed or reproduce, or to rear or nurture their young; or
 - (ii) In the case of hibernating or migratory species, to hibernate or migrate;
- To affect significantly the local distribution or abundance of the species to which they belong
- Damage or destroy a breeding site or resting place of a bat
- Be in possession of, or to control a bat
- Transport, sell, exchange, or offer for sale or exchange, any live or dead bat, or part of.

All bat roosting sites receive legal protection even when bats are not present.

3. METHODOLOGY

3.1. Acoustic Bat Activity Surveys

Acoustic bat activity surveys were conducted monthly between June and August 2019 using either time expansion (Pettersson D240x) or frequency division (BatBox Duet) bat detectors with digital recorders. These recordings were subsequently analysed using Kaleidoscope Pro software, with bat calls being identified to species level where possible.

Surveys were led by Sarah Jackson (MCIEEM, NE Bat Class Licence (level 2) Number 2015-10695-CLS-CLS) and Agatha Thompson with assistance from Kate Gwynn of Arcadian Ecology & Consulting Ltd. A summary of survey details is shown in Table 1, whilst weather conditions during these surveys are described in Table 2.

Table 1. Survey Details

Date	Surveyors	Sunset Time	Survey Start Time	Survey End Time
27/06/2019	Sarah Jackson Agatha Thompson	21:24	21:24	23:04
24/07/2019	Agatha Thompson Kate Gwynn	21:04	21:04	23:04
27/08/2019	Sarah Jackson Agatha Thompson	20:03	20:03	22:03

Table 2. Weather conditions

Date	Temperature Range (°C)	Cloud (Oktas)	Wind (Beaufort)	Rain	General Conditions
27/06/2019	15.0-16.2	0	5	None	Hot, sunny day. Breezy and hazy evening.
24/07/2019	19.0-20.4	1	2	None	Very hot day, warm evening with a light breeze.
27/08/2019	20.0-21.8	2	2	None	Very hot day, warm and humid evening.

3.1.1. Treeline Bat Passes Surveys

Surveyors were positioned at two points along the treeline (Map 2) for 1 hour from sunset. All bat passes along or across the treeline were recorded along with a species identification, count of individuals and target note describing activity. Recordings of bat calls were made when identification of species was uncertain.

3.1.2. Bat Transect Surveys

A set transect was walked starting from 1 hour post-sunset and lasting for an hour, see Map 3. Listening points were established along the transect where surveyors stopped for 3 minutes to observe bat activity. All bat passes were noted along with species, count of individuals and a target note describing activity. Recordings of bat calls were made when identification of species was uncertain.

3.2. Static Detector Recordings

A Song Meter SM4BAT FS Bat Detector was set up at a set location along the main tree line, as shown in Map 2. The detector was in place for a period of 2 weeks from 27th June to 12th July 2019, and was set to record all instances of bat activity during this period.

4. RESULTS

4.1. Treeline Bat Pass Surveys

4.1.1. Treeline Passes Survey – 27th June 2019

Three species of bat were recorded and identified: common pipistrelle, soprano pipistrelle and serotine *Eptesicus serotinus*. Several bats were recorded using the treeline for foraging or commuting, heading both east and west. Survey results are shown in Table 3 and activity is represented visually on Map 4.

Table 3. Treeline passes results for 27th June 2019. Target notes correspond to arrows in Map 4.

Time	Species	No. of Bats	Activity	Target Note
21:50	Serotine	1	Flew through treeline east to west	1
22:01	Common pipistrelle	1	Heard but not seen	
22:08	Common pipistrelle	1	Heard but not seen	
22:18	Common pipistrelle	1	Heard but not seen	
22:20	Pipistrelle species	1	Heard but not seen	
22:22	Common pipistrelle	1	Foraging for 1 minute	2
22:24	Common pipistrelle	1	Foraging back and forth along treeline	3
22:01	Soprano pipistrelle	1	Foraging along south side of treeline, heading east	4
22:08	Common pipistrelle	1	Foraging along south side of treeline, heading west	5
22:16	Soprano pipistrelle	1	Looped around west end of treeline over arable field	6
22:17	Soprano pipistrelle	1	Foraging along south side of treeline, heading east	4
22:18	Soprano pipistrelle	1	Foraging along south side of treeline, heading west	5
22:20	Soprano pipistrelle	1	Foraging along south side of treeline, heading west	5
22:22	Common pipistrelle	1	Heard but not seen	
22:22	Soprano pipistrelle	1	Heard but not seen	
22:23	Soprano pipistrelle	1	Heard but not seen	
22:23	Soprano pipistrelle	1	Heard but not seen	
22:24	Soprano pipistrelle	1	Foraging along south side of treeline, heading east	4

4.1.2. Treeline Passes Survey – 24th July 2019

Three species of bat were recorded and identified: soprano pipistrelle, serotine and noctule *Nyctalus noctula*. A lot of foraging and commuting activity was recorded both along the treeline, mostly in an easterly direction, and in the south west corner of the site. Survey results are shown in Table 4 and activity is represented visually on Map 5.

Table 4. Treeline passes results for 24th July 2019. Target notes correspond to arrows in Map 5.

