



This report has been prepared by WSP on behalf of Highways England in relation to the A27 Arundel Bypass project ('the Scheme').

This report contains interim ecological baseline survey findings relating to surveys undertaken for the Scheme between spring 2017 and spring 2018 inclusive. These surveys were undertaken during Highways England Project Control Framework Stage 2 (option selection), prior to the 2018 Preferred Route Announcement, and relate to Options 1, 3 and Option 5A as shown at the non-statutory public consultation held for the Scheme in 2018.

It is intended that the baseline data presented in this report will be updated as appropriate as the Scheme continues to be developed.



Highways England

BAT RADIO - TRACKING INTERIM BASELINE REPORT

A27 Arundel Bypass





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EXECUTIVE SUMMARY

WSP was commissioned by Highways England to undertake a bat radio-tracking survey for the A27 Arundel Bypass Scheme in Arundel (the Scheme).

The purpose of the survey was to determine the importance of the Field Survey Area for bats. The Field Survey Area comprises an area between Long lane in the north, [REDACTED] in the south to Slindon in the west and Crossbush in the east. This report presents the interim results of bat radio-tracking surveys completed in 2017. Surveys and data analyses for the Field Survey Area are ongoing.

Trapping and radio-tracking of bats was undertaken across 24 locations within the Field Survey Area, over three trapping 'sessions' throughout the period of year during which bats are active.

A total of 129 bats of nine species were captured over ten trapping nights between 24th July and 21st September 2017. The nine-species captured were Alcahloe bat, barbastelle, Bechstein's bat, Daubenton's bat, Natterer's bat, whiskered bat, brown long-eared bat, common pipistrelle, and soprano pipistrelle

Breeding females of the following eight species were trapped: Alcahloe bat, Bechstein's bat, Daubenton's bat, Natterer's bat, whiskered bat, brown long-eared bat, common pipistrelle, and soprano pipistrelle. This indicates that breeding colonies of all of these species are present within or in close proximity to the Field Survey Area, bats from which move through or across the Field Survey Area between roosting and foraging sites.

Radio-transmitters were fitted to 30 bats of seven species. Individual bats selected for radio-tagging were those that met appropriate welfare conditions (suitable weight, breeding status and general health). The radio-tracking survey identified roosting locations, flight lines and home ranges (when enough data was collected) of the radio-tagged bats. 27 roosting locations within the Field Survey Area were identified.

At least two breeding colonies of Bechstein's bat are present within the Field Survey Area. One identified by AEWC Ltd (2017) surveys south of Tortington Common and one in Steward's Copse were shown by this study to comprise four separate maternity tree roosts.

At least two breeding colonies of Alcahloe bat are present within the Field Survey Area, with four maternity roosts at the Barn's Copse woodland block and one maternity roost within a separate woodland block in Steward's Copse.

Development of the Scheme may affect roosts, flight lines and foraging areas of the species identified in this survey. Further studies are recommended to inform later stages of the Scheme.

The radio-tracking and bat activity surveys undertaken have shown that at least 14 species of bat are present in the Scheme Options footprint. These include a diverse assemblage of woodland



species; breeding and foraging Annex II species; and the most southerly known breeding colony of Alcaethoe bat in the UK. The data collected to date indicates that the bat population of the Field Survey Area is potentially of National Importance.

1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1. The scope of the A27 Arundel Bypass scheme as described in the Road Investment Strategy¹ is: “The replacement of the existing single carriageway road with a dual carriageway bypass, linking together the two existing dual carriageway sections of the road”.
- 1.1.2. This corresponds to the six-kilometre section of the A27 from the A284 Crossbush junction (east of Arundel) to the west of Yapton Lane (west of Arundel). The existing A27 currently traverses the South Downs National Park and the town of Arundel passing over the River Arun and crossing the Arun Valley Railway Line.
- 1.1.3. The Scheme Options taken forward to the Public Consultation were Options 1, Option 3 and Option 5A. These are briefly described individually below.
- **Option 1** consists of new dual carriageway from Crossbush junction south of the current A27 to the south-west of Arundel railway station, joining the A27 east of Ford Road, with a new bridge over the River Arun alongside the existing bridge. From Ford Road roundabout, which will be signalised, the existing A27 would be widened to dual carriageway.
 - **Option 3** is an off-line route from the existing A27 alignment. Option 3 would consist of a new dual carriageway corridor along its entire length. The proposed alignment will then be joined to the existing A27 via an extension of the existing infrastructure at Crossbush Junction. The alignment that runs westwards across the floodplain south of Tortington Priory and requires two new overbridges, firstly over the Arun Valley Railway Line and secondly over the River Arun. Its alignment diverges north through the Binsted Woods, Tortington Common and South Downs National Park, re-joining the existing A27 at Havenwood Park. It requires four new underbridges at Old Scotland Lane, Binsted Lane, Tortington Lane and at Ford Road.
 - **Option 5A** is a new dual carriageway from Crossbush junction south of the current A27. The alignment crosses the Arun Valley Railway, continuing west across the floodplain, over Ford Road, running south of Tortington Priory Scheduled Monument before going north through the Binsted Wood complex and the South Downs National Park, re-joining the existing A27 at a new junction near Yapton Lane.
- 1.1.4. When referred to the combined footprint of the Scheme (all options), the term ‘Scheme Options’ is used in this report. When discussing the footprint of any single option, the option number is referred to i.e. Option 1, Option 3 or Option 5A.
- 1.1.5. The bat radio-tracking surveys were undertaken within a Field Survey Area extending to 1km from the outer boundary of the Scheme Options footprint. The full geographical extent of the Field Survey Area comprises a land parcel stretching from Long lane in the north, [REDACTED] in the south to Slindon in the west and Crossbush in the east.

¹ Road Investment Strategy: for the 2015/2016 – 2019/2020 Road Period, Department for Transport, March 2015

1.1.6. This report presents the interim results of bat radio-tracking surveys completed in 2017. Surveys and data analyses for the Field Survey Area are ongoing with further surveys planned to be undertaken in 2018.

1.2 ECOLOGICAL BACKGROUND

1.2.1. The Field Survey Area contains habitat considered to be of high suitability for bats², comprising continuous high-quality habitat which is well connected to the wider landscape by features such as a river floodplain, tree-lined watercourses, extensive hedgerows and large areas of ancient woodland. This complex of available habitat is suitable to support a wide assemblage of bat species, including rare woodland bats.

1.2.2. The following additional studies concerning bats (reported separately) were also undertaken to inform the Scheme:

- Bat activity transect surveys;
- Bat static automated surveys;
- Local Effects (or Crossing Point) surveys;
- Landscape Scale Effects surveys;
- Preliminary Bat Roost Assessments on trees and structures within the Field Survey Area; and
- Hibernation roost surveys.

1.2.3. The bat activity transects and automated surveys and roost surveys were undertaken with reference to good practice guidance³. Local effects and landscape scale effects surveys were undertaken with reference to the Defra guidance⁴.

1.2.4. The surveys listed above confirmed the presence of EU Habitat Directive Annex II bat species Bechstein's bat *Myotis bechsteinii* and barbastelle *Barbastella barbastellus* roosting within the Field Survey Area, as well as the 'very rare'⁵ Alcathe bat *Myotis alcathoe*.

1.2.5. The surveys provided a bat species list for the Field Survey Area. The presence of grey long-eared bat *Plecotus austriacus* has not been ruled out, and further radio-tracking work in 2018 may confirm its presence.

1.2.6. Bat roost assessments identified 237 trees containing multiple potential roost features. Further surveys are proposed to identify bat roosts within the Field Survey Area.

1.2.7. Activity surveys undertaken by WSP in 2017⁶ confirmed the presence of two additional species to those identified by this study, Leisler's bat *Nyctalus leisleri* and greater horseshoe bat *Rhinolophus ferrumequinum*, within the Field Survey Area.

² Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.). The Bat Conservation Trust, London. Table 4.1.

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

⁴ Berthinussen & Altringham (2015) WC1060 'Development of a cost-effective method for monitoring the effectiveness of mitigation for bats crossing linear transport infrastructure'

⁵ As stated in Desk Study Results, taken from the Sussex bat group local distribution information on this species. Also listed nationally as 'data deficient'.

⁶ WSP (2017) A27_ECO_BAT_BAT ACTIVITY INTERIM-BASELINE REPORT

- 1.2.8. Highways England is undertaking an Environmental Impact Assessment of the Scheme Options. Information on bats is required to help Scheme Option selection and ultimately to inform an Environmental Impact Assessment of the preferred Scheme Option.

1.3 SUMMARY OF RADIO-TRACKING SURVEY WORK UNDERTAKEN TO DATE

- 1.3.1. AEWG Ltd undertook bat trapping surveys at Binsted Woods, Arundel on behalf of the Mid-Arun Valley Environmental Survey Group (MAVES) in May 2016⁷. In total, 11 species of bat were caught including barbastelle, Alcahioe bat, Bechstein's bat, whiskered bat *Myotis mystacinus*, Natterer's bat *Myotis nattererii*, brown long-eared bat *Plecotus auritus*, Nathusius' pipistrelle *Pipistrellus nathusii*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctula*, and serotine *Eptesicus serotinus*.
- 1.3.2. During the trapping and radio-tracking survey undertaken by AEWG Ltd in 2016, four bats were radio-tracked. These were one of each of: Alcahioe bat, barbastelle, Bechstein's bat and serotine. These surveys identified roosts of Alcahioe bat, barbastelle and Bechstein's bat within Binsted Woods and a serotine colony in Barnham, approximately 3km from the Field Survey Area.
- 1.3.3. The barbastelle roost could not be observed from the ground but was considered likely to be a solitary roost or a roost for a low number of individual bats. However, maternity roosts of this species have previously been recorded in nearby Slindon, approximately 1km from the Field Survey Area⁸.
- 1.3.4. The breeding colony of Bechstein's bat was identified in a tree south of Tortington Common [REDACTED] with a total of 26 Bechstein's bats emerging from the roost.
- 1.3.5. The Alcahioe bat roost was not considered to be a maternity roost, however, several breeding females and juvenile bats were caught in the trapping surveys, indicating the presence of a breeding colony of this species within the Field Survey Area.
- 1.3.6. A maternity colony of serotine, located in Barham, was identified by the surveys. The trapping and radio-tracking surveys also confirmed other breeding species to be present within the Field Survey Area, including Natterer's bat.
- 1.3.7. AEWG Ltd carried out further trapping and radio-tracking surveys in May 2017⁹ within the Field Survey Area. Nine species of bat were caught comprising barbastelle, Bechstein's bat, Alcahioe bat, whiskered bat, Natterer's bat, Daubenton's bat *Myotis daubentonii*, brown long-eared bat, common pipistrelle and soprano pipistrelle. Two further roosts of Alcahioe bat [REDACTED] and two roosts of Bechstein's bat [REDACTED] were identified during these surveys.

⁷ Whitby, D. (2016) *Bat Survey and Trapping Survey, Binsted Woods*. Animal Ecology and Wildlife Consultants Ltd.

⁸ Data received from Sussex Biological Records Centre

⁹ Whitby, D. (2017) *Bat Survey, Trapping Survey Interim report of results Binsted Woods*. AEWG Ltd. Private publication

- 1.3.8. The records of the radio-tracking surveys undertaken by AEWC were considered relevant where they were located within the Field Survey Area and are therefore included within the findings of previous surveys undertaken within the Field Survey Area.

1.4 AIMS AND OBJECTIVES

- 1.4.1. The objectives of the study were to:

- Determine the importance of the Field Survey Area for bats and identify key areas of bat activity to inform the EIA on the likely impacts on bats of the Scheme; and
- Determine if breeding colonies of Annex II species such as Bechstein's bat and/or barbastelle and other rare woodland bat species are present within the Field Survey Area.

- 1.4.2. WSP was commissioned by Highways England to:

- Undertake a detailed desk study;
- Undertake field surveys to establish the presence of Annex II bat species including Bechstein's bat and barbastelle, as well as other woodland bat species (Alcathoe bat, Brandt's bat *Myotis brandtii*, whiskered bat, Daubenton's bat, Natterer's bat, and brown long-eared bat);
- Conduct non-invasive DNA analysis on small *Myotis* bats (whiskered bat/ Brandt's bat/ Alcathoe bat) in order to confirm the species;
- If captured within the Field Survey Area, to radio-tag a maximum number of: ten Alcathoe bats, four Brandt's bats, four whiskered bats, ten barbastelles, ten Bechstein's bats, four Daubentons bats, four Natterer's bats and four brown long-eared bats; and
- Locate bat roosts, identify foraging areas related to key roost sites such as those used for breeding and identify flight lines connecting roosts and feeding grounds within the Field Survey Area.

- 1.4.3. This report presents the method and results of the radio-tracking surveys undertaken in 2017. The contents of this report represent interim baseline survey findings collected at Project Control Framework Stage 2 (option selection).

- 1.4.4. It should be noted that bat roosting surveys and bat activity surveys are reported within separate reports¹⁰. The results of the other bat surveys have been included within this report, where applicable.

¹⁰ WSP (2017) A27_ECO_BAT_BAT HABITAT AND TREE ROOST INTERIM-BASELINE REPORT

2 METHODS

2.1 STUDY AREA

The following study areas were used for desk study and field survey work:

- Desk Study Area – extending to a distance of 6km from the outer boundary of the Scheme Options footprint, within which bat records were obtained from the Sussex Biological Records Centre (hereafter the ‘Desk Study Area’). This distance was selected based on the furthest bat core sustenance zone¹¹.
- Field Survey Area – land within 1km of the outer boundary of the Scheme Options footprint (the ‘Field Survey Area’).

2.2 DESK STUDY

- 2.2.1. A desk study was undertaken to collate all records of bats from the last ten years within 6km of the Desk Study Area. Verified records were obtained from the Sussex Biological Records Centre¹¹. This information was supplemented by a review of radio-tracking work undertaken for Mid-Arun Environmental Survey (MAVES) from both May 2016¹² and June 2017¹³.
- 2.2.2. A review of the conservation status of bats recorded within the Field Survey Area in the UK and Sussex¹⁴ was also undertaken to provide context to the discussion section of the report.
- 2.2.3. Sussex Biological Records Centre also provided information on non-statutory designated sites within 6km of the existing A27 that are designated for bats or which contain bats within their citation. The Multi-Agency Geographic Information for the Countryside (MAGIC)¹⁵ website was consulted for National statutory designated sites within 10km of the Field Survey Area, and 30km for Special Areas of Conservation (SAC), where bats are the qualifying feature, in accordance with the Design Manual for Roads and Bridges¹⁶. The Joint Nature Conservation Committee website¹⁷ was also consulted to identify candidate SACs within 30km of the Field Survey Area where bats are the qualifying feature.

2.3 SCOPING

- 2.3.1. The radio-tracking survey work was targeted at eight bat species. Species were selected with reference to their rarity, legislative protection, and/or known susceptibility to impacts from road schemes:
- Barbastelle;
 - Bechstein’s bat;
 - Alcthoë bat;
 - Brandt’s bat;

¹¹ This includes records submitted by the Sussex Bat Group.

¹² Whitby, D. (2016) Bat Survey and Trapping Survey, Binsted Woods AEWC Ltd. Private publication.

¹³ Whitby, D. (2017) Bat Survey, Trapping Survey Interim report of results Binsted Woods. AEWC Ltd. Private publication

¹⁴ <http://www.sussexbatgroup.org.uk/batsinsussex> Accessed 13 September 2017

¹⁵ <http://www.natureonthemap.naturalengland.org.uk/> Accessed 2017

¹⁶ DMRB volume 11 section 4 (2009) Assessment of Implications (of highways and/or roads projects).

¹⁷ <http://jncc.defra.gov.uk/page-1458-> Accessed 2017

- Whiskered bat.
- Daubenton's bat;
- Natterer's bat; and
- Brown long-eared bat.

2.3.2. Seven of the eight target species were caught and radio-tagged. Brandt's bat was not tagged during the 2017 surveys.

2.3.3. Female bats (and, reproductive females) were preferentially selected for radio-tagging in preference to male bats, as this enables the identification of maternity roosts which are of higher conservation significance. Bats which were heavily pregnant or were underweight were not selected for radiotracking due to potential welfare risks for the bat.

2.3.4. All bats were caught, handled and radio-tracked under a project licence from Natural England¹⁸.

IDENTIFICATION OF TARGET AREAS

2.3.5. Aerial photographs and OS maps were examined to identify the distribution of suitable habitats within the landscape and the connectivity of features for bats so as to determine the most appropriate locations at which to trap bats. Trapping locations were typically within 250 metres of the Scheme Options. The following features were considered during the identification of trapping locations:

- The Field Survey Area;
- The Scheme Option footprints; and,
- Habitat features which could be used by bats to move across the Field Survey Area, such as hedgerows and tree lines that connect woodland blocks and other suitable foraging habitats.

2.3.6. The names of woodlands referenced in this report are provided in Figure 1.2 (Appendix C)

- North Area. Area of 167 hectares comprising east of Goblestubb's Copse (north of the current A27 Road), west of Tortington Common, Scotland Barn, Paine's Wood, Winchers Copse, Singer's Piece, Pinewoods, Tortington Common (north) and north of Binsted Wood. The habitats within this area comprise woodland, arable land, pastures and hedgerows.
- South Area. Area of 167 hectares comprising Ash Piece, Binsted Wood (south), Pinewoods (south), Spinningwheel Copse, Binsted Park, The Shaw, Lake Copse, The Lag, Tortington Common (south) and fields and small woodland copses south of Tortington Common. The habitats in this area comprise woodland, arable fields, arable land, hedgerows and wet ditches.
- East Area. Area of 287 hectares comprising The Waterwoods, Arundel Park, Tortington Common (east), Steward's Copse, Tortington Priory Farm and surrounding fields and Watermeadows (west). The habitats in this area comprise woodland, arable land, pastures, River Arun, hedgerows and wet ditches.
- West Area. 287 hectares comprising east of Danes Wood (north of the current A27 Road), east of Goblestubb's Copse (north of A27 Road), Brickkiln Copse, Threecomer Wood, Scotland Barn, Pedler's Croft, Barn's Copse, Avisford Park Golf Course and Binsted Village. The habitats in this

¹⁸ Natural England licence number 2017-30132-SCI-SCI

area comprise woodland, arable land, amenity grassland in the form of the golf course grounds, wet ditches and hedgerows.

SCOPING SURVEY

- 2.3.7. A scoping survey was undertaken to identify the most appropriate trapping locations within the Field Survey Area at which to trap the target bat species. A site walkover assessment was carried out at each location, prior to each trapping night, to identify access points for the harp-trap set up.
- 2.3.8. This scoping survey was undertaken from 10th to 14th July 2017, covering the period when juvenile bats would be able to fly. Grid references of the trapping locations are shown in Table 2-1 and Figure 2.1.

Table 2-1 - Trapping locations considered during the Scoping survey

Trapping location	Date	Easting	Northing	Description
TL 1	10/07/2017	498996	105926	Lake Copse (north). Woodland habitat
TL 2	10/07/2017	499091	105850	Lake Copse (south). Woodland habitat
TL 3	10/07/2017	498927	106312	Ash Piece. Woodland corridor between arable land.
TL 4	10/07/2017	499255	106222	South of Binsted Wood. Woodland habitat
TL 5	10/07/2017	498437	107167	Point G Brickkiln Copse. Woodland habitat
TL 6	10/07/2017	498466	106719	Point W. Pedler's Croft, south of Old Scotland Lane (Path). Woodland habitat
TL 7	10/07/2017	497994	106952	Point H North east compartment of Barn's Copse. Woodland habitat
TL 8	10/07/2017	497740	106657	Point I South west compartment of Barn's Copse. Woodland habitat
TL 9	12/07/2017	499946	107050	Scotland Barn. Woodland habitat
TL 10	12/07/2017	500700	105870	South of Tortington Priory Farm. Small

Trapping location	Date	Easting	Northing	Description
				woodland copse with interconnecting hedge lines.
TL 11	12/07/2017	499270	107186	Paine's Wood. Woodland habitat
TL 12	12/07/2017	499317	106267	South of Binsted Wood. Woodland habitat
TL 13	12/07/2017	499518	106340	South of Tortington Common. Woodland habitat
TL 14	12/07/2017	499276	106507	Binsted Wood. Woodland habitat
TL 15	12/07/2017	499618	106463	Tortington Common. Woodland habitat
TL 16	13/07/2017	500782	107445	North of The Waterwoods. Woodland habitat.
TL 17	13/07/2017	500729	107183	The Waterwoods (west). Woodland habitat
TL 18	13/07/2017	501028	107285	The Waterwoods (east). Woodland habitat
TL 19	14/07/2017	500261	107039	Steward's Copse. Woodland habitat
TL 20	14/07/2017	500334	1069898	Steward's Copse. Woodland habitat
TL 21	14/07/2017	500403	106984	Steward's Copse. Woodland habitat

2.4 FIELD SURVEY

TRAPPING AND TRACKING SURVEYS

2.4.1. Trapping surveys, using harp traps and lures, were carried out during each of the following trapping sessions:

- 24th to 26th July 2017;
- 21st to 23rd August 2017;
- 13th to 14th September 2017; and
- 20th to 21st September 2017.

2.4.2. Trapping locations during each trapping session are shown in Figures 2.1 to 2.4, and Tables 2-2 to 2-4. The survey comprised 10 nights of trapping from July to September 2017.

Table 2-2 - Trapping locations for trapping survey, July 2017

Trapping location	Date	Easting	Northing	Description
TL 1	24/07/2017	500311	106993	North of Steward's Copse. Woodland habitat.
TL 2	24/07/2017	500352	106894	Steward's Copse (central). Woodland habitat.
TL 3	24/07/2017	500405	106861	Steward's Copse (central). Woodland habitat.
TL 4	24/07/2017	500551	106640	Steward's Copse (south east). Woodland habitat.
TL 5	24/07/2017	498468	107145	Brickkiln Copse. Woodland habitat.
TL 6	24/07/2017	498047	106976	Barn's Copse (east). Woodland habitat.
TL 7	24/07/2017	497794	106641	Barn's Copse (south). Woodland habitat.
TL 8	24/07/2017	498467	106714	Pedler's Croft. Woodland habitat.
TL 9	25/07/2017	499075	105827	Lake Copse. Woodland habitat.
TL 10	25/07/2017	499555	106249	Tortington Common (south). Woodland habitat.
TL 11	25/07/2017	499311	106296	Binsted Wood (south west). Woodland habitat.
TL 12	25/07/2017	498906	106233	Ash Piece (south). Woodland habitat.
TL 13	25/07/2017	499867	106220	Tortington Common (south). Woodland habitat.

Trapping location	Date	Easting	Northing	Description
TL 14	25/07/2017	499879	106313	Tortington Common (south). Woodland habitat.
TL 15	25/07/2017	499915	106485	Tortington Common (central). Woodland habitat.
TL 16	25/07/2017	499910	106655	Tortington Common (central). Woodland habitat.
TL 17	26/07/2017	499448	107158	Scotland Barn (west). Woodland habitat.
TL 18	26/07/2017	499693	107126	Scotland Barn (central). Woodland habitat.
TL 19	26/07/2017	499661	106897	Pinewoods (north). Woodland habitat.
T20	26/07/2017	500638	105841	Small woodland copse south of Tortington Priory. Woodland habitat with ponds.
TL 21	26/07/2017	501031	107277	The Waterwoods. Woodland habitat near fishing lakes.
TL 22	26/07/2017	500786	107472	Screens Wood. Woodland habitat.

Table 2-3 - Trapping locations for trapping survey, August 2017

Trapping location	Date	Easting	Northing	Description
TL 1	21/08/2017	499189	106376	Binsted Wood (south). Woodland habitat.
TL 2	21/08/2017	499343	106513	Binsted Wood (central). Woodland habitat.
TL 3	21/08/2017	499251	106227	Binsted Wood (south). Woodland habitat.
TL 4	21/08/2017	498936	106319	Ash Piece (south). Woodland habitat.
TL 5	21/08/2017	498431	107133	Brickkiln Copse. Woodland habitat.
TL 6	21/08/2017	498050	106957	Barn's Copse. Woodland habitat.
TL 7	21/08/2017	497818	106603	Barn's Copse (south). Woodland habitat.
TL 8	21/08/2017	498504	106765	Pedler's Croft. Woodland habitat.
TL 9	21/08/2017	499050	105858	Lake Copse. Woodland habitat.
TL 10	22/08/2017	499910	106655	Tortington Common (central). Woodland habitat.

Trapping location	Date	Easting	Northing	Description
TL 11	22/08/2017	499915	106485	Tortington Common (central). Woodland habitat.
TL 12	22/08/2017	499871	106327	Tortington Common (south). Woodland habitat.
TL 13	22/08/2017	499880	106226	Tortington Common (south). Woodland habitat.
TL 14	22/08/2017	499815	107073	Scotland Barn (east). Woodland habitat.
TL 15	22/08/2017	499443	106962	Scotland Barn (south west). Woodland habitat.
TL 16	22/08/2017	499383	107102	Scotland Barn (west). Woodland habitat.
TL 17	22/08/2017	499225	107209	Paine's Wood. Woodland habitat.
TL 18	23/08/2017	500325	107060	Steward's Copse (north). Woodland habitat.
TL 19	23/08/2017	500271	106998	Steward's Copse (north). Woodland habitat.
TL 20	23/08/2017	500341	106895	Steward's Copse (central). Woodland habitat.
TL 21	23/08/2017	500433	106957	Steward's Copse (north). Woodland habitat.
TL 22	23/08/2017	500865	107359	The Waterwoods. Woodland habitat.
TL 23	23/08/2017	501021	107382	The Waterwoods. Woodland habitat.
TL 24	23/08/2017	500620	105840	Small woodland copse south of Tortington Priory Farm. Woodland habitat.

