ATTACHMENT A: CORRECTED VERSION OF TECHNICAL APPENDIX 8-6: BAT RADIO TRACKING BASELINE SURVEY

A27 Arundel Bypass Bat Radiotracking Baseline Survey

Appendix 8-6: Bat Radiotracking Baseline Survey

15 August 2019

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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 (henceforth referred to as 'the Scheme').

The purpose of the survey was to provide information to determine the importance of the 'Field Survey Area' for bats. The Field Survey Area comprises the land within one kilometre of the outer boundary of the Scheme option 5A footprint. ~~This report presents the results of bat radio-tracking surveys completed in 2018.~~ Surveys and data analyses for the Field Survey Area are ongoing; t~~. T~~his report presents the interim results of bat radio-tracking surveys carried out in 2018.

Trapping and radio-tracking of bats was undertaken at 40 locations within the Field Survey Area over four trapping 'sessions' between May and September when bats are active.

A total of 279 bats of 11 species were captured over ~~12~~ 13 trapping nights between 14th May and 13th September 2018.The species captured included barbastelle (*Barbastella barbastellus*), Alcathoe bat (*Myotis alcathoe*), Bechstein's bat (*Myotis bechsteinii*), Daubenton's bat (*Myotis daubentonii*), Natterer's bat (*Myotis nattereri*), whiskered bat (*Myotis mystacinus*), noctule (*Nyctalus noctula*), common pipistrelle (*Pipistrellus pipistrellus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), soprano pipistrelle (*Pipistrellus pygmaeus*) and brown long-eared bat (*Plecotus auritus*).

Breeding females of the following eight species were trapped during the survey within the Field Survey Area: barbastelle, Alcathoe bat, Bechstein's bat, Natterer's bat, whiskered bat, common pipistrelle, soprano pipistrelle and brown long-eared bat.

Radio-transmitters were fitted to 31 bats of seven species of woodland bats. 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 foraging areas (when enough data was collected) of the radio-tagged bats. During these surveys, 27 confirmed roosting locations within the Field Survey Area were identified.

Development of the Scheme would potentially result in interactions with bat roosts, flight lines, home ranges and foraging areas and therefore, in the absence of mitigation, the favourable conservation status of bats could be reduced. Surveys in 2018 were concentrated on the area of route Option 5A. Further surveys are required to provide information on likely bat interactions with the new Scheme options.

1 Introduction

1.1 Project Background

1.1.1.1 The scope of the A27 Arundel Bypass Scheme as described in the Road Investment Strategy [1] 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*".

1.1.1.2 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.

1.1.1.3 The Scheme options taken forward to the Public Consultation were Option~~s~~ 1, Option 3 and Option 5A. These are briefly described individually below.

- **Option 1** consists of a 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. 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 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 Binsted Woods Complex Local Wildlife Site (LWS), Tortington Common and the 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** consists of a new dual carriageway from Crossbush junction south of the current A27 and ending at a new junction that rejoins the existing A27 near Yapton Lane. 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 Woods Complex LWS and the South Downs National Park.

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

1.1.1.4 In October 2018, Highways England announced that a further, non-statutory public consultation would be undertaken on the Scheme (the Further Consultation) and that the Scheme would return to PCF Stage 2 (Option Selection). Through the additional studies and surveys, Highways England came across new and important information. Highways England wishes to ensure that forthcoming decision on the preferred route is made taking this new information into account and that consultees are given a fair opportunity to comment on the options on the basis of the information available. The further PCF Stage 2 work (Option Selection) (2018/2019) work included the identification of a suite of potential new Scheme options.

1.1.1.5 The process for identifying and short-listing the new set of Scheme options for consideration in PCF Stage 2, is set out in Chapter 3 of the Environmental Assessment Report. Ecological field survey data is not available for the western sections of Options 4/5AV1 and 5BV1. This is because these sections were previously too far west of the study area to necessitate a survey. Additional survey work targeting these areas is ongoing in 2019 and will be reported on in winter 2019. The information collected for Option 1, Option 3 and Option 5A in 2017 and 2018 will be used to inform an assessment of the six Scheme options and Scheme option selection.

1.1.1.6 The full geographical extent of the Field Survey Area comprises Goblestubb's Copse, west of Tortington Common, Scotland Barn, Paine's Wood, Winchers Copse, Singer's Piece, Pinewoods, Torting-ton Common, Binsted Woods Complex LWS, Ash Piece, Spinningwheel Copse, Binsted Park, The Shaw, Lake Copse, The Lag, fields and small woodland copses south of Tortington Common, The Water-woods, Arundel Park, Steward's Copse, Tortington Priory Farm and surrounding fields, Water-meadows, Danes Wood, Brickkiln Copse, Threecomer Wood, Scotland Barn, Pedler's Croft, Barn's Copse, Avisford Park Golf Course and Binsted Village.

1.1.1.7 This report presents the interim results of bat radio-tracking surveys completed in 2018. Further surveys will be undertaken in 2019 within a defined Field Survey Area to gain further information to inform an assessment of the Scheme options.

1.2 Ecological Background

1.2.1.1 The Field Survey Area contains habitat considered to be of high suitability[2] for bats, comprising extensive areas of ancient semi-natural woodland, ancient replanted woodland, wood pasture and park-land, wetland, floodplain, grazing marsh and extensive mature hedgerows and tree lines. This mosaic of suitable habitat has the potential to support a wide range of bat species including rare woodland bats.

1.2.1.2 Highways England has prepared an Environmental Assessment Report of the Scheme options to inform Scheme development. This report advises measures to avoid and minimise impacts on sensitive habitats and species and informs possible mitigation requirements. A statutory Environmental Impact Assessment (EIA) will be prepared to assess the impacts of the preferred route. Comprehensive survey data for bat species and habitats is required to inform the EIA.

1.2.1.3 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
- Aerial tree bat roost inspection surveys
- Preliminary bat roost assessments on trees and structures
- Hibernation roost surveys.

1.2.1.4 The bat activity transects, automated surveys and roost surveys were undertaken with reference to good practice guidance[2] and the local effects and landscape scale effects surveys were undertaken with reference to the Defra guidance[3].

1.2.1.5 The surveys listed above confirmed the presence of two EU Habitat Directive Annex II bat species roosting within the Field Survey Area; Bechstein's bat (*Myotis bechsteinii*) and barbastelle (*Barbastella barbastellus*), as well as the 'very rare' [4] Alcathoe bat (*Myotis alcathoe*).

1.2.1.6 These surveys provided a species list of bats within the Field Survey Area. Grey long-eared bat (*Plecotus austriacus*) is a rare species that is not on that species list, but this species may also be present and further radio-tracking work in 2019 may confirm the presence of this species.

1.2.1.7 Roost assessments identified 237 trees with multiple potential roost features. On-going surveys in 2019 will provide an updated list of known roosts within the Field Survey Area.

[2] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust
[3] Berthinussen & Altringham (2015) WC1060 'Development of a cost-effective method for monitoring the effectiveness of mitigation for bats crossing linear transport infrastructure'
[4] As stated in Desk Study Results, taken from the Sussex bat group local distribution information on this species. Also listed nationally as 'data deficient' in the IUCN Red List.

1.2.1.8 Activity surveys, comprising bat activity transects and automated static surveys, undertaken by WSP in 2017 [5] confirmed the presence of two species within the Field Survey Area that were not encountered by this study: Leisler's bat (*Nyctalus leisleri*) and greater horseshoe bat (*Rhinolophus ferrumequinum*).

1.2.2 Summary of Radio-Tracking Survey Work Undertaken to Date

AEWEC Ltd 2016 study

1.2.2.1 AEWC Ltd undertook bat trapping and radio-tracking surveys at Binsted Woods Complex LWS, Arundel on behalf of the Mid-Arun Valley Environmental Survey Group (MAVES) in May 2016 [6]. In total, 11 species of bat were caught: barbastelle, Alcathoe bat, Bechstein's bat, Natterer's bat (*Myotis nattereri*), whiskered bat (*Myotis mystacinus*), common pipistrelle (*Pipistrellus pipistrellus*), Nathusius' pipistrelle (*Pipistrellus nathusii*), soprano pipistrelle (*Pipistrellus pygmaeus*), noctule (*Nyctalus noctula*), serotine (*Eptesicus serotinus*) and brown long-eared bat (*Plecotus auritus*).

1.2.2.2 During the trapping and radio-tracking survey undertaken by AEWC Ltd in 2016, four bats were radio-tracked. These bats comprised one barbastelle, one Alcathoe bat, one Bechstein's bat and one serotine. These surveys identified roosts of Alcathoe bat, barbastelle and Bechstein's bat in trees within Binsted Woods Complex LWS and a serotine colony in the village of Barnham, approximately three ~~kilometers~~kilometres from the Field Survey Area.

1.2.2.3 The barbastelle tree roost could not be observed from the ground but was considered likely to be a solitary roost or a roost used by a small number of bats. However, maternity roosts for this species have previously been recorded nearby the village of Slindon, approximately 1 kilometre from the Field Survey Area [7].

1.2.2.4 A maternity roost of Bechstein's bats was identified in an oak tree south of Tortington Common (OS Grid reference SU 99771 06159) with a total of 26 Bechstein's bats emerging from the roost.

1.2.2.5 The Alcathoe 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.

1.2.2.6 The maternity roost of serotines was identified within the village of Barham. The trapping and radiotracking surveys also confirmed breeding roosts for other species within the Field Survey Area, notably Natterer's bat.

[5] WSP (2017) A27_ECO_BAT_BAT ACTIVITY INTERIM-BASELINE REPORT
[6] Whitby, D. (2016) *Bat Survey and Trapping Survey, Binsted Woods*. Animal Ecology and Wildlife Consultants Ltd.
[7] Data received from Sussex Biological Records Centre

A~~W~~EWC Ltd 2017 study

1.2.2.7 AEWC Ltd carried out further trapping and radio-tracking surveys in May 2017 [8] within the Field Survey Area. A total of nine species of bat were caught including barbastelle, Alcathoe bat, Bechstein's bat, Daubenton's bat (*Myotis daubentonii*), Natterer's bat, whiskered bat, brown long-eared bat, common pipistrelle and soprano pipistrelle.

1.2.2.8 Two additional roosts of Alcathoe bat (Grid reference: SU 9711 0687 and SU 99006 06489) and two roosts of Bechstein's bat (Grid reference: TQ 00356 0729 and TQ 00422 06960) were identified during these surveys.

1.2.2.9 The records of the radiotracking surveys undertaken by AEWC were considered relevant when they were located within the Field Survey Area and are therefore included within the findings of previous surveys undertaken within the Field Survey Area.

WSP and Arbeco Ltd 2017 study

1.2.2.10 WSP and Arbeco Ltd undertook a trapping and radio-tracking study in 2017 to determine the importance of the Field Study Area for bats, identify the key areas of bat activity, and determine the extent to which breeding colonies of Annex II species such as barbastelle and Bechstein's bat, and other rare woodland bat species are present in the Field Study Area. During this study a total of 129 bats were captured over 14 trapping nights between 10th July and 21st September 2017.

1.2.2.11 During the trapping surveys individuals of ~~nine~~ ten different species were caught: two barbastelles, 10 Alcathoe bats, 16 Bechstein's bats, one Daubenton's bat, 12 Natterer's bats, 24 whiskered bats, 43 brown long-eared bats, three common pipistrelles, one Nathusius' pipistrelle and 17 soprano pipistrelles.

1.2.2.12 For the 2017 trapping study the Field Survey Area was divided into four trapping areas (North, South, East and West Areas). The highest number of bats were trapped in the South and East trapping areas with 48 bats of seven different species and 44 bats of seven different species respectively. Both trapping areas were characterised by dense woodland with hedgerow lined agricultural fields providing connectivity across the wider landscape.

1.2.2.13 Breeding females of eight species were trapped: Alcathoe bat, Bechstein's bat, Daubenton's bat, Natterer's bat, whiskered bat, common pipistrelle, soprano pipistrelle and brown long-eared bat. This suggests the presence of breeding roosts of these species within or near to the Field Survey Area.

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

1.2.2.14 During the radio-tracking surveys one barbastelle, five Alcathoe bats, six Bechstein's bats, one Daubenton's bat, five Natterer's bats, five whiskered bats and seven brown long-eared bats were fitted with radio-transmitters. These 30 bats were subsequently radio-tracked to determine roosting locations, foraging areas and flight lines between roosts and foraging sites.

1.2.2.15 A total of 30 bat roosts were identified during the 2017 radio-tracking surveys as shown in **Table 1-1** below.

Table 1-1 - Summaries of roosts identified during the 2017 trapping & radio-tracking study

Bat Species	No. bats tagged	Maternity roosts		Day roosts	
		No.	Location	No.	Location
Barbastelle	1	1	Danes Wood		
Alcathoe bat	5	4	Barn's Copse	1	Barn's Copse
		1	Stewards Copse		
Bechstein's bat	6	4	Stewards Copse	1	Steward's Copse
Daubenton's bat	1	1	South of Calceto Lane		
Natterer's bat	5	1	Spinningwheel Copse	1	Tortington Common
		1	South of Calceto Lane	1	Barn's Copse
				2	Binsted Woods Complex LWS
Whiskered bat	5	1	2 Maxwell Road	1	Tortington Priory
				1	Oakley Cottages
				1	Meadow Lodge
Brown long-eared bat	7	1	Barn's Copse	1	Arundel Arboretum
		1	8 Bernard Road	1	Avisford Park Golf Course
		2	Stewards Copse	1	Little Danes Wood

1.2.2.16 Flight lines were identified for seven bats of five species (barbastelle, Alcathoe bat, Bechstein's bat, Natterer's bat and whiskered bat). The 2017 radio-tracking study showed bats to be flying along the lines of hedgerows, wet ditches and woodland edges while moving between roosts and for-aging areas.

1.2.2.17 The 2017 radio-tracking survey identified a total of 25 foraging areas used by seven species: barbastelle, Alcathoe bat, Bechstein's bat, Daubenton's bat, Natterer's bat, whiskered bat and brown long-eared bat.

1.3 Aims and Objectives

1.3.1.1 This report presents the interim results of bat radio-tracking surveys carried out in 2018. The surveys were carried out to further inform baseline ecological conditions of bats for the A27 Arundel By-pass Scheme (the Scheme). Surveys in 2018 concentrated on the area of route Option 5A.

1.3.1.2 The objectives of the study are to:

- Provide further information 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 of the Scheme on bats
- Gain further information on the extent of the colonies of Annex II species and other rare wood-land bat species to better understand the impacts of the Scheme and to inform mitigation options.

1.3.1.3 WSP was commissioned by Highways England to:

- Undertake a detailed desk study and update this at yearly intervals;
- Undertake field surveys to establish the presence of Annex II bat species such as 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). The eight species were selected with reference to their rarity, legislative protection, and/or known susceptibility to impacts from road schemes
- Conduct non-invasive bat dropping DNA analysis on small Myotid bats (whiskered bat/Brandt's bat/Alcathoe bat) in order to confirm identification of the species
- If captured within the Field Survey Area, to radio-tag a maximum of ten Bechstein's bats, ten barbastelles, four Brandt's bats, four brown long-eared bats, 15 Alcathoe bats, 15 whiskered bats, four Daubenton's bats and four Natterer's bats
- Locate bat roosts, identify foraging areas related to key roost sites such as those used for breeding and identify flight lines connecting roosts and foraging areas within the Field Survey Area.

1.3.1.4 This report presents the methods and results of the radio-tracking surveys undertaken in 2018. The contents of this report represent baseline survey findings collected at Project Control Framework Stage 2 (option selection) and PCF Stage 3 (preliminary design).

2 Methods

2.1 Study Area

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

- Desk Study Area – extending to a distance of six kilometres 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 zone[11](barbastelle bats have the furthest reaching zone at six kilometres).
- The 2017 Field Survey Area is defined as a zone extending to 1 kilometre from the outer boundary of the Scheme options 1, 3 and 5A (hereafter the '2017 Field Survey Area'). This distance was selected to obtain baseline information on the potential direct impact on roosts of higher conservation significance [9] to aid in the route selection process
- The 2018 Field Survey Area is defined as a zone extending to 1 kilometre from the outer boundary of Option 5A. This area will hereafter be referred to as the '2018 Field Survey Area'.

2.2 Desk Study

2.2.1.1 A desk study was undertaken to collate records of bats from the past ten years within six kilometres of the Scheme options. Verified records were obtained from the Sussex Biological Records Centre [10.]. This information was supplemented by a review of radio-tracking work undertaken for Mid-Arun Environmental Survey (MAVES) from both May 2016 [11] and June 2017 [12].

2.2.1.2 A review of the conservation status in the UK and Sussex [13] of bats that have been recorded within the Field Survey Area was also undertaken to provide context to inform the discussion section of the report (**4.1 Species Records**).

2.2.1.3 Sussex Biological Records Centre also provided information on non-statutory designated sites within 6 kilometres of the existing A27 that are designated for bats or which contain bats within their citation.

[9] English Nature (2004) Bat Mitigation Guidelines. English Nature, Peterborough
[10] This includes records submitted by the Sussex Bat Group.
[11] Whitby, D. (2016) Bat Survey and Trapping Survey, Binsted Woods AEWC Ltd. Private publication.
[12] Whitby, D. (2017) Bat Survey, Trapping Survey Interim report of results Binsted Woods. AEWC Ltd. Private publication
[13] http://www.sussexbatgroup.org.uk/batsinsussex [Accessed August 2019]

2.2.1.4 The Multi-Agency Geographic Information for the Countryside (MAGIC) [14] website was consulted for National statutory designated sites within 2~~10~~ kilometres of the Field Survey Area, and 30 kilometres for Special Areas of Conservation (SAC), where bats are the qualifying feature, in accordance with the Design Manual for Roads and Bridges [15]. The Joint Nature Conservation Committee website [16] was also consulted to identify candidate SACs within 30 kilometres of the Field Survey Area where bats are the qualifying feature. Figure 1.1 shows desk study records within the Field Survey Area (**Appendix C**).

2.2.2 Identification of Target Areas

2.2.2.1 Aerial photographs and OS maps were used to assess the landscape and habitat connectivity to determine where to concentrate the trapping survey effort. Trapping locations were typically within 1 kilometres of the Scheme 5A Option. The following features were used to identify trapping locations:

- The Field Survey Area;
- The 5A Option footprint;
- Habitat features which are likely to enable bats to move across the Field Survey Area, such as hedgerows and tree lines that connect woodland blocks and other foraging areas.
- The names of woodlands referenced in this report are provided in **Figure 1.2 (Appendix C).**

2.2.3 Scoping Survey

2.2.3.1 A walkover assessment of pre-determined potential suitable trapping locations within 1 kilometre of Scheme Option 5A was undertaken on 2nd May 2018 by a suitably qualified and experienced full member of CIEEM who holds a bat licence (Natural England 2017-28263_CLS-CLS).

2.2.3.2 Habitats were first identified from Ordnance Survey maps and aerial photographs. Habitats were chosen based on the presence of woodland and woodland edge habitats and water courses and these areas were then assessed on foot where access was permitted, to determine if the habitats were suitable as trapping locations. Areas in which the scoping survey was undertaken comprised the stream and associated vegetation on Avisford Golf Course, Lake Copse, the Shaw, Tortington and Priory Farm on Ford Road.

2.2.3.3 Based on the desk study and scoping survey, a total of 40 trapping locations were selected as shown in **Figures 2.1, 2.2, 2.3 & 2.4** (**Appendix C**).

[14] http://www.natureonthemap.naturalengland.org.uk/ Accessed 2018
[15] DMRB volume 11 section 4 (2009) Assessment of Implications (of highways and/or roads projects).
[16] http://jncc.defra.gov.uk/page-1458- Accessed 2018

2.3 Field Survey

2.3.1.1 The bat trapping and radio-tracking survey work was targeted at eight bat species, as per the objectives in **Section 1.3**:

- Barbastelle
- Alcathoe bat
- Bechstein's bat
- Brandt's bat
- Whiskered bat
- Daubenton's bat
- Natterer's bat
- Brown long-eared bat

2.3.1.2 All bats were caught, handled and radio-tracked under a project licence issued by Natural England [17].

2.3.2 Trapping Surveys

2.3.2.1 Trapping surveys were carried out during each of the following sessions:

- 14th to 18th May 2018, 34 trapping locations
- 16th to 19th July 2018, ~~40~~ 26 trapping locations;
- 20th to 23rd August 2018, ~~39~~ 27 trapping locations
- 10th to 13th September 2018, ~~27~~ 18 trapping locations;

2.3.2.2 Trapping locations per session are provided in **Figures 2-1 to 2-4**, and **Tables 2.1 to 2.4.** A total of ~~12~~ 13 nights of trapping were carried out during the survey period from May to September 2018.