Time	Species	No. of Bats	Activity	Target Note
21:22	Unidentified bat species	1	Seen but not heard: flying south over east end of treeline	1
21:34	Unidentified bat species	1	Heard but not seen	
21:39	Noctule	1	Heard but not seen	

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21:39	Soprano pipistrelle	1	Heard but not seen	
21:40	Unidentified bat species	1	Heard but not seen	
21:41	Noctule	1	Foraging over field behind surveyor	2
21:41	Unidentified bat species	2	Commuting east along north side of treeline, then across field towards tree line on the west side of the field	3
21:41	Noctule	2	Foraging over field behind surveyor, then foraging along north side of treeline, heading east	4
21:42	Serotine	1	Foraging over field behind surveyor	2
21:42	Noctule	2	Foraging over field behind surveyor, then foraging along north side of treeline, heading east	4
21:44	Noctule	1	Foraging along north side of treeline, heading east	4
21:45	Noctule	1	Foraging for 3 minutes over field behind surveyor	2
21:45	Noctule	1	Foraging over field behind surveyor, then foraging along north side of treeline, heading east	4
21:46	Noctule	1	Heard but not seen	
21:47	Noctule	1	Foraging over field behind surveyor, then foraging along north side of treeline, heading east	2 then 4
21:49	Noctule	1	Foraging, heading north over treeline	5
21:49	Noctule	1	Travelling towards treeline then foraging at treeline	
21:51	Noctule	1		
21:51	Soprano pipistrelle	2	Flew through gap in treeline	6
21:52	Noctule	2	Foraging in corner of field behind surveyor for 5 minutes	2
21:53	Unidentified bat species	1	Foraging along north side of treeline, heading east	4
21:53	Unidentified bat species	1	Heard but not seen	
21:53	Unidentified bat species	1	Foraging along north side of treeline, heading east	4
21:54	Unidentified bat species	1	Heard but not seen	
21:55	Unidentified bat species	1	Heard but not seen	
21:56	Serotine	1	Heard but not seen	
21:57	Noctule	1	Foraging in corner of field behind surveyor	2
21:58	Noctule	1	Foraging in corner of field behind surveyor	2
21:58	Unidentified bat species	1	Foraging in a loop over field behind surveyor and up to north side of treeline	2
22:00	Noctule	1	Foraging in corner of field behind surveyor for 3 minutes	2
22:02	Unidentified bat species	1	Foraging in a loop over field behind surveyor and up to north side of treeline	2
22:04	Unidentified bat species	1	Foraging in a loop over field behind surveyor and up to north side of treeline	2

4.1.3. Treeline Passes Survey – 27th August 2019

Four species of bat were recorded and identified to species level: common pipistrelle, soprano pipistrelle, noctule and serotine. Two passes of *Myotis* bats were also recorded, but these could not be identified to species level.

Table 5. Treeline pass results for 27th August 2019. Target notes correspond to arrows in Map 6.

Time	Species	No. of Bats	Activity	Target Note
20:19	Common pipistrelle	1	Heard but not seen, commuting	
20:19	Common pipistrelle	1	Foraging along north side of treeline, heading west	1
20:20	Noctule	1	Heard but not seen, commuting	
20:23	Common pipistrelle	1	Heard but not seen	
20:24	Common pipistrelle	1	Heard but not seen	
20:24	Common pipistrelle	1	Foraging along north side of treeline, heading east then west	2
20:24	Common pipistrelle	1	Heard but not seen, commuting	
20:28	Soprano pipistrelle	1	Heard but not seen	
20:29	Pipistrelle species	1	Heard but not seen	
20:29	Common pipistrelle	1	Foraging along north side of treeline, heading west	1
20:29	Noctule	1	Heard but not seen	
20:30	Soprano pipistrelle	1	Foraging across field heading west	3
20:30	Common pipistrelle	1	Heard but not seen, commuting	
20:32	Common pipistrelle	1	Heard but not seen, foraging	
20:32	Common pipistrelle	1	Heard but not seen, foraging	
20:34	Soprano pipistrelle	1	Heard but not seen, commuting	
20:35	Noctule	1	Heard but not seen	
20:35	Common pipistrelle	1	Heard but not seen	
20:36	Common pipistrelle	1	Foraging along south side of treeline, heading east	4
20:36	Common pipistrelle	1	Heard but not seen	
20:37	Common pipistrelle	1	Foraging along north side of treeline, heading east	5
20:37	Soprano pipistrelle	1	Heard but not seen, foraging	6
20:37	Soprano pipistrelle	1	Foraging along south side of treeline, heading west	
20:38	Soprano pipistrelle	1	Heard but not seen, foraging	
20:38	Serotine	1	Commuting west across field	7
20:40	Common pipistrelle	1	Foraging along north side of treeline	8
20:40	Soprano pipistrelle	1	Heard but not seen, commuting	
20:40	Common pipistrelle	1	Heard but not seen, commuting	
20:42	Common pipistrelle	1	Commuting along north side of treeline, heading west	9
20:43	Soprano pipistrelle	1	Heard but not seen, foraging	
20:44	Soprano pipistrelle	1	Heard but not seen, commuting	

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20:45	Common pipistrelle	1	Foraging along south side of treeline	10
20:45	Noctule	1	Heard but not seen	
20:46	Common pipistrelle	1	Foraging along south side of treeline	10
20:46	Noctule	1	Heard but not seen	
20:47	Serotine	1	Heard but not seen	
20:47	Noctule	1	Heard but not seen	
20:48	Noctule	1	Heard but not seen	
20:49	Common pipistrelle	1	Foraging along north side of treeline, heading east	5
20:51	Common pipistrelle	1	Heard but not seen	
20:51	Bat species	1	Heard but not seen	
20:52	Noctule	1	Heard but not seen	
20:52	Common pipistrelle	1	Heard but not seen	
20:53	Serotine	1	Heard but not seen	
20:54	Serotine	1	Heard but not seen	
20:54	Serotine	1	Heard but not seen, commuting	
20:55	<i>Myotis</i> species	1	Heard but not seen	
20:56	<i>Myotis</i> species	1	Foraging along south side of treeline	11
20:57	Serotine	1	Heard but not seen	
20:57	Common pipistrelle	1	Heard but not seen	
20:58	Common pipistrelle	1	Foraging along south side of treeline, heading west	6
20:59	Noctule	1	Heard but not seen	
21:00	Noctule	2	Heard but not seen, foraging nearby for 3 minutes	
21:00	Common pipistrelle	1	Heard but not seen	
21:02	Noctule	1	Heard but not seen	

4.2. Transect Bat Activity Surveys

4.2.1. Transect Activity Survey – 27th June 2019

Two species of bat were recorded and identified: common pipistrelle and noctule.