Table 2-4 - Trapping locations for trapping survey, September 2017

Trapping location	Date	Easting	Northing	Description
TL 1	13/09/2017	499357	106541	Binsted Woods (central). Woodland habitat.
TL 2	13/09/2017	499257	106260	Binsted Woods (south). Woodland habitat.
TL 3	13/09/2017	499188	106368	Binsted Woods, east of Spinningwheel Copse. Woodland habitat.

Trapping location	Date	Easting	Northing	Description
TL 4	13/09/2017	499135	106474	Binsted Woods, north of Spinningwheel Copse. Woodland habitat.
TL 5	13/09/2017	499077	105826	Lake Copse. Woodland habitat
TL 6	13/09/2017	498919	106177	Ash Piece (south). Woodland habitat.
TL 7	13/09/2017	498765	105861	Lake Copse (west). Woodland habitat.
TL 8	13/09/2017	498485	106613	Pedler's Croft. Woodland habitat.
TL 9	13/09/2017	498115	106954	Barn's Copse (east). Woodland habitat.
TL 10	14/09/2017	500422	106973	Steward's Copse (north). Woodland habitat.
TL 11	14/09/2017	500333	106908	Steward's Copse (central). Woodland habitat.
TL 12	14/09/2017	500369	106838	Steward's Copse (central). Woodland habitat.
TL 13	14/09/2017	500463	106597	Steward's Copse (south). Woodland habitat.
TL 14	14/09/2017	500227	106294	Tortington Common (south east). Woodland habitat.
TL 15	20/09/2017	498412	107136	Brickkiln Copse. Woodland habitat.
TL 16	20/09/2017	497893	106944	Barn's Copse (central). Woodland habitat.
TL 17	20/09/2017	497784	106791	Barn's Copse (central). Woodland habitat.
TL 18	20/09/2017	497880	106584	Barn's Copse (south). Woodland habitat.
TL 19	21/09/2017	499513	106242	Tortington Common (south west). Woodland habitat.
TL 20	21/09/2017	499908	106120	Tortington Common (south). Woodland habitat.
TL 21	21/09/2017	499338	106074	Lake Copse (north east) east of Binsted Manor. Woodland habitat.

2.4.3. Trapping surveys were carried out using Faunatech Austbat Harp Traps. A harp trap is a portable trap made from aluminium tubes. A combination of four two-bank (incorporating two-line carriers) and two three-bank (with three-line carriers anecdotally noted for improved retention and catch rates of bats)

harp traps were used for the trapping surveys. The locations selected for placement of traps were selected based on the presence of habitat features commonly used by commuting and/or foraging bats such as woodland habitat, hedgerows and watercourses.

- 2.4.4. Each trap was fitted with a Sussex Autobat acoustic lure to increase the likelihood of catching bats within the Field Survey Area. The acoustic lure simulates a variety of bat social calls. Simulations of barbastelle, Bechstein's bat, Natterer's bat, small Myotis spp. and brown long-eared bat were used.
- 2.4.5. The bats captured in the harp traps were handled by a suitably experienced ecologist, under the direction of the licensed ecologist. Each bat was transferred to an individual clean cloth bag. The bats were identified to species (where possible - see DNA analysis below), sexed, weighed using a light line spring scale, forearm measured using digital callipers, reproductive status ascertained and any other general health observations noted.
- 2.4.6. Bats selected for radio-tagging were retained, so as to have a radio-transmitter attached. All other bats were safely released immediately in close proximity to the site of capture. Bats that were selected for radio-tracking included female bats (and in particular, reproductive females) in preference to male bats, as this enables the identification of maternity roosts which are of higher conservation significance. Additionally, only healthy bats were selected in which the radio-tag only formed 5% of the selected bats respective weight.

DNA ANALYSIS

- 2.4.7. Droppings were collected from the trapped bats and DNA analysis was conducted through the non-invasive method of dropping analysis. This technique was used for small Myotis bats (whiskered bat, Brandt's bat and Alcaethoe bat) when there was uncertainty regarding species identification.
- 2.4.8. Bat droppings were collected from the clean cloth bags in which the bats were held, using gloves to avoid contamination of the sample. Droppings were then transferred into a clean, dry and sterile Eppendorf-type plastic tube. When possible up to five droppings from an individual were added to a sample tube, to allow for a retest if required. The samples were labelled, noting species, sex, biometrics, health status and trapping location of each animal. Samples were then sent for analysis (by University of Exeter).

RADIO-TRACKING SURVEY

- 2.4.9. Only bats in good condition were fitted with radio-tracking transmitters. Bats were weighed to ensure that the weight of the transmitter was always less than 5% of the weight of the bat.
- 2.4.10. Fur was clipped from the area between the shoulder blades of bats selected for tracking. Transmitters were attached to each bat in this position using Skin-Bond® (Pfizer Inc). Each bat was assigned a unique identification number associated with the radio frequency of the transmitter attached to it. This frequency was programmed into the radio receivers carried by the radio-tracking teams.
- 2.4.11. Bats fitted with radio-transmitters were released on the same night of capture in close proximity to the capture site. Bats were not radio-tracked immediately after release to avoid collecting atypical behaviour (due to the experience of being captured and having a radio transmitter fitted). On subsequent survey nights after the capture, bats were tracked from the time they emerged from the roost until they returned to roost, when possible or until the transmitter signal was lost. A day-time roost search team located the tagged bats to enable the emergence surveys (see Section 2.4.20 Emergence Surveys) and to follow the bats from the roost.

- 2.4.12. Bats were radio-tracked using a Biotrack ‘Sika’ receiver and a Yagi 3-element antenna on a height adjustable and portable mast. To determine the position of radio-tagged bats during the day (day time roost location) and night (commuting and foraging locations), bats were radio-tracked on foot and by car by a minimum of two surveyors. Following this, 360-degree scans of the area were carried out and compass bearing noted on the strongest signal which determined the approximate location of the bat. A Yagi 5-element antenna was also used to provide information on daytime roosting locations.
- 2.4.13. The position of the bat under study was determined by two methods; triangulation and close-approach:
- Triangulation required a minimum of two radio-tracking teams in different locations taking simultaneous bearings (paired bearings) at regular intervals from the direction of the strongest signal of the bat. Notes were made of the compass bearing of the direction of the strongest signal in order to identify the location of each bat at a given time (this is termed a fix); and
 - The close-approach method required the radio-tracking team to follow an individual bat while making observations of its behaviour and use of habitat when close contact with the bat was maintained.
- 2.4.14. The following information was recorded during each bat recording taken and observation made during the radio-tracking survey:
- Time;
 - Compass bearing;
 - GPS coordinates;
 - Description of bat behaviour; and
 - Weather conditions.
- 2.4.15. Each animal was radio-tracked for up to five sequential nights (depending on the length of time contact with each radio-tagged animal was received). This enabled an estimate of flight lines, home ranges and roost locations to be identified, this was undertaken using the following techniques:
- The positions of the radio-tagged bat at intervals after leaving the roost, were used to identify flight lines between the roost and foraging areas.
 - The data from each night of radio-tracking was added to a cumulative database for each bat and used to estimate the home range of the bat (section Home Range Analysis).
 - Daytime roosting locations were identified from radio-tracked bats. Emergence surveys were subsequently undertaken at these locations to confirm whether they were bat roosts and to count the number of bats emerging from the roost.
- 2.4.16. Tables in Appendix E show the surveyors, dates and equipment used for daytime roost searches and radio-tracking surveys, which were repeated during each survey session.

BAT EMERGENCE SURVEYS

- 2.4.17. Emergence surveys were undertaken at 17 bat roost locations that had been identified by the radio-tracking. The emergence surveys sought to locate the entrance/egress points where possible and to determine the number of bats using the roost. In total, 23 dusk emergence surveys were carried out by experienced bat surveyors in appropriate weather conditions following standard guidelines on

emergence survey procedure¹⁹. Some of these locations received repeat surveys either because they contained multiple tagged bats (to obtain a roost count for potential likelihood of a maternity roost) or due to the roost being occupied during different survey sessions (Appendix E).

- 2.4.18. Observations were made from the outside of the building or tree identified as a roost. Dusk emergence surveys commenced approximately 15 minutes before sunset and lasted for approximately 90 minutes in accordance with best practice methods to confirm use of a bat roost.
- 2.4.19. Real time detectors (Elekon Batlogger M and Wildlife Acoustics EchoMeter Touch) were used to record bat echolocation calls of any emerging bats and to identify species where possible.
- 2.4.20. Canon XA-20 video recorders with the assistance of infra-red lighting were used in conjunction with surveyors' observations during the bat emergence surveys to ensure appropriate coverage of all elevations and to ensure that accurate counts were obtained. The recordings were later examined using VLC media player (version 2.2.6 Umbrella) to ascertain the number of bats (if any) that emerged from the videoed location.
- 2.4.21. All bat passes were noted and all bats were identified to species level, where possible. Echolocation calls were recorded onto Apple iPad Air 2 / iPhone 6 or on the in-built sound card of the detector (Batlogger M). These were subsequently analysed using BatExplorer / Kaleidoscope Pro computer software, which facilitates species identification, by an ecologist with experience of bat call analysis.
- 2.4.22. The findings of the emergence surveys corresponding to the radio-tracked bats are described in the subsections below. Radio-tracked bats are referred to by species and identification number.

Barbastelle

- 2.4.23. The barbastelle roost used by Bat 12 was in an unidentified tree east of Danes Wood, north of the A27. Due to access restrictions during the radio-tracking survey, the tree was not able to be located and no emergence survey was carried out.

Bechstein's Bat

- 2.4.24. Six emergence surveys were carried out at roosts identified for Bechstein's bat:
 - Two emergence surveys were undertaken at a dead leaning oak tree in Steward's Copse [REDACTED] on the 26 and 27 July 2017. The tree contained multiple woodpecker holes suitable to support roosting bats. Bats 4, 5, 7 and 8 were confirmed to roost in this tree.
 - One emergence survey was undertaken at an oak tree [REDACTED] south of the footpath in Steward's copse on the 28 July 2017 at which Bats 4, 5, 7, 8 and 13 were recorded as roosting.
 - Two emergence surveys were undertaken on 23rd and 24th August 2017 at an oak tree with split limbs in Steward's Copse [REDACTED] at which Bats 13 and 28 had

¹⁹ Collins, J. (ed.) 2016, Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition), The Bat Conservation Trust, London.

been recorded roosting during the radio-tracking survey. The roost feature identified on the tree was a woodpecker hole on a tree limb.

- One emergence survey was undertaken on 22nd September 2017 at an ash tree [REDACTED] Tortington Common [REDACTED]. A single large roost feature was visible from ground level in the form of a large branch cavity with occluded bark on a lateral limb. Bat 28 was recorded roosting within the feature during the radio-tracking survey.

Alcathoe Bat

2.4.25. Five emergence surveys were carried out at roosts identified for Alcathoe bat:

- Two emergence surveys were carried out at an oak tree south of Barn's Copse [REDACTED] on 25 July 2017 and 15 September 2017. Bats 1, 9 and 20 were recorded roosting in this tree.

2.4.26. Three emergence surveys were undertaken on 24 August 2017, 14 and 15 September 2017 at an oak tree in the north-west corner of Barn's Copse [REDACTED] Daubenton's bat.

2.4.27. Bat 10 was likely to have roosted in a tree south of Calceto Lane (Figure 3.5). Due to access restrictions, the tree was not located and no emergence survey was carried out.

Natterer's Bat

2.4.28. Five surveys were carried out on roosts identified for Natterer's bat:

- One emergence survey was carried out on 23 August 2017 at an oak tree in Spinningwheel Copse [REDACTED]. The roost feature within this tree was located on the main trunk but could not be observed from ground level. Bat 11 was recorded roosting in the tree during the radio-tracking survey.
- Two surveys were undertaken at an oak tree within a small woodland copse south of Tortington Common [REDACTED] on 14 and 15 September 2017. This tree contained numerous rot holes and branch cavities with occluded edges suitable to support roosting bats. Bat 18 was recorded roosting within this tree.
- One survey was carried out on 21 September 2017 at an ash tree on a steep embankment in Barn's Copse, south of the A27 [REDACTED]. Bat 26 was recorded roosting within this tree.
- One survey was carried out on 22nd September 2017 at a beech tree on the south edge of Binsted Wood [REDACTED]. Two large trunk wounds with cavities and occluded bark edges provided suitable roosting features. Bat 27 was recorded roosting within this tree.

Whiskered Bat

2.4.29. Four surveys were carried out at roosts identified for whiskered bat:

- One survey was carried out on 27 July 2017 at a building [REDACTED] containing gaps under roof tiles suitable for use by roosting bats. Bat 6 was recorded roosting here during the radio-tracking survey.
- One survey was carried out on 25 August 2017 [REDACTED] a residential property with gaps under roof tiles suitable to provide bats access into the roof void. Bat 14 was recorded roosting here during the radio-tracking survey.

- One survey was carried out on 14 September 2017 at a residential property [REDACTED] with gaps under roof tiles providing access points to the roof void. Bat 21 was recorded roosting here during the radio-tracking survey.
- One survey was carried out on 14 September 2017 [REDACTED] a residential property with gaps under roof tiles providing access points to the roof void. Bat 22 was recorded roosting within the roof void during the radio-tracking survey.

Brown long-eared Bat

2.4.30. Three emergence surveys were carried out at roosts identified for brown long-eared bat:

- One emergence survey was undertaken on 28 July 2017 at a willow tree in the south-west corner of Barn's Copse [REDACTED]. More than three woodpecker holes were present at various elevations on the north aspect of the tree trunk. Bat 2 was recorded roosting within the tree during the radio-tracking survey.
- One emergence survey was undertaken on 27 July 2017 [REDACTED]. Roost features evident on the building included at least two access points to the roof void at the west and south gable ends. Bat 3 was recorded roosting within the house during the radio-tracking survey.
- One emergence survey was undertaken on 21 September 2017 at a large oak tree in the south-west corner of Barn's Copse [REDACTED]. Partially visible roosting features were present within the tree canopy. Bats 24 and 25 were recorded roosting within the tree during the radio-tracking survey.

HOME RANGE ANALYSIS

2.4.31. Fixes were estimated from paired compass bearings and locations identified by triangulation using the software package LOAS (version 2.12, Ecological Software Solutions). Information was recorded in a database along with the approximate bat locations obtained using the close-approach method, and were subsequently analysed using BIOTAS (version 2.0 Alpha, Ecological Software Solutions). The results were then imported into QGIS (version 2.18.0) to produce a visual representation of the estimated home ranging areas of bats.

2.4.32. Two methods were used to estimate the home ranges of radio-tracked bats:

- 100% Minimum Convex Polygon (100% MCP) provides the maximum home range. This estimator connects the outermost points on the scatter of mapped locations such that the sum of linkage distances between edge points is minimised. 100% MCP is very sensitive to outliers and requires large data sets for accurate estimations for home range size²⁰. This method does not provide information regarding how an animal uses its home range²¹.
- Kernel Density Estimation (KDE) is a probabilistic approach to home range estimators where the density of fixes is estimated throughout the area used by the animal. Kernel Density

²⁰ Powell, R.A. (2000). Animal home ranges and territories and home ranges estimators. In Research techniques in animal ecology: controversies and consequences. Boitani, L. & Fuller, T.K. (eds) Columbia University Press, New York, USA, pp. 65-110.

²¹ Harris, S., Cresswell, W.J., Forde, P.G., Trehwella, W.J., Woolard, T. and Wray, S. (1990). Home range analysis using radio-tracking data – a review of problems and techniques particularly applied to the study of mammals. Mammal review, 20, 97-123.

Estimation^{22,23,24} is a non-parametric estimator that describes home ranges by means of hierarchical probabilities for the intensity of habitat utilisation, termed isopleths. A series of isopleths can be plotted around the smallest area where the cumulative probability reaches a particular value. For example, the 95% isopleth encompasses the area where the probability of finding an animal is 95% and the 50% isopleth encompasses the area where the probability of finding an animal is 50%.

- 2.4.33. Studies have shown that for a number of environment related reasons, certain parts of the home range of bats are visited more frequently than others^{25,26}. The centre(s) of activity is taken as the area within the home range in which the most fixes occurred during the radio-tracking period. This provides an indication of the part(s) of the home range that the bat is using most intensively. Areas of more intensive use have been termed as the 'core area of the home range' of the animal and may be related to the greater availability of food resources and refuges²⁷.
- 2.4.34. Core areas (95% isopleths) are useful considerations when investigating patterns of behaviour or identifying particular resources^{20,21}. As per the standard approach, the 50% isopleth (median value) was taken as an indicator of the peripheral foraging area.
- 2.4.35. The fixes, MCP, 95% KDE and 50% KDE were plotted onto an OS map to produce visual representation of the home range of each bat radio-tracked. (Figure 3.8-3.14, Appendix C)

2.5 LIMITATIONS AND CONSTRAINTS

- 2.5.1. Both two-bank and three-bank harp traps were utilised during the catching sessions. There is anecdotal evidence that the three-bank is a more efficient harp trap. However, there is no evidence base to support this. Therefore, it is considered that this would have minimal impact on the analysis across the Field Survey Area as a whole. The assessment is therefore considered valid.
- 2.5.2. Trap Locations 23 and 24 were only repeated for one session, instead of the three sessions used for other trapping locations, due to access restrictions. These lower number of catching days have been taken in to account in comparison of survey areas. Therefore, given the large area and number of trapping nights considered as a whole, it is considered that this does not materially affect this assessment.
- 2.5.3. All radio-tracking was carried out from land where access was permitted, public roads and public rights of way. Restricted access to land affected the accuracy of the bearings taken during radio-tracking. If a tracked bat was foraging in an area of land where the strength of the signal was weak (as a consequence of the topography) and/or had disappeared, then it was not possible to ascertain the precise location of the bat. These constraints were overcome using the following methods:

²² Silverman, B.W. (1986). Density estimation for statistics and data analysis. Chapman & Hall. London

²³ Worton, B.J. (1987). A review of models of home range for animal movement. *Ecological Modelling*, 38, 277-298.

²⁴ Worton, B.J. (1989). Kernel methods for estimating the utilization distribution in home-range studies. *Ecology*, 70, 164-168.

²⁵ Adams, L. and Davis, S.D. (1967). Internal anatomy of home range. *Journal of Mammalogy*, 48, 529-536.

²⁶ Dixon, K.R. and Chapman, J.A. (1980). Harmonic mean measure of animal activity areas. *Ecology*, 61, 1040-1044.

²⁷ Samuel, M.D., Pierce, D.J. and Garton, E.O. (1985). Identifying areas of concentrated use within the home range. *Journal of Animal Ecology*, 54, 711-719.

- If the bat was likely to be roosting in land where access was prohibited, multiple bearings were taken from a variety of different locations in a 360-degree radius of the signal direction to get a better estimate of likely roosting locations;
- Where radio-tracking data on bats was deficient, subsequent radio-tracking night(s) concentrated effort on those bats for which data was limited;
- Where radio signals were lost, bearings were taken by a single survey team or with another team or by changing position in the landscape until such time as a better fix was obtained or the signal was regained; and
- If the bat was foraging in an area of land where the signal strength was weak, then the surveyors would move to a more elevated position to obtain a stronger signal.

2.5.4. Due to access restrictions, trapping surveys could not be undertaken in the woodland north of the A27 (Danes Wood and Gobblestubb's Copse), Binsted Park and along the flood plain between Ford Road and A284 Lyminster Road. Trapping surveys were restricted to Public Rights of Way within Scotland Barn, north of Binsted Wood and north of Pinewoods. Access was also restricted to Public Rights of Way for the whole North Area.

2.5.5. All radio-tracking data was achieved by trapping target species and attaching a radio-tag to suitable individuals. This signal emitted from the tag was triangulated, this provided information on roost type, locations and flight lines. Due to the nature of the survey type there were limitations to the data collection, specifically the lack of flight line data identified for Daubenton's bat and brown-long eared bat. No continuous signals were identified for these species, which prevented surveyors from establishing the locations of flight lines and determining commuting routes used by these species. Additionally, only one flight line was identified for Alcathe bat and whiskered bat within the Field Survey Area.

2.5.6. The positions of the radio-tagged bats are received at intervals after leaving the roost, and used to identify flight lines between the roost and foraging areas, therefore flight lines are partially estimated based on the best available data. This is considered as an acceptable limitation, as assumptions on direction and use of landscape features can be made, based on known bat behavioural ecology.

3 RESULTS

3.1 DESK STUDY

DESIGNATED SITES

- 3.1.1. Three SACs designated for bats were identified within 30km of the Field Survey Area. These are: Ebernoe Common SAC, which is located approximately 19km north of the nearest of the three Scheme Options; The Mens SAC, which is located approximately 15km north of the nearest of the three Scheme Options; and Singleton and Cocking Tunnels SAC, which is located approximately 14km north-west of the nearest of the three Scheme Options (see Table 3-1). Barbastelle and Bechstein's bat are qualifying features of these SACs. These SACs are all of International importance.
- 3.1.2. No other sites were identified with bats as qualifying features.

Table 3-1 – Special Areas of Conservations within 300km

Site Designation	Statutory / Non - Statutory	Site Name	Approximate Distance (kilometres) and Direction From Scheme Options			Key Habitat Type
			1	3	5A	
SAC	Statutory	Singleton and Cocking Tunnels	14.1km north-west	13km north-west	12.4km north-west	Man-made structure
SAC	Statutory	The Mens	14.5km north	14.5km north	15.4km north	Woodland / wood pasture
SAC	Statutory	Ebernoe Common	18.1km north	18km north	18.3km north	Woodland / wood pasture

SPECIES RECORDS

- 3.1.3. The desk study identified 35 confirmed or likely bat roosts within the Desk Study Area. The most recent records were from 2015. Sussex Biodiversity Records Centre identified confirmed or likely roosts of the following five bat species: common pipistrelle, soprano pipistrelle, brown long-eared bat, serotine and barbastelle.
- 3.1.4. The recorded bat roosts were widely distributed within the Desk Study Area. The majority of bat roost records were from the area around Slindon Common and Slindon Wood approximately 1km north-west of the Field Survey Area and 1km to the north-east within Arundel Wetland Centre (Figure 1.1). Common pipistrelle roosts were also present around Arundel Castle approximately 0.4km north of the Field Survey Area. Barbastelle roosts were recorded within Poling Copse and Slindon Common / Wood, approximately 1km east and west of the Field Survey Area respectively. All bat records are provided in Appendix D.

3.1.5. The MAVES commissioned bat surveys in 2016 and 2017 to be undertaken by Animal Ecology and Wildlife Consultants²⁸. These surveys identified the following species to be present, predominantly from Binsted Wood Complex LWS. Those with an asterisk (*) were identified by MAVES to be breeding within the Desk Study Area:

- Barbastelle;
- Bechstein's bat*;
- Alcahloe bat*;
- Brandt's bat*;
- Daubenton's bat;
- Natterer's bat*;
- Whiskered bat*;
- Brown long-eared bat*;
- Nathusius' pipistrelle;
- Common pipistrelle;
- Soprano pipistrelle;
- Noctule*;
- and
- Serotine*.

3.1.6. The status²⁹ of each of the above species both locally and nationally is shown in Table 3-2.

Table 3-2 – Relative UK & Local distribution and status of bat species recorded or assumed to be present within the Field Survey Area

Flight strategy	Species	Relative UK Distribution and Status ³⁰	Local Distribution and Status ³¹
Cluttered Habitat Adapted Species	Bechstein's bat	Very rare, (restricted to southern Wales and parts of southern England)	Very rare
	Alcahloe bat	Data deficient	Very rare, hardly known
	Whiskered bat	Widespread, scarce	Widespread, scarce
	Brandt's bat	Widespread, uncommon (slightly less common and widespread than Whiskered bat)	Widespread, scarce

²⁸ Whitby, D (2016 and 2017 – two reports). *Bat Survey Trapping Survey Binsted Woods*. A report by Animal Ecology and Wildlife Consultants for MAVES

²⁹ It should be noted that the distribution and status data was obtained from a national source and a local source, as such terminology may vary

³⁰ Bat Conservation trust (2010) Species Factsheets http://www.bats.org.uk/pages/uk_bats.html Accessed 13 September 2017

³¹ <http://www.sussexbatgroup.org.uk/batsinsussex> Accessed 13 September 2017

Flight strategy	Species	Relative UK Distribution and Status ³⁰	Local Distribution and Status ³¹
	Natterer's bat	Widespread, locally common	Widespread, scarce
	Daubentons bat	Widespread, fairly abundant	Widespread, Fairly abundant
	Brown long-eared bat	Widespread, relatively common	Relatively abundant, widespread
	Grey long-eared bat	Very rare, restricted to southern England	Rare, south coast areas
	Lesser horseshoe bat	Restricted to South West England and Wales, rare	One record
	Greater horseshoe bat	Restricted to the south west England and Wales, Rare	Very rare
Edge Habitat Adapted Species	Barbastelle	Widespread, very rare	Widespread, very rare
	Common pipistrelle	Widespread, common	Widespread, abundant
	Nathusius' pipistrelle	Rare, but widespread, may be under recorded	Widespread, scarce
	Soprano pipistrelle	Widespread, common	Widespread, fairly common
	Serotine	Uncommon, largely restricted to the south of England	Widespread, uncommon
Open Habitat Adapted Species	Leisler's bat	Uncommon, largely restricted to the south of England	Rarely recorded
	Noctule	Widespread, relatively common	Widespread, uncommon

3.1.7. A review of MAGIC³² identified a total of 14 granted Natural England European Protected Species Mitigation Licences relating to bats. The licences include those issued to permit the damage and destruction of breeding sites and resting places. Species covered by these licences are: common pipistrelle; soprano pipistrelle; brown long-eared bat; whiskered/Brandt's bat; serotine; Natterer's bat and barbastelle (Appendix D).