Table 2-1 - Trapping locations for trapping survey May 2018

Trapping location	Date	Easting	Northing	Description
TL 1	14/05/18	500343	106899	Stewards Copse (central) Woodland habitat
TL 2	14/05/18	500405	106861	Stewards Copse (east) Woodland habitat
TL 3	14/05/18	500433	106957	Stewards Copse (north) Woodland habitat
TL 4	14/05/18	500271	106998	Stewards Copse (west) Woodland habitat
TL 5	14/05/18	499748	106209	Tortington Common (west) Woodland habitat
TL 6	14/05/18	500024	106382	Tortington Common (east) Woodland habitat
TL 7	14/05/18	499260	106257	Binsted Woods Complex LWS (east) Woodland habitat
TL 8	14/05/18	499243	106361	Binsted Woods Complex LWS (central) Woodland habitat

[17] Natural England licence number 2017-30132-SCI-SCI

Trapping location	Date	Easting	Northing	Description
TL 9	14/05/18	499131	106472	Binsted Woods Complex LWS (~~south~~central) Woodland habitat
TL 10	15/05/18	499045	106603	Binsted Woods Complex LWS (north-west) Woodland habitat
TL 11	15/05/18	499166	106479	Binsted Woods Complex LWS (central) Woodland habitat, adjacent to pond
TL 12	15/05/18	499173	106345	Binsted Woods Complex LWS (south) Edge of woodland habitat
TL 13	15/05/18	499244	106227	Binsted Woods Complex LWS (south) Woodland habitat, beside stream
TL 14	15/05/18	498898	106266	Ash Piece (south)
TL 15	15/05/18	499181	106239	Binsted Woods Complex LWS (south) Woodland habitat
TL 16	15/05/18	499008	105893	~~Lake Copse (central)~~The Shaw Woodland habitat
TL 17	15/05/18	498916	106147	Lake Copse (north) Woodland habitat
TL 18	15/05/18	499382	105926	The Lag/~~W~~woodland copse south of Binsted Woods Complex LWS, woodland habitat
TL 19	16/05/18	497942	106974	Barn's Copse (north) woodland habitat
TL 20	16/05/18	497813	106815	Barn's Copse (central) woodland habitat
TL 21	16/05/18	497683	106822	Barn's Copse (west) woodland habitat
TL 22	16/05/18	497975	106827	Barn's Copse (east) woodland edge
TL 23	16/05/18	498032	106077	Woodland copse east of Avisford park golf course (north).
TL 24	16/05/18	498088	105973	Woodland copse east of Avisford park golf course (south).
TL 25	16/05/18	500108	105218	The Withy Beds/~~W~~woodland copse west of Tortington (north). Woodland and wetland habitat
TL 26	16/05/18	500064	105154	The Withy Beds/w~~W~~oodland copse west of Tortington (south). Woodland and wetland habitat
TL 27	16/05/18	500616	105874	Tortington ~~manor~~Priory, between ponds. Woodland and wetland habitat.

Trapping location	Date	Easting	Northing	Description
TL 28	17/05/18	500948	107466	~~Watercress beds~~The Waterwoods/trout farm (south). Woodland and wetland habitat
TL 29	17/05/18	500991	107409	The Waterwoods/~~Watercress beds~~/trout farm (south). Woodland and wetland habitat
TL 30	17/05/18	500845	107577	The Waterwoods/~~Watercress beds~~/trout farm (central). Woodland and wetland habitat
TL 31	17/05/18	500700	107667	The Waterwoods/~~Watercress beds~~/trout farm (central). Woodland and wetland habitat
TL 32	17/05/18	500584	107817	The Waterwoods/~~Watercress beds~~/trout farm (north). Woodland and wetland habitat
TL 33	17/05/18	500538	107956	The Waterwoods/~~Watercress beds~~/trout farm (north). Woodland and wetland habitat
TL 34	17/05/18	499104	106201	Binsted Woods Complex LWS (south) Woodland habitat

Table 2-2 - Trapping locations for trapping survey July 2018

Trapping location	Date	Easting	Northing	Description
TL 1	16/07/18	500343	106899	Stewards Copse (central) Woodland habitat
TL 2	16/07/18	500405	106861	Stewards Copse (east) Woodland habitat
TL 3	16/07/18	500433	106957	Stewards Copse (north) Woodland habitat
TL 4	16/07/18	500271	106998	Stewards Copse (west) Woodland habitat
TL 5	17/07/18	499748	106209	Tortington Common (south) Woodland habitat
TL 6	18/07/18	500024	106382	Tortington Common (east) Woodland habitat
TL 7	18/07/18	499260	106257	Binsted Woods Complex LWS (east) Woodland habitat
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Trapping location	Date	Easting	Northing	Description
TL 14	17/07/18	498898	106266	Ash Piece (south)
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TL 17	17/07/18	498916	106147	Lake Copse (north) Woodland habitat
TL 18	17/07/18	499382	105926	The Lag/~~W~~woodland copse south of Binsted Woods Complex LWS, woodland habitat
TL 19	16/07/18	497942	106974	Barn's Copse (north) woodland habitat
TL 20	16/07/18	497813	106815	Barn's Copse (central) woodland habitat
TL 21	16/07/18	497683	106822	Barn's Copse (west) woodland habitat
TL 23	16/07/18	498032	106077	Woodland copse east of Avisford Park golf course (north).
TL 24	16/07/18	498088	105973	Woodland copse east of Avisford Park golf course (south).
TL 25	18/07/18	500108	105218	The Withy Beds/ w~~W~~oodland copse west of Tortington (north). Woodland and wetland habitat
TL 26	18/07/18	500064	105154	The Withy Beds/ w~~W~~oodland copse west of Tortington (south). Woodland and wetland habitat
TL 28	18/07/18	500948	107466	Watercress beds/trout farm (south). Woodland and wetland habitat
TL 32	18/07/18	500584	107817	Watercress beds/trout farm (north). Woodland and wetland habitat
TL 35	17/07/2018	499558	106996	Scotland Barn (central) Woodland habitat
TL 36	17/07/18	499575	107000	Scotland Barn (central) Woodland habitat
TL 37	17/07/18	499667	106963	Scotland Barn (south) Woodland habitat

Trapping location	Date	Easting	Northing	Description
TL 38	17/07/18	499694	107078	Scotland Barn (north) Woodland habitat
TL 39	18/07/18	~~499901~~499928	~~106377~~106469	Tortington Common (~~north~~central) Woodland habitat
~~TL 40~~	~~18/07/18~~	~~499928~~	~~106469~~	~~Tortington Common (south) Woodland habitat~~

Table 2-3 - Trapping locations for trapping survey August 2018

Trapping location	Date	Easting	Northing	Description
TL 1	21/08/18	500343	106899	Stewards Copse (central) Woodland habitat
TL 2	21/08/18	500405	106861	Stewards Copse (east) Woodland habitat
TL 3	21/08/18	500433	106957	Stewards Copse (north) Woodland habitat
TL 4	21/08/18	500271	106998	Stewards Copse (west) Woodland habitat
TL 5	20/08/18	499748	106209	Tortington Common (west) Woodland habitat
TL 6	~~20~~22/08/18	500024	106382	Tortington Common (east) Woodland habitat
TL 7	~~20~~22/08/18	499260	106257	Binsted Woods Complex LWS (east) Woodland habitat
TL 8	20/08/18	499243	106361	Binsted Woods Complex LWS (central) Woodland habitat
TL 13	22/08/18	499244	106227	Binsted Woods Complex LWS (south) Woodland habitat, beside stream
TL 14	20/08/18	498898	106266	Ash Piece (south)
TL 16	22/08/18	499008	105893	The Shaw~~Lake Copse (central)~~ Woodland habitat
TL 17	20/08/18	498916	106147	Lake Copse (north) Woodland habitat

Trapping location	Date	Easting	Northing	Description
TL 18	22/08/18	499382	105926	The Lag/~~W~~woodland copse south of Binsted Woods Complex LWS, woodland habitat
TL 19	20/08/18	497942	106974	Barn's Copse (north) woodland habitat
TL 20	20/08/18	497813	106815	Barn's Copse (central) woodland habitat
TL 21	20/08/18	497683	106822	Barn's Copse (west) woodland habitat
TL 23	20/08/18	498032	106077	Woodland copse east of Avisford Park golf course (north).
TL 24	20/08/18	498088	105973	Woodland copse east of Avisford Park golf course (south).
TL 25	21/08/18	500108	105218	The Withy Beds/w~~W~~oodland copse west of Tortington (north). Woodland and wetland habitat
TL 26	21/08/18	500064	105154	The Withy Beds/ w~~W~~oodland copse west of Tortington (south). Woodland and wetland habitat
TL 27	21/08/18	500616	105874	Tortington ~~manor~~Priory, between ponds. Woodland and wetland habitat.
TL 28	22/08/18	500948	107466	Watercress beds/trout farm (south). Woodland and wetland habitat
TL 30	22/08/18	500845	107577	Watercress beds/trout farm (central). Woodland and wetland habitat
TL 35	21/08/18	499558	1069966	Scotland Barn (~~south~~central) Woodland habitat
TL 36	~~17/07~~21/08/18	499575	107000	Scotland Barn (central) Woodland habitat
TL 37	~~17/07~~21/08/18	499667	106963	Scotland Barn (south) Woodland habitat

Trapping location	Date	Easting	Northing	Description
TL 39	~~18/07~~22/08/18	499928~~499901~~	106469~~106377~~	Tortington Common (central) Woodland habitat~~Tortington Common (north) Woodland habitat~~

Table 2-4 - Trapping locations for trapping survey September 2018

Trapping location	Date	Easting	Northing	Description
TL 1	11/09/18	500343	106899	Stewards Copse (central) Woodland habitat
TL 2	11/09/18	500405	106861	Stewards Copse (east) Woodland habitat
TL 3	11/09/18	500433	106957	Stewards Copse (north) Woodland habitat
TL 4	11/09/18	500271	106998	Stewards Copse (west) Woodland habitat
TL 5	10/09/18	499748	106209	Tortington Common (west) Woodland habitat
TL 6	10/09/18	500024	106382	Tortington Common (east) Woodland habitat
TL 7	10/09/18	499260	106257	Binsted Woods Complex LWS (east) Woodland habitat
TL 14	10/09/18	498898	106266	Ash Piece (south)
TL 15	10/09/18	499181	106239	Binsted Woods Complex LWS (south) Woodland habitat
TL 16	12/09/18	499008	105893	The Shaw~~Lake Copse (central)~~ Woodland habitat
TL 17	12/09/18	498916	106147	Lake Copse (north) Woodland habitat
TL 18	12/09/18	499382	105926	The Lag/~~W~~woodland copse south of Binsted Woods Complex LWS, woodland habitat
TL 19	11/09/18	497942	106974	Barn's Copse (north) woodland habitat
TL 20	11/09/18	497813	106815	Barn's Copse (central) woodland habitat
TL 21	11/09/18	497683	106822	Barn's Copse (west) woodland habitat
TL 25	12/09/18	500108	105218	The Withy Beds/w~~W~~oodland copse west of Tortington (north). Woodland and wetland habitat
TL 26	12/09/18	500064	105154	The Withy Beds/w~~W~~oodland copse west of Tortington (south). Woodland and wetland habitat
TL 27	12/09/18	500616	105874	Tortington ~~manor~~Priory, between ponds. Woodland and wetland habitat.

2.3.2.4 Trapping surveys were carried out using Faunatech Austbat Harp Traps. A harp trap consists of a bank of vertical fine nylon filaments tightly strung to a rectangular frame of aluminium pole further sup-ported by aluminium pole legs. The trap safely catches bats in flight by taking away their momentum. The bats then safely fall into a large cotton bag affixed below the trap where they can be removed by hand. A combination of six two-bank and two three-bank 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.

2.3.2.5 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, Daubenton's bat, Natterer's bat, small *Myotis* spp. and brown long-eared bat were used.

2.3.2.6 The bats captured in the harp traps were removed by a suitably experienced ecologist, under the direction of the licensed ecologist and each bat was transferred to an individual clean cloth bag. The bats were identified to species wherever possible (see DNA analysis below), sexed, weighed using a Pesola light line spring scale, forearm measured using digital callipers, reproductive status ascertained, and any other general health observations were noted.

2.3.2.7 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.

2.3.2.8 Female bats (and, reproductive females) were selected for radio-tagging in preference to male bats, as tracking females enables the identification of maternity roosts which are of higher conservation significance than other roost types. Bats were selected, such that the radio-tag comprised no more than 5% of the total weight of the bat. Bats which were heavily pregnant were not selected for radiotracking.

2.3.3 DNA Analysis

2.3.3.1 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 Alcathoe bat) when there was uncertainty regarding species identification.

2.3.3.2 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 to Nature Metrics Ltd for analysis to confirm bat species. It is not always possible to retrieve a faecal sample from a bat, due to the short duration times of capture. Therefore, these bats are identified to genus level.

2.3.4 Radio-Tracking Survey

2.3.4.1 Fur was clipped from the area between the shoulder blades of bats selected for radio-tagging. Transmitters were attached to each bat in this position using an adhesive (Skin-Bond® Pfizer Inc). Each radio-tagged 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.

2.3.4.2 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 recording atypical behaviour (caused by the immediate experience of being captured and having a radio transmitter fitted). On subsequent survey nights after capture and radio-tagging, bats were tracked from the time they emerged from their roosts until they returned to roost or until the transmitter signal was lost. A day-time roost search team located the tagged bats to enable the emergence surveys (see **Section ~~3.9~~3.2.7 Emergence Surveys**) and identification of flight lines to and from roosting locations.

2.3.4.3 Bats were radio-tracked using a Biotrack ‘Sika’ radio receiver and a combination of Yagi 3-element antenna and car-mounted antenna. 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.

2.3.4.4 The position of radio-tagged bats 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). The point where the two separate teams’ bearings cross determined the location of the fix;

- 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.

2.3.4.5 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
- Weather conditions.

2.3.4.6 Each bat was radio-tracked for up to five sequential nights (depending on the length of time contact was received). This enabled an estimate of flight lines, home ranges, core and peripheral foraging areas 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, flight lines, and foraging areas of the bat (**see Section 3.~~8~~ 2.6 Home Range and Foraging Areas Analysis**).
- Daytime roosting locations were identified for radio-tagged bats. Emergence surveys were subsequently undertaken at these locations to confirm the number of bats emerging from the roost (**see Section 3.~~9~~ 2.7 Bat Emergence Surveys**).

2.3.4.7 Tables in **Appendix E** show the number of surveyors, dates and equipment used for daytime roost searches and radio-tracking surveys, which were repeated for each survey session.

2.3.5 Bat Emergence Surveys

2.3.5.1 Emergence surveys were undertaken at 19 bat roost locations that had been identified by day roost searches. The emergence surveys aimed to locate the roost access/egress points where possible and to determine the number of bats using the roost. In total, ~~22~~ 24 dusk emergence surveys were carried out by experienced bat surveyors in appropriate weather conditions following standard guidelines on emergence survey procedure [18]. The repeat surveys were undertaken on known roosting locations to get a better understanding of access/egress points, where different species occupied the same roost and where access could not be achieved to identify other roosting locations.

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

2.3.5.2 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[18].

2.3.5.3 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.

2.3.5.4 Canon XA-20 video recorders with the assistance of infra-red lighting were used in conjunction with surveyor's observations during the bat emergence surveys to ensure appropriate coverage of all elevations and to ensure that accurate individual counts were obtained. The recordings were later examined using VLC media player (version 2.2.6 Umbrella) to determine the number of bats (if any) that emerged from the videoed location.

2.3.5.5 All bat passes were noted and bats were identified to species 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 soft-ware, which facilitates species identification, by an ecologist with experience of call analysis.

2.3.5.6 The details of the emergence surveys and corresponding radio-tagged bat identification number are shown in **Table 2.5** below:

Table 2-5 - Dates and locations of emergence surveys

Date	Easting	Northing	Bat No.	Species	Location details	Equipment
15/05/18	500446	106970	Bat 5	Brown long-eared bat	Mature oak in Steward's copse	Batlogger M
15/05/18	500362	107051	Bat 2	Bechstein's bat	Semi mature ash tree with knot hole at 6m height, NW elevation.	Batlogger M, Canon XA20 Infra-red video camera
15/05/18	500231	206904	Bat 6	Alcathoe bat	Oak tree adjacent to Tortington lane (bat 6)	Batlogger M
16/05/18	500181	107210	Bats 3-4	Whiskered bat	East lodge, Top of Tortington lane.	Batlogger M
17/05/18	498874	104904	Bat 10	Barbastelle	Marsh farm, access and visibility restricted	Batlogger M
18/05/18	498817	106826	Bat 1	Alcathoe bat	Ash oak tree in Binsted Woods Complex LWS.	Batlogger M
18/05/18	498867	104926	Bat 10	Barbastelle	Marsh Farm lean too barn with dense ivy.	Batlogger M, Canon XA20 Infra-red video camera
19/05/18	498906	105761	Bat 8	Natterer's bat	Ash tree in Lake Copse.	Batlogger M, Canon XA20 Infra-red video camera
17/07/18	499708	106685	Bat 13	Whiskered bat	House at Pinewoods, SE corner of property.	Batlogger M, EMT and IPhone 7
17/07/18	500224	107924	Bats 11-12	Bechstein's bat	Sycamore tree on northern perimeter of White Swan Hotel carpark, Chichester Rd.	Batlogger M, Canon XA20 Infra-red video camera
17/07/18	497903	106941	Bat 14	Brown long-eared bat	Beech tree in Barn's Copse.	Batlogger M, Canon XA20 Infra-red video camera
18/07/18	500224	107924	Bats 11	Bechstein's bat	Sycamore tree on northern perimeter of White Swan Hotel carpark, Chichester Rd.	Batlogger M, Canon XA20 Infra-red video camera

Date	Easting	Northing	Bat No.	Species	Location details	Equipment
			& 12			
18/07/18	499708	106685	Bat 13	Whiskered bat	House at Pinewoods, SE corner of property.	Batlogger M, EMT and IPhone 7
18/07/18	499333	106166	Bat 16	Barbastelle	Large oak tree on woodland edge, south of Binsted Woods Complex LWS. Multiple features.	Batlogger M, Batbox Duet, EMT, IPhone 7
19/07/18	499305	106906	Bat 15	Natterer's bat	Oak tree within Binsted Woods Complex LWS.	Batlogger M, Canon XA20 Infra-red video camera
20/07/18	500793	107490	Bat 19	Daubenton's	Group of ash and beech trees, exact roosting location could not be identified	Batlogger M, Canon XA20 Infra-red video camera
21/08/18	499708	106685	Bat 20	Whiskered bat	House at Pinewoods, SE corner of property.	Batlogger M
22/08/18	500085	106151	Bat 21	Bechstein's bat	Large mature oak, southern perimeter of Tortington common.	Batlogger M, Canon XA20 Infra-red video camera
23/08/18	500175	107205	Bat 20	Whiskered bat	West lodge, Tortington lane.	Batlogger M
23/08/18	500085	106151	Bat 21	Bechstein's bat	Large mature oak, southern perimeter of Tortington common.	Batlogger M
11/09/18	500332	106969	Bat 27	Barbastelle	Leaning sweet chestnut.	Batlogger M
12/09/18	500284	106878	Bat 31	Bechstein's bat	Early mature beech located in Steward's Copse.	Batlogger M, Canon XA20 Infra-red video camera
12/09/18	498552	107089	Bat 28	Barbastelle	Mature oak in Brickkiln Copse.	Batlogger M, Canon XA20 Infra-red video camera
13/09/18	498890	104873	Bat 28	Barbastelle	Agricultural unit at Marsh Farm.	Batlogger M

2.3.6 Home Range Analysis

2.3.6.1 A home range is the area in which an animal lives and moves on a periodic basis, and is the region that contains all the resources the animal requires to survive and reproduce.

2.3.6.2 Fixes of the locations of each bat were estimated from paired compass bearings and the location the bearings were taken by triangulation from the software package LOAS (version 2.12, Ecological Software Solutions). These were 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 of the home range analysis were then imported into QGIS (version 2.18.0) to produce a visual representation of the estimated ranging areas.

2.3.6.3 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 size [19]. This method does not provide information regarding how an animal uses its home range [20].
- 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 Estimation 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%.

2.3.6.4 Core areas (~~95~~50% isopleths) are useful considerations when investigating patterns of behaviour or identifying particular resources[19,20]. As per the standard approach, the ~~50~~95% isopleth (median value) was taken as an indicator of the peripheral foraging area.

[19] 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.
[20] Harris, S., Cresswell, W.J., Forde, P.G., Trewhella, 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.

2.3.6.5 The fixes, MCP, 95% KDE and 50% KDE were plotted onto an OS map to produce visual representation of the home range of each radio-tracked bat. (**Figure 3.8 – 3.20, Appendix C**).

2.4 Assumptions and Limitations

2.4.1.1 Both two-bank and three-bank harp traps were used 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.

2.4.1.2 Where identification to species level was not possible in the field, droppings of trapped bats were collected and sent for DNA analysis. As the duration of capture was short, it was not always possible to collect a sample from each bat. DNA analysis was therefore not possible in these cases. Where identification to species level was not possible, species were identified to genus for example *Myotis* sp. Therefore, this is not considered a limitation to the study.

2.4.1.3 The positions of the radio-tagged bats were received at intervals after leaving the roost and this information was used to identify flight lines between the roost and foraging areas. Therefore, flight lines were partially estimated based on the best available data the implications of partially estimating flight lines and foraging areas on the best available data may result in missing area's that are not identified as core foraging area or flight lines. This is an acceptable limitation as assumptions on direction and use of landscape features can be made based on known bat behavioural ecology.