Table 6. Treeline pass results for 27th June 2019. Target notes represented in Map 7.

Time	Species	No. of Bats	Activity	Target Note
22:54	Noctule	1	Heard but not seen	1
22:59	Noctule	1	Heard but not seen	2
23:01	Common pipistrelle	1	Heard but not seen	3
23:03	Common pipistrelle	1	Foraging at field edge	4

4.2.2. Transect Activity Survey – 24th July 2019

Four species of bat were recorded and identified: common pipistrelle, soprano pipistrelle, noctule and serotine.

Table 7. Treeline pass results for 24th July 2019. Target notes represented in Map 8.

Time	Species	No. of Bats	Activity	Target Note
22:13	Common pipistrelle	1	Heard but not seen: foraging	
22:14	Common pipistrelle	1	Heard but not seen: foraging	1
22:14	Noctule	1	Heard but not seen	1
22:16	Common pipistrelle	2	Heard but not seen	1
22:20	Soprano pipistrelle	1	Heard but not seen	
22:22	Common pipistrelle	1	Heard but not seen	
22:24	Common pipistrelle	1	Heard but not seen	2
22:27	Soprano pipistrelle	1	Heard but not seen	2
22:27	Noctule	1	Heard but not seen	2
22:29	Unidentified bat species	1	Heard but not seen	3
22:29	Common pipistrelle	1	Heard but not seen	3
22:30	Common pipistrelle	1	Heard but not seen	3
22:32	Serotine	1	Heard but not seen	3
22:37	Unidentified bat species	1	Heard but not seen	4
22:41	Common pipistrelle	1	Heard but not seen	4
22:42	Common pipistrelle	1	Heard but not seen	5
22:43	Serotine	1	Heard but not seen	5
22:44	Noctule	1	Heard but not seen	6
22:45	Serotine	1	Heard but not seen	6
22:45	Noctule	1	Heard but not seen	6
22:46	Serotine	1	Heard but not seen	7
22:51	Common pipistrelle	1	Heard but not seen	8
22:52	Common pipistrelle	1	Heard but not seen	8
22:56	Common pipistrelle	1	Heard but not seen	9
22:58	Common pipistrelle	1	Heard but not seen	10

23:00	Common pipistrelle	1	Heard but not seen	10
23:00	Serotine	1	Heard but not seen	10
23:03	Pipistrelle species	1	Heard but not seen	11
23:09	Common pipistrelle	1	Heard but not seen	12

4.2.3. Transect Activity Survey – 27th August 2019

Three species of bat were recorded and identified to species level: common pipistrelle, serotine and noctule.

Table 8. Treeline pass results for 27th August 2019. Target notes represented in Map 9.

Time	Species	No. of Bats	Activity	Target Note
21:12	Serotine	1	Heard but not seen	1
21:14	Serotine	1	Heard but not seen	2
21:15	Common pipistrelle	1	Heard but not seen	3
21:17	Noctule	1	Heard but not seen	4
21:18	Serotine	1	Heard but not seen	5
21:21	Serotine	1	Heard but not seen	6
21:25	Serotine	1	Heard but not seen	7
21:28	Serotine	1	Heard but not seen	8
21:30	Serotine	1	Foraging along treeline	9
21:31	Serotine	1	Flying across corner of field	10
21:34	Serotine	1	Heard but not seen	11
21:36	Serotine	1	Heard but not seen	12
21:36	Common pipistrelle	1	Heard but not seen	12

4.3. Static Detector Recordings

A total of 4206 bat passes from 12 different species were recorded during the two week period. A summary of these results is shown in Table 9.

Table 9. Summary of bat passes at Barton Meadows between 27th June and 12th July 2019

Common Name	Scientific Name	Total Count	Legal and Conservation Status
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	2267	
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	560	UK BAP Priority species
Noctule	<i>Nyctalus noctula</i>	488	UK BAP Priority species
Natterer's	<i>Myotis nattereri</i>	418	
Serotine	<i>Eptesicus serotinus</i>	349	
Daubenton's	<i>Myotis daubentonii</i>	47	
Brown long-eared	<i>Plecotus auritus</i>	35	UK BAP Priority species
Leisler's	<i>Nyctalus leisleri</i>	9	
Grey long-eared	<i>Plecotus austriacus</i>	5	
Brandt's	<i>Myotis brandtii</i>	3	
Bechstein's	<i>Myotis bechsteinii</i>	2	Habitats Directive Annex II UK BAP Priority species
Barbastelle	<i>Barbastella barbastellus</i>	1	Habitats Directive Annex II UK BAP Priority species
Unidentified <i>Myotis</i> species	<i>Myotis sp.</i>	21	