³²<http://www.magic.gov.uk/MagicMap.aspx>: Accessed 14/3/2018

3.2 TRAPPING SURVEYS

3.2.1. A total of 129 bats of 9 different species were captured over 10 trapping nights between 24 July and 21 September 2017 at 24 different locations. Figures 2.1, 2.2, 2.3 and 2.4 show the trapping locations for each trapping session. Trapping data is shown in Table 3-3 and Diagram 3.1, and Appendix A.

Table 3-3 – Trapping results by species

Species	Number of bats
Barbastelle	2
Bechstein's bat	16
Alcathoe bat	10
Whiskered bat	24
Daubenton's bat	1
Natterer's bat	12
Common pipistrelle	4
Soprano pipistrelle	17
Brown long-eared bat	43
Total	129

3.2.2. Tables 3-4 and 3-5 indicate the number of bats caught in each trapping area.

Table 3-4 – Number of bats captured and survey effort per area

Trapping Area	Number of bats (B)	Trapping nights (N)	No. Bats Per Night (B/N)
North	9	3	3.0
South	48	8	6.0
East	44	6	7.3
West	28	5	5.6

Table 3-5 – Trapping results within Field Survey Area

Trapping Area	Species	Number of bats
North	Bechstein's bat	3
	Whiskered bat	3
	Soprano pipistrelle	1
	Brown long-eared bat	2
South	Alcathoe bat	4
	Barbastelle	2
	Bechstein's bat	3
	Natterer's bat	6
	Whiskered bat	13
	Soprano pipistrelle	9
	Brown long-eared bat	11
East	Alcathoe bat	2
	Bechstein's bat	10
	Natterer's bat	3
	Whiskered bat	4
	Common pipistrelle	3
	Soprano pipistrelle	4
	Brown long-eared bat	18
West	Alcathoe bat	4
	Daubenton's bat	1
	Natterer's bat	3
	Whiskered bat	4
	Common pipistrelle	1
	Soprano pipistrelle	3
	Brown long-eared bat	12

3.2.3. When analysing the data by species and areas several peaks are observed:

- Bechstein's bat - a total of 10 bats trapped within the East Area (over 6 nights trapping), 3 bats in North and South Areas (over 11 nights trapping) and no bats in the West Area (over 5 nights trapping).
- Whiskered bat – a total of 13 bats were caught within the South Area (over 8 nights trapping),

- with 4 bats trapped in the East and West Areas (over 11 nights trapping) and 3 in the North Area (over 3 nights trapping).
- Natterer’s bat – in total, 6 bats were captured in the South Area (over 8 nights trapping), with 3 bats captured in the North and East Areas (over 9 nights trapping).
- Soprano pipistrelle – nine bats were trapped in the South Area (over 8 nights trapping).
- Brown long-eared bat – in total 18 bats were caught within the East Area (over 6 nights trapping), with 12 bats within the West Area (over 5 nights trapping) and 11 bats within the South Area (over 8 nights trapping). Two brown long-eared bats were trapped in the North Area (over 3 nights trapping).

3.2.4. Diagram 3.7 shows the trapping results grouped by species and trapping areas.

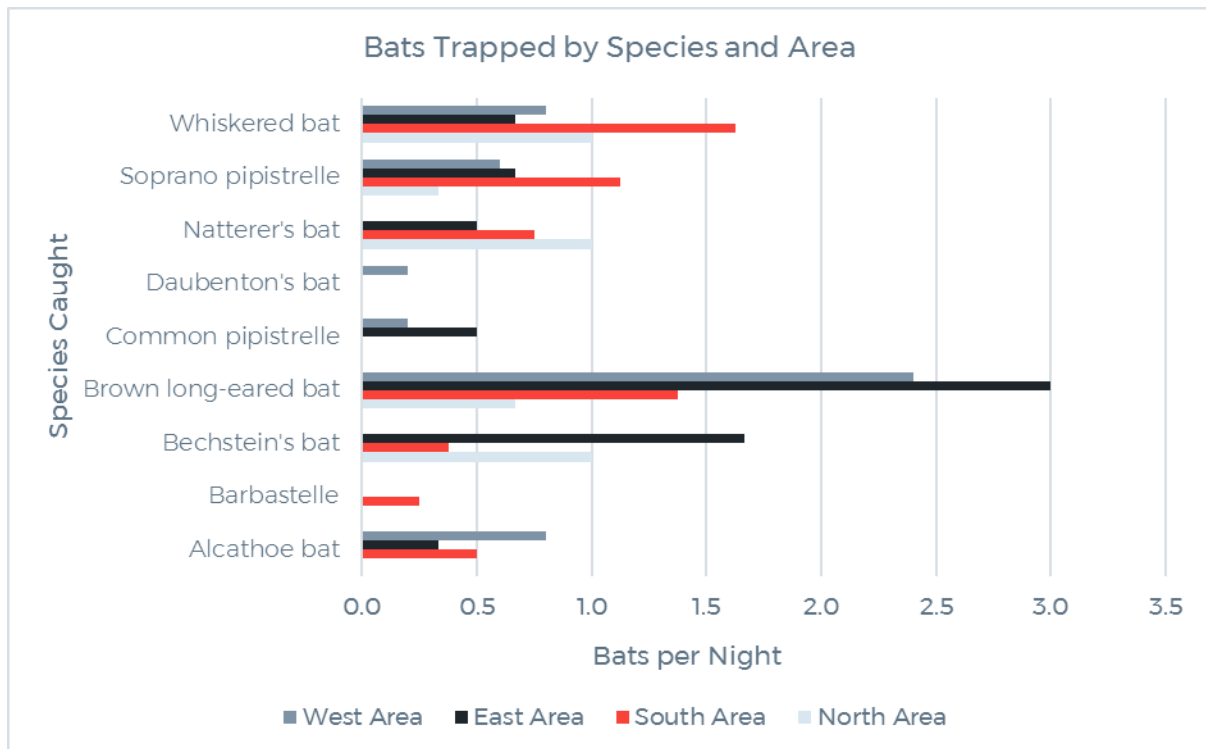


Diagram 3.7. Bats trapped by species and Areas.

3.2.5. Breeding females of the following eight species were trapped: whiskered bat, Alcathoe bat, Bechstein’s bat, Daubenton’s bat, Natterer’s bat, common pipistrelle, soprano pipistrelle and brown long-eared bat (Appendix A).

3.3 ROOSTS

3.3.1. A total of 27 confirmed roosting locations were identified from 30 radio-tracked bats (Table 3-6).

Table 3-6 – Roosts identified during surveys

Roost	Roost ID	Species	Bat identification number	Approximate Coordinates		Emergency survey undertaken (Y/N)
				Easting	Northing	
Oak tree south of Barn's Copse	R1	Alcathoe bat	Bat 1 Bat 9 Bat 20			Y
Oak tree in Barn's Copse	R2	Alcathoe bat	Bat 1			N
Oak tree in Barn's Copse.	R3	Alcathoe bat	Bat 9 Bat 19 Bat 20			Y
Dead oak tree in Steward's Copse	R4	Alcathoe bat	Bat 15			N
Estimated location unidentified tree North of A27 east of Danes Wood	R5	Barbastelle	Bat 12			N
Oak tree in Steward's Copse	R6	Bechstein's bat	Bat 4			N
Dead leaning oak in Steward's Copse with numerous woodpecker holes	R7	Bechstein's bat	Bat 4 Bat 5 Bat 7 Bat 8			Y
Oak tree south of footpath in Steward's Copse	R8	Bechstein's bat	Bat 4 Bat 5 Bat 7 Bat 8			Y
Oak tree with split limbs in Steward's Copse	R9	Bechstein's bat	Bat 13 Bat 28			Y

Roost	Roost ID	Species	Bat identification number	Approximate Coordinates		Emergency survey undertaken (Y/N)
				Easting	Northing	
Ash tree near the southern end of Tortington Common	R10	Bechstein's bat	Bat 28	[REDACTED]	[REDACTED]	Y
Small willow tree in south west corner of Barn's Copse	R11	Brown long-eared bat	Bat 2	[REDACTED]	[REDACTED]	Y
House dwelling, [REDACTED]	R12	Brown long-eared bat	Bat 3	[REDACTED]	[REDACTED]	Y
Oak tree within Steward's Copse, [REDACTED]	R13	Brown long-eared bat	Bat 3	[REDACTED]	[REDACTED]	N
Oak tree in Steward's Copse	R14	Brown long-eared bat	Bat 17	[REDACTED]	[REDACTED]	N
Barn in Arundel Arboretum (north of Scotland Barn)	R15	Brown long-eared bat	Bat 23	[REDACTED]	[REDACTED]	N
Unidentified tree in Avisford Park Golf Course	R16	Brown long-eared bat	Bat 24 Bat 25	[REDACTED]	[REDACTED]	N
Large oak tree in south west corner of Barn's Copse	R17	Brown long-eared bat	Bat 24 Bat 25	[REDACTED]	[REDACTED]	Y

Roost	Roost ID	Species	Bat identification number	Approximate Coordinates		Emergency survey undertaken (Y/N)
				Easting	Northing	
Unidentified tree south of Calceto Lane*	R18	Daubenton's bat Natterer's bat	Bat 10 Bat 16			N
Oak tree in Spinningwheel Copse	R19	Natterer's bat	Bat 11			Y
Oak tree at small woodland copse south of Tortington Common	R20	Natterer's bat	Bat 18			Y
Ash tree in Barn's Copse, south of A27, edge on steep bank	R21	Natterer's bat	Bat 26			Y
Beech tree on south west edge of Binsted Woods.	R22	Natterer's bat	Bat 27			Y
Oak tree near woodland edge in Binsted Wood, east of Spinningwheel Copse	R23	Natterer's bat	Bat 27			N
Building [REDACTED]	R24	Whiskered bat	Bat 6			Y
Residential dwelling [REDACTED]	R25	Whiskered bat	Bat 14			Y

Roost	Roost ID	Species	Bat identification number	Approximate Coordinates		Emergency survey undertaken (Y/N)
				Easting	Northing	
Residential dwelling, [REDACTED]	R26	Whiskered bat	Bat 21 Bat 29	[REDACTED]	[REDACTED]	Y
Residential property, [REDACTED]	R27	Whiskered bat	Bat 22	[REDACTED]	[REDACTED]	Y

*Estimated location; it was not possible to determine whether there were one or two roosting locations for these bats because of access restrictions.

3.4 RADIO-TRACKING SURVEY

3.4.1. The radio-tracking survey identified roosting locations, flight lines and home ranges of the 30 radio-tagged bats (Appendix E and raw data in Appendix B).

FLIGHT LINES

3.4.2. For the purposes of this report a flight line is defined as a feature, such as a hedgerow or watercourse used as a structure which influences a bat's direction of flight.

3.4.3. A commuting route is defined as the route taken by a bat flying from one structure to another structure.

Barbastelle

3.4.4. Four different flight lines were recorded for barbastelle (Bat 12) (see Figure 3.9):

- Bat 12 was observed flying north from the Binsted Village area (south of [REDACTED]), crossing Binsted Lane and Barn's Copse to cross the A27 towards Danes Wood.
- Bat 12 was recorded flying from Singer's Piece towards Goblestubb's Copse, crossing the A27 at a point near the junction between the A27 and Binsted Lane (west).
- Bat 12 was recorded commuting south from the woodland area north of The Waterwoods following the farm track in [REDACTED] and the tree line west of [REDACTED] to cross the A27 at a point opposite [REDACTED] and
- Bat 12 was recorded commuting west from the Watermeadows area (east of the River Arun) towards the area south of Tortington Common, using the hedgerows along the field boundaries on both sides of the river.

Bechstein's Bat

3.4.5. Flight lines were recorded for Bat 4 and Bat 13 (see Figure 3.10):

- Bat 4 was recorded flying north from Scotland Barn along the tree line west of [REDACTED] crossing the A27 to then turn west along the eastern edge of Goblestubb's Copse.

- Bat 4 was recorded flying in a westerly direction from Pedler's Copse toward Barn's Copse along the hedge line linking this woodland with the easternmost corner of Barn's Copse. This flight line is similar to the one described for Bat 1 (Alcathoe bat).
- Bat 13 was observed commuting north above the Watermeadows (east of the River Arun), following vegetation along field boundaries.

Alcathoe Bat

3.4.6. Of the five radio-tracked Alcathoe bats, flight lines could only be identified for Bat 1. The flight lines could only be established for Bat 1 as it was the only tag that was emitting a radio signal suitable for tracking. The flight lines were as follows:

- After emerging from its roosting location in Barn's Copse, Bat 1 was observed flying east toward Pedler's Croft crossing Binsted Lane at three different points (see Figure 3.8).
- The northernmost flight line was recorded starting in Barn's Copse and continuing east along the line of a ditch and hedgerow starting in Sandy Hole Pond linking Barn's Copse and an area north of Pedler's Croft.
- When using the two southern flight lines Bat 1 followed the hedge line along Old Scotland Way footpath from Binsted Lane to Pedler's Croft.

Natterer's Bat

3.4.7. Flight lines were identified for Bat 11 and Bat 26 (see Figure 3.11). Bat 11 was recorded using several flight lines:

- From south of Barn's Copse, Bat 11 was observed commuting south east along Avisford Park Golf Course and Binsted Lane to commute east towards The Shaw;
- From Binsted Nursery, Bat 11 flew south-east along a watercourse leading to Lake Copse;
- From Lake Copse, Bat 11 flew north following The Shaw towards Ash Piece; and
- A flight line was recorded from the Goose Farm area (along the water course to the east of the farm) towards Lake Copse, following the watercourses in this area. Bat 26 was recorded flying south from Ash Piece following The Shaw (west of Binsted Park) to Lake Copse.

Whiskered Bat

3.4.8. One flight line was recorded for Bat 6 (see Figure 3.14):

3.4.9. Bat 6 was recorded flying north-east toward Tortington Common after emerging from Tortington Priory Farm. Daubenton's bat

3.4.10. No flight lines were identified for Bat 10. The contact with this bat was lost on numerous occasions during the radio-tracking survey and insufficient data was obtained to identify commuting routes.

Brown long-eared bat

3.4.11. No flight lines were identified for brown long-eared bat. No definite commuting routes for this species was identified from the radio-tracking survey as no bats were identified leaving the roost. Home ranges and Foraging Areas

3.4.12. The fixes obtained during the radio-tracking survey were analysed with LOAS and BIOTAS to calculate the maximum home range (100% MCP), the peripheral foraging areas (95% KDE) and the core foraging areas (50% MCP) of each tracked bat. The calculated 100% MCP, 95% KDE and 50% KDE

for each tracked bat are shown in Appendix E. Figures 3.8- 3.14 display visual representations of these data and deduced flight lines.

Alcathoe Bat

- 3.4.13. Alcathoe bats were identified foraging at Barn's Copse, fields to the east of Binsted Lane (east of Barn's Copse), Pedler's Copse, Scotland Barn, The Shaw, Tortington Common and Steward's Copse. Figure 3.8 displays the flight lines, the core and peripheral foraging areas of Alcathoe bat.

Barbastelle

- 3.4.14. Barbastelle was recorded foraging within an extensive area of the Field Survey Area, with regularly-used foraging areas at Threecorner Wood, Brickkiln Copse, Winchers Copse, Singer's Piece, Scotland Barn, Goblestubb's Copse and The Waterwoods. Figure 3.14 displays the flight lines, the core and peripheral foraging areas of barbastelle.

Bechstein's Bat

- 3.4.15. Foraging areas of Bechstein's bat were identified at Scotland Barn, Pinewoods, Tortington Common and Steward Copse. The peripheral foraging area for the bats trapped in July (Bats 4, 5, 7 and 8) extended further west up to Barn's Copse, north across the A27 Road to Goblestubb's Copse and south to The Shaw.
- 3.4.16. Bat 13, trapped in August, was shown to forage over a more extensive area although its core foraging area remained the same as that of the bats trapped in July. Peripheral foraging areas extended to the west and north of Marsh Farm, Tortington area, The Whity Beds (small woodland area located west of Tortington), and the Watermeadows to the east of the River Arun. Figure 3.10 displays the flight lines, the core and peripheral foraging areas of Bechstein's bat.

Brown long-eared Bat

- 3.4.17. The core foraging areas of brown long-eared bats were at Barn's Copse (Bat 2) and Steward Copse (Bat 17). The peripheral foraging area for Bat 2 included Brickkiln Copse. The peripheral foraging area for Bat 17 was unevenly distributed between Steward's Copse to the north and Tortington to the south. Figure 3.11 displays the flight lines, the core and peripheral foraging areas of brown long-eared bat.

Daubenton's Bat

- 3.4.18. Foraging areas were only able to be calculated for Bat 10. These comprised Barn's Copse, Avisford Park Golf Course, Binsted Village area, Scotland Barn, Pinewoods, Tortington Common, fields to the south of Tortington Common and Brookfield. Figure 3.12 displays the flight lines, the core and peripheral foraging areas of Daubenton's bat.

Natterer's bat

- 3.4.19. Core foraging areas of Natterer's bats (Bat 16 and Bat 11) were identified in Tortington Common, The Whithy Beds (east of Tortington) and the Brookfield area (east of A284 Lyminster Road). Peripheral foraging areas comprised areas of the floodplain to the east of Knucker Hole, Tortington Common, Pinewoods, Binsted Wood, Ash Piece, Spinningwheel Copse, Pedler's Croft, Scotland Barn, Brickkiln Copse, Little Danes Wood, Binsted Village, The Shaw, Lake Copse, Ford and fields to the north and fields to the north of Tortington Priory Farm. Figure 3.13 displays the flight lines, the core and peripheral foraging areas of Natterer's bat.

Whiskered Bat

- 3.4.20. The core foraging areas of whiskered bats (Bat 6 and Bat 14) were Tortington Common and Steward's Copse. Peripheral foraging area extended to Pinewoods, Binsted Wood, Tortington and fields to the North and the Watermeadows. Figure 3.14 displays the flight lines, the core and peripheral foraging areas of whiskered bat

3.5 EMERGENCE SURVEYS

- 3.5.1. In total, 27 roosts of seven species were located via tracking the radio-tagged bats. The locations of these roosts are presented in Figures 3.1 to 3.7 (Appendix C). 23 emergence surveys were successfully undertaken at 17 of these locations, as discussed below.
- 3.5.2. Six of these roosts are of EU Habitats Directive Annex II species (Table 14), including one barbastelle roost and five Bechstein's bat roosts.

Alcathoe Bat

- 3.5.3. Oak tree south of Barn's Copse [REDACTED] on 25 July 2017 and 15 September 2017. Bats 1, 9 and 20 were recorded roosting in this tree.
- On 25 July, prior to the commencement of the survey, a trunk cavity was identified on the northern elevation of the tree which was suitable to support roosting bats. Although no bats were observed emerging from the tree (from the described feature or any other visible features) by surveyors or camera footage, Bat 1 was recorded emerging at 21:18 (sunset: 20:58). The roosting feature within the tree could not be identified precisely, because of the presence of dense vegetation; and
 - On 15 September, no emerging bats were observed because of dense overgrown vegetation. Numerous Myotis species calls were recorded during the survey.
- 3.5.4. Oak tree in the north-west corner of Barn's Copse ([REDACTED]) on 24 August 2017, 14 and 15 September 2017. Bats 9 and 19 were recorded roosting in this tree.
- On 24 August, Bat 9 emerged from the tree at 20:28 (sunset: 20:06). The exact roosting location was not observed due to dense vegetation.
 - On 14 September, the exact roosting location was not observed due to dense vegetation obscuring the roosting feature. Bat 19 emerged at 19:55 (sunset: 19:00); and
 - On 15 September, Myotis spp calls were recorded during the survey but the exact roosting location was not observed. Bat 19 emerged at 19:18 (sunset: 19:20).

Barbastelle

- 3.5.5. The barbastelle roost used by Bat 12 was in an unidentified tree east of Danes Wood, north of the A27.

Bechstein's bat

- 3.5.6. Two emergence surveys were undertaken at a dead leaning oak tree in Steward's Copse [REDACTED] [REDACTED] on the 26 and 27 July 2017. Bats 4, 5, 7 and 8 were recorded roosting in this tree.
- On 26 July no bats were observed emerging from the tree roost. Analysis of the camera footage showed eight bats flying around the tree but the feature from which they had emerged was not identified (potential feature obscured by thick understory vegetation). It was confirmed that Bats 4 and 5 were within the roost at the beginning of the survey. Bat 5 emerged around 21:35 (sunset 21:00) and Bat 4 around 21:45; and

- On 27 July 14 Bechstein's bats were seen emerging from a woodpecker hole on the north aspect of the tree (woodpecker hole facing downwards). Two roost entrances were identified in the tree with the main one located above the understory vegetation which masked its location. Bats 4 and 5 emerged at around 21:25 (sunset 20:55), Bat 8 at 21:34 and Bat 7 at 21:36.

3.5.7. One emergence survey was undertaken at an oak tree [REDACTED] south of the footpath in Steward's copse on the 28 July 2017 at which Bats 4, 5, 7, 8 and 13 were recorded as roosting.

- On 28 July two bats were seen emerging from the roost, the first at 21:33 (sunset 20:55) and the second, Bat 4, at 21:49. Analysis of the camera footage showed 26 bats flying from behind one of the tree limbs, around the south aspect of the tree, but the feature from which they had emerged was not visible.

3.5.8. Two emergence surveys were undertaken on 23 and 24 August 2017 at an oak tree with split limbs in Steward's Copse [REDACTED] at which Bats 13 and 28 were recorded as roosting.

- On 23 August 31 bats were seen emerging from the woodpecker hole. Bat 13 emerged at 20:51 (sunset 20:06); and
- On 24 August 30 bats were seen emerging from the feature. The first bats emerged at 20:32 (sunset 20:08), with Bat 13 emerging at 20:51.

3.5.9. One emergence survey was undertaken on 22 September 2017 at an ash tree near the southern end of Tortington Common [REDACTED] Bat 28 was recorded roosting within this tree.

- On 22 September no bats were seen emerging from the tree roost. Four bats were recorded flying around the tree. Bat 28 was recorded (detected) emerging from the tree (but not seen) from which it headed north.

Brown long-eared Bat

3.5.10. One emergence survey was undertaken on 28 July 2017 at a willow tree in the south-west corner of Barn's Copse [REDACTED]. Bat 2 was recorded roosting within this tree.

- On 28 July although no bats were recorded emerging from the roost, bats were recorded flying around the tree from 21:28 (sunset 20:53). However, three bats were observed within a woodpecker hole (approximately 2m above ground level) including Bat 2 (as the radio transmitter was visible on the camera footage).

3.5.11. One emergence survey was undertaken on 27 July 2017 [REDACTED] Bat 3 was recorded roosting within the house.

- On 27 July five bats were seen emerging from the building. Two bats emerged from the west access point at the roof at 21:31 (sunset 20:55) and three from the southern roof access point at 21:58.

3.5.12. One emergence survey was undertaken on 21 September 2017 at a large oak tree in the south-west corner of Barn's Copse [REDACTED] Partially visible roosting features were present within the tree canopy. Bats 24 and 25 were recorded roosting within this tree.

- On 21 September no bats were seen emerging from the tree. Bat 25 was recorded leaving the tree at 19:47 (sunset 19:05).

Daubenton's Bat

- 3.5.13. Bat 10 was likely to have roosted in a tree south of Calceto Lane. Emergence surveys were not carried out on the tree due to access constraints.

Natterer's bat

- 3.5.14. One emergence survey was carried out on 23 August 2017 at an oak tree in Spinningwheel Copse [REDACTED]. Bat 11 was recorded roosting in this tree.
- On 23 August 40 bats were seen emerging from the roost. The first emerged at 20:36 (sunset 20:08) and the last at 21:17. Bat 11 was roosting within the tree during the survey and was recorded emerging at 20:41, from which point it headed north.
- 3.5.15. Two surveys were undertaken at an oak tree within a small woodland copse south of Tortington Common [REDACTED] on 14 and 15 September 2017. Bat 18 was recorded roosting within this tree.
- On 14 September no bats were seen emerging from the roost tree. Analysis of the camera footage showed six bats flying around the tree. Bat 18 was recorded within the tree during radio-tracking/emergence survey and left the tree at 20:33 (sunset 19:20).
 - On 15 September five bats were seen emerging from the roost tree, the first at 19:33 (sunset 19:18). Bat 18 emerged at around 20:00. Two bats were recorded foraging around the tree.
- 3.5.16. One survey was carried out on 21 September 2017 at an ash tree on a steep embankment in Barn's Copse, south of the A27 [REDACTED]. Bat 26 was recorded roosting within this tree.
- On 21 September no bats could be observed emerging from the roost because of dense concealing vegetation around the tree. Bat 9 was recorded emerging from the tree at 19:57 (sunset 19:04) before heading due east. The tag on the Bat 9 emitted a signal, which was detected on the radio-tracking receiver. The signal produced was weaker and the corresponding sound was faint when Bat 9 left the roost. The survey was stopped at 20:27 because of no other bat activity.
- 3.5.17. One survey was carried out on 22 September 2017 at a beech tree on the south edge of Binsted Wood [REDACTED]. Bat 27 was recorded roosting within this tree.
- On 22 September one bat was seen emerging from the highest roost feature at 19:53 (sunset 19:02). Radio-tracking confirmed this to be Bat 27. Analysis of the camera footage indicated that no other bats were present.

Whiskered Bat

- 3.5.18. One survey was carried out on 27 July 2017 at a building [REDACTED]. Bat 6 was recorded roosting here.
- During the survey, two bats were seen emerging from the building. The first of these was a common pipistrelle emerging from beneath roof tiles on the north elevation of the southern barn at 21:11 (sunset 20:55). Later, Bat 6 emerged from the eastern elevation of the building at 21:33.
- 3.5.19. One survey was carried out on 25 August 2017 [REDACTED]. Bat 14 was recorded roosting here during the radio-tracking survey.
- During the survey, no bats were seen emerging from the building. Analysis of the camera footage showed four bats emerging from gaps under roof tiles on the south elevation. Bat 6 was recorded

within the roost but did not emerge. It was concluded that the radio tag had become detached from Bat 6 while in the roost.