2.4.1.4 Due to access restrictions trapping, radio-tracking and emergence surveys could not be undertaken in the woodland areas north of the A27 (Danes Wood and Gobblestubb's Copse), Binsted Park, Binsted Woods Complex LWS, Paine's Wood and to the residential property at 17 Hazel Grove, Arundel, BN18 9JD. The lack of information on the areas could result in important bat roost's, foraging areas and flight paths not being identified within the Field Survey area.

2.4.1.5 No flight lines could be recorded for both Daubenton's bats radio-tagged during the 2018 radio-tracking survey, due to lack of sufficient data.

2.4.1.6 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 radio-tagged 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:

- 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.
- Bats are highly mobile species and consequently any bats trapped and tagged within the survey area may not always be identified roosting or in flight in the survey area on subsequent survey days.

3 Results

3.1 Desk Study

3.1.1 Designated Sites

3.1.1.1 Three SACs designated for bats were identified within 30 kilometres of the Field Survey Area. These are: Ebernoe Common SAC, which is located approximately 19 kilometres north of the nearest of the three Scheme options; The Mens SAC, which is located approximately 15 kilometres north of the nearest of the three Scheme options; and Singleton and Cocking Tunnels SAC, which is located approximately 14 kilometres 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.

3.1.1.2 Both Bechstein's bat and barbastelle are listed on Annex II of the Habitats Directive (for which SAC 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 Species [21] and are regarded as Very Rare both in Sussex [22] and UK [23]. Alcathoe bat is listed as Data Deficient on the IUCN Red List of Threatened Species [24] and are considered Very Rare, with distribution across the UK unknown, having only recently been recognised in the UK [25].

3.1.1.3 No other sites were identified with bats as qualifying features.

[21] 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

[22] http://www.sussexbatgroup.org.uk/batsinsussex Accessed 13 September 2017

[23] 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

[24] Hutson, A.M. & Paunović, M. 2016. *Myotis alcathoe*. 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.

[25] Bat Conservation trust (2010) http://www.bats.org.uk/pages/uk_bats.html#Alcathoe Accessed 13 September 2017.

Table 3-1 - Special Areas of Conservation within 30km

Site Designation	Statutory / Non - Statutory	Site Name	Approximate Distance (kilometres) and Direction from Scheme Options			Key Habitat Type	Reason for designation
			1	3	5A		
SAC	Statutory	Singleton and Cocking Tunnels	14.1km north-west	13km north-west	12.4km north-west	Man-made structure	Annexe II species present: ▪ Barbastelle ▪ Bechstein's bat
SAC	Statutory	The Mens	14.5km north	14.5km north	15.4km north	Woodland / wood pasture.	Annexe II species present: ▪ Barbastelle
SAC	Statutory	Ebernoe Common	18.1km north	18km north	18.3km north	Woodland / wood pasture	Annex II species present; ▪ Barbastelle - maternity colony; ▪ Bechstein's bat - maternity colony

3.1.2 Species Records

3.1.2.1 The desk study was updated in 2018 and identified 162 confirmed bat roosts within the Desk Study Area. The most recent records were from 2017 Sussex Biodiversity Records Centre and identified confirmed bat roosts for ~~five~~ eight bat species: common pipistrelle, soprano pipistrelle, brown long-eared bat, serotine, barbastelle, Daubenton's bat, Natterer's bat and whiskered/Brandt's bat.

3.1.2.2 Sussex Biodiversity Records Centre data showed bat roosts to be widely distributed within the Desk Study Area. The majority of bat roost records were within Binsted Woods Complex LWS and the area around Slindon Common and Slindon Wood, approximately 1 kilometre west of the Field Survey Area. Common pipistrelle roosts were also present around Arundel Castle approximately 0.4 kilometres north of the Field Survey Area. Barbastelle roosts were recorded within Poling Copse and Slindon Common/ Wood, approximately 1 kilometre east and west of the Field Survey Area respectively. All bat records are available upon request.

3.1.2.3 The MAVES commissioned bat surveys in 2016 and 2017 to be undertaken by AEWC Ltd [26]. These surveys identified the following species to be present, predominantly from Binsted Woods Complex LWS. Those with an asterisk (*) were identified by MAVES to be breeding within the Desk Study Area:

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

3.1.2.4 The relative UK and local distribution and status [27] of each bat species recorded or assumed to be present within the Field Survey Area are shown in **Table 3-2.**

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

[27] 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

Table 3-2 - Relative UK and 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[28]	Local Distribution & Status[29]
Cluttered Habitat Adapted Species – species with adapted roosting and foraging behaviour to woodlands habitats.	Bechstein's bat	Very rare, (restricted to southern Wales and parts of southern England	Very rare
	Alcathoe 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
	Natterer's bat	Widespread, locally common	Widespread, scarce
	Daubenton's bat	Widespread, fairly abundant	Widespread, Fairly abundant
	Brown long-eared bat	Widespread, relatively common	Relatively abundant, widespread
	Greater horseshoe bat	Restricted to the south west England and Wales, Rare	Very rare, restricted
Edge Habitat Adapted Species – Species with adapted roosting and foraging behaviour in edge habitats such as hedgerows, tree lines, woodland edge	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 – Species with adapted foraging and flight behaviour in open habitats such as arable land, floodplains.	Leisler's bat	Uncommon, largely restricted to the south of England	Rarely recorded
	Noctule	Widespread, relatively common	Widespread, uncommon

[28] Bat Conservation trust (2010) Species Factsheets http://www.bats.org.uk/pages/uk_bats.html Accessed 13 September 2017
[29] http://www.sussexbatgroup.org.uk/batsinsussex Accessed 13 September 2017

3.1.2.5 A review of MAGIC[30] identified a total of 14 granted Natural England European Protected Species mitigation licences relating to bats. The licences include those permitting 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**).

3.1.3 Scoping

3.1.3.1 A scoping assessment undertaken on 2nd May 2018 identified additional trapping locations to the south of Option 5A. This included areas to the West of St Mary's Church (off Binsted Lane) along a stream and within woodland north of this, Lake Copse and The Shaw (off Binsted Lane) and Tortington Priory Farm on Ford Road.

3.2 Field Survey

Trapping Surveys

3.2.1.1 A total of 279 bats of 11 species were captured over 13 trapping nights between 14th May and 13th September 2018 in ~~40~~ 39 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 Appendix A.**

Table 3-3 - Trapping results by species

Species	Number of bats
Barbastelle	9
Alcathoe bat	~~8~~9
Bechstein's bat	22
Daubenton's bat	4
Natterer's bat	20
Whiskered bat	~~31~~32
Brandt's bat/whiskered bat/Alcathoe bat	~~6~~4
Noctule	5
Common pipistrelle	40
Nathusius' pipistrelle	1
Soprano pipistrelle	~~66~~65
Brown long-eared bat	67
No ID	1
Total	279

[30] http://www.magic.gov.uk/MagicMap.aspx: Accessed 14/3/2018

3.2.1.2 The number of bats caught at each trapping location and number of trapping nights at each location is shown in **Table 3-4 and Figure 2.4 to 2.15 in Appendix A**.

Table 3-4 - Number of bats captured and survey effort per trapping location

Trapping Location	Number of bats (B)	Trapping nights (N)	No. Bats Per Night (B/N)
TL1	13	4	3.25
TL2	13	4	3.25
TL3	9	4	2.25
TL4	13	4	3.25
TL5	17	4	4.25
TL6	8	4	2.00
TL7	15	4	3.75
TL8	5	4	1.25
TL9	0	1	0.00
TL10	7	1	7.00
TL11	1	1	1.00
TL12	4	1	4.00
TL13	4	2	2.00
TL14	13	4	3.25
TL15	3	2	1.50
TL16	8	4	2.00
TL17	8	4	2.00
TL18	17	4	4.25
TL19	6	4	1.50
TL20	8	4	2.00
TL21	16	4	4.00
TL22	0	1	0.00
TL23	10	3	3.33
TL24	3	3	1.00
TL25	13	4	3.25
TL26	8	4	2.00
TL27	14	3	4.67
TL28	4	3	1.33
TL29	1	1	1.00
TL30	10	2	5.00
TL31	0	1	0.00

Trapping Location	Number of bats (B)	Trapping nights (N)	No. Bats Per Night (B/N)
TL32	3	2	1.50
TL33	2	1	2.00
TL34	1	1	1.00
TL35	3	~~1~~2	~~3.00~~1.5
TL36	5	2	2.50
TL37	3	2	1.50
TL38	7	1	7.00
TL39	4	2	2.00
~~**TL40**~~	~~0~~	~~1~~	~~0.00~~

~~3.2.1.8~~3.2.1.3 A total of eleven species of bat, comprising barbastelle, Alcathoe bat, Bechstein's bat, Daubenton's bat, Natterer's bat, whiskered bat, noctule, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle and brown long-eared bat, were trapped within the Field Study Area. These species are described in more detail below.

Barbastelle

~~3.2.1.9~~3.2.1.4 A total of nine barbastelles were captured in eight trapping locations as shown in **Table 3.5 below. Figure 2.5 in Appendix C** shows the location of the traps where barbastelles were captured.

Table 3-5 - Trapping results for barbastelle

Trapping location	Easting	Northing	Number of bats
TL4	500271	106998	1
TL5	499748	106209	1
TL7	499260	106257	2
TL8	499243	106361	1
TL12	499173	106345	1
TL14	498898	106266	1
TL19	497942	106974	1
TL39	499928	106469	1
		Total	**9**

~~3.2.1.10~~3.2.1.5 Barbastelles were captured in:

- Barn's Copse (TL19) with one barbastelle captured
- Spinningwheel Copse, in Binsted Woods Complex LWS (TL7, TL8, TL12 and ~~TL14~~) with ~~five~~ four bats captured including radio-tracked bats 10, 16, 27 and, ~~28~~ 30
- Ash Piece (TL14) with one bat captured (radio-tracked bat 28)
- Tortington Common (TL5 and TL39) with two bats captured (radio-tracked bats 7 and 23)
- Steward's Copse (TL4) with one bat captured.

~~3.2.1.11~~3.2.1.6 All these locations are characterised by woodland habitat and/or the interface between woodland habitat and agricultural fields and grasslands and are next to or in the proximities of water courses.

Alcathoe Bat

~~3.2.1.12~~3.2.1.7 A total of ~~eight~~ nine Alcathoe bats were captured in seven of the ~~40~~ 39 trapping locations as shown in **Table 3.6 below. Figure 2.6 in Appendix C** shows the location of the traps where Alcathoe bats were captured.

Table 3-6 - Trapping results for Alcathoe bat

Trapping location	Easting	Northing	Number of bats
TL3	500433	106957	1
TL6	500024	106382	1
TL7	499260	106257	1
TL16	499008	105893	1
TL18	499382	105926	1
TL20	497813	106815	~~2~~3
TL21	497683	106822	1
		Total	**~~8~~9**

~~3.2.1.13~~3.2.1.8 Alcathoe bats were captured in:

- Barn's Copse (TL20 and TL21) with a total of ~~three~~ four bats captured
- The Shaw and the Lag (TL16 and TL18) with two bats captured including radio-tracked bat 9
- Spinningwheel Copse, in Binsted Woods Complex LWS (TL7) with one bat captured (radio-tracked bat 1)
- Tortington Common (TL6) with one bat captured (radio-tracked bat 24)
- Steward's Copse (TL 3) with one bat captured (radio-tracked bat 6).

~~3.2.1.14~~3.2.1.9 All these locations correspond with woodland habitat and TL21, TL16, TL7 and TL18 are next to or in the proximities of watercourses.

Alcathoe Bat/ Brandt's Bat/ Whiskered Bat

~~3.2.1.15~~3.2.1.10 A total of ~~six~~ four bats could not be positively identified to species level but were identified as being either Brandt's bat, whiskered bat or Alcathoe bat. Identification of female bats of these species is difficult without DNA analysis due to physical similarities. These bats were captured in ~~six~~ three different trapping locations as shown in **Table 3.7 and Figure 2.7 in Appendix C**.

Table 3-7 - Trapping results for Brandt's bat/whiskered bat/Alcathoe bat

Trapping location	Easting	Northing	Number of bats
~~TL19~~	~~497942~~	~~106974~~	~~1~~
~~TL20~~	~~497813~~	~~106815~~	~~1~~
TL36	499575	107000	~~2~~1
TL38	499694	107078	~~1~~2
TL39	499928	106469	1
		Total	~~6~~**4**

~~3.2.1.16~~3.2.1.11 These bats were captured in the following areas:

- ~~Barn's Copse (TL19 and TL20) with a total of two bats captured~~
- Scotland Barn~~North of Pinewoods~~ (TL36 and TL38) with three bats captured
- Tortington Common (TL39) with one bat captured.

~~3.2.1.17~~3.2.1.12 All these locations are characterised by dense woodland.

Whiskered Bat

~~3.2.1.18~~3.2.1.13 A total of ~~31~~ 32 whiskered bats were captured in ~~15~~ 17 different trapping locations during the trapping surveys as shown in **Table 3-8** below. **Figure 2.8 in Appendix C** shows the location of the traps where whiskered bats were captured.

Table 3-8 - Trapping results for whiskered bats

Trapping location	Easting	Northing	Number of bats
TL2	500405	106861	1
TL3	500433	106957	3
TL5	499748	106209	3
TL7	499260	106257	3
TL10	499045	106603	3
TL14	498898	106266	2
TL15	499181	106239	2
TL17	498916	106147	3
TL 19	497942	497942	1
TL23	498032	106077	2
TL24	498088	105973	1
TL25	500108	105218	1
TL26	500064	105154	1
TL27	500616	105874	3
TL 36	499575	107000	1
TL37	499667	106963	1
TL38	499694	107078	~~2~~1
		Total	**~~31~~32**

~~3.2.1.19~~3.2.1.14 Whiskered bats were captured in:

- Woodland area east of Avisford Park Golf Course (TL23 and TL24) with a total of three bats captured
- Spinningwheel Copse, in Binsted Woods Complex LWS (TL7, ~~TL14,~~ TL15 and TL17) with a total of ~~ten~~ eight bats captured including radio-tracked bats 3,~~17, 20~~ and 26
- Ash Piece (TL14) with two bats captured including radio-tracked bat 17
- Binsted Woods Complex LWS (TL10) with three bats captured ~~including radio-tracked bat 3~~
- Scotland Barn ~~North of Pinewoods~~ (TL 36, TL37 and TL38) with three bats captured
- Tortington Common (TL5) with three bats captured including radio-tracked bats 4 and 20

- Steward's Copse (TL2 and TL3) with four bats captured including radio-tracked bat 13
- Tortington Priory (TL27) with three bats captured
- Barn's Copse (TL19) with one bat captured
- The Withy Beds (TL25 and TL26) with two bats captured.

~~3.2.1.20~~3.2.1.15 With the exception of TL23, TL24, TL25, TL26 and TL 27 which are associated to watercourses and water bodies, all trapping locations are located within the main woodland block and characterised by a dense woodland habitat.

Bechstein's Bat

~~3.2.1.21~~3.2.1.16 A total of 22 Bechstein's bats were captured in 10 of the ~~40~~ 39 trapping locations as shown in **Table 3.9** below. **Figure 2.9 in Appendix C** shows the location of the traps where Bechstein's bats were captured.

Table 3-9 - Trapping results for Bechstein's bat

Trapping location	Easting	Northing	Number of bats
TL1	500343	106899	3
TL2	500405	106861	4
TL3	500433	106957	4
TL4	500271	106998	3
TL5	499748	1069209	1
TL6	500024	106382	1
TL7	499260	106257	3
TL25	500108	105218	1
TL36	499575	107000	1
TL37	499667	106963	1
		Total	**22**

~~3.2.1.22~~3.2.1.17 Bechstein's bats were captured in:

- Spinningwheel Copse, in Binsted Woods Complex LWS (TL7) with three bats captured including radio-tracked bat 25
- Scotland Barn ~~North of Pinewoods~~ (TL36 and 37) with two bats captured ~~including radio-tracked bat 25~~
- Tortington Common (TL5 and TL6) with ~~one~~ two bats captured
- The Withy Beds west of Tortington ~~(TL25)~~ Manor (TL25) with one bat captured (radio-tracked bat 18)
- Steward Copse (TL1, TL2, TL3 and TL4) with 14 Bechstein's bats captured including radio-tracked bats 2, 11, 12, 21 and 31.

~~3.2.1.23~~3.2.1.18 These locations correspond with dense woodland habitat.

Daubenton's Bat

~~3.2.1.24~~3.2.1.19 A total of four Daubenton's bats were captured in three different trapping locations (TL27, TL28 and TP30) as shown in **Table 3.10** below. **Figure 2.10 in Appendix C** shows the location of the traps where Daubenton's bats were captured.

Table 3-10 - Trapping results for Daubentons bats

Trapping location	Easting	Northing	Number of bats
TL27	500616	105874	2
TL28	500948	107466	1
TL30	500845	107577	1
		Total	**4**

~~3.2.1.25~~3.2.1.20 All these trapping locations are associated with water bodies. TL27 is located in Tortington Priory next to a complex of ponds~~,~~, TL 28 and 30, where radio-tracked bats 19 and 22 were captured, are located at the edge of The Waterwoods and Cricket Hill Farm and north of the lakes of the Trout Fishery.

Natterer's Bat

~~3.2.1.26~~3.2.1.21 A total of 20 Natterer's bats were captured in 12 different trapping locations along the survey period as shown in **Table 3.11** below. **Figure 2.11 in Appendix C** shows the location of the traps where Natterer's bats were captured.

Table 3-11 - Trapping results for Natterer's bat

Trapping location	Easting	Northing	Number of bats
TL4	500271	106998	2
TL5	499748	106209	3
TL6	500024	106382	1
TL10	499045	106603	1
TL14	498898	106266	2
TL16	499008	105893	1
TL17	498916	106147	2
TL18	499382	105926	1
TL19	497942	106974	2
TL21	497683	106822	3
TL26	500064	105154	1
TL37	499667	106963	1
		Total	**20**

~~3.2.1.27~~3.2.1.22 Natterer's bats were captured in:

- Barn's Copse (TL19 and 21) with 5 bats captured including radio-tracked bat 29
- The Shaw and the Lag (TL16 and 18) with two bats captured
- Spinningwheel Copse, in Binsted Woods Complex LWS (~~TL14 and~~ TL17) with ~~four~~ two bats captured
- Ash Piece (TL14) with two bats captured
- Binsted Woods Complex LWS (TL10) with one bat captured (radio-tracked bat 8)
- Scotland Barn ~~North of Pinewoods~~ (TL37) with one bat captured
- Tortington Common (TL5 and TL6) with four bats captured including radio-tracked bat 15
- Steward's Copse (TL4) with two bats captured
- The Whithy Beds (TL26) east of Tortington Manor with one bat captured.

~~3.2.1.28~~3.2.1.23 All these locations are characterised by dense woodland habitat.

Common Pipistrelle

~~3.2.1.29~~3.2.1.24 A total of 40 common pipistrelles were captured in 18 different trapping locations as shown in **Table 3-12** below and **Figure 2.12 in Appendix C**.

Table 3-12 - Trapping results for common pipistrelle

Trapping location	Easting	Northing	Number of bats
TL2	500405	106899	3
TL5	499748	106209	4
TL7	499260	106257	1
TL16	499008	105893	2
TL17	498916	106147	1
TL18	499382	105926	2
TL20	497813	106815	1
TL21	497683	106822	3
TL23	498032	106077	7
TL24	498088	105973	1
TL25	500108	105218	~~3~~2
TL26	500064	105218	2
TL27	500616	105874	1
TL30	500845	107577	1
TL32	500584	107817	2
TL33	500538	107956	2
TL34	499104	106201	1
TL35	499558	106996	3
TL38	499694	107078	1
		Total	**40**

~~3.2.1.30~~3.2.1.25 Common pipistrelles were captured in the following areas:

- Barn's Copse (TL20 and TL21) with four bats captured
- Woodland area east of Avisford Park Golf Course (TL23 and TL24) with eight bats captured
- The Shaw and the Lag (TL16 and TL18) with four bats captured
- Spinningwheel Copse, in Binsted Woods Complex LWS (TL7, TL17 and TL34) with three bats captured
- Scotland Barn~~Woodland north of Pinewoods~~ (TL35 and TL38) with four bats captured
- Tortington Common (TL5) with four bats captured;
- Steward's Copse (TL2) with three bats captured
- The Withy Beds (TL25 and TL26) with four bats captured

- Tortington Priory (TL27) with one bat captured
- The Waterwoods (TL30, TL32 and TL33) with five bats captured

Nathusius' Pipistrelle

3.2.1.313.2.1.26 One Nathusius' pipistrelle was captured at trapping location 15 30 (Grid Reference TQ 00845 07577). This trap was located at the edge of The Waterwoods woodland with Cricket Hill Farm at the top of the slope. **Figure 2.13 in Appendix C** shows the trapping location for Nathusius' pipistrelle.

Noctule

3.2.1.323.2.1.27 Five noctules were captured in four trapping locations (TL8, TL16, TL18 and TL25) as shown in **Table 3-13** and **Figure 2.14 in Appendix C**.

Table 3-13 - Trapping results for noctule

Trapping location	Easting	Northing	Number of bats
TL8	499243	106361	1
TL16	499008	105893	1
TL18	499382	105926	1
TL25	500108	105218	2
		Total	**5**

3.2.1.333.2.1.28 Noctules were captured in the following areas:

- Spinningwheel Copse, in Binsted Woods Complex LWS (TL8) with one bat captured
- The Shaw and the Lag (TL16 and TL18) with two bats captured
- The Withy Beds (TL25) with two bats captured.