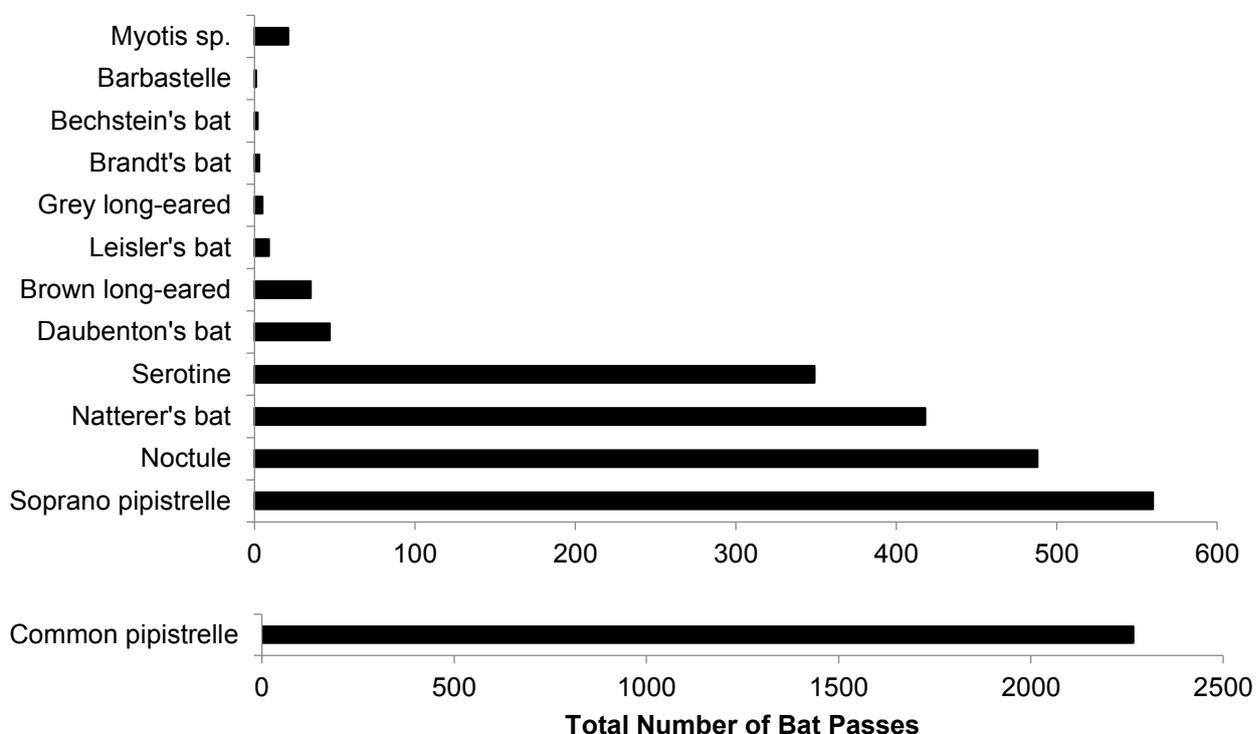


Figure 1. Total number of bat passes from each species, common pipistrelle is shown on a different axis

The most abundant species recorded during the two week period was the common pipistrelle, followed by the soprano pipistrelle and noctule. Five UK BAP Priority species were recorded: soprano pipistrelle, noctule, brown long-eared bat, Bechstein's bat and barbastelle, with the latter two also being Habitats Directive Annex II species.

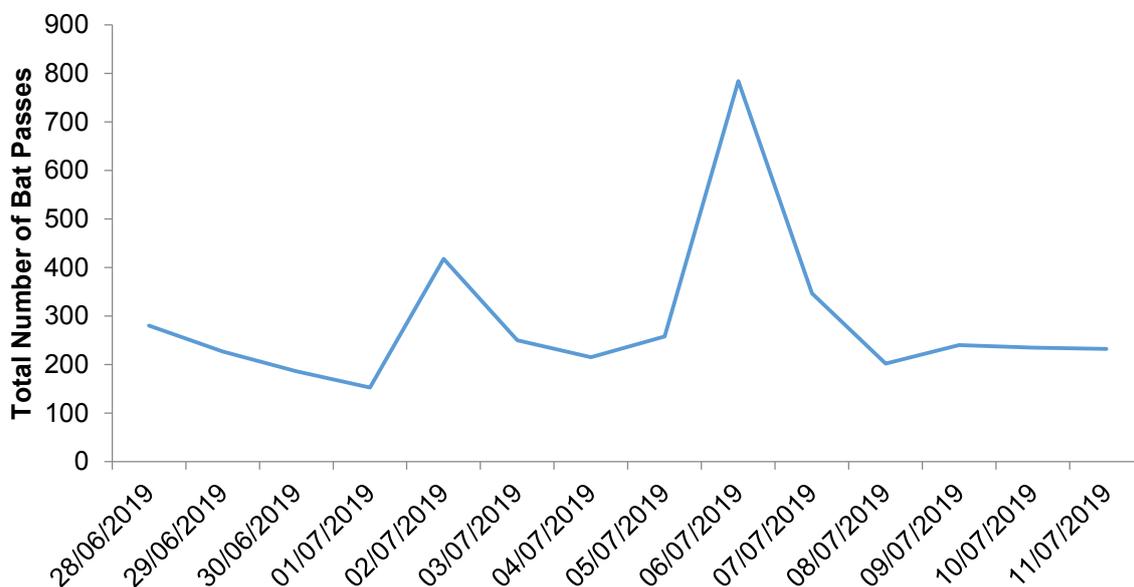


Figure 2. Total number of bat passes from all species across the two week period

The base level of bat activity appears to be constant, with no fewer than 153 bat passes recorded on a single day, and the mean number of passes being 263. Total activity peaked twice, once on the 2nd July and once on 6th July. There is no clear explanation for this, as climatic conditions remained consistent throughout the survey period, with no rain or other extremes of weather recorded.