3.5.20. One survey was carried out on 14 September 2017 at a residential property [REDACTED] [REDACTED] Bat 21 was recorded roosting here.

- During the survey, no bats were seen emerging from the roost. Analysis of the camera footage showed no bats emerged from the roost. Radio-tracking confirmed Bat 21 as present within the roost.

3.5.21. One survey was carried out on 14 September 2017 [REDACTED] a residential property with gaps under roof tiles providing access points to the roof void. Bat 22 was recorded roosting within the roof void.

- During the survey, four bats were seen emerging from the roof void, the first at 19:33 (sunset 19:20) and the last at 19:58.

A total of 27 roosting locations were identified during the radio-tracking surveys, of which 23 bat roosts were confirmed.

3.6 ROOSTS

Barbastelle

3.6.1. One barbastelle was captured and tagged (Bat 12) during the August 2017 surveys. Bat 12 was an adult male tracked to an estimated roost location east of Danes Wood, north of the A27. This roost is considered to be a day roost for this species.

Bechstein's Bat

3.6.2. Three Bechstein's bat roosts were identified in July 2017:

- Bat 4, a juvenile male, was detected roosting in an oak tree in Steward's Copse [REDACTED]. No emergence survey was undertaken in this location, but the young age of Bat 4 indicates that this roost is likely to be a maternity roost for Bechstein's bat.
- Bat 4, Bat 5 (non-breeding juvenile female), Bat 7 (non-breeding juvenile female) and Bat 8 (non-breeding juvenile female) were recorded roosting in a dead leaning oak tree in Steward's Copse [REDACTED]. Because of the young age of all of the radio-tracked bats it is concluded that this is a maternity roost for Bechstein's bat.
- Bats 4, 5, 7 and 8 were also recorded roosting in an oak tree south of the footpath in Steward's Copse [REDACTED]. The young age of the radio-tracked bats and the large number of emerging bats recorded indicates that this roost is a maternity roost for Bechstein's bat.

3.6.3. Two Bechstein's bat roosts were identified in August 2017:

- Bat 13 was detected roosting in the same location as were Bats 4, 5, 7 and 8 in July 2017 [REDACTED]. As Bat 13 was a post-lactating female, this supports the conclusion that this roost is a maternity roost for Bechstein's bat.
- Bat 13 was also detected roosting in an oak tree with split limbs in Steward's Copse [REDACTED]. Because Bat 13 is a post-lactating female and a large number of bats were detected emerging from this roost, it is concluded that this is a maternity roost for Bechstein's bat.

3.6.4. Two Bechstein's bat roosts were identified in September 2017:

- One non-breeding juvenile female (Bat 28) was detected roosting in the roost previously used by Bat 13 [REDACTED]. Bat 28 was also identified roosting in an ash tree near the southern edge of Tortington Common [REDACTED]. Because of the late date in the season and the fact that no other bats were roosting here it is concluded that this tree is a day roost used by low numbers of Bechstein's bat.

Alcathoe Bat

- Two Alcathoe bat roosts were identified in July 2017. Bat 1 was recorded roosting in an oak tree south of Barn's Copse [REDACTED] and an oak tree in Barn's Copse [REDACTED]. Because Bat 1 was a post-lactating female, it is concluded that both roosts are maternity roosts for Alcathoe bat.
- Two Alcathoe bat roost locations were identified in August 2017. Bat 9 was recorded in an oak tree roost in the north-west corner of Little Barn's Copse [REDACTED]. Because Bat 9 was a post-lactating female, it is concluded that this roost is a maternity roost for Alcathoe bat. Bat 15 was roosting in a dead oak tree within Steward's Copse. Because Bat 15 was a post-lactating female, it is concluded that this tree is a maternity roost for Alcathoe bat.
- Two Alcathoe bat roost locations were identified in September 2017. Bat 19, a non-breeding, juvenile female was recorded roosting in the roost identified in Barn's Copse in August [REDACTED]. Bat 20, a post-lactating female, was recorded roosting in the roost identified in Barn's Copse [REDACTED] in August 2017 and in the other maternity roost in Barn's Copse [REDACTED] identified in July 2017.

Daubenton's Bat

- 3.6.5. One Daubenton's bat was caught and tracked back to a roost in August 2017. Bat 10, a post-lactating adult female, was recorded at an unidentified roost south of Calceto Lane [REDACTED]. Because of the breeding status of this bat, it is concluded that a breeding roost of Daubenton's bat is present in this location.

Natterer's

- 3.6.6. Two Natterer's bats (Bat 11 and Bat 16) were caught and tracked bat to roosts in August 2017.
- Bat 11, a post-lactating adult female, was roosting in an oak tree in Spinningwheel Copse [REDACTED]. During the emergence survey undertaken on 23rd August 2017, 40 bats were observed emerging from this tree. Because of the breeding status of Bat 11 and the large number of emergent bats it is concluded that this roost is a maternity roost for Natterer's bat.
 - Bat 16, a juvenile male, was detected at an unidentified roost south of Calceto Lane [REDACTED] during the maternity season. Because of the young age of Bat 16, it is likely that a maternity colony of Natterer's bat is present at this roost.
- 3.6.7. Three Natterer's bats (Bats 18, 26 and 27) were caught and tracked back to roosts in September 2017.
- Bat 30 was also caught in September but could not be tracked to a roost. Bat 18, an adult male, was detected roosting in an oak tree at a small woodland copse south of Tortington Common [REDACTED]. This roost is considered to be a day roost for Natterer's bat.
 - Bat 26, an adult male, was roosting in an ash tree in Barn's Copse [REDACTED]. During the emergence survey undertaken on the 21st September 2017 no bats were seen emerging from this tree. It is therefore concluded that this is a day roost supporting a low number of Natterer's bats.

- Bat 27, another adult male, was detected roosting in two different locations: a beech tree on the south-west edge of Binsted Wood [REDACTED] and an oak tree near the edge of Binsted Wood [REDACTED]. Both roosts are concluded to be day roosts likely to support low numbers of Natterer's bats.

Whiskered Bat

3.6.8. One whiskered bat (Bat 6) was trapped and tracked back to a roost in July 2017.

- Bat 6, an adult non-breeding female, was found roosting within a converted barn [REDACTED]. Two bats were seen emerging from this building on the 27th July 2017. Considering the non-breeding condition of this bat and the low number of bats emerging, it is concluded that this roost is a day roost supporting a low number of whiskered bats.

3.6.9. One whiskered bat (Bat 14) was trapped and tracked back to a roost in August 2017.

- Bat 14, an adult post-lactating female, was found roosting [REDACTED]. Because of the breeding status of this bat, it is concluded that this roost is a maternity roost for whiskered bat.
- Three whiskered bats (Bats 21, 22 and 29) were trapped and tracked back to roosts in September 2017.
- Bat 21 (a juvenile male) and Bat 29 (an adult male with no signs of having bred during the maternity season) were detected roosting [REDACTED]. No bats were seen emerging from the building on the emergence survey on 14th September 2017. Due to the late date in the season (post-maternity), and the low number of bats during emergence surveys, it is concluded that this roost is a day roost supporting low numbers of whiskered bats.
- Bat 22, an adult post-breeding female captured in September, was detected roosting [REDACTED] Binsted Road [REDACTED]. During the emergence survey undertaken in this roost on 14 September 2017 four bats were seen emerging from the south-east corner of this building. This roost is considered to be a day roost for whiskered bats due to the low number of bats emerging and the identification of the roost in the post-maternity season.

Brown long-eared Bat

3.6.10. Three brown long-eared bats were caught and tracked back to roosts in July 2017:

- Bat 2 roosted within a willow tree [REDACTED] in the south-west corner of Barn's Copse. Because Bat 2 was a post-lactating female, it is concluded that this roost is a maternity roost for brown long-eared bat. Bat 3 was recorded roosting [REDACTED]. Because Bat 3 was a post-lactating female, it is concluded that roost is a maternity roost for brown long-eared bat.
- Bat 3 was also recorded roosting in an oak tree within Steward's Copse [REDACTED]. Although no emergence surveys were undertaken at this roost, because Bat 3 was a post-lactating female, it is concluded that this roost is also a maternity roost for brown long-eared bat.
- One brown long-eared bat (Bat 17) was caught and tracked back to a roost in August 2017. Bat 17 was recorded roosting in an oak tree in Steward's Copse [REDACTED]. Although no emergence surveys were undertaken at this roost, because Bat 17 was a post-lactating female, it is concluded that this roost is also a maternity roost for brown long-eared bat.

3.6.11. Three brown long-eared bats (Bats 23, 24 and 25) were caught and tracked back to roosts in September 2017.

- Bat 23, an adult female with no signs of having bred during the season, was recorded roosting in a barn [REDACTED]. This roost is concluded to be a day roost for brown long-eared bat.
- Bat 24 (adult post-breeding female) and bat 25 (adult post-breeding female) were recorded roosting together in two locations in September: an unidentified tree in Avisford Park Golf Course [REDACTED] and a large oak tree in the south west corner in Little Danes Wood [REDACTED]. These roosts are concluded to be day roosts for brown long-eared bat because these roosts were identified in the post-maternity season.

4 DISCUSSION

4.1 SUMMARY

4.1.1. The presence of the following provides evidence which indicates that the bat assemblage of the Field Survey Area is potentially of National Importance:

- A minimum of 14 species of bat, including a diverse assemblage of woodland species;
- Three Annex II species: greater horseshoe bat (confirmed during the activity surveys), barbastelle and Bechstein's bat;
- Breeding Bechstein's bat; and
- One of the most southerly known breeding colonies of Alcaethoe bat in the UK.

4.1.2. The sections below summarise the results obtained for the desk study and the trapping and radio-tracking surveys undertaken.

4.2 DESK STUDY

4.2.1. There are no sites within the Field Survey Area which are being considered or identified as candidate sites (cSACs) for SAC designation³³.

4.2.2. The MAVES bat surveys³⁴ confirmed maternity colonies of Bechstein's bat, Alcaethoe bat and occasional roosts of a range of other bat species in Binsted Wood Complex LWS. A serotine maternity roost was located south east of the field survey area, as a result of individuals captured foraging in Binsted Wood Complex LWS. MAVES surveyors also recorded barbastelle roosting in the Binsted Wood Complex LWS but considered it unlikely the roost they found was a breeding roost.

4.2.3. Both Bechstein's bat and barbastelle are listed on Annex II of the Habitats Directive (for which SACs are designated as a mechanism for protection of these species) and are also categorised as Near Threatened on the International Union for the Conservation of Nature (IUCN) Red List of Threatened Species³⁵ and are regarded as Very Rare both in Sussex³⁶ and the UK³⁷. Alcaethoe bat is listed as Data Deficient on the IUCN Red List of Threatened Species³⁸ and is considered Very Rare, with its distribution across the UK unknown, having only recently been recognised in the UK³⁹.

³³ <http://jncc.defra.gov.uk/page-1458> Accessed 13 September 2017.

³⁴ Whitby, D (2016 and 2017 – two reports). *Bat Survey Trapping Survey Binsted Woods*. A report by Animal Ecology and Wildlife Consultants for the Mid-Arun Valley Environmental Survey.

³⁵ Piraccini, R. (2016). *Barbastella barbastellus*. The IUCN Red List of Threatened Species 2016: e.T2553A22029285. <http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T2553A22029285.en>. Downloaded on 13 September 2017 and Paunović, M. 2016. *Myotis bechsteinii*. The IUCN Red List of Threatened Species 2016: e.T14123A22053752. <http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T14123A22053752.en>. Downloaded on 13 September 2017

³⁶ <http://www.sussexbatgroup.org.uk/batsinsussex> Accessed 13 September 2017

³⁷ Bat Conservation trust (2010) Species Factsheet http://www.bats.org.uk/data/files/barbastelle_11.02.13.pdf and http://www.bats.org.uk/data/files/Species_Info_sheets/bechsteins.pdf Downloaded on 13 September 2017

³⁸ Hutson, A.M. & Paunović, M. 2016. *Myotis alcaethoe*. The IUCN Red List of Threatened Species 2016: e.T136680A518740. <http://dx.doi.org/10.2305/IUCN.UK.2016-2.RLTS.T136680A518740.en>. Downloaded on 13 September 2017.

³⁹ Bat Conservation trust (2010) http://www.bats.org.uk/pages/uk_bats.html#Alcaethoe Accessed 13 September 2017.

4.3 TRAPPING SURVEY

- 4.3.1. Access restrictions have limited the data obtained from the trapping surveys at woodland north of the A27 and on the flood plain between Ford Road and Lyminster Road. Further studies will be carried out in these areas during 2018 to ensure sufficient coverage to assess the effects of the scheme on bats in these areas.
- 4.3.2. A total of 129 bats of nine different species comprising Whiskered bat, Alcahloe bat, barbastelle, Bechstein's bat, Daubenton's bat, Natterer's bat, common pipistrelle, soprano pipistrelle and brown long-eared bat were trapped during 14 trapping nights at 24 different locations within the Field Survey Area between 10 July and 21 September 2017.
- 4.3.3. The four target areas identified in which bats were trapped all supported large numbers of bats of different species.
- In the East Area, which comprises a mosaic of habitats dominated by woodland and agricultural land, 44 bats of seven different species were caught. This resulted in a capture rate of 7.3 bats caught per night. This area was particularly successful for capturing brown long-eared bats (18 individuals caught) and Bechstein's bats (10 individuals caught), indicating this area to be of value for these woodland bat species.
 - In the South Area 48 bats of seven different species were caught, resulting in a capture rate of six bats per night. This area is characterised by dense woodland with hedgerow-lined agricultural fields that provide connectivity between habitats suitable for use by bats within the wider landscape. The network of wet ditches located immediately east of Lake Copse in this area is a regularly used foraging area for bats.
 - In the West Area a total of 28 bats of seven different species was caught, resulting in a capture rate of 5.6 bats per night. This area is characterised by a mosaic of habitats comprising woodland blocks and agricultural fields connected by hedgerows and wet ditches.
 - A total of nine bats of four different species were captured in the North Area, which largely comprises dense woodland. This resulted in a capture rate of three bats per night.
- 4.3.4. Breeding females of eight species were trapped during this study, all captured within the Field Survey Area. These comprised Bechstein's bat, Alcahloe bat, whiskered bat, Daubenton's bat, Natterer's bat, brown long-eared bat, common pipistrelle and soprano pipistrelle. This indicates that breeding colonies of all of these species are present within or in close proximity to the Field Survey Area, moving through or across it, between roost and foraging sites. Flight lines and foraging areas for these individual bats can be seen in Figures 3.8-3.14.

4.4 ROOSTS

Alcahloe Bat

- 4.4.1. Four maternity roosts have been identified at the Barn's Copse woodland block and one maternity roost within Steward's Copse, it is concluded that at least two breeding colonies of Alcahloe bats are present within the Field Survey Area.

Barbastelle

- 4.4.2. One barbastelle was captured and tagged (Bat 12) during the August 2017 surveys. Bat 12 was an adult male tracked to an estimated roost location east of Danes Wood, north of the A27. This roost is considered to be a day roost for this species.

Bechstein's Bat

- 4.4.3. At least two breeding colonies of Bechstein's bat are present within the Field Survey Area. One identified by AEWEC Ltd (2017) surveys south of Tortington Common and one in Steward's Copse comprising four separate maternity tree roosts, identified by this study.

Brown long-eared Bat

- 4.4.4. This study has shown that at least three breeding colonies of brown long-eared bat are present within the Field Survey Area, one in the Barn's Copse woodland block, one in Steward's Copse and one at [REDACTED]. Three day-roosts likely to support low numbers of brown long-eared bats have also been shown to be present in the Field Survey Area.

Daubenton's Bat

- 4.4.5. One Daubenton's bat was caught and tracked back to a roost in August 2017. Bat 10, a post-lactating adult female, was recorded at an unidentified roost south of Calceto Lane [REDACTED]. Because of the breeding status of this bat, it is concluded that a breeding roost of Daubenton's bat is present in this location.

Natterer's

- 4.4.6. The study has shown that two breeding colonies of Natterer's bat are present in the Field Survey Area, at Spinningwheel Copse and at the easternmost end of the Field Survey Area (south of Calceto Lane). Three day-roosts of Natterer's bat were also identified.

Whiskered Bat

- 4.4.7. The study showed that at least one breeding colony of whiskered bat is present within the Field Survey Area. A maternity roost is present at [REDACTED]. Three day-roosts likely to support low numbers of whiskered bats are also present in the Field Survey Area.

4.5 FLIGHT LINES

- 4.5.1. Flight lines were identified for seven bats of five species as follows:

- Bat 1 (Alcathoe bat);
- Bat 12 (barbastelle);
- Bat 4 and Bat 13 (Bechstein's bat);
- Bat 11 and Bat 27 (Natterer's bat); and
- Bat 6 (whiskered bat).

- 4.5.2. Radio-tracking showed bats to fly along the lines of hedgerows, wet ditches and woodland edges while moving between roosts and foraging areas.

4.6 FORAGING AREAS

Foraging areas were identified as shown in Table 4-1

Table 4-1 – Foraging areas of Bat species

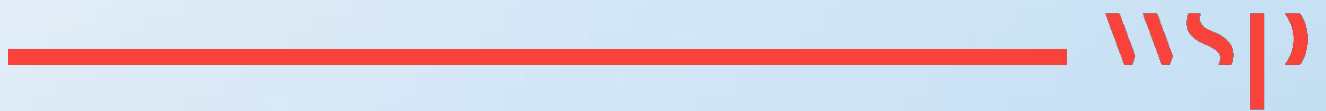
Foraging Area	Alcathoe bat	Barbastelle	Bechstein's bat	Daubenton's bat	Natterer's bat	Whiskered bat	Brown long-eared bat
Agricultural fields south of Tortington Common				X	X	X	
Ash Piece		X			X		
Avisford Park Golf Course				X			
Barn's Copse	X		X	X			X
Binsted Wood			X		X	X	
Brickkiln Copse		X			X		X
Brookfield				X	X		
Fields between Barn's Copse and Pedler's Copse	X		X				
Fowlers Copse		X					X
Goblestubb's Copse		X	X				
Lake Copse					X		
Little Danes Wood	X			X			X
Pedler's Croft	X				X		
Pinewoods			X		X	X	X
Scotland Barn			X	X			
Screen Woods		X					
Singer's Piece	X	X			X		
Steward's Copse	X		X			X	X
The Shaw	X		X		X		
The Watermeadows		X	X		X	X	
The Whity Beds			X		X		



Threecorner Wood		X					
Tortington			X			X	X
Tortington Common	X		X	X	X	X	X
Wichers Copse		X					

Appendix A

TRAPPING DATA





Bat No	Date	Trap No	Trapping Area	Easting	Northing	Species	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
1	10.07.17	2	South	██████████		P. pyg	M	Adult	N/A	NR	4.70	31.10	
2	10.07.17	4	South	██████████		P.aur	M	Adult	N/A	NR	8.10	40.20	
3	10.07.17	4	South	██████████		P.aur	F	Adult	Lactating	N/A	8.60	37.90	
4	10.07.17	4	South	██████████		P.aur	F	Adult	Lactating	N/A	8.60	39.70	Appears blind
5	10.07.17	4	South	██████████		P.aur	M	Adult	N/A	NR	7.40	38.60	
6	10.07.17	4	South	██████████		M.mys	F	Adult	Lactating	N/A	5.50	34.70	Species confirmed DNA analysis
7	10.07.17	4	South	██████████		M.mys	F	Juvenile	Non-breeding	N/A	4.80	34.20	Species confirmed DNA analysis
8	10.07.17	2	South	██████████		P.aur	M	Adult	N/A	NR	7.70	38.80	
9	10.07.17	3	South	██████████		M.mys	F	Adult	Lactating	N/A	5.70	34.80	Species confirmed DNA analysis
10	10.07.17	2	South	██████████		M.bec	F	Juvenile	Non-breeding	N/A	8.40	41.70	
11	10.07.17	1	South	██████████		P.pyg	M	Ad	N/A	NR	5.10	30.80	
12	10.07.17	7	West	██████████		P.aur	M	Juvenile	N/A	0	7.00	36.90	

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Bat No	Date	Trap No	Trapping Area	Easting	Northing	Species	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
13	10.07.17	7	West	[REDACTED]	[REDACTED]	P.pyg	F	Adult	Post-lactating	N/A	5.00	33.50	
14	10.07.17	6	West	[REDACTED]	[REDACTED]	M.mys	M	Adult	N/A	1	5.00	36.30	
15	10.07.17	5	West	[REDACTED]	[REDACTED]	M.alc	M	Adult	N/A	0	5.00	33.60	Species confirmed DNA analysis
16	10.07.17	7	West	[REDACTED]	[REDACTED]	M.alc	F	Adult	Lactating	N/A	6.00	33.20	Species confirmed DNA analysis
17	10.07.17	5	West	[REDACTED]	[REDACTED]	M.nat	M	Adult	N/A	2	8.00	40.08	
18	10.07.17	8	West	[REDACTED]	[REDACTED]	P.aur	F	Adult	Lactating	N/A	9.00	39.30	
19	10.07.17	8	West	[REDACTED]	[REDACTED]	P.aur	M	Adult	N/A	1	8.00	37.60	
20	12.7.17	9	North	[REDACTED]	[REDACTED]	P.aur	F	Juvenile	Non-breeding	N/A	8.50	32.00	
21	12.7.17	10	East	[REDACTED]	[REDACTED]	P.pip	M	Juvenile	N/A	1	5.00	32.20	
22	12.7.17	9	North	[REDACTED]	[REDACTED]	P.aur	F	Adult	Non-breeding	N/A	9.50	42.40	
23	12.7.17	12	South	[REDACTED]	[REDACTED]	P.aur	F	Adult	Lactating	N/A	8.50	41.06	
24	12.7.17	12	South	[REDACTED]	[REDACTED]	P.aur	F	Adult	Lactating	N/A	8.00	39.25	

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25	12.7.17	12	South	██████████		M.nat	F	Adult	Non-breeding	N/A	9.00	42.25	
26	12.7.17	14	South	██████████		M.nat	F	Adult	Lactating	N/A	8.50	41.75	
27	12.7.17	15	South	██████████		B.bar	M	Adult	N/A	NR	8.00	39.67	
28	12.7.17	14	South	██████████		P.pyg	M	Adult	N/A	NR	4.50	31.25	
29	13.7.17	15	South	██████████		M.mys	F	Adult	Non-breeding	N/A	5.00	36.25	
30	13.7.17	16	East	██████████		P.pyg	M	Juvenile	N/A	1	4.50	32.20	
31	13.7.17	15	South	██████████		P.pyg	M	Juvenile	N/A	1	5.00	31.95	
32	13.7.17	16	East	██████████		M.mys	M	Adult	N/A	1	5.00	33.25	
33	13.7.17	16	East	██████████		M.mys	M	Juvenile	N/A	0	4.50	34.10	
34	13.7.17	16	East	██████████		M.mys	M	Adult	N/A	1	4.50	34.25	
35	14.07.17	18	East	██████████		M.mys	M	Adult	N/A	1	5.00	33.90	Caught before Autobat switched on
36	14.07.17	19	East	██████████		M.bec	F	Juvenile	N/A	N/A	7.90	40.90	

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37	14.07.17	19	East	██████████		M.nat	M	Adult	N/A	NR	7.50	38.70	
38	14.07.17	19	East	██████████		P.aur	F	Adult	Lactating	N/A	7.90	39.60	
39	14.07.17	19	East	██████████		P.aur	M	Adult	N/A	NR	7.60	39.50	
40	14.07.17	20	East	██████████		M.bec	F	Juvenile	N/A	N/A	8.00	41.10	
41	14.07.17	20	East	██████████		P.aur	F	Adult	Lactating	N/A	7.60	39.40	
42	14.07.17	20	East	██████████		P.aur	F	Adult	Lactating	N/A	8.90	41.00	
43	14.07.17	20	East	██████████		M.bec	M	Juvenile	N/A	NR	7.90	40.80	
44	14.07.17	18	East	██████████		P.aur	F	Adult	Lactating	N/A	7.80	39.70	
45	14.07.17	18	East	██████████		P.aur	M	Adult	N/A	NR	7.90	38.30	
46	14.07.17	19	East	██████████		M.bec	F	Juvenile	N/A	N/A	8.20	41.20	
47	14.07.17	19	East	██████████		P.aur	F	Adult	Lactating	N/A	8.30	40.30	
48	14.07.17	19	East	██████████		P.aur	M	Adult	N/A	NR	7.40	38.60	
49	14.07.17	19	East	██████████		M.bec	M	Adult	N/A	NR	9.60	NR	DH – Released before measuring forearm

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50	14.07.17	19	East	██████████		P.aur	M	Adult	N/A	NR	7.70	37.20	
51	14.07.17	20	East	██████████		M.bec	F	Juvenile	N/A	N/A	8.30	41.70	
52	14.07.17	20	East	██████████		M.bec	F	Adult	Lactating	N/A	10.40	41.90	
53	14.07.17	19	East	██████████		M.bec	F	Adult	Lactating	N/A	10.90	42.10	
54	14.07.17	20	East	██████████		M.bec	F	Adult	Lactating	N/A	11.00	42.80	
55	14.07.17	20	East	██████████		P.aur	F	Adult	Lactating	N/A	8.10	38.00	
56	14.07.17	18	East	██████████		P.aur	M	Adult	N/A		7.50	38.70	
57	24.07.17	4	East	██████████		P.aur	F	Adult	Lactating	N/A	8.20	39.20	Radio-tagged Bat 3: 173.7150 (tag shifted to 7164 after tagging)
58	24.07.17	1	East	██████████		P.aur	F	Adult	Non-breeding	N/A	8.20	39.10	released
59	24.07.17	1	East	██████████		P.aur	M	Juvenile	N/A	NR	7.20	40.20	subdued, released
60	24.07.17	4	East	██████████		P.aur	M	Adult	N/A	NR	7.50	38.50	