3.2.1.343.2.1.29 All these trapping locations are associated with watercourses or water bodies within dense woodland habitat.

Soprano Pipistrelle

3.2.1.353.2.1.30 A total of 66 65 soprano pipistrelles were captured in 25 different trapping locations as shown in **Table 3-14** below and in **Figure 2.15 in Appendix C**.

Table 3-14 - Trapping results for soprano pipistrelle

Trapping location	Easting	Northing	Number of bats
TL1	500343	106899	2
TL2	500405	106861	2
TL3	500433	106957	1
TL4	500271	106998	3
TL5	499748	106209	1
TL6	500024	106382	1
TL8	499243	106361	1
TL12	499173	106345	1

Trapping location	Easting	Northing	Number of bats
TL13	499244	106227	4
TL14	498898	106266	~~3~~2
TL15	499181~~499008~~	106239~~105893~~	1
TL16	499008	105893	3
TL17	498916	106147	1
TL18	499382	105926	8
TL19	497942	106974	1
TL20	497813	106815	1
TL21	497683	106822	3
TL23	498032	106077	1
TL24	498088	105973	1
TL25	500108	105218	7
TL26	500064	105154	3
TL27	500616	105874	8
TL28	500948	107466	1
TL30	500845	107577	7
TL32	500584	107817	1
		Total	~~66~~65

~~3.2.1.36~~3.2.1.31 Soprano pipistrelles were captured in the following areas:

- Barn's Copse (TL19, TL20 and TL21) with five bats captured
- Woodland to the east of Avisford Park Golf Course (TL23 and TL24) with two bats captured
- The Shaw and the Lag (TL16, ~~TL15~~ and TL18) with 11 bats captured
- Spinningwheel Copse, in Binsted Woods Complex LWS (TL8, TL12, TL13, ~~TL14~~ TL15 and TL17) with ~~nine~~ eight bats captured
- Ash Piece (TL14) with two bats captured
- Tortington Common (TL5 and TL6) with two bats captured
- Steward's Copse (TL1, TL2, TL3 and TL4) with eight bats captured
- The Withy Beds (TL25 and TL26) with 10 bats captured
- Tortington Priory (TL27) with eight bats captured
- The Waterwoods (TL28, TL30 and TL32) with nine bats captured.

~~3.2.1.37~~3.2.1.32 Barn's Copse and Steward's Copse are characterised by dense woodland habitat. The rest of the locations are characterised by woodland habitat in the proximities with the interface between this habitat and grassland and/or agricultural fields and associated with water courses and water bodies.

Brown Long-Eared Bat

~~3.2.1.39~~3.2.1.34 A total of 67 brown long-eared bats were captured at 21 different trapping locations as shown in **Table 3-15** below and **Figure 2.16 in Appendix C**.

Table 3-15 - Trapping results for brown long-eared bat

Trapping location	Easting	Northing	Number of bats
TL1	500343	106899	8
TL2	500405	106861	3
TL4	500271	106998	4
TL5	499748	106209	4
TL6	500024	106382	4
TL7	499260	106257	5
TL8	499243	106361	2
TL10	499045	106603	3
TL11	499166	106479	1
TL12	499173	106345	2
TL14	498898	106266	6
TL17	498916	106147	1
TL18	499382	105926	4
TL19	497942	106974	1
TL20	497813	106815	3
TL21	497683	106822	6
TL26	50064	105154	1
TL28	500948	107466	2
TL36	499575	107000	2
TL38	499694	107078	3
TL39	499928	106469	2
		Total	**67**

~~3.2.1.40~~3.2.1.35 Brown long-eared bats were trapped in the following areas:

- Barn's Copse (TL19, TL20 and TL21) with ten bats captured
- The ~~Shaw~~ Lag (TL18) with four bats captured
- Spinningwheel Copse, in Binsted Woods Complex LWS (TL7, TL8, TL12, ~~TL14~~ and TL17) with ~~16~~ ten bats captured
- Ash Piece (TL14) with six bats captured
- Binsted Woods Complex LWS (TL10 and TL11) with four bats captured
- Scotland Barn~~Woodland north of Pinewoods~~ (TL36 and TL38) with five bats captured
- Tortington Common (TL5, TL6 and TL39) with ten bats captured
- Steward's Copse (TL1, TL2 and TL4) with 15 bats trapped including radio-tracked bats 5 and 14

- The Withy Beds (TL26) with one bat captured
- The Waterwoods (TL28) with two bats captured.

~~3.2.1.41~~3.2.1.36 All these locations are associated with dense woodland habitat.

3.2.2 DNA Analysis

3.2.2.1 Droppings were obtained from 17 of the trapped bats belonging to the Alcathoe, Brandt's or/and whiskered species ~~of the trapped Alcathoe/Brandt's/Whiskered bats~~ which were all sent for DNA analysis. Fifteen of these samples were successfully analysed to species level, which confirmed that 3 Alcathoe bats and 12 whiskered bats were successfully identified in the hand. The results of this analysis can be found in **Appendix E.**

3.2.3 Radio-Tracking Survey

3.2.3.1 The radio-tracking survey identified roosting locations, flight lines and home ranges of the 31 radio-tagged bats (**Appendix E** and raw data in **Appendix B**). Radio-tagged bats are described in **Table 3-16** below.

Table 3-16 - Radio-tagged bats

Species	No. of bats radio-tagged	Bat identification No.s
Barbastelle	7	Bat 7, Bat 10, Bat 16, Bat 23, Bat 27, Bat 28 and Bat 30
Alcathoe bat	4	Bat 1, Bat 6, Bat 9 and Bat 24
Bechstein's bat	7	Bat 2, Bat 11, Bat 12, Bat 18, Bat 21, Bat 25 and Bat 31
Daubenton's bat	2	Bat 19 and Bat 22
Natterer's bat	3	Bat 8, Bat 15 and Bat 29
Whiskered bat	6	Bat 3, Bat 4, Bat 13, Bat 17, Bat 20 and Bat 26
Brown long-eared bat	2	Bat 5 and Bat 14
Total	31	

3.2.4 Roosts

3.2.4.1 A total of 27 confirmed roosting locations were identified from 23 radio-tagged bats of seven species, see **Table 3.17** below.

Table 3-17 - Roosts identified during surveys

Roost	Species, sex and status	Roost ID	Bat No.	Approximate Coordinates		Emergence survey undertaken	No. of Bats Emerged	Roost Type
				Easting	Northing			
Oak tree in Binsted Woods Complex LWS	Barbastelle Adult male	R1	Bat 7	499027	106666	N	-	Day Roost
Agricultural unit at Marsh Farm, Binsted Lane	Barbastelle Pregnant female	R2	Bat 10	498874	104904	Y	1	Maternity
Oak tree on southern perimeter of Tortington Common	Barbastelle Post-lactating female	R3	Bat 16	499333	106166	Y	Not observed feature obscured	Maternity
Dead sweet chestnut tree in North of Steward's Copse	Barbastelle Adult female previously bred	R4	Bat 27	500332	106969	Y	1	Day Roost
Oak tree in central Brickkiln Copse	Barbastelle Adult male	R5	Bat 28	498552	107089	Y	1	Day Roost
Agricultural unit at Marsh Farm, Binsted Lane (different agricultural unit to Bat 10 roost)	Barbastelle Adult male	R6	Bat 28	498890	104873	Y	1	Day Roost
Oak tree in Binsted Woods Complex LWS	Alcathoe bat Pregnant female	R7	Bat 1	498817	106826	Y	Not observed feature obscured	Maternity
Oak tree west of Tortington Lane	Alcathoe bat Adult male	R8	Bat 6	500231	106904	Y	1	Day Roost

Roost	Species, sex and status	Roost ID	Bat No.	Approximate Coordinates		Emergence survey undertaken	No. of Bats Emerged	Roost Type
				Easting	Northing			
Group of ash trees central Binsted Woods Complex LWS	Alcathoe bat Adult male	R9	Bat 9	498881	106730	N	-	Day Roost
Ash tree in Steward's Copse	Bechstein's bat Adult female not previously bred	R10	Bat2	500362	107051	Y	53	Maternity
Sycamore on north boundary of White Swan Hotel car park, Chichester Road	Bechstein's bat Post-lactating adult female	R11	Bats 11 & 12	500204	107229	Y	2	Maternity
Mature oak on the southern boundary of Tortington Common	Bechstein's bat Adult female no previous breeding	R12	Bat 21	500085	106151	Y	1	Day Roost
Beech tree on the western boundary of Steward's Copse	Bechstein's bat B21 Adult female non- breeder B31 Adult with historical breeding	R13	Bats 21 & 31	500285	106871	Y	1 (Bat 21)	Day Roost
Beech tree in woodland copse to the north of Park Farm	Bechstein's bat Adult female non-breeder	R14	Bat 21	500054	108315	N	-	Day Roost
Ash tree in The Waterwoods	Daubenton's bat Adult Male	R15	Bat 19	500793	107490	N	-	Day Roost
Group of ash and beech trees on The Waterwoods*	Daubenton's bat Adult Male	R16	Bat 19	500774	107454	Y	1	Day Roost
Woodland copse north of Arundel Castle*	Daubenton's bat Adult Male	R17	Bat 22	501666	107833	N	-	Day Roost
Ash tree in Lake Copse	Natterer's bat Pregnant female	R18	Bat 8	498906	105761	Y	4	Maternity

Roost	Species, sex and status	Roost ID	Bat No.	Approximate Coordinates		Emergence survey undertaken	No. of Bats Emerged	Roost Type
				Easting	Northing			
Residential property at 17 Hazel Grove, BN18 9JD	Natterer's bat Lactating female	R19	Bat 15	500330	106670	N	-	Maternity
Oak tree in Binsted Woods Complex LWS	Natterer's bat Lactating female	R20	Bat 15	499305	106906	Y	-	Maternity
Unidentified tree north of Binsted Woods Complex LWS *	Natterer's bat Lactating female	R21	Bat 15	499151	106842	N	-	Maternity
East Lodge, top of Tortington Lane	Whiskered bat 2 x Pregnant female	R22	Bats 3 & 4	500181	107210	Y	4	Maternity
West Lodge, top of Tortington Lane	Whiskered bat Post-lactating female	R23	Bat 20	500175	107205	Y	4	Maternity
House at Pinewoods, Binsted Lane, roof tile and south-east corner of the property	Whiskered bat Post-lactating	R24	Bat 20	499708	106685	Y	52 (peak count)	Maternity
Oak tree in Steward's Copse	Brown long-eared bat Adult female no previous breeding	R25	Bat 5	500446	106970	Y	8	Maternity
Oak tree in Steward's Copse	Brown long-eared bat Adult female no previous breeding	R26	Bat 5	500487	106914	N	-	-
Beech tree in Barn's Copse	Brown long-eared bat Lactating female	R27	Bat 14	497903	106941	Y	14	Maternity

*Estimated location; it was not possible to determine the roosting locations for these bats because of access restrictions.

3.2.4.2 The location of the roosts is shown in **Figure 3.1, Appendix C**

3.2.5 Flight Lines

Barbastelle

3.2.5.1 Of the seven radio-tagged barbastelles, flight lines could be identified for bat 7, bat 10, bat 16, bat 23, bat 28 and bat 30. **Figure 3.2 in Appendix** C shows the flight lines identified for barbastelles.

3.2.5.2 Bat 7 was recorded flying north from Lake Copse across The Shaw to get to Spinningwheel Copse and Ash Piece. Bat 7 was also recorded flying south from Tortington Common towards the agricultural fields south of the woodland and later recorded flying north from the fields back towards the woodland.

3.2.5.3 Bat 10 was recorded flying south from its roost at Marsh Farm towards the Arundel-Ford-Barnham railway line along wet ditches and hedgerows.

3.2.5.4 Bat 16 was recorded flying from Lake Copse, north towards its roost on the southern edge of Tortington Common.

3.2.5.5 Bat 23 was observed flying from Lake Copse along the woodland between Lake copse and Binsted park north towards Ash Piece and later observed flying south from Binsted Woods Complex LWS back towards Lake Copse. Bat 23 was also observed south over the agricultural fields between Tortington Common and Meadow Lodge.

3.2.5.6 Bat 28 was observed flying north from Lake Copse to Ash Piece, along the same route as bats 7 and 10 and in the direction of its roost in Brickkiln Copse. Bat 28 was also recorded flying north from Manor House towards Binsted Woods Complex LWS.

3.2.5.7 Bat 30 was recorded flying from Slate Barn Farm, north towards Lake Copse.

Alcathoe Bat

3.2.5.8 Of the four radio-tagged Alcathoe bats, flight lines could be identified for bat 1, bat 6 and bat 9. **Figure 3.3 in Appendix C** shows the flight lines identified for Alcathoe bats.

3.2.5.9 Bats 1 and 9 were recorded flying north following The Shaw (west) towards Spinningwheel Copse. Bat 1 was also recorded flying south using The Shaw (east) from the area north of Binsted Manor to-wards Lake Copse.

3.2.5.10 Bat 6 was recorded flying north along The Shaw (east) from Lake Copse towards Spinningwheel Copse.

3.2.5.11 Bat 6 was also recorded flying south from the roost location across Tortington Common following a network of wet ditches.

Bechstein's Bat

3.2.5.12 Of the seven radio-tagged Bechstein's bats, flight lines could be identified for bat 18 (see **Figure 3.4 in Appendix C**).

3.2.5.13 Bat 18 was recorded flying south from Tortington Common, following hedgerows and turning west towards Lake copse.

3.2.5.14 Bat 18 was also recorded flying north from the direction of Tortington village towards Tortington Common.

Daubenton's Bat

3.2.5.15 No flight lines could be recorded for both Daubenton's bats radio-tagged during the 2018 radio-tracking survey.

Natterer's Bat

3.2.5.16 Of the three radio-tagged Natterer's bats, flight lines could be identified for bat 8 and bat 15 (see **Figure 3.6 in Appendix C**).

3.2.5.17 Bat 8 was recorded flying from Lake Copse, where its roost was identified, north through The Shaw towards Ash Piece.

3.2.5.18 Bat 15 was recorded flying from Binsted Woods Complex LWS, and the general direction of its roost, south towards Meadow Lodge. Bat 15 was also observed flying north through Lake Copse towards its roost in Binsted Woods Complex LWS.

Whiskered Bat

3.2.5.19 Of the six radio-tagged Whiskered bats, flight lines could be identified for bat 3 and bat 20 (see **Figure 3.5 in Appendix C**).

3.2.5.20 Bat 3 was recorded flying from south Binsted Woods Complex LWS, south towards Manor House. Bat 3 was also observed flying south from Tortington Common towards Slate Barn Farm.

3.2.5.21 Bat 20 was recorded flying south from its roost in Tortington Common towards Tortington village. Bat 20 was also recorded flying from the agricultural fields at Goose Green, south over the railway line towards Wicks Farm and Ford village.

Brown Long-Eared Bat

3.2.5.22 Of the two radio-tagged brown long-eared bats, a single flight line could be recorded for bat 5 (see **Figure 3.7 in appendix C**).

3.2.5.23 Bat 5 was recorded flying south from Ash Piece, along The Shaw, towards Lake Copse.

3.2.6 Home Ranges and Foraging Areas

3.2.6.1 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~~KDE) 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 to 3.20** display visual representations of these data and deduced flight lines.

Barbastelle

3.2.6.2 Barbastelles were recorded foraging extensively over the Field Survey Area. Peripheral foraging was also recorded as far north as the Whiteways Roundabout (A29/A284) and as far south as Yapton.

3.2.6.3 During the May radio-tracking study core foraging areas were identified over a large area south Binsted Woods Complex LWS and Tortington Common (bat 7) and over the barbastelle roost at Marsh Farm and the woodland copse between Marsh Farm and the railway line (bat 10). The peripheral foraging area for both bats spread over Lake Copse, The Shaw and the agricultural fields and hedgerows be-tween Binsted Lane and Tortington Lane. Bat 10 peripheral foraging areas also included the agricultural fields around Marsh Farm and as far south as the Ford Airfield industrial estate.

3.2.6.4 During the July radio-tracking study core foraging for bat 16 was recorded in close proximity to its roost in the south of Binsted Woods Complex LWS. Peripheral foraging areas were spread over Binsted Woods Complex LWS, Lake Copse, Tortington Common and the agricultural fields between Tortington Common and Torting-ton village. Peripheral foraging for bat 16 also occurred north-east of the Field Study Area to-wards the Arundel Wildfowl and Wetland Reserve.

3.2.6.5 During the August radio-tracking study, the core foraging area for bat 23 was on the east and west of south Binsted Lane, over Binsted Woods Complex LWS and Tortington Common. Peripheral foraging areas spread over Tortington Common, Binsted Woods Complex LWS, Lake Copse, The Shaw and the agricultural fields south of the woodland. Pockets of peripheral foraging areas also occurred as far south as Manor Farm, Decoy Wood and as far north as Screens Wood.

3.2.6.6 During the September radio-tracking study, the foraging areas for bat 27, bat 28 and bat 30 were identified:

3.2.6.7 The core foraging area for bat 27 was north of its roost in Stewards Copse in the woodland at the top of Tortington Lane, adjacent to the current A27. Another core foraging area was identified in the agricultural fields west of Park Farm. Its peripheral foraging area spread over north of Steward's Copse and Tortington Common.

3.2.6.8 Core foraging areas for bat 28 were around its roost at Marsh Farm. Peripheral foraging spread south towards Ford Road and as far north as its roost in Brickkiln Copse. Other pockets of peripheral foraging areas occurred in Screens Wood, north of the current A27.

3.2.6.9 Core foraging areas for bat 30 were north of the A27, in the woodland east of the Whiteways Roundabout and further south over Arundel Park. Pockets of peripheral foraging areas were identified in the woodland north of the Arundel Wildfowl and Wetland Centre, around Arundel Park and as far south as Lake Copse and Marsh Farm.

3.2.6.10 Core and peripheral foraging areas for barbastelles are shown in **Figure 3.9 to 3.12 in Appendix C.**

Alcathoe Bat

3.2.6.11 Alcathoe bats were identified foraging over an extensive area of the Field Survey Area, with core foraging areas identified at Steward's Copse, north of Tortington Common, Binsted Woods Complex LWS, Ash Piece, Lake Copse and The Shaw.

3.2.6.12 Core and peripheral foraging areas for Alcathoe bats are shown in **Figure 3.8 in Appendix C.**

Bechstein's Bat

3.2.6.13 The core foraging areas for Bechstein's bats were identified over Tortington Common, Steward's Copse, Scotland Barn, woodland west of Manor House and New Barn.

3.2.6.14 The majority of peripheral foraging spread over Tortington Common, Binsted Woods Complex LWS, Stewards Copse and Park Farm. Other pockets of peripheral foraging areas spread as far south as Tortington village (bat 18), west to Walberton Farm (bat 25) north to Gobblestubb's Copse (bat 25) and north to Screens Wood (bat 21).

3.2.6.15 Core and peripheral foraging areas for Bechstein bats are shown in **Figure 3.13 in Appendix C**

Daubenton's Bat

3.2.6.16 The core foraging area for bat 19 was identified east of its roost, in the Waterwoods and Trout Farm area. The peripheral foraging areas were identified over the Waterwoods, Cricket Hill Farm and Park Farm.

3.2.6.17 The core foraging areas for bat 22 were identified as being around Swanbourne Lake, adjacent to its roost, and east over the wildfowl reserve. Peripheral foraging areas spread over the Arundel Wildfowl and Wetland Reserve, Watermeadows, Home Farm and Arundel Park.

3.2.6.18 Core and peripheral foraging areas for Daubenton's bat are shown in **Figure 3.14 in Appendix C**

Natterer's Bat

3.2.6.19 The core foraging area for bat 8 spread over an extensive area of the Binsted Woods Complex LWS, Pinewoods, Paine's Wood, Singer's Piece and over the Arundel Arboretum. A further core foraging area was identified over Spinningwheel Copse, just north of its roost in Lake Copse. The peripheral foraging area spread extensively over the Binsted Woods Complex LWS, as far north as Park Farm and south beyond Lake Copse.

3.2.6.20 The core foraging area for bat 15 was identified over Lake Copse, The Shaw, Manor House and Tortington Common. The peripheral foraging area spread extensively over the Binsted Woods Complex LWS, Tortington Common and the agricultural fields south of the woodland.

3.2.6.21 Core and peripheral foraging areas for Natterer's bats are shown in **Figure 3.15 in Appendix C**.

Whiskered Bat

3.2.6.22 Whiskered bats were identified to be foraging extensively over the Field Study Area and beyond.

3.2.6.23 During the May radio-tracking study, core foraging areas for both bat 3 and bat 4 were identified over Tortington Common and the Binsted Woods Complex LWS. Another core foraging area for both bats were identified around their roost at the top of Tortington Lane. Peripheral foraging areas spread extensively over the Binsted Woods Complex LWS, Tortington Common, Pinewoods and Steward's Copse. Further pockets of peripheral foraging were identified as far north as Screens Wood (bat 4) and as far south as the Ford Aerodrome (bat 3).