Bat activity was highest in two windows as expected (see Figure 3), at dusk between 21:30 and 23:00, and at dawn, 02:30 to 04:30. The species with the earliest peak activity were the common and soprano pipistrelles at 22:00, followed by serotine, noctule and natterer's bat at 22:30. Natterer's bat and common pipistrelle showed a second peak in activity at 03:00 and 03:30 respectively, whilst the other three species were less active during this second window.

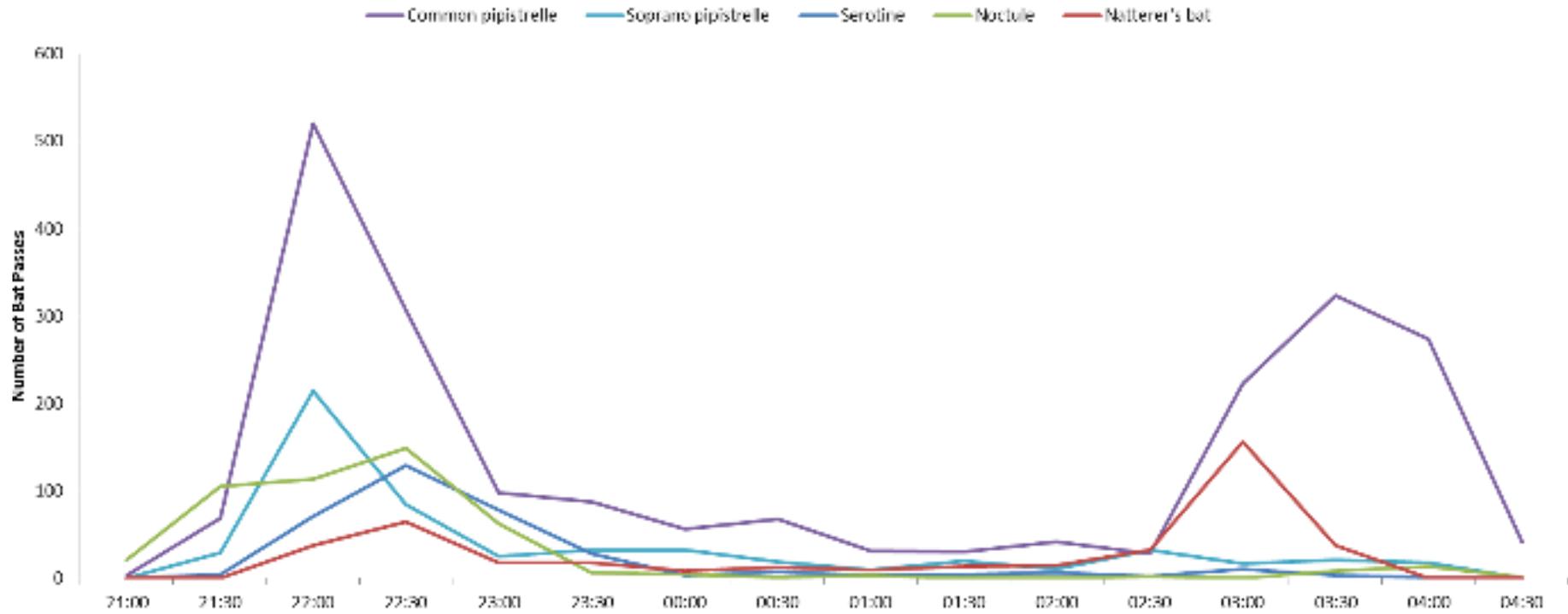


Figure 3. Number of bat passes from the five most active species at Barton meadows according to the times at which they were recorded

5. DISCUSSION AND RECOMMENDATIONS

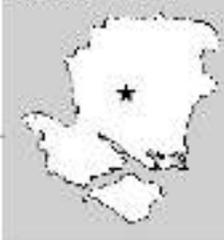
Twelve bat species were recorded in close proximity to the treeline; five of these were UK BAP Priority species and two were Habitats Directive Annex II species. This indicates that the treeline provides an important feature for a wide variety of bat species within the landscape. During the treeline passes surveys, common pipistrelles, soprano pipistrelles, serotines, noctules and *Myotis* sp. were directly observed using the treeline, foraging and feeding on invertebrates around the vegetation. In addition, these species were also observed commuting along the tree line both in a west and an east direction. Bat foraging activity was also recorded around the perimeter of the site and along the main hedgerow which bisects the site splitting the west and east sides.

It is therefore apparent that Barton Meadows is an important site for bats, containing a number of features which are regularly used by a wide variety of species. In particular, the main treeline which has been discussed in detail in this report should be considered a feature of vital importance to bats within the local landscape.

6. REFERENCES

- **Collins, J. (2016).** *Bat Surveys for Professional Ecologists: Good Practice Guidelines, 3rd edition.* The Bat Conservation Trust, London.
- **Institution of Lighting Professionals (2018).** *Bats and Artificial Lighting in the UK: Bats and the Built Environment Series. Guidance Note 08/18.* Institution of Lighting Professionals / Bat Conservation Trust
- **Russ, J. (2012).** *British Bat Calls. A guide to species identification.* Pelagic Publishing, Exeter

MAPS



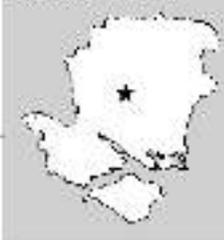
Map 1. Site Location

Barton Meadows

Scale 1:40000



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Map 2. Treeline Surveys: Surveyor and Detector Locations

Barton Meadows

Scale 1:2000



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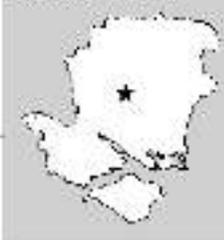
Map 3. Bat Transect Survey Route