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61	24.07.17	2	East	██████████	██████████	M.bec	M	Juvenile	N/A	NR	8.00	40.90	Radio-tagged Bat 4: 173.3230 (tag shifted to 3243 after tagging)
62	24.07.17	1	East	██████████	██████████	P.aur	M	Adult	N/A	NR	8.00	38.80	
63	24.07.17	5	West	██████████	██████████	M.alc	F	Adult	Post-lactating	N/A	4.50	32.01	Droppings collected; confirmed M.alc. Radio-tagged Bat 1: 173.9160
64	24.07.17	6	West	██████████	██████████	P.aur	F	Adult	Post-lactating	N/A	7.50	36.57	Radio-tagged Bat 2: 173.3150
65	24.07.17	8	West	██████████	██████████	P.pyg	M	Adult	N/A	1	5.00	32.01	
66	24.07.17	8	West	██████████	██████████	P.aur	F	Adult	Post-lactating	N/A	7.50	36.99	
67	24.07.17	8	West	██████████	██████████	P.pip	M	Adult	N/A	NR	5.00	32.99	
68	24.07.17	5	West	██████████	██████████	P.aur	F	Adult	Post-lactating	N/A	8.50	37.99	
69	25.07.17	11	South	██████████	██████████	P.aur	M	Adult	N/A	1	7.50	36.60	

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70	25.07.17	9	South	[REDACTED]	[REDACTED]	M.bec	F	Juvenile	Non-breeding	N/A	8.50	42.80	Radio-tagged Bat 5: 173.2126; Ringed: H5923
71	25.07.17	15	South	[REDACTED]	[REDACTED]	P.aur	F	Adult	Lactating	N/A	7.80	40.00	
72	25.07.17	13	South	[REDACTED]	[REDACTED]	M.mys	M	Adult	N/A	NR	4.70	34.40	
73	26.07.17	17	North	[REDACTED]	[REDACTED]	M.mys	M	Adult	N/A	1	5.00	33.40	
74	26.07.17	17	North	[REDACTED]	[REDACTED]	M.mys	F	Adult	Non-breeding	N/A	5.50	33.62	Radio-tagged Bat 6: 173.8950; Ringed H5924
75	26.07.17	18	North	[REDACTED]	[REDACTED]	M.bec	F	Juvenile	Non-breeding	N/A	8.50	41.62	Radio-tagged Bat 7: 173.2720; Ringed H5925
76	26.07.17	19	North	[REDACTED]	[REDACTED]	M.bec	F	Juvenile	Non-breeding	N/A	8.50	40.99	Radio-tagged Bat 8: 173.3030; Ringed H5926
77	21.08.17	1	South	[REDACTED]	[REDACTED]	P.pyg	F	Adult	NP	N/A	5.50	31.60	

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78	21.08.17	1	South	██████████		P.pyg	F	Adult	NP	N/A	5.60	32.70	
79	21.08.17	1	South	██████████		B.barb	M	Adult	N/A	NR	8.50	39.10	Radio-tagged Bat 12: 173.2880: Ringed H5927
80	21.08.17	1	South	██████████		M.mys	M	Adult	N/A	NR	5.00	33.70	
81	21.08.17	2	South	██████████		M.nat	F	Adult	NP	N/A	6.10	39.40	
82	21.08.17	6	West	██████████		M.alc	F	Adult	Post-lactating	N/A	5.10	32.30	Radio-tagged Bat 9: 173.8348
83	21.08.17	8	West	██████████		M.dau	F	Adult	Post-lactating	N/A	8.50	38.72	Radio-tagged Bat 10: 173.3220
84	21.08.17	7	West	██████████		M.natt	F	Adult	Post-lactating	N/A	9.50	41.06	Radio-tagged Bat 11: 173.2460
85	22.8.17	16	North	██████████		M.bec	F	Adult	Post-lactating	N/A	8.50	40.39	Radio-tagged Bat 13: 173.4412; Ringed H5928
86	22.8.17	17	North	██████████		P.pyg	M	Adult	N/A	0	4.50	32.69	

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Bat No	Date	Trap No	Trapping Area	Easting	Northing	Species	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
87	22.8.17	17	North	██████████		M.mys	M	Adult	N/A	0	5.00	34.67	
82	22.08.17	1	South	██████████		M.mys	F	Adult	Post-lactating	N/A	5.10	33.40	Radio-tagged Bat 14: 173.8646
83	22.08.17	2	South	██████████		M.alc	F	Adult	Post-lactating	N/A	4.70	31.10	Radio-tagged Bat 15: 173.7606
84	22.08.17	1	South	██████████		M.alc	M	Adult	N/A	0	4.50	34.70	
85	23.08.17	20	East	██████████		P.pyg	M	Juvenile	N/A	NR	4.90	30.30	
86	23.08.17	20	East	██████████		M.natt	M	Juvenile	N/A	NR	6.90	38.30	Radio-tagged Bat 16: 173.3176
87	23.08.17	18	East	██████████		M.alc	M	Juvenile	N/A	NR	4.00	32.10	Droppings collected - confirmed M.alc
88	23.08.17	21	East	██████████		P.aur	F	Adult	Post-lactating	N/A	9.00	40.50	Radio-tagged Bat 17: 173.2996
89	23.08.17	24	East	██████████		P.pip	M	Juvenile	Post-lactating	NR	5.00	31.05	

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Bat No	Date	Trap No	Trapping Area	Easting	Northing	Species	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
90	23.08.17	23	East	██████████	██████████	P.pip	M	Juvenile	Post-lactating	NR	4.50	30.97	
91	13.09.17	4	South	██████████	██████████	M.mys	M	Adult	N/A	1	4.50	33.80	
92	13.09.17	4	South	██████████	██████████	M.mys	M	Juvenile	N/A	0	4.80	33.40	
93	13.09.17	4	South	██████████	██████████	M.alc	F	Adult	Post-lactating	N/A	5.90	32.60	Radio-tagged Bat 20: 173.8085
94	13.09.17	3	South	██████████	██████████	M.mys	M	Juvenile	N/A	0	5.00	33.30	Radio-tagged Bat 21: 173.7763 - Radio-tagged male juvenile
95	13.09.17	3	South	██████████	██████████	P.pyg	M	Adult	N/A	1			Escaped before bagged!
96	13.09.17	3	South	██████████	██████████	P.pyg	F	Adult	Post-lac	N/A	5.60	32.10	
97	13.09.17	5	South	██████████	██████████	M.alc	F	Juvenile	Non-breeding	N/A	4.50	32.00	Droppings collected - confirmed M.alc. Radio-tagged Bat 19.173.8437
98	13.09.17	5	South	██████████	██████████	P.pyg	M	Adult	N/A	2	5.00	32.90	

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Bat No	Date	Trap No	Trapping Area	Easting	Northing	Species	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
99	13.09.17	6	South	██████████		M.nat	M	Juvenile	N/A	0	6.00	43.04	
100	13.09.17	6	South	██████████		M.nat	M	Adult	N/A	2	6.50	41.25	Radio-tagged Bat 18: 173.9570
101	13.09.17	8	West	██████████		M.mys	M	Adult	N/A	2	5.50	35.60	
102	13.09.17	5	South	██████████		M.mys	F	Adult	Parous	N/A	5.50	33.50	Radio-tagged Bat 22: 173.2795
103	13.09.17	5	South	██████████		M.mys	F	Juvenile	Nulliparous	N/A	6.50	33.00	
104	14.09.17	10	East	██████████		P.aur	F	Adult	Nulliparous	N/A	7.90	39.50	Radio-tagged Bat 23: 173.2832
105	14.09.17	10	East	██████████		M.alc	M	Juvenile	N/A	0	4.30	31.30	Droppings collected - confirmed M.alc
106	14.09.17	12	East	██████████		P.pyg	M	Adult	N/A	2	4.20	30.70	
107	14.09.17	10	East	██████████		P.pyg	M	Juvenile	N/A	0	4.90	31.40	
108	14.09.17	10	East	██████████		M.nat	M	Adult	N/A	2	7.30	39.40	2 'blisters' on each ear

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Bat No	Date	Trap No	Trapping Area	Easting	Northing	Species	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
109	20.09.17	18	West	██████████	██████████	P.aur	M	Juvenile	N/A	0	7.00	37.20	Mites
110	20.09.17	18	West	██████████	██████████	P.aur	F	Adult	Parous	N/A	8.50	38.50	Mites. Radio-tagged Bat 24: 173.8084
111	20.09.17	17	West	██████████	██████████	P.aur	F	Adult	Parous	N/A	8.00	37.75	Radio-tagged Bat 25: 173.8970
112	20.09.17	18	West	██████████	██████████	P.aur	F	Adult	Parous	N/A	7.00	38.60	
113	20.09.17	18	West	██████████	██████████	P.aur	M	Juvenile	N/A	0	7.50	37.90	Mites
114	20.09.17	15	West	██████████	██████████	P.pyg	F	Adult	Nulliparous	N/A	5.50	32.05	
115	20.09.17	15	West	██████████	██████████	P.aur	M	Juvenile	N/A	0	6.50	35.75	
116	20.09.17	17	West	██████████	██████████	M.mys	M	Juvenile	N/A	0	4.50	30.00	
117	20.09.17	17	West	██████████	██████████	M.nat	M	Adult	N/A	1	7.00	36.90	Radio-tagged Bat 26: 173.2516
118	20.09.17	18	West	██████████	██████████	M.mys	M	Juvenile	N/A	0	4.50	33.20	

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Bat No	Date	Trap No	Trapping Area	Easting	Northing	Species	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
119	21.09.17	21	South	██████████	██████████	M.bec	F	Juvenile	Nulliparous	N/A	8.50	43.10	Radio-tagged Bat 28: 173.3380
120	21.09.17	19	South	██████████	██████████	M.mys	F	Juvenile	Nulliparous	N/A	4.50	35.50	Radio-tagged Bat 29: 173.7890
121	21.09.17	19	South	██████████	██████████	P.aur	F	Adult	Nulliparous	N/A	6.00	36.15	Radio-tagged Bat 30: 173:7933
122	21.09.17	19	South	██████████	██████████	P.aur	M	Adult	N/A	1	6.00	36.50	
123	21.09.17	20	South	██████████	██████████	M.nat	M	Adult	N/A	2	7.00	38.10	Radio-tagged Bat 27: 173.9345

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Highways England

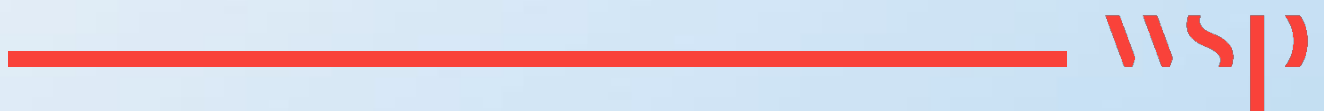
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Age	
Juvenile	Still suckling
Imm/Juvenile	Cartilage in joints
Adult	Fused epiphyses

Species names	
English name	Scientific abbreviation
Alcathoe bat	<i>M.alc</i>
Barbastelle	<i>B.bar</i>
Bechstein's bat	<i>M.bec</i>
Brown long-eared bat	<i>P.aur</i>
Common pipistrelle	<i>P.pip</i>
Daubenton's bat	<i>M.dau</i>
Natterer's bat	<i>M.nat</i>
Soprano pipistrelle	<i>P.pyg</i>
Whiskered bat	<i>M.mys</i>

Appendix B

INDIVIDUAL RADIO-TAGGED BATS



BAT 1

Bat 1, a post-lactating female Alctaco bat, was caught on the 24th July 2017 at trapping location 5 (Brickkiln Copse).

Roost

Bat 1 was found roosting in an Oak tree to the south of Barn's Copse [REDACTED] and in an Oak tree in Barn's Copse [REDACTED]

Flight Lines

Bat 1 was recorded leaving the roost and flying east over Binsted Lane and towards Old Scotland Lane and Pedler's Croft.

Bat 1 was also recorded following the stream and hedge line from the pond to the east of Barn's Copse to Old Scotland Lane.

Foraging Areas

The peripheral foraging area (95% KDE) includes approximately 34.9 ha of woodland and farmland ranging from junction of the B2132 and A27 east over Barn's Copse and over Binsted Lane towards Pedler's Croft.

The core foraging area (50%KDE) for Bat 1 includes approximately 1.6 ha between Barn's Copse and Old Scotland Lane over the pond and stream adjacent to Binsted Lane, approximately 1 ha over its roost and in two small areas of approximately 0.15 ha on the arable farmland either side of Binsted Lane.

BAT 2

Bat 2, a post-lactating female brown long-eared bat, was caught on the 24th July 2017 at trapping location 6 (Barn's Copse).

Roost

Bat 2 was found roosting in an Oak tree in the south-west corner of Barn's Copse [REDACTED] for the duration of the survey.

Flight Lines

Bat 2 was recorded flying over the woodland around Barn's Copse for the majority of the survey.

Bat 2 was recorded briefly crossing over the A27 to Goblestubb's Copse and further south in Brickkiln Copse.

Foraging Areas

The peripheral foraging area (95% KDE) includes approximately 40 ha over Barn's Copse and approximately 6.5 ha over the A27 in Goblestubb's Copse and Brickkiln Copse.

The core foraging area (50% KDE) comprises of approximately 14.7 ha over Barn's Copse.



BAT 3

Bat 3, a lactating female brown long-eared bat, was caught on the 24th July at trapping location 4 (Steward's Copse).

Roost

Bat 3 was found roosting in a dwelling [REDACTED] Arundel [REDACTED] and in an Oak tree in Steward's Copse [REDACTED]

Flight Lines

Bat was recorded flying on the eastern edge of Steward's Copse and over the residential area around Torton Hill Road and Bernard Road.

Foraging Areas

A peripheral foraging area and core foraging area could not be assessed due to the amount of data collected on Bat 3.

BAT 4

Bat 4, a juvenile male Bechstein's bat, was caught on the 24th July 2017 at trapping location 2 (Steward's Copse).

Roost

Bat 4 was found roosting in three separate Oak trees in Steward's Copse [REDACTED]

Flight Lines

Bat 4 was recorded flying north-west of the northern edge of Binsted Wood over the A27 towards Goblestubb's Copse.

Bat 4 was also recorded flying west from Pedler's Croft over Binsted Lane to Barn's Copse.

Foraging Areas

The peripheral foraging area (95%KDE) was included approximately 57 ha over the eastern edge of Binsted Wood, over Tortington Common and towards the eastern edge of Arundel Town. Other smaller areas of between one and three ha are spread over Lake Copse, Pedler's Croft, Brickkiln Copse, Barn's Copse and Goblestubb's Copse.

The core foraging area (50%KDE) comprises of approximately 13.2 ha over Tortington Common and Steward's Copse.

BAT 5

Bat 5, a juvenile non-breeding female Bechstein's bat was caught on the 25th July 2017 at trapping location 9 (Lake Copse).

Roost

Bat 5 was found roosting in two separate Oak trees in Steward's Copse [REDACTED]



Flight Lines

Bat 5 was recorded flying around Tortington Common, Steward's Copse and Binsted Wood.

Foraging Areas

The peripheral foraging area (95% KDE) comprises of approximately 33.1 ha spread from Pedler's Croft in the west to Steward's Copse in the east.

The Core foraging area (50% KDE) comprises of approximately 1.5 ha of woodland between Pinewoods and Scotland Barn.

BAT 6

Bat 6, an adult non-breeding female whiskered bat was caught on the 26th July 2017 at trapping location 17 [REDACTED].

Roost

Bat 6 was found roosting within a dwelling in Tortington Priory [REDACTED] throughout the survey.

Flight Lines

Bat 6 was recorded flying from its roost in Tortington Priory north-west towards Tortington Common.

Foraging Areas

The core foraging area (50%KDE) comprises of approximately 8.5 ha of woodland within Tortington Common.

BAT 7

Bat 7, a juvenile non-breeding female Bechstein's bat was caught on the 26th July 2017 at trapping location 18 [REDACTED].

Roost

Bat 7 was found roosting in two separate oak trees in Steward's Copse [REDACTED].

Flight Lines

Bat 7 was recorded flying around Tortington Common between Binsted Lane and Tortington Lane.

Foraging Areas

The core foraging area (50% KDE) comprises of approximately 25 ha of woodland between Tortington Common and Pinewoods.

BAT 8

Bat 8, a juvenile non-breeding female Bechstein's bat was caught on the 26th July 2017 at trapping location 19 (Pinewoods).

Roost

Bat 8 was found roosting in two separate oak trees in Steward's Copse [REDACTED].



Flight Lines

Bat 8 was recorded flying from Pinewoods in the west, north to [REDACTED] and east over Tortington Common and Steward's Copse.

Foraging Areas

The peripheral foraging area (95% KDE) comprises of approximately 43.8 ha of woodland around Pinewoods, Scotland Barn, Tortington Common and Steward's Copse.

The core foraging area (50% KDE) comprises of approximately 5.7 ha of woodland within Tortington Common, to the east of Binsted Lane.

BAT 9

Bat 9, a post-lactating adult female Alcaethoe bat was caught on the 21st August 2017 in trapping location 6 (Barn's Copse).

Roost

Bat 9 was recorded roosting in two separate oak trees in Barn's Copse [REDACTED]
[REDACTED]

Flight Lines

Bat 9 was recorded flying only close to its roost in the woodland around Barn's Copse.

Foraging Areas

The peripheral foraging area (95% KDE) comprises of approximately 0.17 ha of small pockets within Barn's Copse.

The core foraging range are (50% KDE) comprises of approximately 0.0089 ha of small pockets within Barn's Copse.

BAT 10

Bat 10, a post-lactating adult female Daubenton's bat was caught on the 21st August 2017 in trapping location 8 (Peddler's Croft).

Roost

The precise location of the roost for Bat 10 could not be identified due to access restrictions however the roost has been estimated from tracking data to an unidentified tree south of Calceto Lane [REDACTED]

Flight Lines

Insufficient radio-tracking data was collected to assess flight lines for Bat 10. Data collected on the location of Bat 10 ranged from as far west as Avisford Park Golf Course to as far east as Calceto Lane.

Foraging Areas

There was not enough data collected to find peripheral and core foraging areas for Bat 10.



BAT 11

Bat 11, a post-lactating adult female Natterer's bat was caught on the 21st August 2017 in trapping location 7 (Hundredhouse Copse).

Roost

Bat 11 was found roosting in an oak tree in Spinningwheel Copse [REDACTED] throughout the survey.

Flight Lines

Bat 11 was recorded flying from Barn's Copse south east towards Lake Copse, south to north between Ford village and The Withy Beds and south to north from lake copse to its roost in Spinningwheel Copse.

Foraging Areas

The peripheral foraging area (95% KDE) comprises of approximately 515 ha ranging from Ford Village in the south, east to Tortington Priory Farm, north to the A27 and west to Barn's Copse. The area comprises of a mix of woodland, farmland and residential habitats.

BAT 12

Bat 12, a male adult barbastelle was caught on the 21st August 2017 in trapping location 1 (Spinningwheel Copse).

Roost

The roost for Bat 12 could not be found during the survey however it is estimated to be roosting north of the A27 east of Danes Wood [REDACTED]

Flight Lines

Bat 12 was recorded flying from Binsted village north over the A27 towards West Stubbs Copse, from Winchers Copse north over the A27 towards Goblestubb's Copse, from north of The Waterwoods south-west over the A27 towards [REDACTED] and from the floodplain east of the river Arun west towards Tortington Common.

Foraging Areas

The peripheral foraging area (95%KDE) comprises of approximately 827 ha and ranges from Broomhurst farm in the east to Danes wood in the west and as far north as Sherwood Rough.

The core foraging area (50% KDE) comprises of approximately 40 ha from Pedler's Croft to the south to Goblestubb's Copse on the other side of the A27.

BAT 13

Bat 13, an adult post-lactating female Bechstein's bat was caught on the 22nd August 2017 in trapping location 2 (Binsted Wood).

Roost

Bat 13 was found roosting in two separate oak trees in Steward's Copse [REDACTED]



Flight Lines

Bat 13 was recorded flying from east of the river Arun between Lyminster and Tortington north towards Arundel town.

Foraging Areas

The peripheral foraging area (95%KDE) comprises of approximately 268 ha and ranges from Paine's Wood in the west over Binsted Wood and Tortington Common to Steward's Copse in the east and further across the floodplain east of the river Arun.

BAT 14

Bat 14, an adult female post-lactating whiskered bat was caught was caught on the 22nd August 2017 in trapping location 10 (Tortington Common).

Roost

Bat 14 was found to be roosting in a residential dwelling [REDACTED] Arunde [REDACTED]
[REDACTED]

Flight Lines

Bat 14 was recorded from as far south as Ford Village, west as Spinningwheel Copse, north to the A27 and east into Arundel town.

Foraging Areas

The peripheral foraging area (95%KDE) comprises of approximately 289 ha of woodland, farmland and floodplain ranging from Tortington in the south to the A27 in the north.

The core foraging area (50% KDE) comprises of approximately 50.5 ha across Tortington Common and Tortington Priory Farm.

BAT 15

Bat 15, an adult post-lactating female Alcaho bat was caught on the 22nd August 2017 in trapping location 11 (Tortington Common).

Roost

Bat 15 was recorded roosting in an oak tree in Steward's Copse [REDACTED]
[REDACTED]

Flight Lines

Bat 15 was recorded flying from Steward's Copse in the east across Binsted Wood to Little Danes Wood in the West.

Foraging Areas

The peripheral foraging area (95%KDE) comprises of approximately 49.2 ha of woodland and farmland across Tortington Common, Binsted Wood and Barn's Copse.

The core foraging area (50% KDE) comprises of approximately 4 ha of woodland across Tortington Common, Binsted Wood and Barn's Copse.

BAT 16

Bat 16, a male juvenile Natterer's bat was caught on the 23rd August 2017 at trapping location 20 (Steward's Copse).

Roost

The precise location of the roost for Bat 16 could not be identified due to access restrictions however the roost has been estimated from tracking data to an unidentified tree south of Calceto Lane [REDACTED].

Flight Lines

Bat 16 was recorded from as far east as [REDACTED] to as far west as Binsted Park.

Foraging Areas

The peripheral foraging area (95%KDE) comprises of approximately 17.9 ha of woodland, farmland and floodplain from [REDACTED] in the east to Binsted Park in the west.

The core foraging area (50% KDE) comprises of approximately 0.8 ha of farmland around Brookfield, east of the A284.

BAT 17

Bat 17, an adult, female post-lactating female brown long-eared bat was caught on the 23rd August 2017 in trapping location 21 (Steward's Copse).

Roost

Bat 17 was found roosting in an oak tree in Steward's Copse [REDACTED]
[REDACTED]

Flight Lines

Bat 17 was recorded from Tortington Priory Farm in the south to Steward's Copse in the North Area.

Foraging Areas

The peripheral foraging area (95%KDE) comprises of approximately 26.6 ha of woodland, farmland and floodplain from Tortington Priory farm in the south to Steward's Copse in the north.

The core foraging area (50% KDE) comprises of 0.8 ha of woodland in Steward's Copse.

BAT 18

Bat 18, a male adult Natterer's bat was caught on the 13th September 2017 in trapping location 6 (Spinningwheel Copse).

Roost

Bat 18 was recorded roosting in an oak tree in a small copse south of Tortington Common
[REDACTED]

BAT 19

Bat 19, a female non-breeding Alcaethoe bat was caught on the 13th September 2017 in trapping location 5 (Lake Copse).



Roost

Bat 19 was recorded in an oak tree in Barn's Copse [REDACTED]

BAT 20

Bat 20, an adult female post-lactating Alcaethoe bat was caught on the 13th September 2017 in trapping location 4 (Binsted Wood).

Roost

Bat 20 was recorded roosting in two separate oak trees in Barn's Copse [REDACTED]
[REDACTED]

BAT 21

Bat 21, a male juvenile whiskered bat was caught on the 13th September 2017 at trapping location 3 (Spinningwheel Copse).

Roost

Bat 21 was found roosting in a residential dwelling [REDACTED]
[REDACTED].

BAT 22

Bat 22, a female adult parous whiskered bat was caught on the 13th September 2017 at trapping location 5 (Lake Copse)

Roost

Bat 22 was found roosting [REDACTED] a residential dwelling on Binsted Lane [REDACTED]
[REDACTED].

BAT 23

Bat 23, a female adult non-parous brown long-eared bat was caught on the 14th September 2017 at trapping location 10 (Steward's Copse).

Roost

Bat 23 was found to be roosting within a barn [REDACTED]
[REDACTED]

BAT 24

Bat 24, a female adult parous brown long-eared bat was caught on the 20th September 2017 at trapping location 18 (Hundredhouse Copse).

Roost

The roost for Bat 24 could not be identified due to access restrictions however it is estimated to be within an unidentified tree in Avisford Park golf course [REDACTED]
[REDACTED]

BAT 25

Bat 25, a female adult parous brown long-eared bat was caught on the 20th September 2017 at trapping location 17 (Barn's Copse).



Roost

The roost for Bat 25 could not be identified due to access restrictions, however, it is estimated to be within an unidentified tree in Avisford Park golf course ([REDACTED] [REDACTED]).

BAT 26

Bat 26, a male adult Natterer's bat was caught on the 20th September 2017 at trapping location 17 (Barn's Copse).