3.2.6.24 During the July radio-tracking study, core foraging areas for bat 13 were identified over an extensive area or Tortington Common and Pinewoods. Peripheral foraging spread over to the east of the Binsted Woods Complex LWS, Tortington Common, Steward's Copse, Scotland Barn and Paine's Wood. A further peripheral foraging area was identified further north over Screens Wood and Arundel Park.

3.2.6.25 During the August radio-tracking study, core foraging for bat 20 was identified over Tortington Common and Pinewoods, between the two identified roosts. Peripheral foraging areas spread over Torting-ton Common and the Binsted Woods Complex LWS, with separate pockets over south Screens Wood, the agricultural fields south-east of Tortington Common and south of Lake Copse over the fields towards Ford village.

3.2.6.26 During September radio-tracking, core foraging for whiskered bat 26 was identified over the Shaw and east of the Lag. Peripheral foraging areas were distributed in the same general vicinity; and in part of Lake Copse; the north end of the Shaw; and land north of Binsted House.

~~3.2.6.25~~3.2.6.27 Core and peripheral foraging areas for whiskered bats are shown in **Figure 3.16 to ~~23~~.19 in Appendix C**.

Brown Long-Eared Bat

~~3.2.6.26~~3.2.6.28 The core foraging area for bat 5 was identified around its roosts at Stewards Copse. Peripheral foraging spread over north Tortington Common, Scotland Barn and Park Farm. Further peripheral foraging was identified over Lake Copse, Spinningwheel Copse, Ash Piece and Pinewoods.

~~3.2.6.27~~3.2.6.29 The core foraging for bat 14 was identified east of its roost at Barn's Copse. Peripheral foraging was spread in pockets over Barn's Copse, Brickkiln Copse and Pedler's Croft.

~~3.2.6.28~~3.2.6.30 Core and peripheral foraging areas for brown long-eared bats are shown in **Figure 3.20 in Appendix C.**

3.2.7 Emergence Surveys

3.2.7.1 In total, 27 roosts of ~~six~~ seven species were located via tracking the radio-tagged bats. The locations of these roosts are shown in **Figures 3.1 (Appendix C).** A total of ~~22~~ 24 emergence surveys were undertaken at roosts identified during the radio-tracking surveys.

Barbastelle

3.2.7.2 Six emergence surveys were carried out on roosts identified for barbastelle.

Roost R2

3.2.7.3 Two emergence surveys were undertaken on an agricultural lean-to storage unit in Marsh Farm, Binsted Lane, Binsted (grid ref: SU 98874 04904):

3.2.7.4 On the 17th May 2018 an emergence survey was undertaken from approximately 10m south of the roosting location as access wasn't confirmed into the private property. Bat 10 was recorded leaving the roost with radio-tracking equipment at approximately 21:22. No other bats were recorded emerging from the roost.

3.2.7.5 On the 18th May 2018 a repeat emergence survey was undertaken at this location. Bat 10 was recorded emerging at 21:29 using radio-tracking equipment. No other bats were recorded emerging from the roost.

Roost R3

3.2.7.6 One emergence survey was undertaken on a mature oak tree with multiple roosting features on the southern perimeter of Binsted Woods Complex LWS (coordinates 499333 106166) on the 18th July 2018. The features that could be identified from the ground floor comprised splits located 8m high on the southern aspect of the tree. Ivy covered most of the tree obscuring any other potential roosting locations. Bat 16 (post-lactating female) was recorded emerging at 21:41. A further five barbastelles were recorded emerging from the tree. The exact roosting location could not be identified due to vegetation obscuring the top of the tree canopy, but the roost was identified as a maternity roost because of the emergence of the post-lactating female.

Roost R4

3.2.7.7 One emergence survey was undertaken on a heavily leaning sweet chestnut tree in Steward's Copse (coordinates 5000332 106969) on 11 September 2018. Bat 27 was recorded emerging at 20:00 and no other bats were identified emerging from the roost.

Roost R5

3.2.7.8 One emergence survey was undertaken on an oak tree in Brickkiln Copse (coordinates 498552 107089) on 12 September 2018. During this survey bat 28 was recorded emerging from the roost at 19:54. No further bats were recorded emerging from the roost.

Roost R6

3.2.7.9 One emergence survey was undertaken on a brick-built barn at the southern boundary of Marsh Farm, Binsted Lane, Binsted (coordinates 498890 104873) on 13 September 2018. Bat 28 was recorded leaving the roost. No further bats were recorded emerging from the roost.

Alcathoe Bat

3.2.7.10 Two emergence surveys were carried out at roosts identified for Alcathoe bat.

Roost R7

3.2.7.11 One emergence survey was undertaken on an oak tree in Binsted Woods Complex LWS (coordinates 498817 106826) on 18 May 2018. Radio-tracking showed bat 1 leaving the roost at approximately 21:10. No further bats were recorded emerging from the tree.

Roost R8

3.2.7.12 One emergence survey was undertaken at an oak tree in the western perimeter of Steward's Copse adjacent to Tortington Lane (coordinates 500231 206904) on 15 May 2018. Bat 6 was observed emerging from an unidentified feature on the tree at 21:16, although the exact roosting feature could not be identified due to dense vegetation cover around the roost. No further bats were recorded emerging from this roost.

Bechstein's Bat

3.2.7.13 Six emergence surveys were undertaken at roosts identified for Bechstein's bat.

Roost R10

3.2.7.14 One emergence survey was undertaken at a semi-mature ash tree in Steward's Copse (coordinates: 500362 107051) on 15 May 2018. A total of 53 Bechstein's bats were recorded emerging from a knot hole 6m above ground on the north-western aspect of the tree. The first bat was recorded emerging at 21:10 and the final bat emerged at 21:50. The radio-tagged bat, bat 2, was recorded emerging from the roost at 21:34.

Roost R11

3.2.7.15 Two emergence surveys were undertaken at a mature sycamore tree on the northern boundary of the White Swan Hotel car park (coordinates 500224 107924).

3.2.7.16 On the 17th July 2018, radio-tracking recorded bat 11 and bat 12 emerging from the roost at 21:47. The exact emergence location could not be determined because of dense foliage. Two other Bechstein's bats were recorded in close proximity to the roost during the survey, although because of dense foliage their emergence could not be confirmed.

3.2.7.17 On the 18th July 2018, radio-tracking showed bat 11 and bat 12 to leave the roost at 22:11. No further emergences were recorded.

Roost R12

3.2.7.18 One emergence survey was undertaken at a mature oak tree on the southern woodland boundary of Tortington Common (coordinates: 500085 106151).

3.2.7.19 On 22 August 2018, bat 21 was recorded emerging from the canopy of the tree. No other bats were recorded emerging.

Roost R13

3.2.7.20 Two emergence surveys were undertaken at a beech tree in Steward's Copse (coordinates: 500285 106871):

3.2.7.21 On 23 August 2018 bat 21 was recorded by radio-tracking equipment emerging from the roost at 20:56. No further bats were recorded emerging from the roost.

3.2.7.22 On 12 September one Bechstein's bat was recorded emerging from the roost at 20:18 from a branch cavity eight meters high. No other bats were recorded emerging from the roost. The radio-transmitter on bat 31 remained static in the roost for the rest of the radio-tracking session.

Daubenton's Bat

3.2.7.23 One emergence survey was undertaken on roost R16, identified for Daubenton's bats.

Roost R16

3.2.7.24 The exact location of the roost was not identified. Radio-tracking bearings determined it to be within a small group of beech and ash trees in the Waterwoods (coordinates: 500793 107490).

3.2.7.25 On 20 July 2018, bat 19 was recorded by radio-tracking equipment emerging at 22:03. No other bats were recorded emerging.

Natterer's Bat

3.2.7.26 Two emergence surveys were undertaken on roosts identified for Natterer's bats.

Roost R18

3.2.7.27 One emergence survey was undertaken on an ash tree within Lake Copse (coordinates: 498906 105761).

3.2.7.28 On 19 May 2018 bat 8 was recorded emerging at 21:44. Three additional Natterer's bats emerged between 21:44 and 22:00.

Roost R20

3.2.7.29 One emergence survey was undertaken on an oak tree within Binsted Woods Complex LWS (R20) (coordinates: 499305 106906). The oak tree was approximately 25m high, with potential roost features in its north-eastern aspect in the form of a dead limb approximately 6m above ground with splits and one cavity.

3.2.7.30 On 19 July 2018, bat 15 was recorded by radio-tracking leaving the roost. No other bats were observed during the emergence survey.

Whiskered Bat

3.2.7.31 Five emergence surveys were undertaken at roosts identified for ~~Whiskered~~ whiskered bats.

Roost R22

3.2.7.32 One emergence survey was undertaken at a private property at the top of Tortington Lane, East Lodge (coordinates 500181 107210) on 16 May 2018. The property is a two-storey residential building with two hipped roof pitches. Single storey extensions were located at the southern and eastern elevations of the building.

3.2.7.33 This emergence survey identified a total of four whiskered bats, including bats 3 and 4, emerging from a lifted rooftile.

Roost R23

3.2.7.34 One emergence survey was undertaken at a private property at the top of Tortington Lane, West Lodge (coordinates 500175 107205) on 23 August 2018.

3.2.7.35 This survey recorded four whiskered bats emerging from an unidentified feature on the south-eastern elevation of the building.

3.2.7.36 One hour after the final emergence the transmitter for bat 20 was still within the building and it is assumed that it had fallen off.

Roost 24

3.2.7.37 Three emergence surveys were undertaken at a private residential property at Pinewoods, Binsted Lane (coordinates: 499708 106685).

3.2.7.38 On 17 July 2018 52 whiskered bats emerged from under a roof tile at the south-east corner of the property between 21:31 and 22:10. Bat 13 was recorded emerging at 21:35.

3.2.7.39 On 18 July 2018, 46 whiskered bats were recorded emerging from the same feature.

3.2.7.40 On 21 August, 11 whiskered bats were recorded emerging from the south-east corner of the property between 20:08 and 21:56. Bat 20 emerged at 21:56.

Brown Long-Eared Bat

3.2.7.41 Two emergence surveys were undertaken at roosts identified for brown long-eared bats.

Roost 25

3.2.7.42 One emergence survey was undertaken on a mature oak in Stewards Copse (coordinates 500446 106970).

3.2.7.43 On 15 May 2018, eight brown long-eared bats, including bat 5, were recorded emerging from a compression wound cavity 12m above ground between 20:06 and 21:10.

Roost 27

~~3.2.7.43~~3.2.7.44 One emergence survey was undertaken at a beech tree in Barn's Copse (R27) (coordinates: 497903 106941).

~~3.2.7.44~~3.2.7.45 On 17 July 2018, 14 brown long-eared bats emerged between 21:21 and 21:34. Bat 14 emerged at 21:26. Vegetation overgrowth meant that the roosting feature could not be identified

4 Discussion and Recommendations

4.1 Discussion

4.1.1 Desk Study

Species Records

4.1.1.1 The MAVES bat surveys [31] confirmed the presence of maternity roosts of Bechstein's bat, Alcathoe bat and occasional roosts for 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 Woods Complex LWS but considered it unlikely the roost they found was a breeding roost.

4.1.2 Field Survey

Trapping Surveys

4.1.2.1 Access restrictions limited the data obtained from the trapping surveys at the woodland north of the A27 (Goblestubb's Copse and Rewell Wood) and some areas of woodland south of the A27 including Scotland Barn, woodland north of Binsted Woods Complex LWS, Paine's Wood and Singer's Piece. Further studies will be carried out in these areas in 2019 to further investigate bats in these areas.

4.1.2.2 The floodplain between Ford Road and Lyminster Road was considered unsuitable for trapping due to the sparse vegetation present in this area which was considered likely to lower the effectiveness of the trapping surveys as bats would be likely to detect the harp traps and avoid capture.

4.1.2.3 A total of 278 bats of 11 different species comprising barbastelle, Alcathoe bat, Bechstein's bat, Daubenton's bat, Natterer's bat, whiskered bat, noctule, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle and brown long-eared bat were trapped during 12 trapping nights at 40 different locations located in 12 different areas within the Field Survey Area between 14 May and 13 September 2018. **Table 4-1** summarises the trapping results by area and species.

[31] 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.

Table 4-1 - Summary of trapping results

	Barb	Alc	Bech	B/W/A	Daub	Whisk	Natt	Noct	NP	CP	SP	BLE	Species confirmed
Barn's Copse	1	~~3~~4		~~2~~		1	5			4	5	10	6
Spinningwheel Copse	~~5~~4	1	3			~~10~~8	~~4~~2	1		3	~~9~~8	10	9
Ash Piece	1					2	2				2		4
Tortington Common	2	1	~~1~~2	1		3	4			4	2	10	8
Steward's Copse	1	1	14			4	2			3	8	15	8
The Shaw and the Lag		2					2	2		4	11	4	6
Scotland Barn~~North of Pinewoods~~			2	3		3	1			4		5	~~6~~5
The Withy Beds			1			2	1	2		4	10	1	7~~6~~
Binsted Woods Complex LWS						3	1					4	3~~4~~
Tortington Priory					2	3				1	8		4~~3~~
The Waterwoods					2				1	5	9	2	5
East of Avisford Park Golf Course						3				8	2	6	4~~3~~
Total bats	9	~~8~~9	~~21~~22	~~6~~4	4	~~31~~32	20	5	1	~~39~~40	~~64~~65	~~60~~67	

Abbreviations: Barb: barbastelle / Alc: Alcathoe bat / Bechs: Bechstein's bat / Daub: Daubenton's bat / Whis: whiskered bat / Natt: Natterer's bat / Noct: noctule / NP: Nathusius' pipistrelle / CP: common pipistrelle / SP: soprano pipistrelle / BLE: brown long-eared bat

Barbastelle

4.1.2.4 A total of nine bats of this species were captured during the 2018 trapping surveys. Barbastelle was present within the Field Study Area at Barn's Copse, Spinningwheel Copse, Ash Piece, Tortington Common and Steward's Copse. All of these locations are characterised by woodland habitat. The largest number of barbastelles captured were from Spinningwheel Copse.

4.1.2.5 Breeding individuals of this species were recorded during the 2018 trapping surveys. These comprised one pregnant bat and two post-lactating females, indicating the presence of a breeding colony close to the Field Survey Area.

Alcathoe Bat

4.1.2.6 A total of ~~eight~~ nine Alcathoe bats were captured during the 2018 trapping surveys. This species was present within the Field Study Area at Barn's Copse, Spinningwheel Copse, Tortington Common, Steward's Copse, ~~and~~ The Shaw and the Lag. The highest number of trapped Alcathoe bats was obtained from Barn's Copse (~~three~~ four bats).

4.1.2.7 Breeding individuals of this species that were captured during the trapping survey comprised one pregnant bat and one post-lactating female. The trapping and radio-tracking surveys undertaken during 2017 confirmed the presence of two breeding colonies of Alcathoe bats within the Field Study Area at Barn's Copse and Steward's Copse.

Bechstein's Bat

4.1.2.8 A total of ~~21~~ 22 Bechstein's bats were captured during the 2018 trapping surveys within the Field Study Area at Spinningwheel Copse, Tortington Common, Steward's Copse, Scotland Barn (the woodland north of Pinewoods) and the Withy Beds. The highest number of trapped Bechstein's bats was obtained from Steward's Copse where four maternity roosts were identified during the 2017 trapping and radio-tracking surveys undertaken by WSP and Arbeco Ltd.

4.1.2.9 Breeding individuals captured during the 2018 trapping surveys comprised one lactating female and one post-lactating female.

Daubenton's Bat

4.1.2.10 Individuals of this species were successfully captured in two areas within the Field Study Area at Tortington Priory and The Waterwoods with two bats captured in each area.

4.1.2.11 No breeding Daubenton's bats were identified during the 2018 trapping surveys but 2017 trapping and radio-tracking surveys undertaken by WSP/Arbeco Ltd identified a maternity roost south of Calceto Lane.

Natterer's Bat

4.1.2.12 A total of 20 Natterer's bats were captured during the 2018 trapping surveys at ~~eight~~ nine locations within the Field Survey Area: Barn's Copse, Spinningwheel Copse, Ash Piece, Tortington Common, Steward's Copse, The Shaw, the Lag, Scotland Barn~~woodland north of Pinewoods~~, the Withy Beds and Binsted Woods Complex LWS. The highest number of bats was recorded at Barn's Copse where five individuals were captured.

4.1.2.13 Breeding by this species was confirmed during the 2018 trapping surveys by the trapping of one pregnant and two lactating females. This indicates the presence of breeding colonies close to or within the Field Survey Area.

Whiskered Bat

4.1.2.14 A total of ~~31~~ 32 whiskered bats were captured during the trapping surveys from ~~eight~~ ten different areas within the Field Survey Area. These bats were captured in most of the woodland areas with the exception of ~~Barn's Copse and~~ The Shaw and the Lag.

4.1.2.15 Breeding individuals of this species that were captured during the 2018 trapping surveys comprised three pregnant bats, ~~one~~ two lactating and three post-lactating females, confirming the presence of breeding colonies within or close to the Field Survey Area.

Common Pipistrelle

4.1.2.16 A total number of 40 common pipistrelles were captured during the 2018 trapping surveys. The presence of this species was confirmed in all locations within the Field Study Area other than Binsted Woods Complex LWS and ~~Tortington Priory~~Ash Piece.

4.1.2.17 Breeding by this species was demonstrated by the capture of 13 pregnant bats, confirming the presence of breeding colonies within or close to the Field Study Area.

Nathusius' Pipistrelle

4.1.2.18 One individual of this species was captured during the 2018 trapping surveys within the Waterwoods (north of the A27). No breeding individuals for this species were captured.

Soprano Pipistrelle

4.1.2.19 A total of ~~66~~ 65 soprano pipistrelle bats were captured in nine areas within the Field Survey Area, characterised by woodland, hedge and open habitat. The only areas were these bats were not captured were Binsted Woods Complex LWS and Scotland Barn~~the woodland north of Pinewoods~~, both of which comprise dense woodland.

4.1.2.20 Breeding individuals of this species that were captured comprised five pregnant and three lactating females, confirming the presence of breeding colonies within or close to the Field Study Area.

Brown Long-Eared Bat

4.1.2.21 A total of 67 brown long-eared bats were captured in all areas where trapping was carried out other than ~~The Withy Beds,~~ The Shaw, Tortington Priory and the woodland east of Avisford Park golf course.

4.1.2.22 Breeding by this species was confirmed by the capture of five pregnant, 12 lactating and one post-lactating female bats. This confirms the presence of breeding colonies of this species within or close to the Field Study Area.

Noctule

4.1.2.23 Five noctules were captured during the 2018 trapping surveys within the Field Study Area at Spinningwheel Copse, The Shaw, the Lag and The Withy Beds. No breeding individuals of this species were recorded during the 2018 surveys.

4.1.3 Radio-Tracking

Roosts

Barbastelle

4.1.3.1 Six barbastelle roosts were identified during the radiotracking surveys and emergence surveys were undertaken at five of these roosts. Two of these roosts were considered to be maternity roosts, Roost R2 located within Marsh Farm and Roost R3 in an oak tree near the southern boundary of Tortington Common.

Alcathoe Bat

4.1.3.2 Three roosts (R7, R8 & R9) were identified for three individual Alcathoe bats. Two male bats were identified roosting in day roosts and one pregnant female was identified roosting in a maternity roost located in an oak tree in Binsted Woods Complex LWS.

Bechstein's Bat

4.1.3.3 A total of five roosts were identified for Bechstein's bats and six emergence surveys were undertaken at these roosts. Roosts R10 and R11, identified as maternity roosts and were respectively located in an ash tree in Stewards Copse and a sycamore tree in the car park of the White Swan Pub. A peak count of 53 bats was recorded emerging form the Stewards Copse roost.

Daubenton's Bat

4.1.3.4 Three roosts of Daubenton's bats (R15, R16 and R17) were identified during the radio-tracking surveys. All roosts were of adult male bats and considered to be day roosts.

Natterer's Bat

4.1.3.5 Four roosting locations (R18 to R21) used by two Natterer's bats were identified during the 2018 radio-tracking surveys. Of these, two roosts were identified as maternity roosts, Roost R18 in an ash tree and R20 in an oak tree in Binsted Woods Complex LWS. Bat 15 was recorded using three different roosting locations, one in a residential property and the two others at trees in Binsted Woods Complex LWS.

Whiskered Bat

4.1.3.6 Three roosts (R22, R23 and R24) used by bat 3 and bat 20 were identified of which all three were maternity roosts. All roosts were located within residential properties at Tortington Lane near the A27 and on Binsted Lane. Bat 20 was identified roosting at two different residential properties during the radio-tracking surveys.

Brown Long-Eared Bat

4.1.3.7 Three roosts (R25, R26, R27) used by two brown long-eared bats (bat 5 and bat 14) were identified during the 2018 radio-tracking study. Two of these were maternity roosts, one a tree in Stewards Copse R25 with eight bats emerging and the second in a beech tree in Barn's Copse from which 14 bats were observed emerging. Bat 5 was recorded roosting at two different oak trees within Stewards Copse and bat 14 at one roost in Barn's Copse.