Barton Meadows

Scale 1:4000



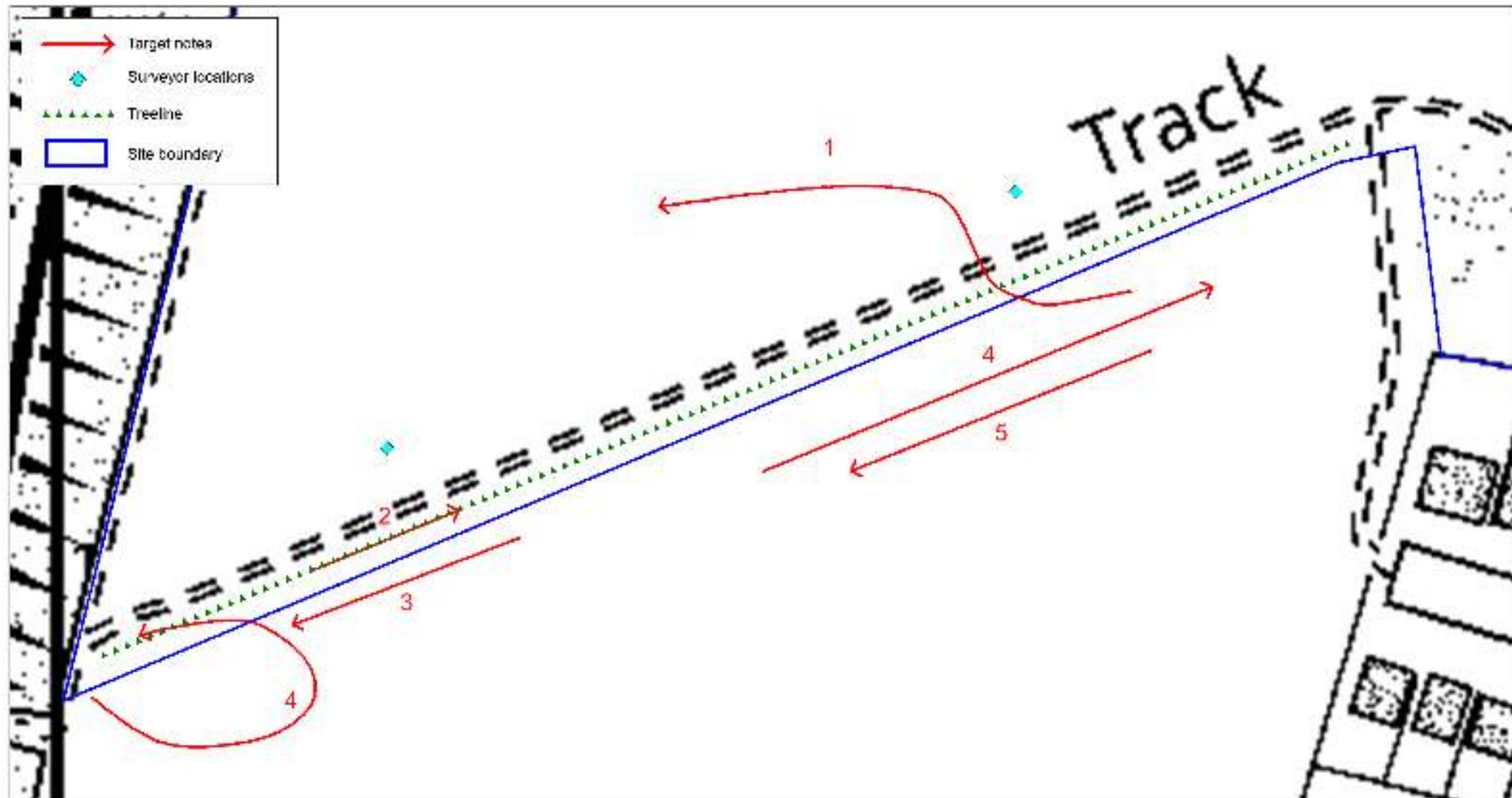
Map prepared by Arcadis on behalf of Leekhampton Wildlife Trust (OS Grid Reference: SJ22001001801)
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 For more information, contact: Leekhampton Wildlife Trust, 100, Leekhampton Road, Leekhampton, Leamington Spa, CV32 9JF.
 Tel: 01482 274455