Roost

Bat 26 was found roosting in an Ash tree in Barn's Copse [REDACTED] [REDACTED].

BAT 27

Bat 27, a male adult Natterer's bat was caught on the 21st September 2017 at trapping location 20 (Tortington Common).

Roost

Bat 27 was found roosting in a beech tree on the south west edge of Binsted Wood [REDACTED] [REDACTED].

BAT 28

Bat 28, a female non-parous Bechstein's bat was caught on the 21st September 2017 in trapping location 21 (east of Binsted Manor).

Roost

Bat 28 was found to be roosting in an oak tree in Steward's Copse [REDACTED] [REDACTED].

BAT 29

Bat 29, a female non-parous whiskered bat was caught on the 21st September 2017 at trapping location 19 (Tortington Common).

Roost

Bat 29 was found to be roosting within a residential dwelling [REDACTED] [REDACTED].

BAT 30

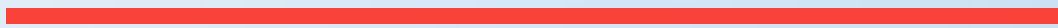
Bat 30, a female adult non-parous brown long-eared bat was caught on the 21st September 2017 at trapping location 19 (Tortington Common)

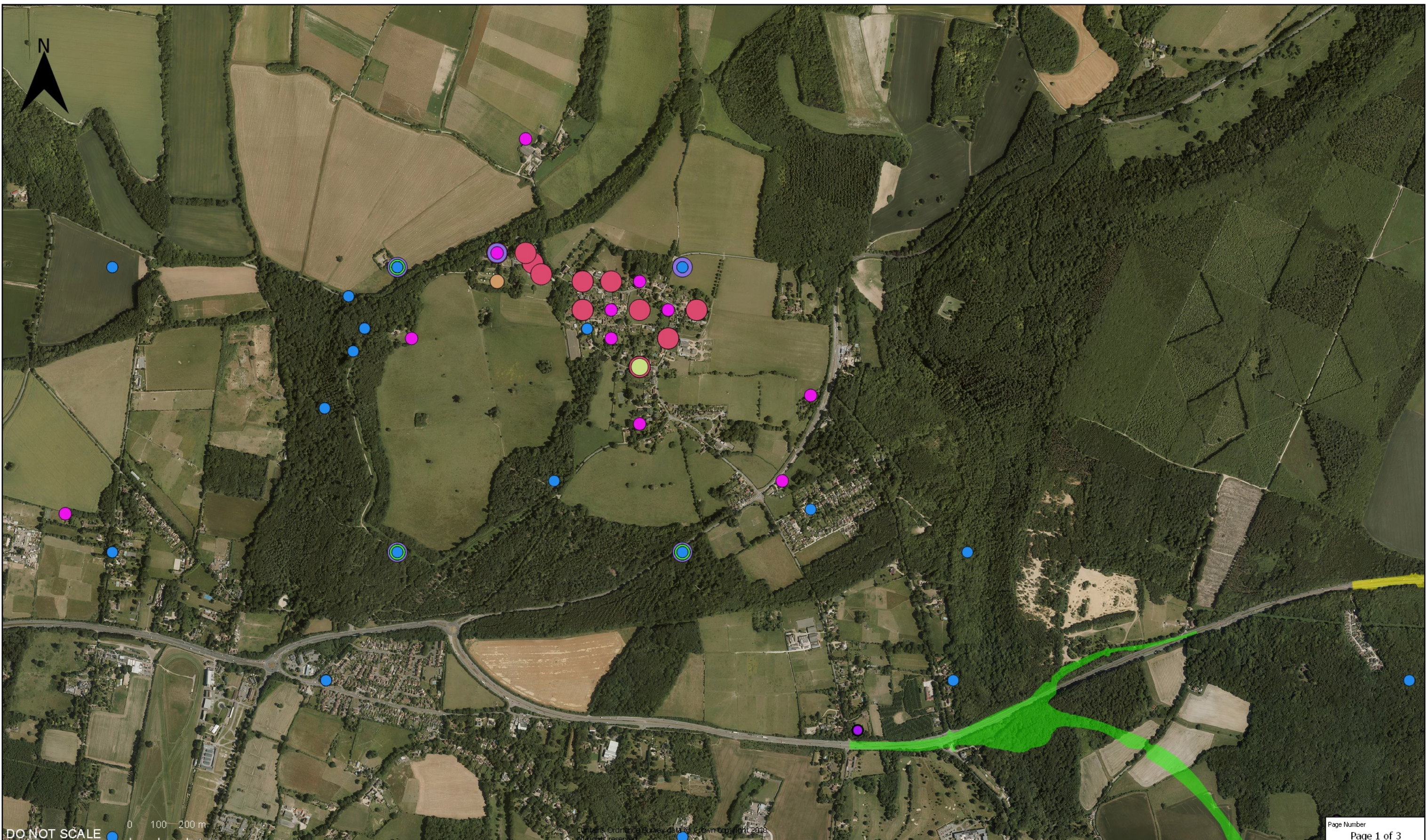
Roost

The roost location for Bat 30 could not be found.

Appendix C

FIGURES





KEY:

Sussex Biodiversity Record Centre Data Records

- Unspecified Record
- Droppings
- Hibemacula Roost

- Maternity Roost
- Maternity Roost; Droppings
- Maternity Roost; Feeding Roost
- Unspecified Roost

- Radio Tracking Results 2016-17**
- Unspecified Roost; Droppings
 - Unspecified roost
 - Maternity roost



Rev.	Date	Description	By	Chkd	App'd

Drawing Status: WORK IN PROGRESS

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: Data Records Map				
Scale: 1:12,500	Drawn: JR	Checked: KJ	Approved:	Authorised:
Original Size: A3	Date: 04/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Originator: WSP	Volume: -GEN	Project Ref. No. 35111 34A	
A27AR Location	-FI Type	-GIS Role	01 Number	Revision P01



DO NOT SCALE

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KEY:

Sussex Biodiversity Record Centre Data Records

- Maternity Roost
- Maternity Roost; Droppings
- Unspecified Record
- Droppings
- Hibernacula Roost

Radio Tracking Results 2016-17

- Unspecified Roost; Droppings
- Unspecified roost
- Maternity roost



Rev.	Date	Description	By	Chkd	App'd

Drawing Status: WORK IN PROGRESS

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: Data Records Map				
Scale: 1:12,500	Drawn: JR	Checked: KJ	Approved:	Authorised:
Original Size: A3	Date: 04/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Project: A27AR	Originator: WSP	Volume: -GEN	Project Ref. No. 35111 34A
Location: A27AR	Type: -FI	Role: -GIS	Number: 01	Revision: P01



KEY:

Sussex Biodiversity Record Centre Data Records	● Maternity Roost	● Unspecified Roost; Droppings
● Unspecified Record	● Maternity Roost; Droppings	Radio Tracking Results 2016-17
● Droppings	● Maternity Roost; Feeding Roost	● Unspecified roost
● Hibernacula Roost	● Unspecified Roost	● Maternity roost



Rev.	Date	Description	By	Chkd	App'd

Drawing Status: WORK IN PROGRESS

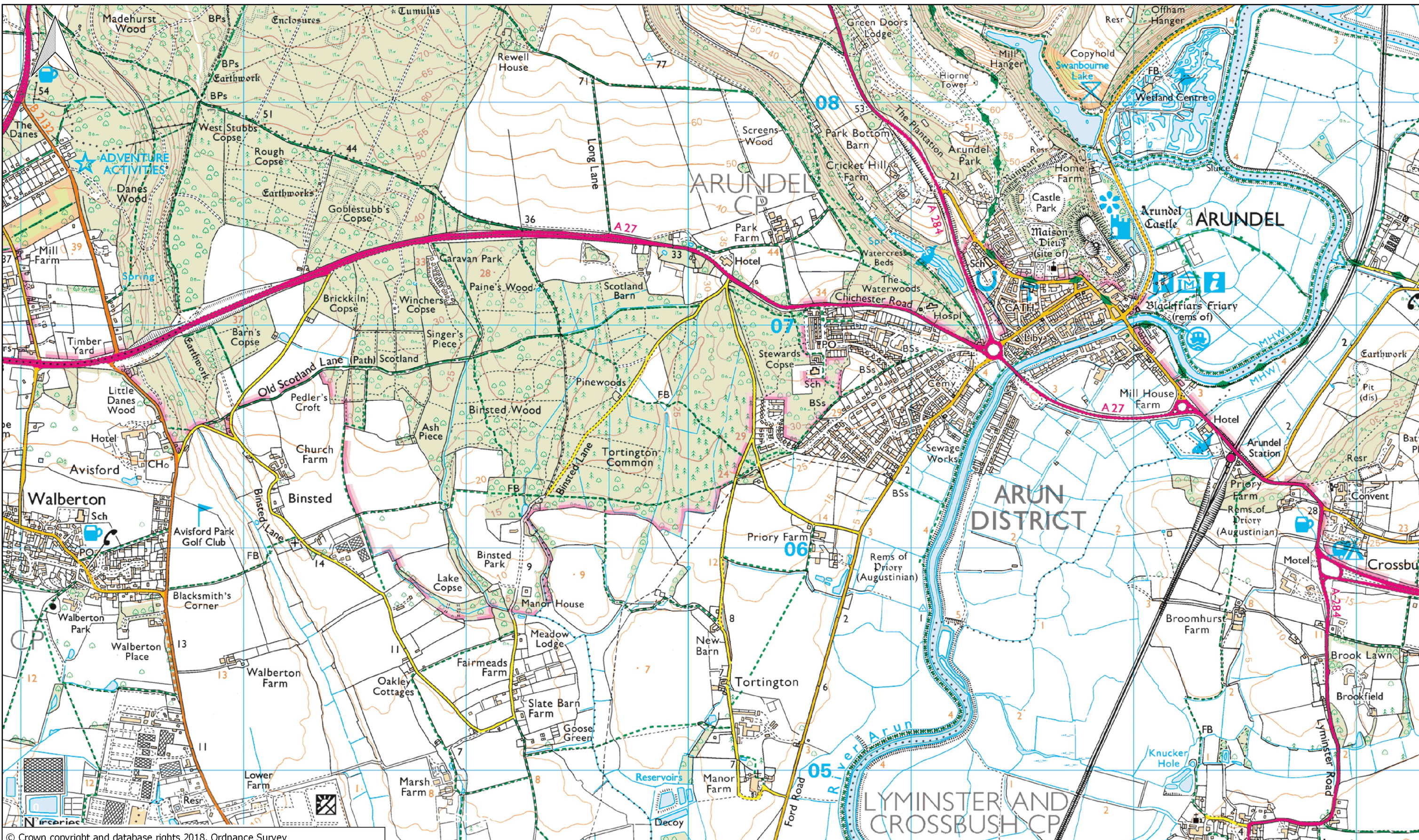
Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: Data Records Map				
Scale: 1:20,000	Drawn: JR	Checked: KJ	Approved:	Authorised:
Original Size: A3	Date: 04/04/18	Date:	Date:	Date:
Drawing Number: HE-551523	Originator: WSP	Volume: -GEN	Project Ref. No. 35111 34A	
A27AR Location	-FI Type	-GIS Role	01 Number	Revision P01



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KEY:
 Scheme Options Footprints
 1
 3
 5A

Rev	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress
 Suitability: S1

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Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: Woodland				
Scale: 1:16,000	Drawn: 18/06/18	Checked:	Approved:	Authorised:
Original Size: A3	Date: 18/06/18	Date:	Date:	Date:
Drawing Number: HE551523	Project: A27 AR	Originator: WSP	Volume: GEN	Project Ref. No: 3511134A
Location:	FI Type:	ECO Role:	01 Number:	Revision: P03



KEY:

- Scheme Options Footprints
- 1
 - 3
 - 5A

- North Areas
- South Area
- East Area
- West Area

◆ Trapping locations

Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress



Suitability: S1

Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 2.1 - Trapping scoping survey July - Trapping locations

Scale: 1:12,000	Drawn: JR	Checked: KJ	Approved:	Authorised: -
Original Size: A3	Date: 11/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Project: A27AR	Originator: WSP	Volume: GEN	Project Ref. No: 3511134A
Location:	FI Type:	ECO Role:	01 Number:	Revision: P03



KEY:

- Scheme Options Footprints
- 1
 - 3
 - 5A

- North Areas
- South Area
- East Area
- West Area

◆ Trapping locations

Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress



Client: Working on behalf of **highways england**

Suitability: S1
Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 2.2 - Trapping survey July - Trapping locations				
Scale: 1:12,000	Drawn: JR	Checked: KJ	Approved:	Authorised: -
Original Size: A3	Date: 11/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Originator: WSP	Volume: GEN	Project Ref. No. 3511134A	
A27AR Location	FI Type	ECO Role	01 Number	Revision P03



KEY:

- Scheme Options Footprints
- 1
 - 3
 - 5A

- North Areas
- South Area
- East Area
- West Area

◆ Trapping locations

Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress



Client: Working on behalf of
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Suitability: S1
Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 2.3 - Trapping survey August - Trapping locations				
Scale: 1:12,000	Drawn: JR	Checked: KJ	Approved:	Authorised: -
Original Size: A3	Date: 11/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Originator: WSP	Volume: GEN	Project Ref. No. 3511134A	
A27AR Location	FI Type	ECO Role	01 Number	Revision P03



KEY:

- Scheme Options Footprints
 - 1 (Blue)
 - 3 (Yellow)
 - 5A (Green)
- North Areas (Grey)
- South Area (White)
- East Area (Red)
- West Area (Blue)
- Trapping locations (Yellow diamond)

Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

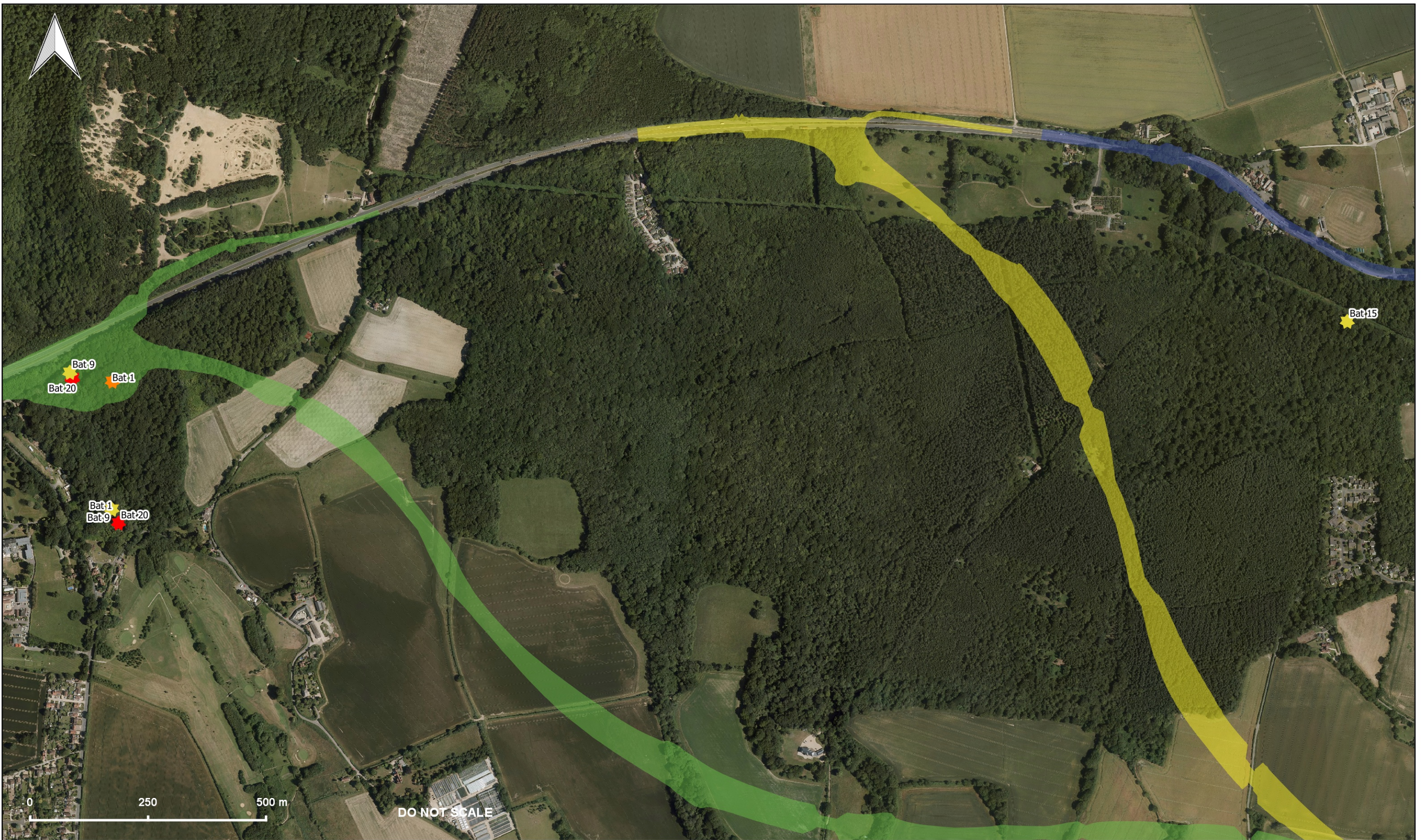
Drawing Status: Work In Progress

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Project Title REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL		Suitability S1	
Drawing Title Figure 2.4 - Trapping survey September - Trapping locations			
Scale 1:12,000	Drawn JR	Checked KJ	Approved -
Original Size A3	Date 11/04/18	Date	Date
Drawing Number Project HE551523	Originator WSP	Volume GEN	Project Ref. No. 3511134A
A27AR Location	FI Type	ECO Role	01 Number
			Revision P03



KEY:

Scheme Options Footprints

- 1
- 3
- 5A

- ★ Alcatthoe bat roost - July
- ★ Alcatthoe bat roost - August
- ★ Alcatthoe bat roost - September

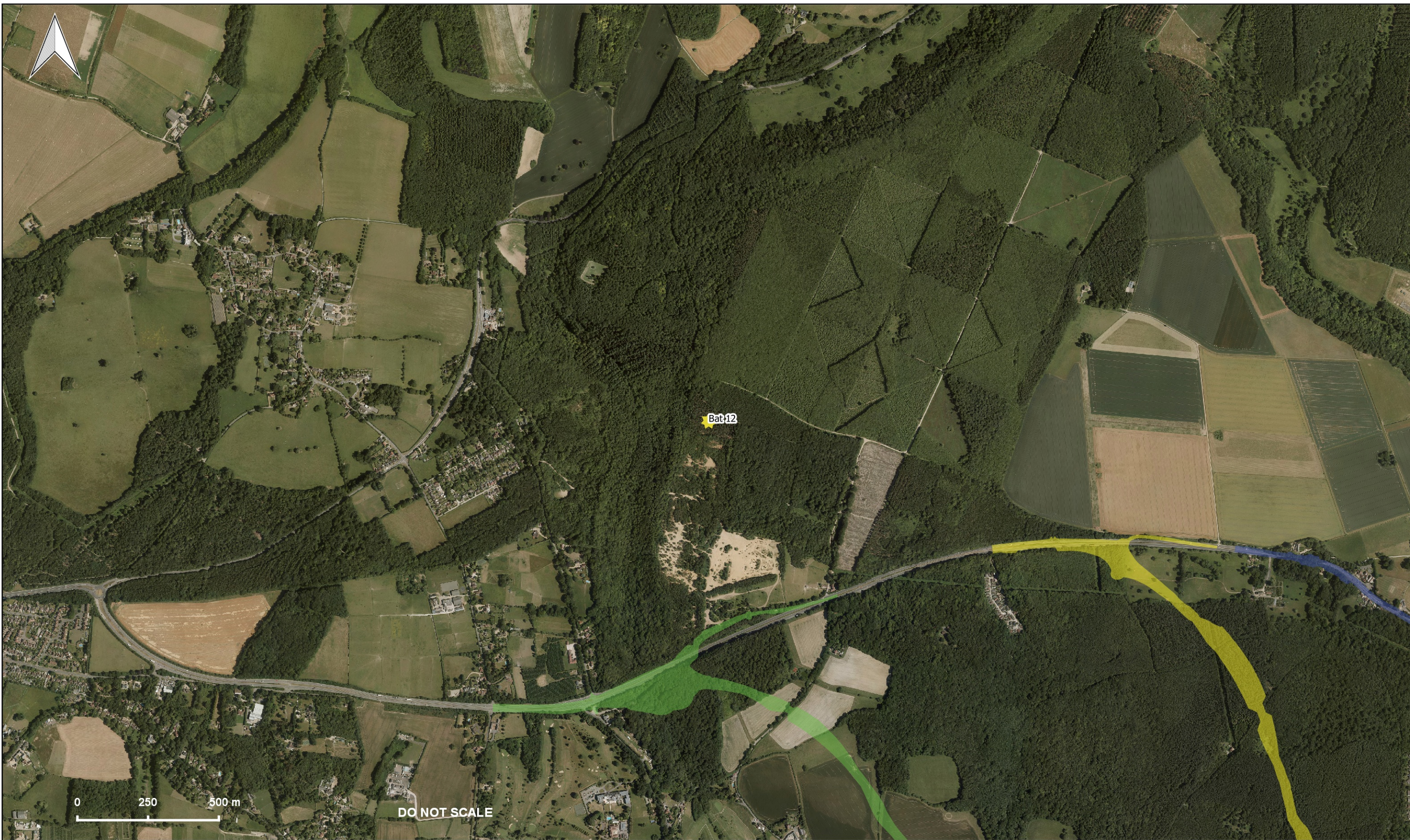
Rev.	Date	Description	By	Ch'kd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress



Suitability: S1
Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 3.1 - Alcatthoe bat roosts				
Scale: 1:7,500	Drawn: JR	Checked: KJ	Approved:	Authorised: -
Original Size: A3	Date: 20/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Project: A27AR	Originator: WSP	Volume: GEN	Project Ref. No: 3511134A
Location:	Type: FI	Role: ECO	Number: 01	Revision: P03



KEY:

Scheme Options Footprints

- 1
- 3
- 5A

★ Barbastelle roost - August

Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

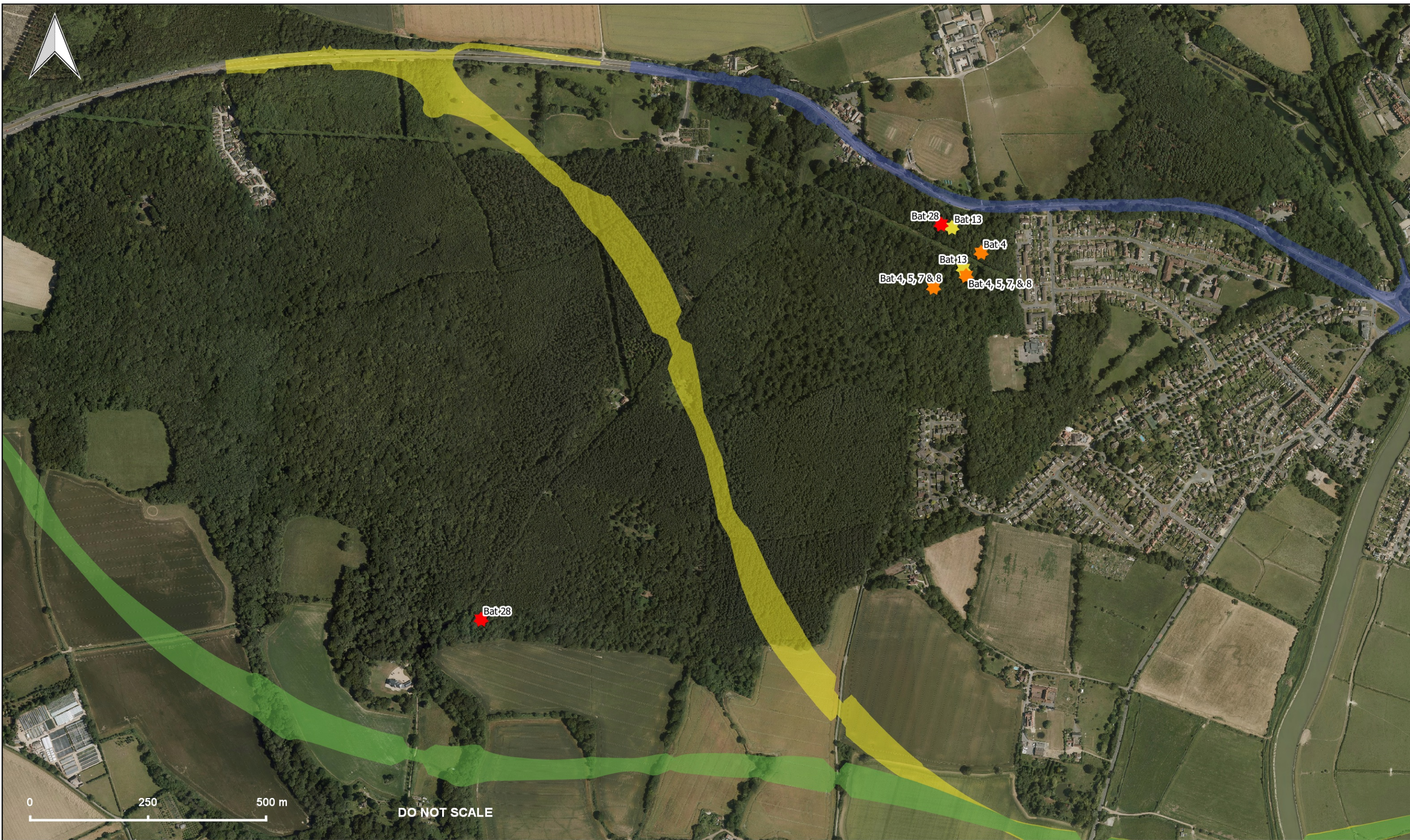
Drawing Status: Work In Progress

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Suitability: S1
 Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 3.2 - Barbastelle bat roosts				
Scale: 1:12,500	Drawn: JR	Checked: KJ	Approved:	Authorised: -
Original Size: A3	Date: 20/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Originator: WSP	Volume: GEN	Project Ref. No. 3511134A	
A27AR Location	FI Type	ECO Role	01 Number	Revision P03