4.1.4 Flight Lines

4.1.4.1 Radio-tracking showed bats to fly along narrow strips of woodland (The Shaw east and west), hedgerows (field boundary and road edges) and wet ditches, moving from roosts to foraging areas and be-tween foraging areas. The Shaw has been identified as a commuting feature used by barbastelle, Alcathoe bat, whiskered bat, Natterer's bat and brown long-eared bat.

4.1.4.2 Flight lines were identified for 15 bats of six species as follows (See **Figures 3.2 – 3.7 in Appendix C)**:

Barbastelle

4.1.4.3 Flight lines were identified for six barbastelles; bat 7, bat 10, bat 16, bat 23, bat 28 and bat 30. Lake Copse and The Shaw (west and east), and two narrow woodland strips south of Spinningwheel Copse, were used by barbastelle to commute to and from the main woodland block of Binsted Woods Complex LWS and Spinningwheel Copse towards the fields to the south. Bat 7, bat 16, bat 23 and bat 28 were recorded using these woodland strips to commute north and south. Other barbastelle flight lines were identified along hedge lines and wet ditches (bat 7 flying south from Tortington Common towards fields south of this woodland, bat 10 flying from the roost towards the Arundel-Ford-Barnham railway line, bat 23 flying between Tortington Common and Meadow Lodge and bat 30 flying from Manor House towards Binsted Woods Complex LWS).

Alcathoe Bat

4.1.4.4 The radio-tracking study identified flight lines for three Alcathoe bats; bat 1, bat 6 and bat 9. Bats 1 and 9 were recorded commuting north-south along The Shaw between Binsted Woods Complex LWS north of Binsted Manor and Lake Copse. Bat 6 was also recorded using the wet ditches within Tortington Com-mon to commute south from its roost in Steward's Copse.

Bechstein's Bat

4.1.4.5 Bat 18 was shown to use the hedgerow network south of Tortington Common to commute south and west towards Lake Copse. This bat was also recorded using the hedge line running along Tortington Lane to commute between Tortington village and Slate Barn Farm.

Whiskered Bat

4.1.4.6 Bat 3 was recorded commuting south from Spinningwheel Copse along The Shaw (east) towards Lake Copse. Other flight lines recorded for this species followed hedgerows (field boundaries and hedgerows along roads, Tortington Lane).

Natterer's Bat

4.1.4.7 Bat 8 and bat 15 were recorded commuting along The Shaw (west) to and from Binsted Woods Complex LWS / Spinningwheel Copse and Lake Copse. These bats were also recorded using hedgerows along field boundaries to commute south from Tortington Common.

Brown Long-Eared Bat

4.1.4.8 The radio-tracking study identified one flight line for bat 5 commuting between The Shaw and Binsted Woods Complex LWS / Spinningwheel Copse towards Lake Copse.

4.1.5 Foraging Areas

4.1.5.1 Foraging areas were identified as shown in **Table 4-2.**

Barbastelle

4.1.5.2 Radio tagged barbastelle were mainly identified foraging within Binsted Woods Complex LWS, Pinewoods and Tortington Common, with peripheral foraging confirmed as far north at the Whiteways Roundabout (A39/A284) and as far south as Yapton.

Alcathoe Bat and Whiskered Bat

4.1.5.3 Radio tagged Alcathoe bats and whiskered bats were identified foraging extensively in the Field Survey Area, with whiskered bats foraging beyond the Field Survey Area. Core foraging areas for both species were identified within Tortington Common and Binsted Woods Complex LWS, with whiskered bat peripheral foraging areas extending as far south as Ford Aerodrome and as far North as Screens Wood.

Bechstein's Bat

4.1.5.4 The core foraging areas for radio tagged Bechstein's bats were identified over Tortington Common, Steward's Copse, Scotland Barn, woodland west of Manor House and New Barn with peripheral foraging at Binsted Woods Complex LWS, extending south to Tortington Village, west to Walberton Farm and north of Screens Wood.

Daubenton's Bat

4.1.5.5 The core foraging areas for Daubenton's bats were identified within The Waterwoods and Trout Farm area, Swanbourne Lake and east over the wildfowl reserve with peripheral foraging over Water-woods, Cricket Hills Farm, Park Farm, Home Farm and Arundel Park.

Natterer's Bat

4.1.5.6 The core foraging areas for Natterer's bat are spread across an extensive area of Binsted Woods Complex LWS, The Shaw, Tortington Common and Arundel Arboretum. Peripheral foraging extends as far north as Park Farm and south beyond Lake Copse, including the agricultural fields south of the woodland.

Brown Long-Eared Bat

4.1.5.7 The core foraging area for brown long-eared bats was identified around its roosts at Stewards Copse. Peripheral foraging extended north to Tortington Common, Scotland Barn and Park Farm, and across Lake Copse, Spinningwheel Copse, Ash Piece and Pinewoods.

Table 4-2 - Foraging area of bat species

Foraging Area	Barb	Alc	Bech	Natt	Daub	Whisk	BLE
Agricultural fields south of Tortington Common	X	X	X	X		X	
Arundel Arboretum			X	X		X	
Ash Piece	X	X		X		X	X
Avisford Park Golf Course	X		X				
Barn's Copse	X		X				X
Binsted Woods Complex LWS	X	X	X	X	X	X	X
Brickkiln Copse	X			X			X
Fields around Ford village	X		X			X	
Fields around Grove Lodge and Hoe Lane	X	X					
Fields between Barn's Copse and Pedler's Copse	X						X
Fowlers Copse	X			X			
Furzefield Copse	X			X			
Goblestubb's Copse	X			X			
Lake Copse	X	X	X	X		X	X
Little Danes Wood							X
Marsh Farm	X						
Park Farm	X	X	X	X	X	X	X
Paine's Wood	X		X	X			
Pedler's Copse	X			X			X
Pinewoods	X	X	X	X	X	X	X
Rewell Wood	X		X				
Scotland Barn	X	X	X	X		X	X
Screen Woods	X		X		X	X	
Singer's Piece	X	X		X			
Spinningwheel Copse	X			X	X	X	X
Steward's Copse	X	X	X	X		X	X
The Shaw	X	X	X	X		X	X
The Watermeadows	X		X				
The Waterwoods/Trout Farm	X				X		X

Foraging Area	Barb	Alc	Bech	Natt	Daub	Whisk	BLE
The Whity Beds	X		X				
Threecorner Wood							X
Tortington			X			X	
Tortington Common	X	X	X	X	X	X	X
Wildfowl Reserve and Surrounding fields	X				X		
Winchers Copse	X			X	X		

Key: Barb (Barbastelle); Alc (Alcathoe); Bech (Bechstein); (Natt (Natterers); Daub (Daubentons); BLE (Brown Long eared bat).

Appendix A – Trapping Data

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
1	14.5.18	*Pipistrellus pipistrellus*	5	SU 99748 06209	M	Adult	N/A	2	3	29.90	Insects on body
2	14.5.18	*Myotis mystacinus*	7	SU 99260 06257	F	Adult	Pregnant	N/A	5	34.60	Bat 3
3	14.5.18	*Myotis alcathoe*	7	SU 99260 06257	F	Adult	Pregnant	N/A	4	31.74	**Bat 1 - Dropping sample collected**
4	14.5.18	*Myotis mystacinus*	5	SU 99748 06209	F	Adult	Pregnant	N/A	4.5	34.02	**Bat 4 - Dropping sample collected**
5	14.5.18	*Pipistrellus pipistrellus*	5	SU 99748 06209	F	Adult	Non-parous	N/A	4	32.40	
6	14.5.18	*Pipistrellus pygmaeus*	5	SU 99748 06209	M	Adult	N/A	1	3.5	30.50	
7	14.5.18	*Myotis mystacinus*	5	SU 99748 06209	M	Adult	N/A	0	4.5	32.86	
8	14.5.18	*Barbastella barbastellus*	5	SU 99748 06209	M	Adult	N/A	0	7	37.42	Bat 7
9	14.5.18	*Pipistrellus pipistrellus*	5	SU 99748 06209	F	Adult	Pregnant	N/A	5.5	31.50	
10	14.5.18	*Pipistrellus pipistrellus*	5	SU 99748 06209	F	Adult	Pregnant	N/A	4.5	31.30	
11	14.5.18	*Plecotus auritus*	7	SU 99260 06257	M	Adult	N/A	1	7.5	37.78	
12	14.5.18	*Myotis mystacinus*	7	SU 99260 06257	F	Adult	Pregnant	N/A	6	34.05	
13	14.5.18	*Plecotus auritus*	7	SU 99260 06257	M	Adult	N/A	1	8	39.57	
14	14.5.18	*Plecotus auritus*	7	SU 99260 06257	M	Adult	N/A	1	7	38.00	
15	14.5.18	*Myotis bechsteinii*	3	TQ 000433 06957	F	Adult	Non-parous	N/A	9	41.40	Bat 2
16	14.5.18	*Myotis nattereri*	4	TQ 00271 06998	M	Adult	N/A	0	6.2	39.00	
17	14.5.18	*Plecotus auritus*	4	TQ 00271 06998	M	Adult	N/A	0	7.3	38.50	
18	14.5.18	*Plecotus auritus*	4	TQ 00271 06998	F	Adult	Non-parous	N/A	7.9	38.30	Bat 5
19	14.5.18	*Pipistrellus pygmaeus*	3	TQ 00433 06957	M	Adult	N/A	0	3.9	33.00	
20	14.5.18	*Myotis alcathoe*	3	TQ 00433 06957	M	Adult	N/A	0	4	32.00	Bat 6 **- Dropping sample collected**
21	14.5.18	*Pipistrellus pygmaeus*	4	TQ 00271 06998	F	Adult	Non-parous	N/A	5.4	32.00	
22	14.5.18	*Pipistrellus pygmaeus*	4	TQ 00271 06998	M	Adult	N/A	0	4.4	31.70	
23	14.5.18	*Pipistrellus pygmaeus*	1	TQ 00343 06899	M	Adult	N/A	0	4.2	31.00	
24	14.5.18	*Myotis bechsteinii*	4	TQ 00271 06998	F	Adult	Non-parous	N/A	9.2	4..1	
25	14.5.08	*Pipistrellus pygmaeus*	4	TQ 00271 06998	M	Adult	N/A	0	4.1	31.20	
26	15.5.18	*Plecotus auritus*	14	SU 498898 06239	F	Adult	Non-parous	N/A	7	38.80	
27	15.5.18	*Myotis mystacinus*	14	SU 498898 06240	M	Adult	N/A	0	5	34.82	**Dropping sample collected**
28	15.5.18	*Myotis nattereri*	14	SU 498898 06241	M	Adult	N/A	1	8	41.60	Half an ear missing
29	15.5.18	*Plecotus auritus*	14	SU 498898 06242	M	Adult	N/A	0	8	39.22	
30	15.5.18	*Pipistrellus pygmaeus*	15	TQ 500024 06382	M	Adult	N/A	2	5	32.20	

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
31	15.5.18	*Myotis mystacinus*	15	TQ 500024 06383	M	Adult	N/A	0	5	33.74	
32	15.5.18	*Plecotus auritus*	14	SU 498898 06242	F	Adult	Parous	N/A	8.5	39.34	
33	15.5.18	*Myotis mystacinus*	15	TQ 500024 06383	M	Adult	N/A	2	5	34.36	**Dropping sample collected**
34	15.5.18	*Plecotus auritus*	12	SU 99173 06345	F	Adult	Non-parous	N/A	8	38.45	
35	15.5.18	*Barbastella barbastellus*	12	SU 99173 06345	F	Adult	Pregnant	N/A	9	42.17	Bat 10
36	15.5.18	*Myotis alcathoe*	16	SU 99008 05893	M	Adult	N/A	0	4.5	32.50	Bat 9 - **Dropping sample collected**
37	15.5.18	*Pipistrellus pygmaeus*	16	SU 99008 05893	M	Adult	N/A	1	4.5	32.00	Wings type S - Right and left
38	15.5.18	*Myotis mystacinus*	17	SU 98916 06147	F	Adult	Parous	N/A	4.5	36.00	
39	15.5.18	*Pipistrellus pipistrellus*	16	SU 99008 05893	F	Adult	Pregnant	N/A	5.5	31.00	
40	15.5.18	*Plecotus auritus*	18	SU 99382 05926	F	Adult	Pregnant	N/A	7.5	39.00	Tragus 15.00mm x 5.5mm Thumb 7mm
41	15.5.18	*Myotis mystacinus*	17	SU 98916 06147	M	Adult	N/A	0	6	34.00	**Dropping sample collected**
42	15.5.18	*Pipistrellus pygmaeus*	16	SU 99008 05893	M	Adult	N/A	0	4.5	32.00	
43	15.5.18	*Myotis alcathoe*	18	SU 99382 05926	M	Adult	N/A	0	4.5	33.00	**Dropping sample collected**
44	15.5.18	*Plecotus auritus*	18	SU 99382 05926	F	Adult	Pregnant	N/A	7.5	39.00	
45	15.5.18	*Plecotus auritus*	18	SU 99382 05926	F	Adult	Pregnant	N/A	8.5	39.00	
46	15.5.18	*Plecotus auritus*	18	SU 99382 05926	F	Adult	Pregnant	N/A	7	38.00	
47	15.5.18	*Myotis mystacinus*	10	SU 99045 06603	F	Adult	Non-parous	N/A	5.6	35.90	**Dropping sample collected**
48	15.5.18	*Pipistrellus pygmaeus*	12	SU 99173 06345	M	Adult	N/A	0	4.3	31.60	
49	15.5.18	*Plecotus auritus*	10	SU 99045 06603	F	Adult	Non-parous	N/A	7.3	40.00	
50	15.5.18	*Myotis nattereri*	10	SU 99045 06603	F	Adult	Pregnant	N/A	9.1	39.90	Bat 8
51	15.5.18	*Myotis mystacinus*	10	SU 99045 06603	M	Adult	N/A	0	3.6	33.40	**Dropping sample collected**
52	15.5.18	*Plecotus auritus*	11	SU 99166 06479	F	Adult	Pregnant	N/A	8.5	41.50	
53	15.5.18	*Plecotus auritus*	12	SU 99173 06345	M	Adult	N/A	0	6.9	38.00	
54	15.5.18	*Myotis mystacinus*	10	SU 99045 06603	M	Adult	N/A	0	4.7	34.20	**Dropping sample collected**
55	15.5.18	*Plecotus auritus*	10	SU 99045 06603	F	Adult	Non-parous	N/A	7.1	39.80	
56	15.5.18	*Plecotus auritus*	10	SU 99045 06603	M	Adult	N/A	0	6.9	37.80	
57	16.5.18	*Plecotus auritus*	21	SU 97683 06822	F	Adult	Non-parous	N/A	7.4	39.30	
58	16.5.18	*Plecotus auritus*	21	SU 97683 06822	M	Adult	N/A	0	6.1	38.90	
59	16.5.18	*Pipistrellus pipistrellus*	20	SU 97813 06815	F	Adult	Non-parous	N/A	4.5	32.70	
60	16.5.18	*Plecotus auritus*	21	SU 97683 06822	F	Adult	Non-parous	N/A	7.5	39.50	

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
61	16.5.18	*Pipistrellus pipistrellus*	21	SU 97683 06822	M	Adult	N/A	0	4.4	31.80	
62	16.5.18	*Pipistrellus pygmaeus*	21	SU 97683 06822	F	Adult	Non-parous	N/A	4.4	32.50	
63	16.5.18	*Myotis nattereri*	21	SU 97683 06822	M	Adult	N/A	0	6.8	37.10	
64	16.5.18	*Plecotus auritus*	21	SU 97683 06822	M	Adult	N/A	0	6.5	36.40	
65	16.5.18	*Pipistrellus pygmaeus*	20	SU 97813 06815	M	Adult	N/A	0	4.3	30.20	
66	16.5.18	*Plecotus auritus*	19	SU 97942 06974	M	Adult	N/A	0	6.8	38.30	
67	16.5.18	*Myotis alcathoe*	21	SU 97683 06822	M	Adult	N/A	0	3.6	31.60	
68	16.5.18	*Plecotus auritus*	20	SU 97813 06815	M	Adult	N/A	0	6	38.90	
69	16.5.18	*Myotis alcathoe*	20	SU 97813 06815	M	Adult	N/A	0	4.2	31.40	
70	16.5.18	*Myotis alcathoe*~~*Myotis sp. (Small myotis)*~~	20	SU 97813 06815	F	Adult	Non-parous	N/A	5.8	33.20	
71	16.5.18	*Plecotus auritus*	20	SU 97813 06815	F	Adult	Non-parous	N/A	7.4	40.00	
72	16.5.18	*Myotis mystacinus*	25	TQ 500108 05218	M	Adult	N/A	0	5	35.00	**Dropping sample collected**
73	16.5.18	*Pipistrellus pipistrellus*	25	TQ 500108 05219	F	Adult	Pregnant	N/A	NR	NR	Bracing let go
74	16.5.18	*Myotis nattereri*	26	TQ 500064 05154	M	Adult	N/A	1	8	41.00	
75	16.5.18	*Pipistrellus pipistrellus*	27	TQ 500616 05874	F	Adult	Pregnant	N/A	5.5	31.00	Wings type C - left and right
76	16.5.18	*Pipistrellus pygmaeus*	27	TQ 500616 05875	F	Adult	Pregnant	N/A	5	31.50	Wings Type S - left and right
77	16.5.18	*Pipistrellus pygmaeus*	27	TQ 500616 05876	F	Adult	Pregnant	N/A	5	31.50	Wings Type S - left and right
78	16.5.18	*Pipistrellus pygmaeus*	27	TQ 500616 05877	F	Adult	Pregnant	N/A	4	33.00	Wings Type S - left and right
79	16.5.18	*Myotis mystacinus*	27	TQ 500616 05878	F	Adult	Non-parous	N/A	6	35.00	**Dropping sample collected**
80	16.5.18	*Myotis daubentonii*	27	TQ 500616 05879	M	Adult	N/A	1	10.5	35.00	
81	16.5.18	*Myotis mystacinus*	27	TQ 500616 05880	F	Adult	Parous	N/A	6	33.50	**Dropping sample collected**
82	16.5.18	*Myotis daubentonii*	27	TQ 500616 05881	M	Adult	N/A	1	8.5	38.50	
83	16.5.18	*Pipistrellus pipistrellus*	25	TQ 500108 05219	F	Adult	Pregnant	N/A	7.5	31.00	Wings type C - left and right
84	16.5.18	*Pipistrellus pygmaeus*	26	TQ 500064 05154	F	Adult	Pregnant	N/A	5	32.50	Wings Type S - left and right
85	16.5.18	*Pipistrellus pipistrellus*	23	SU 98032 06077	M	Adult	N/A	0	4	31.50	Mites
86	16.5.18	*Pipistrellus pipistrellus*	23	SU 98032 06077	F	Adult	Pregnant	N/A	5	32.00	
87	16.5.18	*Pipistrellus pipistrellus*	24	SU 98088 05973	F	Adult	Pregnant	N/A	5	32.72	
88	16.5.18	*Myotis mystacinus*	23	SU 98032 06077	M	Adult	N/A	0	5	33.43	
89	16.5.18	*Pipistrellus pipistrellus*	23	SU 98032 06077	F	Adult	Pregnant	N/A	5	32.04	

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
90	16.5.18	*Pipistrellus pipistrellus*	23	SU 98032 06077	F	Adult	Pregnant	N/A	4	32.60	
91	16.5.18	*Pipistrellus pygmaeus*	23	SU 98032 06077	F	Adult	Pregnant	N/A	4	34.20	
92	16.5.18	*Pipistrellus pipistrellus*	23	SU 98032 06077	M	Adult	N/A	1	4	31.61	
93	16.5.18	*Pipistrellus pipistrellus*	23	SU 98032 06077	F	Adult	Pregnant	N/A	6	36.10	
94	16.5.18	*Pipistrellus pipistrellus*	23	SU 98032 06077	F	Adult	Pregnant	N/A	5	32.50	
95	17.5.18	*Pipistrellus pipistrellus*	33	TQ 00538 07956	M	Adult	N/A	1	5	30.40	
96	17.5.18	*Pipistrellus pipistrellus*	33	TQ 00538 07956	F	Adult	Pregnant	N/A	5.5	33.03	
97	17.5.18	*Pipistrellus pygmaeus*	17	SU 498920 06165	M	Adult	N/A	0	5	31.00	
98	17.5.18	*Pipistrellus pipistrellus*	34	TQ 500538 07956	M	Adult	N/A	0	4	30.00	
99	17.5.18	*Pipistrellus pygmaeus*	28	TQ 00948 07466	F	Adult	Non-parous	N/A	4.7	32.00	
100	17.5.18	NO ID	29	TQ 00991 07409	N/A	N/A	N/A	N/A	N/A	N/A	Bat was on lower rail of trap when surveyor approached. It flew off before capture . Likely a Natterer's bat
101	16.07.18	*Myotis nattereri*	19	SU 98290 07107	M	Juvenile	N/A	0	7.5	37.5	
102	16.07.18	*Plecotus auritus*	20	SU 97766 06726	F	Adult	Lactating	N/A	8.5	36.7	
103	16.07.18	*Plecotus auritus*	21	SU 97728 06638	F	Adult	Lactating	N/A	8.5	37	
104	16.07.18	*Myotis mystacinus*	19	SU 98290 07107	F	Adult	Lactating	N/A	5.5	35	
105	16.07.18	*Plecotus auritus*	21	SU 97728 06638	F	Juvenile	N/A	N/A	8.5	38.55	
106	16.07.18	*Pipistrellus pipistrellus*	21	SU 97728 06638	M	Juvenile	N/A	0	4.5	30.1	
107	16.07.18	*Myotis mystacinus*	24	SU 79684 84540	M	Adult	N/A	1	6	35	
108	16.07.18	*Myotis bechsteinii*	~~17~~4	TQ 00405 06861~~TQ 00273 06997~~	M	Juvenile	N/A	N/A	7.5	41.2	Bat 11
109	16.07.18	*Plecotus auritus*	~~8~~2	TQ 00405 06861~~TQ00379 06851~~	M	Adult	N/A	0	8.1	39.2	
110	16.07.18	*Plecotus auritus*	~~8~~2	TQ 00405 06861~~TQ00379 06851~~	M	Adult	N/A	0	8.3	37.6	Small hole in right membrane
111	16.07.18	*Myotis bechsteinii*	~~8~~2	TQ 00405 06861~~TQ00379 06851~~	M	Juvenile	N/A	N/A	7.9	40.7	
112	16.07.18	*Myotis bechsteinii*	~~9~~3	TQ 00343 06899~~TQ 00433 06957~~	F	Adult	Post-lactating	N/A	9.9	42.3	Bat 12
113	16.07.18	*Plecotus auritus*	~~7~~1	TQ 00343 06899~~TQ00289 06937~~	M	Adult	N/A	0	14.6	39.5	
114	16.07.18	*Plecotus auritus*	~~7~~1	TQ 00343 06899~~TQ00289 06938~~	F	Adult	Lactating	N/A	9	40.5	
115	16.07.18	*Plecotus auritus*	~~7~~1	TQ 00343 06899~~TQ00289 06939~~	F	Adult	Lactating	N/A	9.5	39.8	