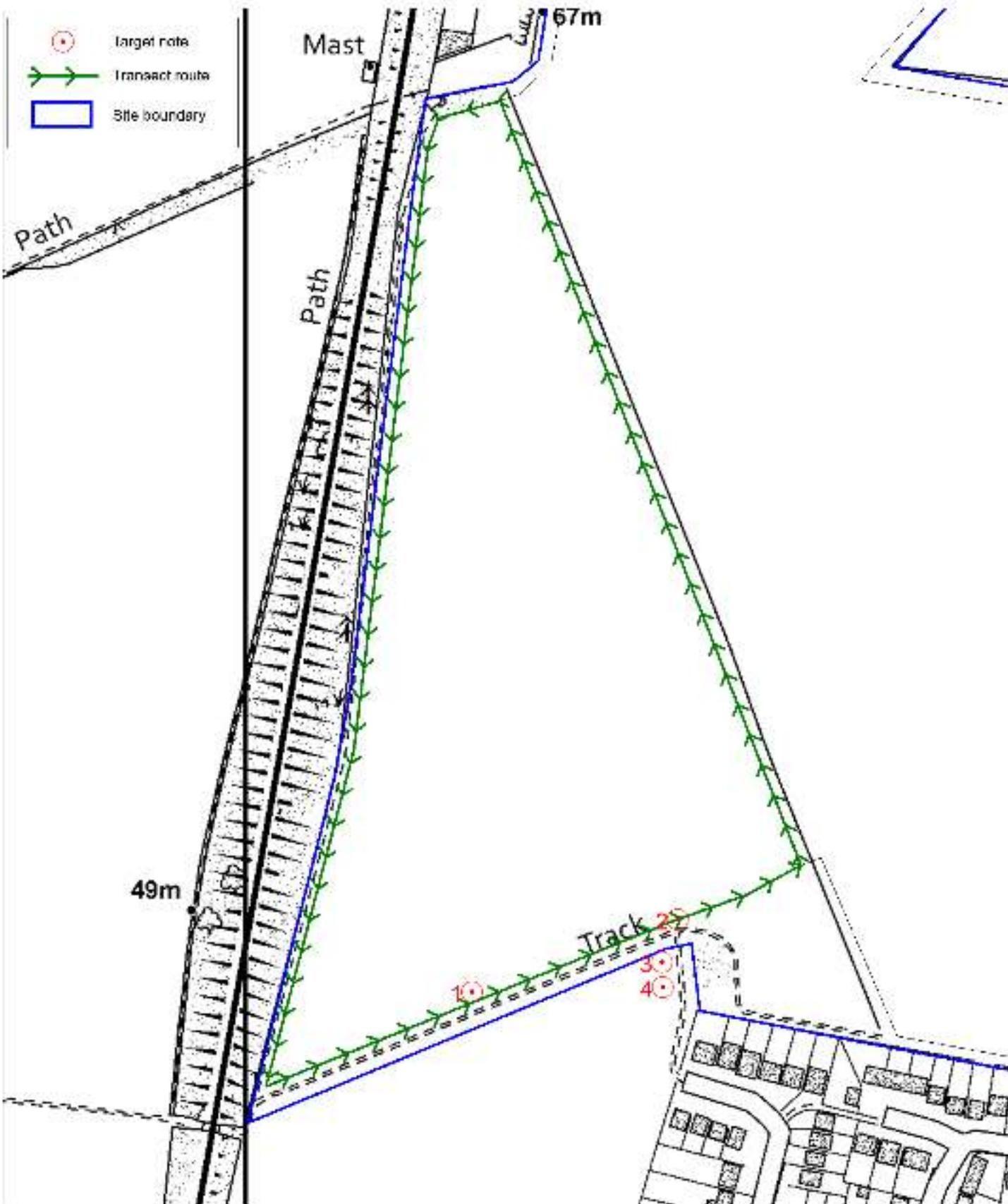
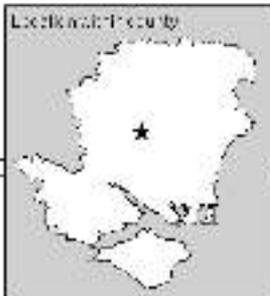


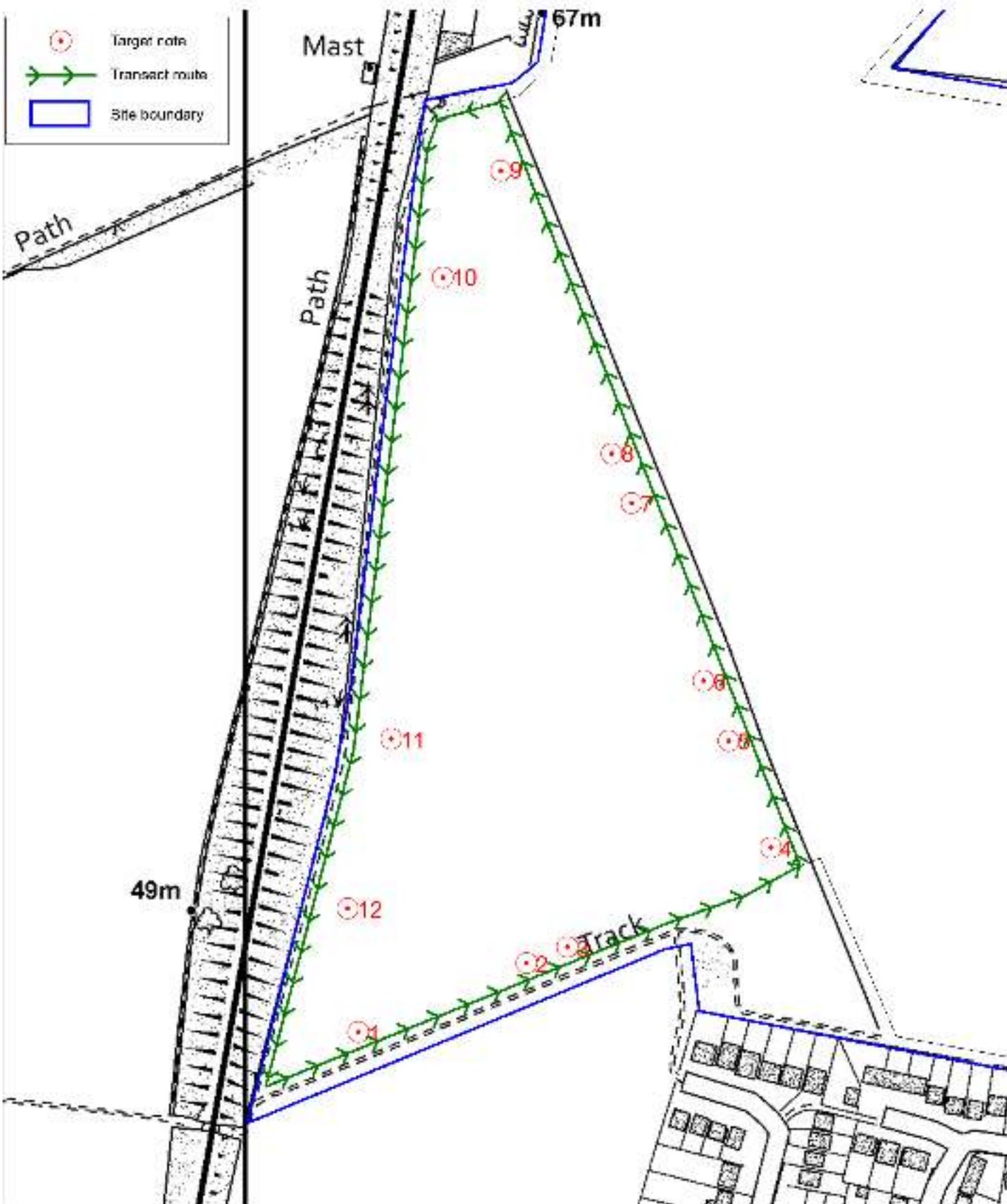
Map 4. Treeline Passes Survey: 27th June 2019