KEY:

Scheme Options Footprints

- 1
- 3
- 5A

- ★ Bechstein's bat roost - July
- ★ Bechstein's bat roosts - August
- ★ Bechstein's bat roosts - September

Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

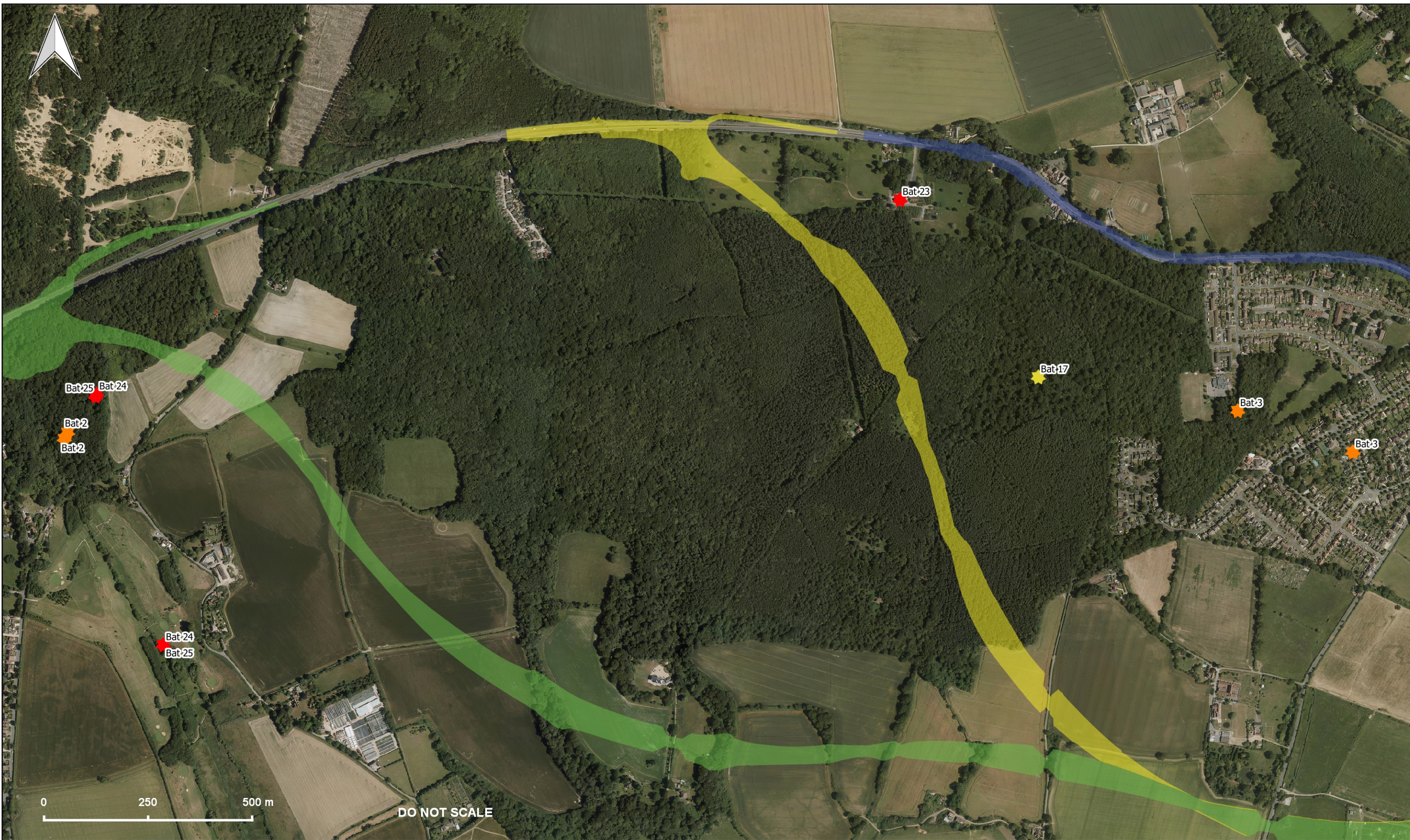
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Suitability: S1
 Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 3.3 - Bechstein's bat roosts				
Scale: 1:7,500	Drawn: JR	Checked: KJ	Approved:	Authorised: -
Original Size: A3	Date: 20/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Originator: WSP	Volume: GEN	Project Ref. No. 3511134A	
A27 AR Location	FI Type	ECO Role	01 Number	Revision P03



KEY:

Scheme Options Footprints

- 1
- 3
- 5A

- ★ Brown long-eared roosts - July
- ★ Brown long-eared roosts - August
- ★ Brown long-eared roosts - September

Rev.	Date	Description	By	Chk'd	App'd
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Project Title REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL		Suitability S1	
Drawing Title Figure 3.4 - Brown long-eared bat roosts			
Scale 1:8,500	Drawn 20/04/18	Checked	Approved
Original Size A3	Date	Date	Date
Drawing Number Project HE551523	Originator WSP	Volume GEN	Project Ref. No. 3511134A
A27AR Location	FI Type	ECO Role	01 Number
			Revision P03



KEY:

Scheme Options Footprints

- 1
- 3
- 5A

Daubenton's bat roost - August

Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress

Suitability: S1

Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 3.5 - Daubenton's bat roosts

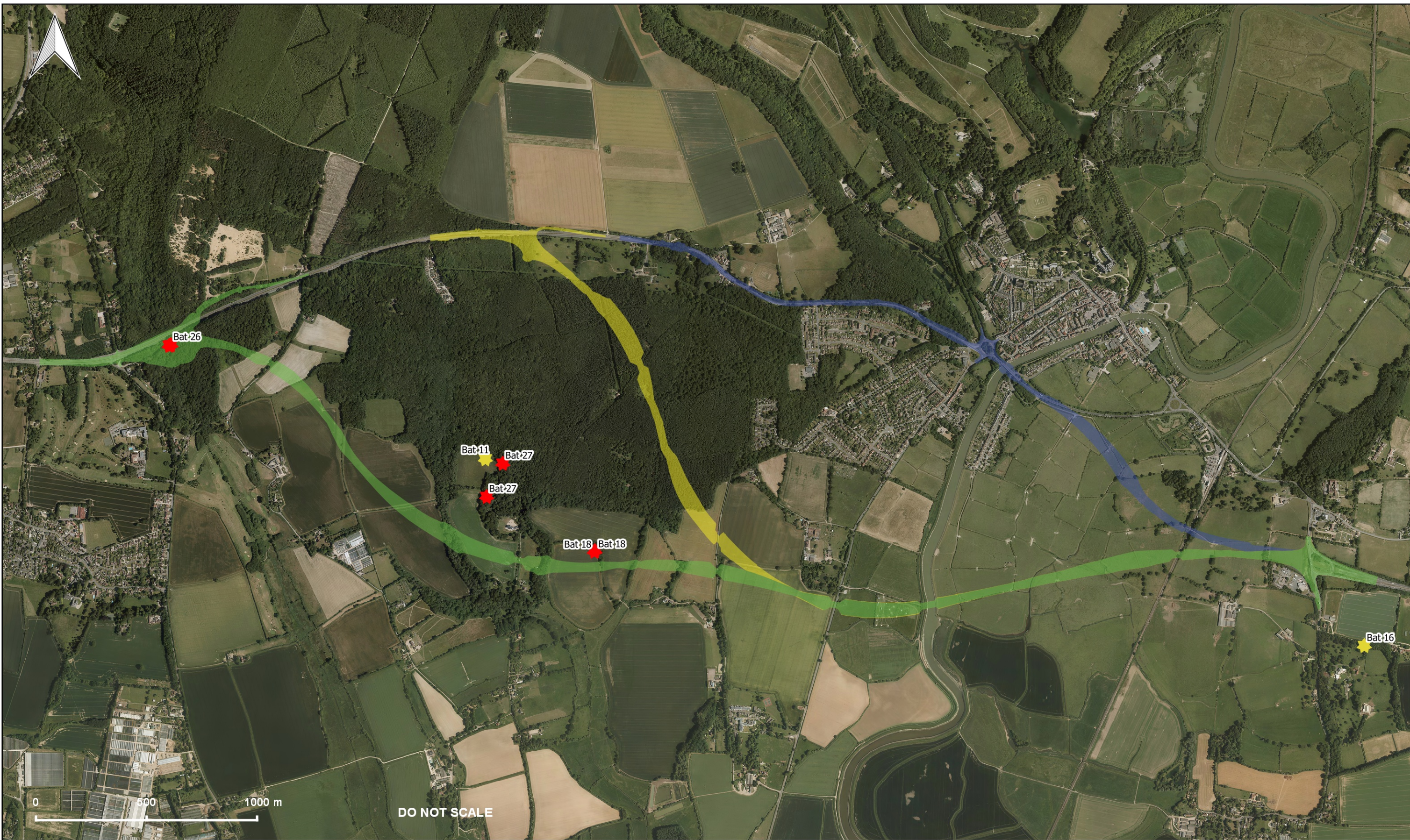
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 Original Size: A3
 Date: 20/04/18

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Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Scale	1:8,000	Drawn	JR	Checked	KJ	Approved		Authorised	-
Original Size	A3	Date	20/04/18	Date		Date		Date	
Drawing Number	HE551523	Originator	WSP	Volume	GEN	Project Ref. No. 3511134A			
A27 AR Location		FI Type		ECO Role	01	Revision P03			



KEY:

Scheme Options Footprints
 1
 3
 5A

★ Natterer's bat roost - August
 ★ Natterer's bat roost - September

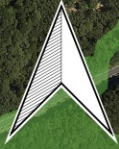
Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress
 Suitability: S1
 Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL
 Drawing Title: Figure 3.6 - Natterer's bat roosts
 Scale: 1:16,000
 Original Size: A3
 Drawing Number: HE551523
 Project: A27AR
 Location: Location

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Drawn	Checked	Approved	Authorised
JR	KJ		
Date	Date	Date	Date
20/04/18			
Originator	Volume	Project Ref. No.	
WSP	GEN	3511134A	
FI	ECO	01	Revision
Type	Role	Number	P03



0 250 500 m

DO NOT SCALE

KEY:

Scheme Options Footprints

- 1
- 3
- 5A

- ★ Whiskered bat roost - July
- ★ Whiskered bat roost - August
- ★ Whiskered bat roost - September

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: Work In Progress



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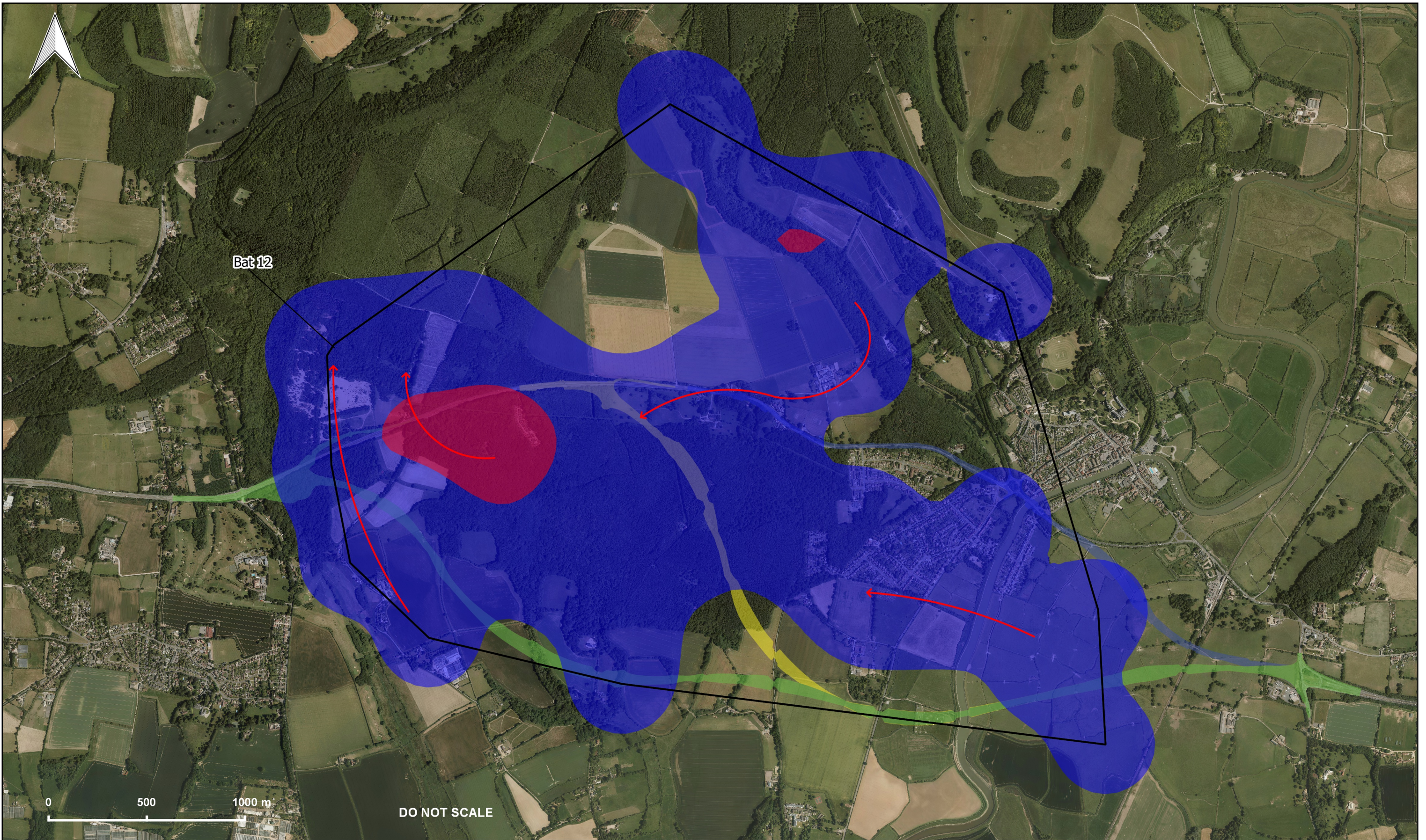
Client: Working on behalf of



Suitability: S1

Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 3.7 - Whiskered bats roosts				
Scale: 1:10,000	Drawn: JR	Checked: KJ	Approved:	Authorised:
Original Size: A3	Date: 20/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Originator: WSP	Volume: GEN	Project Ref. No. 3511134A	
A27 AR Location	FI Type	ECO Role	01 Number	Revision P03



Bat 12

0 500 1000 m

DO NOT SCALE

KEY:

Scheme Options Footprints

- 1
- 3
- 5A

- 100% MCP - Maximum home range
- 50% KDE - Core foraging areas
- 95% KDE - Peripheral foraging areas
- Bat 12 flightlines

Rev	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress

Suitability: S1

Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 3.9 - Barbastelle bat foraging areas

Scale: 1:18,049

Original Size: A3

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Scale	1:18,049	Drawn	JR	Checked	KJ	Approved		Authorised	-
Original Size	A3	Date	10/04/18	Date		Date		Date	
Drawing Number	HE551523	Originator	WSP	Volume	GEN	Project Ref. No.	3511134A		
Location	A27 AR	FI Type	ECO	Role	01	Revision	P03		



KEY:

Scheme Options Footprints

- 1
- 3
- 5A

- 100% MCP - Maximum home range
- 50% KDE - Core Foraging areas

Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress

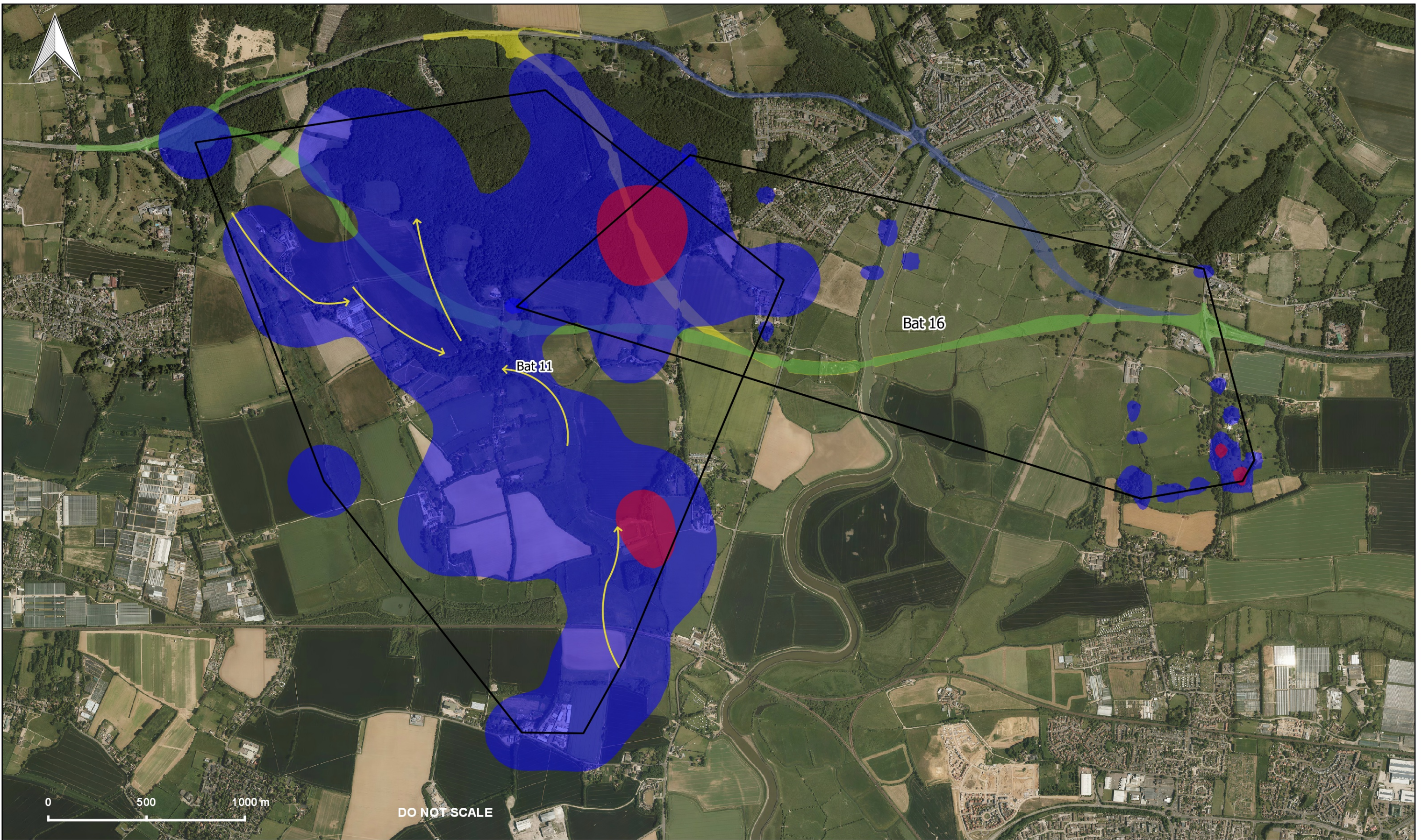
Suitability: S1

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Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title: Figure 3.12 - Daubenton's bats foraging areas				
Scale: 1:16,000	Drawn: JR	Checked: KJ	Approved:	Authorised: -
Original Size: A3	Date: 20/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Project: A27AR	Originator: WSP	Volume: GEN	Project Ref. No: 3511134A
Location:	FI Type:	ECO Role:	01 Number:	Revision: P03



KEY:

Scheme Options Footprints

- 1
- 3
- 5A

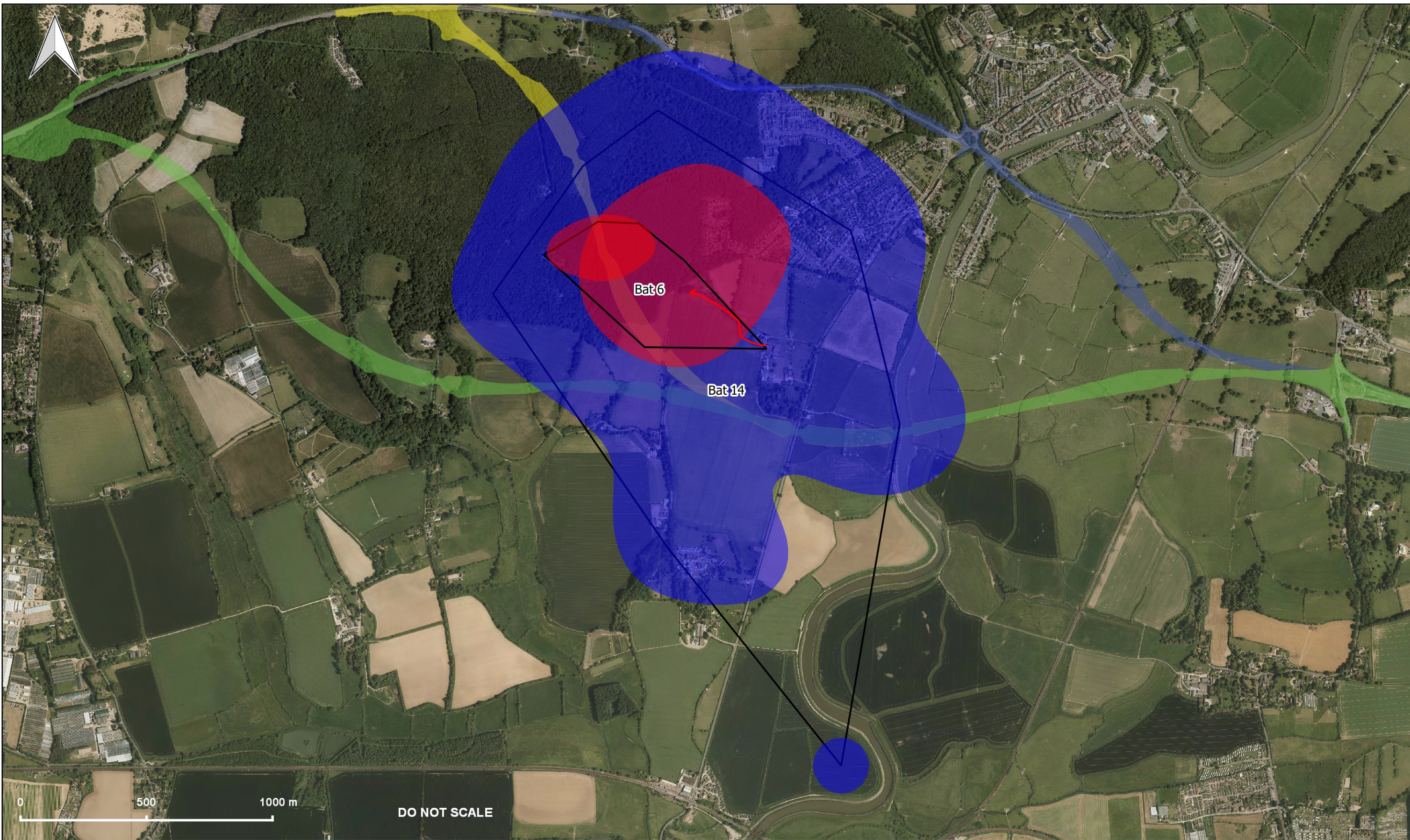
- 100% MCP - Maximum home range
- 50% KDE - Core foraging areas
- 95% KDE - Peripheral foraging areas
- Bat 11 flightlines

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: Work In Progress
 Suitability: S1

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Project Title REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL				
Drawing Title Figure 3.13 - Whiskered bats foraging areas				
Scale 1:18,000	Drawn JR	Checked KJ	Approved	Authorised
Original Size A3	Date 18/06/18	Date	Date	Date
Drawing Number Project HE551523	Originator WSP	Volume GEN	Project Ref. No. 3511134A	
A27AR Location	FI Type	ECO Role	01 Number	Revision P03



KEY:

Scheme Options Footprints

- 1
- 3
- 5A

- 100% MCP - Maximum home range
- 50% KDE - Core foraging areas
- 95% KDE - Peripheral foraging areas
- Bat 6 flightlines

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: Work In Progress



Client: Working on behalf of
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england**

Suitability: S1
Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL

Drawing Title: Figure 3.14 - Whiskered bats foraging areas

Scale: 1:14,038	Drawn: JR	Checked: KJ	Approved:	Authorised:
Original Size: A3	Date: 11/04/18	Date:	Date:	Date:
Drawing Number: HE551523	Project: A27AR	Location:	Originator: WSP	Volume: GEN
	FI Type:	ECO Role:	01 Number:	Project Ref. No. 3511134A
				Revision P03



KEY:

- ▲ Bechstein roost
 - ▲ Whiskered roost
 - ▲ Natterer Roost
 - ▲ Daubentons/Natterer roost
 - ▲ Brown Long-eared roost
 - ▲ Barbastelle roost
 - ▲ Alcathee roost
- Options**
- 1
 - 3
 - 5A

Rev.	Date	Description	By	Chk'd	App'd
P01		FIRST ISSUE			

Drawing Status: Work In Progress

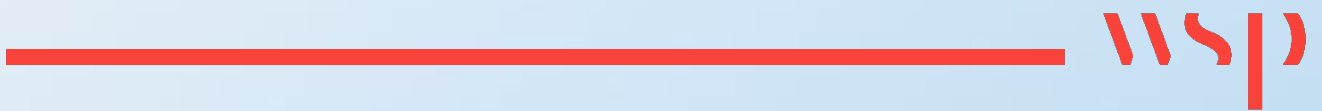
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Suitability: S1		Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL			
Drawing Title: Figure 3.15 - Bat Roost ID					
Scale: 1:15,152	Drawn: JH	Checked: HB	Approved: HB	Authorised: -	
Original Size: A3	Date: 05/12/18	Date:	Date:	Date:	
Drawing Number: HE551523	Originator: WSP	Volume: GEN	Project Ref. No. 3511134A		Revision: P01
A27AR Location:	FI Type:	ECO Role:	01 Number:		