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
116	16.07.18	*Plecotus auritus*	~~7~~1	TQ 00343 06899~~TQ00289 06940~~	F	Adult	Lactating	N/A	8.4	39.9	
117	16.07.18	*Plecotus auritus*	~~7~~1	TQ 00343 06899~~TQ00289 06941~~	F	Adult	Lactating	N/A	8.8	40.5	
118	16.07.18	*Plecotus auritus*	~~7~~1	TQ 00343 06899~~TQ00289 06942~~	F	Adult	Lactating	N/A	8.6	40.5	
119	16.07.18	*Myotis bechsteinii*	~~7~~1	TQ 00343 06899~~TQ00289 06943~~	M	Adult	N/A	0	9.2	41.6	
120	16.07.18	*Myotis mystacinus*	~~9~~3	TQ 00433 06957	F	Adult	Lactating	N/A	5.5	35	**Dropping sample collected**
121	16.07.18	*Plecotus auritus*	~~8~~2	TQ 00405 06861~~TQ00379 06851~~	M	Adult	N/A	0	13.5	39	
122	16.07.18	*Plecotus auritus*	~~7~~1	TQ 00343 06899~~TQ00289 06943~~	F	Adult	Lactating	N/A	9.2	38.3	Bat 14
123	16.07.18	*Pipistrellus pygmaeus*	1~~7~~	TQ 00343 06899~~TQ00289 06944~~	M	Adult	N/A	0	4.5	N/R	
124	16.07.18	*Myotis bechsteinii*	~~8~~2	TQ 00405 06861~~TQ00379 06851~~	F	Adult	Not Lactating	N/A	11.1	41.8	
125	16.07.18	*Myotis bechsteinii*	~~8~~2	TQ 00405 06861~~TQ00379 06852~~	F	Adult	Not Lactating	N/A	10.4	43	
126	16.07.18	*Myotis bechsteinii*	~~8~~2	TQ 00405 06861~~TQ00379 06853~~	F	Adult	Lactating	N/A	9.4	41.4	
127	16.07.18	*Myotis bechsteinii*	~~9~~3	TQ 00433 06957	F	Adult	Not Lactating	N/A	10.7	43.1	
128	16.07.18	*Myotis bechsteinii*	~~9~~3	TQ 0043306957	F	Adult	Lactating	N/A	10.6	43.3	
129	17.07.18	*Myotis bechsteinii*	36	SU 99575 07000	M	Juvenile	N/A	N/A	7	40.75	
130	17.07.18	*Myotis mystacinus*	~~38~~36	SU 99575 07000 ~~SU 99694 07078~~	M	N/R	N/A	N/A	5	33.6	**Dropping sample collected**
131	17.07.18	*Plecotus auritus*	36	SU 99575 07000	M	Juvenile	N/A	N/A	8.5	37.2	
132	17.07.18	*Myotis nattereri*	37	SU 99667 06963	M	Juvenile	N/A	N/A	6.5	37.1	
133	17.07.18	*Plecotus auritus*	36	SU 99575 07000	M	Adult	NR	0.5	8	36.8	Tragus 0.5, thumb 0.7
134	17.07.18	*Myotis bechsteinii*	~~23~~7	SU 99667 06963	M	Juvenile	N/A	N/A	7	39.9	
135	17.07.18	*Pipistrellus pipistrellus*	38	SU99694 07078	M	Juvenile	N/A	N/A	5.5	31.4	
136	17.07.18	*Myotis* sp. (Small Myotis)	36	SU 99575 07000	F	N/R	N/A	N/A	6	34.4	
137	17.07.18	*Pipistrellus pipistrellus*	18	SU 99145 05775	F	Juvenile	N/A	N/A	4	33	
138	17.07.18	*Myotis nattereri*	18	SU 99145 05775	M	Adult	N/A	1	7.5	37	
139	17.07.18	*Myotis nattereri*	16	SU 99194 05641	M	Adult	N/A	0	8	40	
140	17.07.18	*Pipistrellus pipistrellus*	18	SU 99145 05775	F	Juvenile	N/A	N/A	6	32	
141	17.07.18	*Nyctalus noctula*	16	SU 99194 05641	M	Adult	N/A	2	28	54.5	Bat too heavy – weighed in plastic sleeve

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
142	17.07.18	*Pipistrellus pygmaeus*	18	SU 99145 05775	M	Adult	N/A	2	3.5	30.5	
143	17.07.18	*Plecotus auritus*	5	SU 99251 06263	M	Adult	N/A	0	7.8	36.3	
144	17.07.18	*Myotis nattereri*	5	SU 99251 06263	M	Adult	N/A	0	7.2	39.4	
145	17.07.18	*Plecotus auritus*	5	SU 99251 06263	M	Adult	N/A	0	9.5	38.7	
146	17.07.18	*Myotis nattereri*	5	SU 99251 06263	F	Adult	Lactating	N/A	7.7	29.2	Bat 15
147	17.07.18	*Plecotus auritus*	5	SU98931 06360	M	Adult	N/A	0	8.2	37.5	
148	17.07.18	*Plecotus auritus*	14	SU98931 06360	F	Adult	Lactating	N/A	8.4	38.9	
149	17.07.18	*Barbastella barbastellus*	8	SU 99173 06345	F	Adult	Post-lactating	N/A	9.9	39.4	Bat 16
150	17.07.18	*Plecotus auritus*	8	SU 99173 06345	M	Adult	N/A	0	8.6	38.5	
151	17.07.18	*Myotis nattereri*	5	SU 99251 06263	F	Adult	Lactating	N/A	8	40.1	
152	17.07.18	*Myotis mystacinus*	14	SU98931 06360	F	Adult	Post-lactating	N/A	5.1	34.8	Bat 17
153	17.07.18	*Plecotus auritus*	14	SU98931 06360	M	Adult	N/A	0	7.7	37.2	
154	17.07.18	*Plecotus auritus*	17	SU98929 06273	M	Adult	N/A	0	8.1	37.7	
155	17.07.18	*Plecotus auritus*	5	SU 99251 06263	F	Adult	Lactating	N/A	9	29.8	
156	18.07.18	*Plecotus auritus*	28	TQ 00929 07466	F	Juvenile	Non-parous	N/A	7.5	36.8	
157	18.07.18	*Pipistrellus pipistrellus*	32	TQ 00623 07749	F	Juvenile	Non-parous	N/A	5	31.3	
158	18.07.18	*Pipistrellus pipistrellus*	32	TQ00623 07749	M	Adult	N/A	1	5.5	31.4	
159	18.07.18	*Pipistrellus pygmaeus*	32	TQ00623 07749	M	Juvenile	N/A	0	5	30.7	
160	18.07.18	*Plecotus auritus*	28	TQ0092907466	M	Adult	N/A	1	8.5	37.08	
161	18.07.18	*Myotis daubentonii*	28	TQ 00929 07466	M	NR	N/A	N/A		37.6	Bat 19
162	18.07.18	*Pipistrellus pipistrellus*	26	TQ 00059 05175	F	Juvenile	Non-parous	N/A	5	34	
163	18.07.18	*Pipistrellus pipistrellus*	26	TQ 00059 05175	F	Adult	Parous	N/A	4.5	32	
164	18.07.18	*Pipistrellus pygmaeus*	26	TQ 00059 05175	F	Adult	Lactating	N/A	5	32	
165	18.07.18	*Pipistrellus pygmaeus*	25	TQ 00104 05238	F	Adult	Lactating	N/A	5	32	
166	18.07.18	*Pipistrellus pygmaeus*	25	TQ 00104 05238	M	Adult	N/A	2	4	30.5	
167	18.07.18	*Pipistrellus pygmaeus*	25	TQ 00104 05238	M	Adult	N/A	1	4.5	31	
168	18.07.18	*Pipistrellus pygmaeus*	25	TQ 00104 05238	M	Adult	N/A	2	5	30	
169	18.07.18	*Pipistrellus pygmaeus*	25	TQ 00104 05238	F	Adult	Parous	N/A	9.5	43	
170	18.07.18	*Myotis bechsteinii*	25	TQ 00104 05238	F	Adult	Parous	N/A	12	42.5	Bat 18
171	18.07.18	*Pipistrellus pygmaeus*	25	TQ 00104 05238	F	Adult	Lactating	N/A	6	31.5	

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
172	18.07.18	*Pipistrellus pygmaeus*	25	TQ 00104 05238	F	Juvenile	Non-parous	N/A	5.5	31.3	
173	18.07.18	*Pipistrellus pygmaeus*	26	TQ 00059 05175	F	Adult	Non-parous	N/A	5.5	32	
174	18.07.18	*Plecotus auritus*	~~39~~38	SU 99694 07078~~SU 99901 06377~~	F	Adult	Lactating	N/A	8	39.4	
175	18.07.18	*Myotis mystacinus*	~~39~~38	SU 99694 07078~~SU 99901 06377~~	M	Juvenile	N/A	N/A	4.4	33.8	
176	18.07.18	*Plecotus auritus*	~~39~~38	SU 99694 07078~~SU 99901 06377~~	F	Adult	Not Lactating	N/A	8.5	37.5	
177	18.07.18	*Plecotus auritus*	~~39~~38	SU 99694 07078~~SU 99901 06377~~	M	Adult	N/A	0	8	39.8	
178	18.07.18	*Myotis bechsteinii*	7	SU 99887 06151	M	Juvenile	N/A	N/A	7.6	40.8	
179	18.07.18	*Pipistrellus pipistrellus*	7	SU 99887 06151	M	Adult	N/A	2	5	32.1	
180	18.07.18	*Myotis Sp. (Small Myotis)~~Myotis mystacinus~~*	~~39~~38	SU 99694 07078~~SU 99901 06377~~	F	Adult	Post-lactating	N/A	5.3	34.3	
181	18.07.18	*Myotis bechsteinii*	7	SU 99887 06151	M	Juvenile	N/A	N/A	7.8	41.2	
182	18.07.18	*Myotis Sp. (Small Myotis)*	~~39~~38	SU 99694 07078~~SU 99901 06377~~	F	Adult	Lactating	N/A	6.4	34.6	
183	18.07.18	*Myotis Sp. (Small Myotis)~~Myotis mystacinus~~*	~~40~~39	SU 99928 06469	F	Juvenile	N/A	N/A	5.5	35.6	
184	18.07.18	*Plecotus auritus*	~~40~~39	SU 99928 06469	M	Adult	N/A	0	8.2	40.1	
185	18.07.18	*Plecotus auritus*	6	SU 99886 062550	M	Adult	N/A	0	9.8	39.2	
186	18.07.18	*Plecotus auritus*	6	SU 99886 062550	F	Adult	Lactating	N/A	8.9	38.3	
187	20.08.18	*Myotis bechsteinii*	5	SU 99256 06264	M	Juvenile	N/A	N/A	8.5	8.5	
188	20.08.18	*Myotis mystacinus*	5	SU 99256 06264	F	Adult	Post-lactating	N/A	5.5	5.5	**Bat 20~~Dropping sample taken~~**
189	20.08.18	*Myotis nattereri*	14	SU 98909 06459	M	Adult	N/A	0	7.5	7.5	
190	20.08.18	*Pipistrellus pygmaeus*	14	SU 98909 06459	M	Juvenile	N/A	N/A	4.6	4.6	
191	20.08.18	*Pipistrellus pygmaeus*	14	SU 98909 06459	F	Juvenile	N/A	N/A	5.5	5.5	
192	21.08.18	*Pipistrellus pipistrellus*	17	SU 98909 06292	M	Juvenile	N/A	N/A	4.9	4.9	
193	21.08.18	*Myotis nattereri*	17	SU 98909 06292	M	Adult	N/A	1	5.6	5.6	
194	21.08.18	*Plecotus auritus*	14	SU 98909 06459	M	Juvenile	N/A	N/A	6.1	6.1	
195	21.08.18	*Nyctalus noctula*	8	SU 99176 06345	F	Juvenile	N/A	N/A	25.8	25.8	
196	21.08.18	*Pipistrellus pygmaeus*	8	SU 99176 06345	F	Adult	Non-parous	N/A	5	5	
197	21.08.18	*Plecotus auritus*	8	SU 99176 06345	M	Juvenile	N/A	N/A	7.4	7.4	
198	20.08.18	*Myotis nattereri*	21	SU 97835 06574	F	Immature	Non-parous	N/A	7	7	Mites

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
199	20.08.18	*Pipistrellus pipistrellus*	21	SU 97835 06574	M	Immature	N/A	1	5.5	5.5	
200	21.08.18	*Pipistrellus pygmaeus*	21	SU 97835 06574	F	Juvenile	Non-parous	N/A	5.5	5.5	
201	20.08.18	*Pipistrellus pygmaeus*	24	SU 98109 05934	F	Adult	Parous	N/A	5	5	
202	20.08.18	*Myotis mystacinus*	23	SU 97832 06490	F	Adult	Non-parous	N/A	6	6	Tick
203	21.08.18	*Plecotus auritus*	4	TQ 00322 06941	M	Juvenile	N/A	N/A	6.4	6.4	Mites
204	21.08.18	*Myotis bechsteinii*	4	TQ 00322 06941	M	Adult	N/A	0	8.5	8.5	
205	21.08.18	*Myotis bechsteinii*	1	TQ 00359 06889	F	Adult	Non-parous	N/A	8.5	8.5	Bat 21 - Tagged # 2484, Hole in wing membrane
206	22.08.18	*Myotis nattereri*	4	TQ 00322 06941	M	Juvenile	N/A	N/A	7.3	7.3	
207	22.08.18	*Pipistrellus pygmaeus*	2	TQ00379 06851	F	Juvenile	N/A	N/A	5.5	5.5	
208	22.08.18	*Myotis mystacinus*	3	TQ 00396 06955	M	Juvenile	N/A	N/A	4.4	4.4	
209	22.08.18	*Myotis mystacinus*	2	TQ00379 06851	F	Juvenile	N/A	N/A	5	5	
210	21.08.18	*Pipistrellus pipistrellus*	35	SU 99558 06996	M	Immature	N/A	0	4.5	4.5	
211	21.08.18	*Pipistrellus pipistrellus*	35	SU 99558 06996	F	Immature	Non-parous	N/A	5	5	Mites
212	21.08.18	*Pipistrellus pipistrellus*	35	SU 99558 06996	M	Juvenile	N/A	0	4	4	
213	22.08.18	*Myotis mystacinus*	37	SU 99890 07068	F	Adult	Post-lactating	N/A	6.5	6.5	**Dropping sample collected**
214	21.08.18	*Pipistrellus pygmaeus*	27	TQ 00599 05854	F	Adult	Parous	N/A	6.5	6.5	
215	21.08.18	*Pipistrellus pygmaeus*	27	TQ 00599 05854	F	Adult	Non-parous	N/A	4.5	4.5	
216	21.08.18	*Nyctalus noctula*	25	TQ 0026 05237	M	Adult	N/A	0	N/A	N/A	Black swollen epidermis, missing claw on right foot. Too heavy to use scales.
217	21.08.18	*Nyctalus noctula*	25	TQ 0026 05237	F	Adult	Non-parous	N/A	N/A	N/A	Too heavy for scales
218	21.08.18	*Pipistrellus pygmaeus*	27	TQ 00599 05854	F	Adult	Non-parous	N/A	5.5	5.5	
219	21.08.18	*Pipistrellus pygmaeus*	27	TQ 00599 05854	M	Adult	N/A	0	5	5	
220	21.08.18	*Myotis mystacinus*	27	TQ 00599 05854	F	Adult	Non-parous	N/A	4.5	4.5	
221	22.08.18	*Myotis bechsteinii*	6	SU 99894 06158	M	Juvenile	N/A	N/A	7.5	7.5	
222	22.08.18	*Plecotus auritus*	39	SU 99725 06205	M	Adult	N/A	0	8.3	8.3	
223	22.08.18	*Plecotus auritus*	7	SU 99591 06202	M	Juvenile	N/A	N/A	7.7	7.7	
224	23.08.18	*Pipistrellus pygmaeus*	6	SU 99894 06158	M	Juvenile	N/A	N/A	4.1	4.1	
225	23.08.18	*Pipistrellus pygmaeus*	13	SU 99246 06138	M	Juvenile	N/A	N/A	4.4	4.4	
226	23.08.18	*Pipistrellus pygmaeus*	13	SU 99246 06138	F	Juvenile	N/A	N/A	4.9	4.9	
227	23.08.18	*Pipistrellus pygmaeus*	13	SU 99246 06138	F	Adult	Non-parous	N/A	4.7	4.7	

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
228	23.08.18	*Pipistrellus pygmaeus*	13	SU 99246 06138	M	Juvenile	N/A	N/A	4.1	4.1	
229	23.08.18	*Barbastella barbastellus*	39	SU 99725 06205	F	Adult	Non-parous	N/A	9.1	9.1	Bat 23 - Ring NO H2765 on right forearm. RT tag .7925
230	22.08.18	*Pipistrellus nathusii*	30	TQ 01002 67385	M	Adult	N/A	2	4.5	4.5	
231	22.08.18	*Pipistrellus pygmaeus*	30	TQ 01002 67385	F	Juvenile	Non-parous	N/A	6	6	
232	22.08.18	*Pipistrellus pygmaeus*	30	TQ 01002 67385	F	Immature	Non-parous	N/A	5	5	Small tear in left wing
233	22.08.18	*Pipistrellus pipistrellus*	30	TQ 01002 67385	M	Juvenile	N/A	0	5	5	
234	22.08.18	*Pipistrellus pygmaeus*	30	TQ 01002 67385	F	IMM	Non-parous	N/A	5.5	5.5	
235	22.08.18	*Myotis daubentonii*	30	TQ 01002 67385	M	Adult	N/A	1	7.5	7.5	Tag 2910
236	23.08.18	*Pipistrellus pygmaeus*	30	TQ 01002 67385	M	Adult	N/A	2	4	4	
237	23.08.18	*Pipistrellus pygmaeus*	30	TQ 01002 67385	F	Immature	Non-parous	N/A	5.5	5.5	
238	23.08.18	*Pipistrellus pygmaeus*	30	TQ 01002 67385	M	Juvenile	N/A	1	4.5	4.5	
239	23.08.18	*Pipistrellus pygmaeus*	30	TQ 01002 67385	F	Immature	Non-parous	N/A	5	5	
240	22.08.18	*Pipistrellus pygmaeus*	18	SU 99374 06015	F	Adult	Non-parous	N/A	6	6	
241	22.08.18	*Pipistrellus pygmaeus*	18	SU 99374 06015	M	Adult	N/A	1	4.5	4.5	
242	22.08.18	*Pipistrellus pygmaeus*	18	SU 99374 06015	M	Adult	N/A	0	5	5	
243	22.08.18	*Nyctalus noctula*	18	SU 99374 06015	F	Adult	Parous	N/A	26.5	26.5	
244	22.08.18	*Pipistrellus pygmaeus*	18	SU 99374 06015	M	Adult	N/A	0	4.5	4.5	
245	23.08.18	*Pipistrellus pygmaeus*	18	SU 99374 06015	N/R	Adult	N/R	N/R	4.5	4.5	Released early due to stress
246	23.08.18	*Pipistrellus pygmaeus*	18	SU 99374 06015	F	Adult	Non-parous	N/A	5.5	5.5	
247	10.09.18	*Myotis nattereri*	6	SU 99676 06231	M	Adult	N/A	2	9.5	39.65	
248	10.09.18	*Myotis alcathoe*	6	SU 99676 06231	M	Juvenile	N/A	N/A	4.5	32	Bat 24
249	10.09.18	*Myotis bechsteinii*	7	SU 99504, 06201	F	Juvenile	Non-parous	N/A	9.5	42.45	Bat 25
250	10.09.18	*Myotis mystacinus*	7	SU 99504, 06201	F	Adult	Parous	N/A	5	34.3	Bat 26
251	10.09.18	*Plecotus auritus*	7	SU 99504, 06201	M	Adult	N/A	2	7	37	
252	10.09.18	*Plecotus auritus*	6	SU 99676 06231	M	Adult	N/A	0	7	39..4	
253	10.09.18	*Plecotus auritus*	6	SU 99676 06231	F	Adult	Non-parous	N/A	7.5	39.1	
254	10.09.18	*Barbastella barbastellus*	7	SU 99504, 06201	F	Adult	Parous	N/A	8.5	39.5	Bat 27
255	10.09.18	*Barbastella barbastellus*	14	SU 98928 06346	M	Adult	N/A	1 - 2…	8.5	38.2	Bat 28
256	11.09.18	*Myotis nattereri*	~~14~~21	SU 97683 06822~~SU 98928 06346~~	F	Adult	Parous	N/A	8	37.3	