Barton Meadows

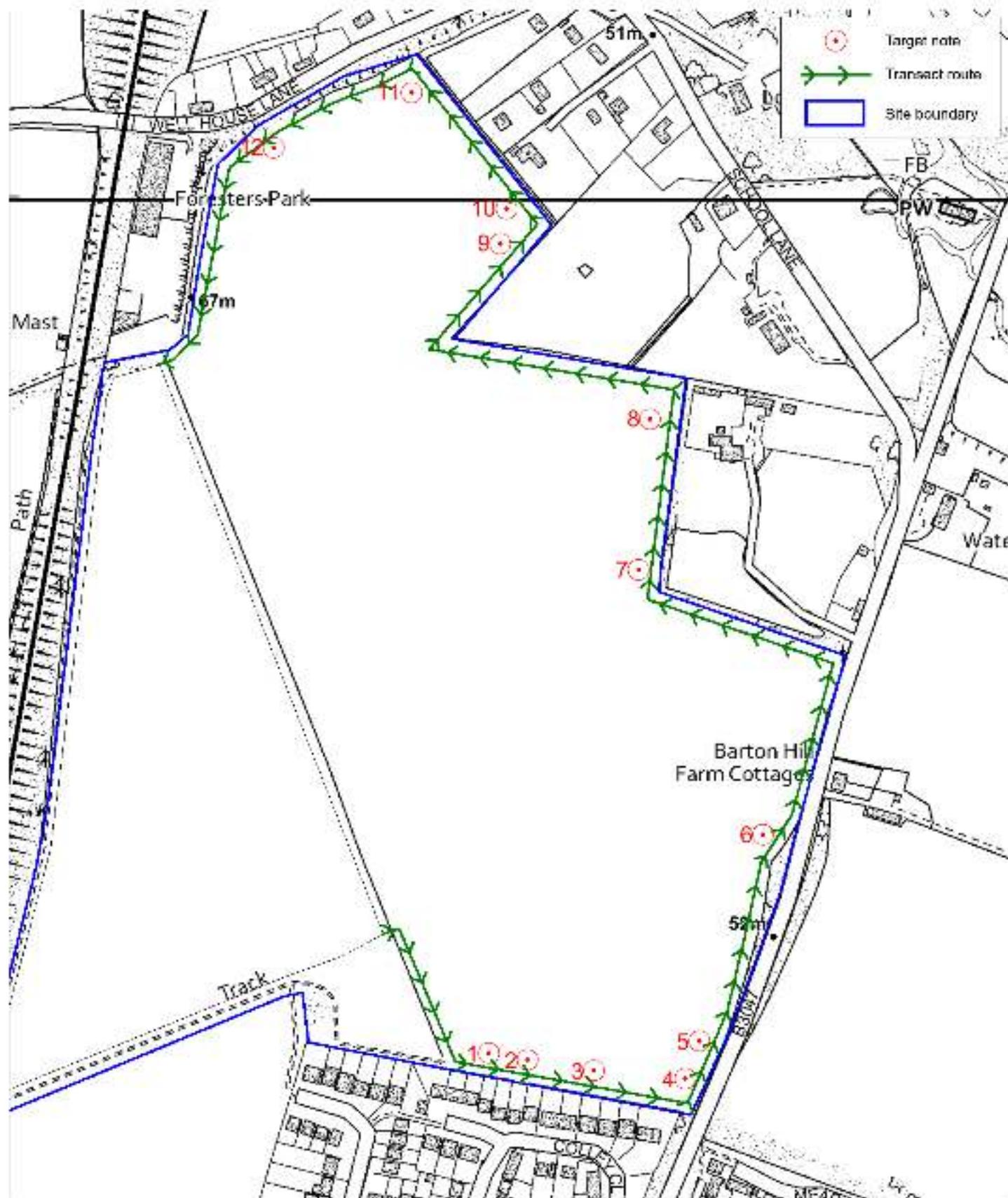
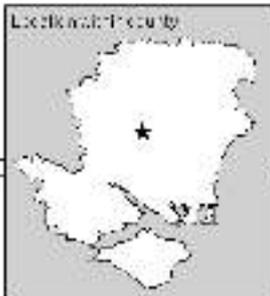
Scale 1:1000







Map prepared using a combination of aerial photography and ground truthing. All distances are approximate and should be used as a guide only. Data is provided for information only and is not to be used for any other purpose. Produced on 4 November 2019 by AgriTech. For more information, contact AgriTech at 01482 774455.



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