Appendix D

DESK STUDY DATA





DESK STUDY:- EUROPEAN PROTECTED SPECIES LICENCES WITHIN 2KM (MAGIC)

Case reference of granted application	2014-2445-EPS-MIT
Species group to which licence relates	Bat
Species on the licence	C-PIP,SER,S-PIP,WHISK
Site county of licence	West Sussex
Licence Start Date	26/08/2014
Licence End Date	31/07/2019
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	N
Does licence allow damage of a resting place	N
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown

Case reference of granted application	2014-352-EPS-MIT
Species group to which licence relates	Bat
Species on the licence	BLE,C-PIP,WHISK
Site county of licence	West Sussex
Licence Start Date	14/05/2014
Licence End Date	30/09/2015
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	N
Does licence allow damage of a resting place	N
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown

Case reference of granted application	2014-352-EPS-MIT-1
Species group to which licence relates	Bat
Species on the licence	BLE,C-PIP,WHISK
Site county of licence	West Sussex
Licence Start Date	08/05/2015
Licence End Date	30/04/2016
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	N
Does licence allow damage of a resting place	N
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown

Case reference of granted application	2015-10184-EPS-MIT
Species group to which licence relates	Bat
Species on the licence	C-PIP
Site county of licence	West Sussex
Licence Start Date	22/05/2015
Licence End Date	31/05/2020
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	N
Does licence allow damage of a resting place	N
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown



Case reference of granted application	2015-13198-EPS-MIT
Species group to which licence relates	Bat
Species on the licence	BLE,C-PIP,S-PIP
Site county of licence	West Sussex
Licence Start Date	24/08/2015
Licence End Date	31/10/2015
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	N
Does licence allow damage of a resting place	Y
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	N
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown

Case reference of granted application	EPSM2010-2709
Species group to which licence relates	Bat
Species on the licence	C-PIP;SER;BLE
Site county of licence	West Sussex
Licence Start Date	28/02/2011
Licence End Date	30/09/2013
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	
Does licence allow damage of a resting place	
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown

Case reference of granted application	2015-14213-EPS-MIT
Species group to which licence relates	Bat
Species on the licence	BLE,C-PIP,SER
Site county of licence	West Sussex
Licence Start Date	15/09/2015
Licence End Date	14/09/2020
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	Y
Does licence allow damage of a resting place	Y
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown

Case reference of granted application	2016-24435-EPS-MIT
Species group to which licence relates	Bat
Species on the licence	BARB,BLE,C-PIP,S-PIP
Site county of licence	West Sussex
Licence Start Date	20/07/2016
Licence End Date	18/07/2021
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	N
Does licence allow damage of a resting place	N
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown



Case reference of granted application	EPSM2011-3053
Species group to which licence relates	Bat
Species on the licence	C-PIP;BLE;WHISK;BRAN
Site county of licence	West Sussex
Licence Start Date	01/05/2011
Licence End Date	30/04/2013
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	
Does licence allow damage of a resting place	
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown

Case reference of granted application	EPSM2013-5700
Species group to which licence relates	Bat
Species on the licence	C-PIP;BLE
Site county of licence	West Sussex
Licence Start Date	17/04/2013
Licence End Date	31/10/2013
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	
Does licence allow damage of a resting place	
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown

Case reference of granted application	EPSM2012-4965
Species group to which licence relates	Bat
Species on the licence	C-PIP;BLE;NATT
Site county of licence	West Sussex
Licence Start Date	05/11/2012
Licence End Date	31/08/2014
Does licence impact on a breeding site	N
Does licence allow damage of breeding site	
Does licence allow damage of a resting place	
Does licence allow destruction of breeding site	N
Does licence allow destruction of a resting place	Y
Does licence impact on a hibernation site	Unknown
NERC agreement reference	Unknown



NERC agreement reference Unknown

Case reference of granted application EPSM2009-946
 Species group to which licence relates Bat
 Species on the licence C-PIP;S-PIP;BLE
 Site county of licence West Sussex
 Licence Start Date 04/06/2010
 Licence End Date 31/12/2011
 Does licence impact on a breeding site Y
 Does licence allow damage of breeding site
 Does licence allow damage of a resting place
 Does licence allow destruction of breeding site Y
 Does licence allow destruction of a resting place Y
 Does licence impact on a hibernation site Unknown
 NERC agreement reference Unknown

Case reference of granted application 2016-24108-EPS-MIT
 Species group to which licence relates Bat
 Species on the licence C-PIP
 Site county of licence West Sussex
 Licence Start Date 01/07/2016
 Licence End Date 30/06/2021
 Does licence impact on a breeding site N
 Does licence allow damage of breeding site N
 Does licence allow damage of a resting place N
 Does licence allow destruction of breeding site N
 Does licence allow destruction of a resting place Y
 Does licence impact on a hibernation site Unknown
 NERC agreement reference Unknown

Case reference of granted application 2016-24108-EPS-MIT-1
 Species group to which licence relates Bat
 Species on the licence C-PIP
 Site county of licence West Sussex
 Licence Start Date 20/10/2016
 Licence End Date 30/11/2021
 Does licence impact on a breeding site N
 Does licence allow damage of breeding site N
 Does licence allow damage of a resting place N
 Does licence allow destruction of breeding site N
 Does licence allow destruction of a resting place Y
 Does licence impact on a hibernation site Unknown
 NERC agreement reference Unknown

DESK STUDY: - BAT RECORDS WITHIN 6KM

Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Barbastella barbastellus	Western Barbastelle	██████████	██████████	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	██████████	██████████	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	██████████	██████████	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	██████████	██████████	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	██████████	██████████	2015	Bat Survey



Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Bat Survey
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Bat Survey
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Bat Survey
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2015	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2014	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2014	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2014	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2014	Unknown
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2014	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2014	Unknown
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2014	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2014	Unknown
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2014	Radio-Tracked
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2013	Unknown
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2013	Unknown



Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2013	Unknown
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2013	Bat Trap
Barbastella barbastellus	Western Barbastelle	[REDACTED]	[REDACTED]	2016	Radio-Tracked
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2015	Droppings
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2014	Roost Exit Count
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2013	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2013	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2013	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2013	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2013	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2013	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2012	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2012	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2011	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2011	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2011	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2011	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Unknown
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection

Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2008	Waterway transect
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2008	Waterway transect
Chiroptera	Bat sp.	[REDACTED]	[REDACTED]	2007	Sunrise Survey
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2016	Aural bat detector
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2015	Aural bat detector
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2014	Droppings
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2014	Aural bat detector
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2014	Droppings
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2014	Aural bat detector
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2013	Bat Trap
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2010	Field Observation
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2010	Building Inspection
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2009	Field Observation
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2016	Radio-Tracked
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2016	Radio-Tracked
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2016	Radio-Tracked
Eptesicus serotinus	Serotine	[REDACTED]	[REDACTED]	2016	Radio-Tracked



Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Myotis	Myotis Bat	[REDACTED]	[REDACTED]	2015	Aural bat detector
Myotis alcaethoe	Alcaethoe Bat	[REDACTED]	[REDACTED]	2016	Radio-tracking
Myotis alcaethoe	Alcaethoe Bat	[REDACTED]	[REDACTED]	2016	Radio-tracking
Myotis alcaethoe	Alcaethoe Bat	[REDACTED]	[REDACTED]	2014	Aural bat detector
Myotis alcaethoe	Alcaethoe Bat	[REDACTED]	[REDACTED]	2013	Bat Trap
Myotis bechsteinii	Bechstein's Bat	[REDACTED]	[REDACTED]	2012	Visual
Myotis bechsteinii	Bechstein's Bat	[REDACTED]	[REDACTED]	2017	Radio-Tracked
Myotis bechsteinii	Bechstein's Bat	[REDACTED]	[REDACTED]	2017	Radio-Tracked
Myotis bechsteinii	Bechstein's Bat	[REDACTED]	[REDACTED]	2016	Radio-Tracked
Myotis brandtii	Brandt's Bat	[REDACTED]	[REDACTED]	2013	Bat Trap
Myotis brandtii	Brandt's Bat	[REDACTED]	[REDACTED]	2013	Bat Trap
Myotis daubentonii	Daubenton's Bat	[REDACTED]	[REDACTED]	2015	Aural bat detector
Myotis daubentonii	Daubenton's Bat	[REDACTED]	[REDACTED]	2015	Aural bat detector
Myotis daubentonii	Daubenton's Bat	[REDACTED]	[REDACTED]	2014	Aural bat detector
Myotis daubentonii	Daubenton's Bat	[REDACTED]	[REDACTED]	2013	Visual
Myotis daubentonii	Daubenton's Bat	[REDACTED]	[REDACTED]	2010	Unknown
Myotis daubentonii	Daubenton's Bat	[REDACTED]	[REDACTED]	2010	Unknown
Myotis daubentonii	Daubenton's Bat	[REDACTED]	[REDACTED]	2010	Unknown
Myotis daubentonii	Daubenton's Bat	[REDACTED]	[REDACTED]	2009	Field Observation
Myotis mystacinus	Whiskered Bat	[REDACTED]	[REDACTED]	2013	Bat Trap
Myotis mystacinus	Whiskered Bat	[REDACTED]	[REDACTED]	2013	Bat Trap
Myotis mystacinus/brandtii	Whiskered/Brandt's	[REDACTED]	[REDACTED]	2015	Aural bat detector
Myotis mystacinus/brandtii	Whiskered/Brandt's	[REDACTED]	[REDACTED]	2015	Aural bat detector



Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Myotis mystacinus/brandtii	Whiskered/Brandt's	[REDACTED]	[REDACTED]	2015	Aural bat detector
Myotis mystacinus/brandtii	Whiskered/Brandt's	[REDACTED]	[REDACTED]	2014	Aural bat detector
Myotis mystacinus/brandtii	Whiskered/Brandt's	[REDACTED]	[REDACTED]	2013	Building Inspection
Myotis nattereri	Natterer's Bat	[REDACTED]	[REDACTED]	2015	Aural bat detector
Myotis nattereri	Natterer's Bat	[REDACTED]	[REDACTED]	2014	Aural bat detector
Myotis nattereri	Natterer's Bat	[REDACTED]	[REDACTED]	2013	Bat Trap
Myotis nattereri	Natterer's Bat	[REDACTED]	[REDACTED]	2010	Hibernacula Survey
Myotis nattereri	Natterer's Bat	[REDACTED]	[REDACTED]	2010	Hibernacula Survey
Nyctalus noctula	Noctule Bat	[REDACTED]	[REDACTED]	2016	Aural bat detector
Nyctalus noctula	Noctule Bat	[REDACTED]	[REDACTED]	2015	Bat Survey
Nyctalus noctula	Noctule Bat	[REDACTED]	[REDACTED]	2014	Aural bat detector
Nyctalus noctula	Noctule Bat	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus	Pipistrelle sp.	[REDACTED]	[REDACTED]	2015	Roost Exit Count
Pipistrellus	Pipistrelle sp.	[REDACTED]	[REDACTED]	2014	Droppings
Pipistrellus	Pipistrelle sp.	[REDACTED]	[REDACTED]	2014	Droppings
Pipistrellus	Pipistrelle sp.	[REDACTED]	[REDACTED]	2013	Droppings
Pipistrellus	Pipistrelle sp.	[REDACTED]	[REDACTED]	2013	Building Inspection
Pipistrellus	Pipistrelle sp.	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus	Pipistrelle sp.	[REDACTED]	[REDACTED]	2010	Building Inspection
Pipistrellus	Pipistrelle sp.	[REDACTED]	[REDACTED]	2009	Field Observation
Pipistrellus	Pipistrelle sp.	[REDACTED]	[REDACTED]	2009	Field Observation
Pipistrellus nathusii	Nathusius's Pipistrelle	[REDACTED]	[REDACTED]	2015	Aural bat detector
Pipistrellus nathusii	Nathusius's Pipistrelle	[REDACTED]	[REDACTED]	2015	Aural bat detector



Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Pipistrellus nathusii	Nathusius's Pipistrelle			2014	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle			2016	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle			2015	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle			2015	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle			2015	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle			2015	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle			2015	Re-entry survey
Pipistrellus pipistrellus	Common Pipistrelle			2015	Re-entry survey
Pipistrellus pipistrellus	Common Pipistrelle			2015	Roost Exit Count
Pipistrellus pipistrellus	Common Pipistrelle			2015	Roost Exit Count
Pipistrellus pipistrellus	Common Pipistrelle			2015	Roost Exit Count
Pipistrellus pipistrellus	Common Pipistrelle			2015	Bat Survey
Pipistrellus pipistrellus	Common Pipistrelle			2014	Visual
Pipistrellus pipistrellus	Common Pipistrelle			2014	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle			2014	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle			2014	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle			2014	Field Observation
Pipistrellus pipistrellus	Common Pipistrelle			2013	Bat Trap
Pipistrellus pipistrellus	Common Pipistrelle			2013	Bat Trap
Pipistrellus pipistrellus	Common Pipistrelle			2013	Bat Trap
Pipistrellus pipistrellus	Common Pipistrelle			2013	Bat Trap
Pipistrellus pipistrellus	Common Pipistrelle			2013	heard



Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Pipistrellus pipistrellus	Common Pipistrelle	[REDACTED]	[REDACTED]	2012	Building Inspection
Pipistrellus pipistrellus	Common Pipistrelle	[REDACTED]	[REDACTED]	2011	Field Observation
Pipistrellus pipistrellus	Common Pipistrelle	[REDACTED]	[REDACTED]	2011	Field Observation
Pipistrellus pipistrellus	Common Pipistrelle	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pipistrellus	Common Pipistrelle	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pipistrellus	Common Pipistrelle	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pipistrellus	Common Pipistrelle	[REDACTED]	[REDACTED]	2010	Aural bat detector
Pipistrellus pipistrellus	Common Pipistrelle	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2016	Aural bat detector
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2016	Aural bat detector
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2015	Aural bat detector
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2015	Aural bat detector
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2015	Unkown
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2015	Aural bat detector
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2015	Unspecified
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2014	Aural bat detector
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2014	Aural bat detector
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2014	Aural bat detector



Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2014	Unspecified
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2013	Bat Trap
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2013	Visual
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2013	Bat Trap
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2013	Bat Trap
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2013	Unspecified
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2010	Unknown
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2009	Field Observation
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2009	Field Observation
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2009	Field Observation

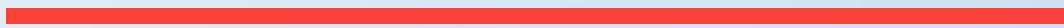
Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2009	Field Observation
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2009	Field Observation
Pipistrellus pygmaeus	Soprano Pipstrelle (55 kHz)	[REDACTED]	[REDACTED]	2008	Field Observation
Plecotus	Long-eared sp.	[REDACTED]	[REDACTED]	2015	Droppings
Plecotus	Long-eared sp.	[REDACTED]	[REDACTED]	2015	Building Inspection
Plecotus	Long-eared sp.	[REDACTED]	[REDACTED]	2014	Droppings
Plecotus	Long-eared sp.	[REDACTED]	[REDACTED]	2014	Field Observation
Plecotus	Long-eared sp.	[REDACTED]	[REDACTED]	2013	Droppings
Plecotus	Long-eared sp.	[REDACTED]	[REDACTED]	2008	Building Inspection
Plecotus	Long-eared sp.	[REDACTED]	[REDACTED]	2007	Building Inspection
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2014	Unknown
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2014	Unknown
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2014	Droppings
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2014	Bat Survey
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2013	Unknown
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2013	Unknown
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2013	Bat Trap
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2013	Droppings
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2013	Bat Trap
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2013	Bat Trap
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2013	Bat Trap



Scientific name	Vernacular name	Grid Reference		Year	Type
		X	Y		
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2013	Building Inspection
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2012	Building Inspection
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2012	Building Inspection
Plecotus auritus	Brown Long-eared Bat	[REDACTED]	[REDACTED]	2010	Building Inspection

Appendix E

RADIO-TRACKED BATS AND
EMERGENCE SURVEY DATA





Day roost search survey dates and teams

Team	Date	Number of Surveyors	Bats Tracked
1	25/07/2017	2	1
2	25/07/2017	2	3 and 4
1	26/07/2017	2	1,2,3,4 and 5
1	27/07/2017	1	3,4,5,7 and 8
1	28/07/2017	2	2,3,4,5,6,7 and 8
1	24/08/2017	2	9 and 15
1	25/08/2017	1	9,10,11,12,13,14,15,16 and 17
1	26/08/2017	1	9,10,11,12,13,14,15,16 and 17
1	14/09/2017	2	19 and 20
1	16/09/2017	2	18,19,20,21,22 and 23
1	22/09/2017	2	24,25,26,27,28,29 and 30
1	23/09/2017	2	24, 25, 26, 27, 28, 29 and 30

Radio-tracking survey dates and surveyors

Team	Dates	Surveyors	Bats Tracked
RT 1	25/07/2017-26/07/2017	3	Bat 1 and Bat 2 from 22:15 until 23:42 and Bat 4 from 23:15 until 23:42.
RT 2	25/07/2017-26/07/2017	2	Bat 1 and Bat 2 from 21:18 until 23:11
RT 3	25/07/2017-26/07/2017	2	Bat 3 and Bat 4 from 22:26 until 02:24
RT 4	25/07/2017-26/07/2017	2	Bat 4 and Bat 5 between 23:00 and 03:33
RT 5	25/07/2017-26/07/2017	2	Bat 4 and Bat 5 between 02:54 and 03:33



Team	Dates	Surveyors	Bats Tracked
RT 1	26/07/2017-27/07/2017	2	Bats 1, 2 and 5 between 21:15 and 22:24
RT 2	26/07/2017-27/07/2017	2	Bat 1 and Bat 2 from 21:05 until 23:46
RT 1	27/07/2017-28/07/2017	2	Bats 2,3,4,5,6,7 and 8 between 20:55 and 03:28
RT 2	27/07/2017-28/07/2017	2	Bats 2,4,5,6,7 and 8 between 22:01 and 03:28
RT 3	27/07/2017-28/07/2017	2	Bats 2, 4, 5, 6, 7 and 8 between 21:36 and 03:28
RT 1	28/07/2017-29/07/2017	2	Bats 4,5, 6, 7, 8 between 22:17 and 02:17
RT 2	28/07/2017-29/07/2017	2	Bats 4,5,6,7 and 8 between 00:38 and 02:40
RT 3	28/07/2017-29/07/2017	1	Bat 8 between 20:55 and 22:47
RT 1	22/08/2017-23/08/2017	2	Bats 9,10,11 and 12 between 20:52 and 01:40
RT 2	22/08/2017-23/08/2017	3	Bats 9,10,11 and 12 between 21:35 and 01:40
RT 1	23/08/2017-24/08/2017	2	Bats 9,10,11,13,14 and 15 between 20:00 and 00:11
RT 2	23/08/2017-24/08/2017	2	Bats 10,11,13, 14 and 15 between 20:56 and 01:33
RT 3	23/08/2017-24/08/2017	2	Bats 10,11,12, 14 and 15 between 20:50 and 01:37
RT 1	24/08/2017-25/08/2017	2	Bats 11,12,14,15, 16 and 17 between 20:42 and 02:32
RT 2	24/08/2017-25/08/2017	1	Bats 9,10,11,12,13,14,15 and 16 between 20:49 and 02:40
RT 3	24/08/2017-25/08/2017	2	Bats 11,12,13,14,15 and 17 between 20:42 and 02:47
RT 4	24/08/2017-25/08/2017	2	Bats 9, 14 and 15 between 22:10 and 23:11

Team	Dates	Surveyors	Bats Tracked
RT 1	25/08/2017-26/08/2017	2	Bats 9,11,13 and 15 between 22:09 and 01:29
RT 2	25/08/2017-26/08/2017	2	Bats 10,11,12,13,16 and 17 between 20:00 and 01:15
RT 3	25/08/2017-26/08/2017	2	Bats 12,14,15 and 16 between 20:25 and 00:49
RT 4	25/08/2017-26/08/2017	2	Bats 10,11,12,13, 14 and 15 between 20:44 and 00:35
RT 1	22/09/2017	2	Bats 27, 28, 12 and 13 between 19:22 and 20:30
RT 2	22/09/2017	2	Bats 26,27,28 and 30 between 19:31 and 20:30

Emergence survey locations

Date	Easting	Northing	Location details	Equipment
25/07/2017			Oak tree with trunk cavity on eastern aspect (Bat 1)	Batlogger M
15/09/2017			Oak tree with trunk cavity on eastern aspect (Bat 20)	Batlogger M + Canon XA20
26/07/2017			Leaning dead oak tree with woodpecker hole in north elevation (Bats 4, 5, 7 and 8)	Batlogger M + Canon XA20
27/07/2017				Batlogger M
27/07/2017			In building (Bat 3)	Batlogger M
27/07/2017			Building Only western elevation of building surveyed due to access restrictions (Bat 6)	EchoMeter Touch + iPhone 6
28/07/2017			Willow with cavity at 2 m height (Bat 2)	Batlogger M + Canon XA20
28/07/2017			Oak tree south of the footpath in Steward's Copse (Bats 4, 5, 7 and 8).	Batlogger M

Date	Easting	Northing	Location details	Equipment
23/08/2017	[REDACTED]	[REDACTED]	Oak tree in woodland clearing south of Binsted Wood (Bat 11)	Batlogger M + Canon XA20
24/08/2017	[REDACTED]	[REDACTED]	Oak tree with woodpecker hole in south elevation (Bat 13 and 28)	Batlogger M
23/08/2017	[REDACTED]	[REDACTED]	Oak tree with woodpecker hole in south elevation (Bat 28)	Batlogger M + Canon XA20
24/08/2017	[REDACTED]	[REDACTED]	Oak tree at north west corner of Barnes Copse (Bat 9)	Batlogger M + Canon XA20
14/09/2017	[REDACTED]	[REDACTED]	Oak tree in north west edge of Barn's Copse (Bat 19)	Batlogger M + Canon XA20
15/09/2017	[REDACTED]	[REDACTED]	Oak tree in north west edge of Barn's Copse (Bat 19)	Batlogger M + Canon XA20
25/08/2017	[REDACTED]	[REDACTED]	[REDACTED] (Bat 14)	Batlogger M + Canon XA20 (x2)
14/09/2017	[REDACTED]	[REDACTED]	Oak tree roost on western edge of a small copse immediately south of Tortington Common Woodland (Bat 18)	Batlogger M + Canon XA20
15/09/2017	[REDACTED]	[REDACTED]		Batlogger M + Canon XA20
14/09/2017	[REDACTED]	[REDACTED]	[REDACTED] Walberton, Arundel (Bat 21 and 29)	Batlogger M
14/09/2017	[REDACTED]	[REDACTED]	[REDACTED] Arundel (Bat 22)	Batlogger M + Canon XA20
21/09/2017	[REDACTED]	[REDACTED]	Large oak tree in SW corner of Little Danes Wood (Bat 25)	Batlogger M + Canon XA20
21/09/2017	[REDACTED]	[REDACTED]	Large ash tree on steep bank in NW corner of Barn's Copse (Bat 26)	Batlogger M + Canon XA20
22/09/2017	[REDACTED]	[REDACTED]	Beech tree on edge of SW corner of Binsted Wood. Folds and cavities present in main stem (Bat 27)	Batlogger M + Canon XA20

Date	Easting	Northing	Location details	Equipment
22/09/2017			Ash tree near southern edge of Tortington Common. Potential roosting feature (fold) very high above canopy. (Bat 28)	Batlogger M + Canon XA20

Radio-tagging data

Species	Number of bats radio-tagged	Bat identification numbers
Alcathoe bat	5	Bat 1, Bat 9, Bat 15, Bat 19 and Bat 20
Barbastelle	1	Bat 12
Bechstein's bat	6	Bat 4, Bat 5, Bat 7, Bat 8, Bat 13 and Bat 28
Brown long-eared bat	7	Bat 2, Bat 3, Bat 17, Bat 23, Bat 24, Bat 25 and Bat 30
Daubenton's bat	1	Bat 10
Natterer's bat	5	Bat 11, Bat 16, Bat 18, Bat 26 and Bat 27
Whiskered bat	5	Bat 6, Bat 14, Bat 21, Bat 22 and Bat 29
Total	30	

100% MCP, 95% KDE and 50% KDE for all bats

Month	Bat Identification Number	Species	100%MCP(ha)	95%KDE (ha)	50% KDE (ha)
July	1	Alcathoe bat	28.3	34.9	3.34
August	9	Alcathoe bat	6.3	0.1	0.009
August	15	Alcathoe bat	175.6	49.2	4
August	12	Barbastelle	881.2	827.2	40
July	4	Bechstein's bat	262.5	66.8	13.2

Month	Bat Identification Number	Species	100%MCP(ha)	95%KDE (ha)	50% KDE (ha)
July	5	Bechstein's bat	81	33.1	1.5
July	7	Bechstein's bat	51.1	N/A*	25
July	8	Bechstein's bat	46.1	43.8	5.7
August	13	Bechstein's bat	485.8	268.4	20.2
July	2	Brown long-eared bat	33.6	48.6	14.7
July	3	Brown long-eared bat	3.9	N/A*	N/A*
August	17	Brown long-eared bat	220.4	26.6	0.8
August	10	Daubenton's bat	735	N/A*	220.9
August	11	Natterer's bat	579.2	515.2	27.9
August	16	Natterer's bat	360.6	17.9	0.8
July	6	Whiskered bat	23.1	N/A*	8.5
August	14	Whiskered bat	224	289.2	50.5

N/A* Insufficient data available for the analysis



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