Bat No	Date	Species	Trap No	Grid reference	Sex	Age	Breeding Status	Testes Size	Weight	Forearm	Notes
257	11.09.18	*Myotis nattereri*	~~6~~19	SU 97942 06974~~SU 99676 06231~~	F	Adult	Non-parous	N/A	7	36.9	Bat 29
258	11.09.18	*Barbastella barbastellus*	7	SU 99504, 06201	M	Adult	N/A	1	8.5	39.5	Bat 30
259	11.09.18	*Pipistrellus pygmaeus*	~~14~~21	SU 97683 06822~~SU 98928 06346~~	M	Adult	N/A	0	4.25	30.5	
260	11.09.18	*Pipistrellus pygmaeus*	~~6~~19	SU 97942 06974~~SU 97949 06903~~	F	Adult	Non-parous	N/A	5.5	23	
261	12.09.18	*Barbastella barbastellus*	~~6~~19	SU 97942 06974~~SU 97949 06903~~	M	Juvenile	N/A	1	7.5	26.5	Ring attached H2783
262	12.09.18	*Myotis alcathoe*	20	SU 97813 06815~~SU 99215 06255~~	F	Adult	Post-lactating	N/A	4.25	22	
263	11.09.18	*Pipistrellus pipistrellus*	2	TQ 00437 06999	M	Adult	N/A	2	5.5	32	
264	11.09.18	*Plecotus auritus*	4	TQ 00249 07121	M	Immature	N/A	0	7.5	37.6	
265	11.09.18	*Pipistrellus pygmaeus*	2	TQ 00437 06999	M	Immature	N/A	0	4	30.2	
266	11.09.18	*Myotis bechsteinii*	1	TQ 00297 07066	F	Adult	Parous	N/A	8.25	41.7	Bat 31
267	11.09.18	*Myotis mystacinus*	3	TQ 00357 07007	M	Immature	N/A	0	4.75	33.7	
268	11.09.18	*Pipistrellus pipistrellus*	2	TQ 00437 06999	M	Immature	N/A	0	5	31.5	
269	12.09.18	*Barbastella barbastellus*	4	TQ 00249 07121	F	Adult	Post-lactating	N/A	8.25	39.1	Existing ring H4449
270	12.09.18	*Plecotus auritus*	~~25~~1	TQ 00343 06899~~TQ 00297 07066~~	F	Adult	Post-lactating	N/A	8.7	41.7	
271	12.09.18	*Pipistrellus pipistrellus*	2	TQ 00437 06999	M	Juvenile	N/A	0	4.5	30.9	
272	12.09.18	*Pipistrellus pygmaeus*	27	TQ 00599 05854	F	Immature	Non-parous	N/A	4.5	30.2	
273	12.09.18	*Myotis mystacinus*	26	TQ 00026 05083	F	Juvenile	Non-parous	N/A	4	34.5	~~**Droppings sample taken**~~
274	13.09.18	*Plecotus auritus*	26	TQ 00026 05083	M	Adult	N/A	1	8.25	41.2	
275	12.09.18	*Myotis mystacinus*	17	SU 99064 05843	M	Adult	N/A	0	4.3	33.25	Very dark
276	12.09.18	*Pipistrellus pygmaeus*	16	SU 99153 05753	M	Adult	N/A	0	5.1	32.1	Large dark epidermis
277	12.09.18	*Pipistrellus pygmaeus*	18	SU 99216 05737	N/A	N/A	N/A	N/A	N/A	N/A	Bat escaped
278	12.09.18	*Pipistrellus pipistrellus*	16	SU 99153 05753	F	Adult	Parous	N/A	6.7	33.5	
279	12.09.18	*Myotis nattereri*	17	SU 99064 05843	M	Adult	N/A	1	7.5	39.9	

Appendix B – Radio Tagging Data

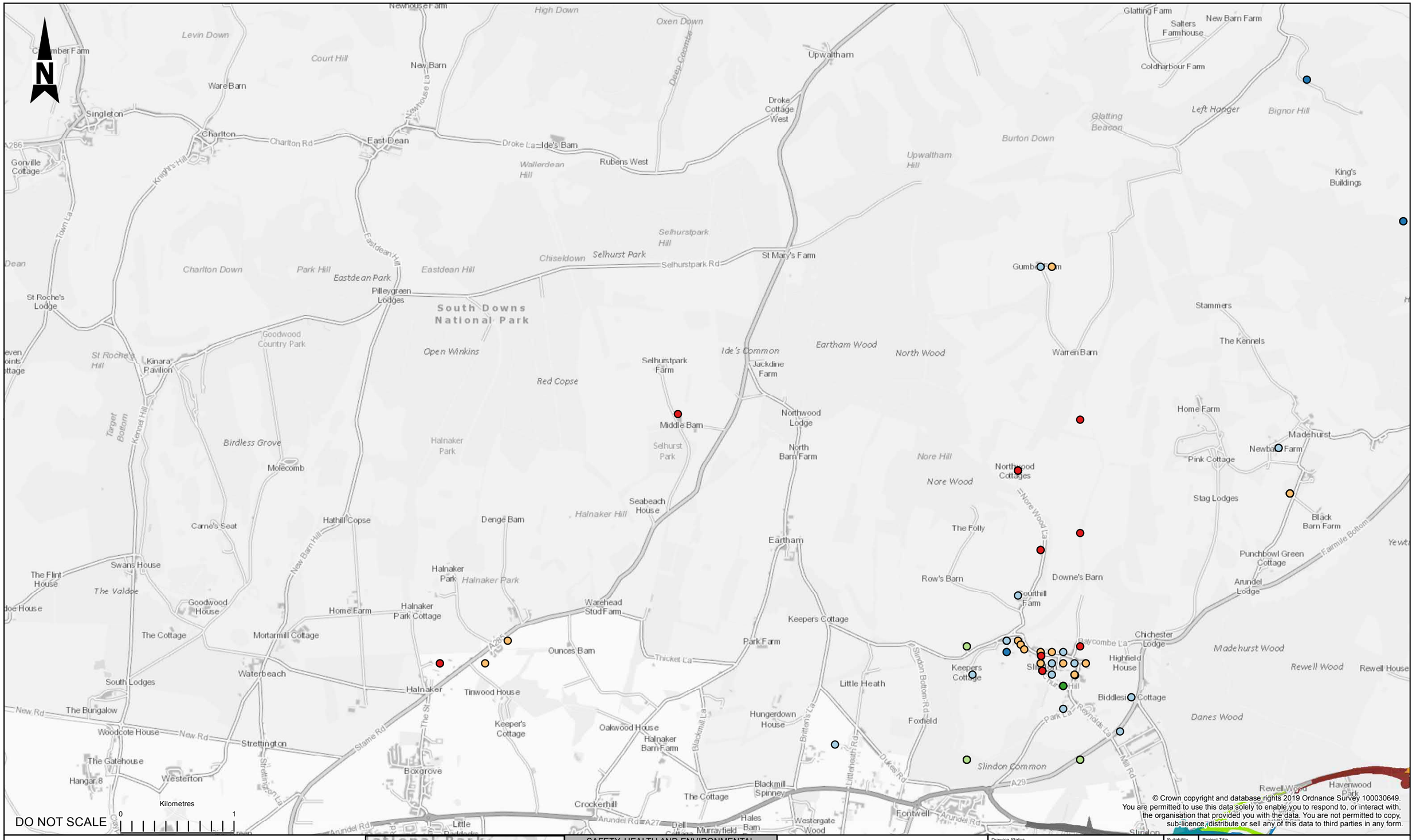
Bat No.	Species	Sex	Breeding Status	Date Caught	Trapping Location	Roost	Flight Lines	Foraging Areas
1	Alcathoe bat	Female	Pregnant	14.05.18	7	Oak tree in central Binsted Woods Complex LWS (approximate grid reference SU 98817 06826).	Bat 1 was observed flying from Lake Copse, north over The Shaw towards Binsted Woods Complex LWS and again south from Binsted Woods Complex LWS back towards Manor house.	The peripheral foraging area (95% KDE) for Bat 1 was over Binsted Woods Complex LWS, Tortington common, Spinningwheel copse, The Shaw, Lake Copse and the agricultural fields south of Tortington Common. The core foraging area (50% KDE) for Bat 1 included the area of woodland around south Binsted lane including south Binsted Woods Complex LWS and South Tortington common.
2	Bechstein's bat	Female	Non-Parous	14.05.18	3	Ash tree in Steward's copse (approximate grid reference TQ 00362 107051).	No flight lines were observed for Bat 2	The peripheral and core foraging area for Bat 2 was centred around its roost in Steward's copse
3	Whiskered bat	Female	Pregnant	14.05.18	7	Residential property East Lodge, at the top of Tortington lane (approximate grid reference TQ 00181 07210).	Bat 3 was observed flying south Binsted Woods Complex LWS towards the agricultural fields south of Tortington common. Bat 3 was also observed flying south from Tortington common towards the agricultural fields west of Tortington village.	The peripheral foraging area for Bat 3 included Binsted Woods Complex LWS, Scotland barn, Tortington common and the agricultural fields south of Tortington common. Two further pockets of peripheral foraging were recorded at Ford Aerodrome and Screens Wood. The core foraging location for Bat 3 was centred over South Tortington common.
4	Whiskered bat	Female	Pregnant	14.05.18	5	Residential property East Lodge, at the top of Tortington lane (approximate grid reference TQ 00181 07210).	No flight lines were observed for Bat 4.	The peripheral foraging area for Bat 4 included Binsted Woods Complex LWS, Scotland barn, Tortington common, Tortington village, Ford village and the agricultural fields south of Tortington common. The core foraging area for Bat 4 was centred around Tortington common east Binsted Woods Complex LWS, with a separate core foraging area around the roost at the top of Tortington lane.
5	Brown long-eared bat	Female	Non-parous	14.05.18	4	Two separate oak trees in Steward's copse (approximate grid reference TQ 00446 06970 and TQ 00487 06914).	A single flight line was observed for Bat 5, flying south from Binsted Woods Complex LWS along the Shaw towards Lake copse.	The peripheral foraging areas for Bat 5 spread over Steward's copse, North Tortington common and Scotland barn. Smaller pockets of peripheral foraging occurred around Pinewoods, Spinningwheel copse and Lake copse. The core foraging area for Bat 5 was observed to be around its roost in Steward's copse.
6	Alcathoe bat	Male	N/A	15.05.18	3	Oak tree on the western edge of Tortington lane (approximate grid reference TQ 00231 06904)	Bat 6 was observed flying from the direction of its roost on Tortington lane, south through Tortington common. Bat 6 was also observed flying south from Tortington common across the agricultural fields and returning north from Lake copse towards Tortington common/ Binsted Woods Complex LWS.	The peripheral foraging area for Bat 6 spread over an extensive area of Binsted Woods Complex LWS, Tortington common and the agricultural fields to the south of the woodland. The core foraging area for Bat 6 was centred around its roost on Tortington lane.
7	Barbastelle bat	Male	N/A	14.05.18	5	Oak tree in central Binsted Woods Complex LWS (approximate grid reference SU 99027 106666).	Bat 7 was observed flying from Lake copse, north through the Shaw towards Binsted Woods Complex LWS and its roost. Bat 7 was also observed flying south through Tortington common and again north from the agricultural fields below Tortington common back towards the woodland.	The peripheral foraging area for Bat 7 spread extensively across Stewards copse in the east, through Tortington common and Binsted Woods Complex LWS to Pedler's Croft in the West. The core foraging area for Bat 7 was centred around the southern half of Tortington common and Binsted Woods Complex LWS and the agricultural fields below.
8	Natterer's bat	Female	Pregnant	15.05.18	10	Ash tree in Lake copse (approximate grid reference SU 98906 05761).	Bat 8 was observed flying north from its roost in Lake copse, through The Shaw towards Spinningwheel copse and Binsted Woods Complex LWS.	The peripheral foraging area for Bat 8 spread extensively across Binsted wood, west to Brickkiln copse, east through Tortington common and south to Lake copse. The core foraging area spread across northern Binsted wood, Paine's wood, Singer's Piece and Wincher's copse.
9	Alcathoe bat	Male	N/A	15.05.18	16	Ash tree in central Binsted Woods Complex LWS (approximate grid reference SU 98881 06730).	Bat 9 was recorded flying from Lake copse, north through The Shaw towards Binsted Woods Complex LWS and its roost.	The peripheral foraging area for Bat 9 spread from Spinningwheel copse in the west, through the southern perimeter of Binsted Woods Complex LWS and Tortington common and south through the agricultural fields below to

Bat No.	Species	Sex	Breeding Status	Date Caught	Trapping Location	Roost	Flight Lines	Foraging Areas
								Lake copse. The core foraging area was centred around Lake copse and The Shaw.
10	Barbastelle	Female	Pregnant	15.05.18	12	Agricultural unit at Marsh farm, Binsted lane (approximate grid reference SU 98874 04904	Bat 10 was recorded flying from its roost at Marsh farm south towards the railway line.	The peripheral foraging area for Bat 10 was split into small segments in the agricultural fields between Marsh farm and Lake copse and as far south as the Ford Airfield industrial estate. The core foraging area was centres over its roost at Marsh farm and in the copse of woodland between Marsh farm and the Arundel-Ford railway line south of the farm.
11	Bechstein's bat	Male	N/A	16.07.18	4	Sycamore tree on the northern perimeter of the White Swan car park on the A27 (Chichester road) (approximate grid reference TQ 00204 107229).	No flight lines were observed for Bat 11	The peripheral foraging area for Bat 11 was spread over north Tortington common, Binsted Woods Complex LWS and Park farm. The core foraging areas were scattered over small areas of north Tortington common, Scotland barn and Park farm, straddling both sides of the current A27.
12	Bechstein's bat	Female	Post-lactating	16.07.18	3	Sycamore tree on the northern perimeter of the White Swan car park on the A27 (Chichester road) (approximate grid reference TQ 00204 107229).	No flight lines were observed for Bat 12.	The peripheral foraging area for Bat 12 was very similar to Bat 11, spread over north Tortington common, Binsted Woods Complex LWS and Park farm. The core foraging areas were scattered over small areas of north Tortington common, Scotland barn and Park farm, straddling both sides of the current A27
13	Whiskered bat	Female	Lactating	16.07.18	3	Residential property at Pinewoods, Binsted lane (approximate grid reference SU 99708 06685).	No flight lines were observed for Bat 13.	The peripheral foraging area for Bat 13 spread extensively over Tortington common, Steward's copse, Binsted Woods Complex LWS, Scotland Barn, Paine's wood and Park farm. A further area of peripheral foraging was identified to the north over Screens wood and Arundel Park.
14	Brown long-eared bat	Female	Lactating	16.07.18	41	Beech tree in Barn's copse (approximate grid reference SU 97903 06941).	No flight lines were observed for Bat 14.	The peripheral foraging area for Bat 14 was scattered over small areas around the Barn's copse, Threecorner wood and Pedlar's croft . The core foraging area was just east of its roost in Barn's Copse.
15	Natterer's bat	Female	Lactating	17.07.18	5	Bat 15 was found roosting in three different locations. In a residential property at 17 Hazel Grove, Arundel (approximate grid reference TQ 00330 06670), in an unidentified tree in Singer's Piece (approximate grid reference SU 99305 06906) and in an unidentified tree in north Binsted Woods Complex LWS (approximate grid reference SU 99151 06842)	Bat 15 was observed flying north from Lake copse, through The Shaw towards Binsted Woods Complex LWS and again south from Tortington common to the agricultural fields east of Lake copse.	The peripheral foraging area for Bat 15 spread extensively over Tortington common, Steward's copse, Binsted Woods Complex LWS, Lake copse and the agricultural fields to the south. The core foraging area was centred around south Tortington common, Lake copse and the agricultural fields between.
16	Barbastelle	Female	Lactating	17.07.18	8	Mature oak on the southern perimeter of Tortington common (approximate grid reference SU 99333 06166).	Bat 16 was observed flying from Lake copse, north towards its roost on the southern perimeter of Tortington common.	The peripheral foraging area for Bat 16 spread from Ash Piece in the west to Tortington Priory Farm in the east and from Scotland Barn in the north to Tortington Village in the south. The core foraging area in centred around the roost on the perimeter of Tortington common.
17	Whiskered bat	Female	Post-lactating	17.07.18	14	Residential property at Pinewoods, Binsted lane (approximate grid reference SU 99708 06685). The same roosting location as Bat 13.	No flight lines were observed for Bat 17.	No foraging areas could be identified for Bat 17.
18	Bechstein's bat	Female	Parous	18.07.18	25	The roosting location for Bat 18 could not be determined	Bat 18 was observed flying south from Tortington common, along the hedgerows to Manor house, then west towards Lake copse. Bat 18 was also observed flying from its trapping location west of Tortington village, north towards Tortington common.	The peripheral foraging area for Bat 18 was in scattered segments from Tortington village in the east to Walberton farm in the west, with the largest area around Tortington common and Lake copse. The core foraging area was in the agricultural fields north of Tortington village, the woodland east of Manor house and the southern woodland of Tortington common.

Bat No.	Species	Sex	Breeding Status	Date Caught	Trapping Location	Roost	Flight Lines	Foraging Areas
19	Daubenton's bat	Male	N/A	18.07.18	28	Bat 19 was found roosting in two locations. An ash tree in the Waterwoods (approximate grid reference TQ 00793 07490) and a group of ash and beech trees in the Waterwood's (approximate grid reference TQ 00774 07454). The exact tree in the group could not be determined.	No flight lines could be determined for Bat 19.	The peripheral foraging area for Bat 19 was around the watercress beds and Waterwoods/Trout farm. The core foraging area was centred above the trout farm.
20	Whiskered bat	Female	Post-lactating	20.07.18	~~175~~	Two separate residential properties, West Lodge, Tortington lane (approximate grid reference TQ 00175 107205) and the house at Pinewoods (approximate grid reference SU 99708 06685).	Bat 20 was observed flying from the direction of its roost at Pinewoods, south towards Tortington village. Bat 20 was also observed flying south over the railway line towards Ford village.	The peripheral foraging area for Bat 20 spread as far north as Screens Wood and as far South as Yapton town. The core foraging area was centred around north Tortington Common and east Binsted Woods Complex LWS.
21	Bechstein's bat	Female	Non-parous	21.08.18	1	Bat 21 was observed roosting in three different locations. A mature oak on the southern woodland boundary of Tortington common (approximate grid reference TQ 00085 06151), a beech tree in Steward's copse (approximate grid reference TQ 00285 06871), and a beech tree in a woodland copse north of Park farm (approximate grid reference TQ 00054 08315)	No flight lines were observed for Bat 21	The peripheral foraging area for Bat 21 spread form Screens wood in the north, south through Tortington common and Steward's copse to the agricultural fields south of Tortington common. The core foraging areas were centred around Steward's copse and south Tortington common
22	Daubenton's bat	Male	N/A	22.08.18	30	Bat 22 was estimated to be roosting in a small woodland copse north of Arundel castle (approximate grid reference TQ 01666 07833).	No flight lines were observed for Bat 22.	The peripheral foraging area for Bat 22 spread extensively for the Wildfowl centre to the east Arundel, across the Watercress beds and Screens wood to Binsted Woods Complex LWS in the south-west. The core foraging areas were around the Wildfowl centre and over the trout farm
23	Barbastelle	Female	Non-parous	23.08.18	39	The roosting location for Bat 23 could not be identified.	Bat 23 was observed flying from Lake copse, north through The Shaw towards Spinningwheel copse and Binsted Woods Complex LWS and returning south from Binsted Woods Complex LWS towards Lake copse. Bat 23 was also observed flying south-west across the agricultural fields south of Tortington common towards Lake copse	The peripheral foraging area for Bat 23 spread extensively over Tortington common, Binsted Woods Complex LWS, Lake copse and the agricultural fields between. Further pockets of peripheral foraging occurred as far north as Screens wood and as far south as Tortington village. The core foraging area was centred around east Binsted Woods Complex LWS and west Tortington common
24	Alcathoe bat	Male	N/A	10.09.18	6	The roosting location for Bat 24 could not be identified	No flight lines were observed for Bat 24.	The peripheral foraging area for Bat 24 spread across Binsted Woods Complex LWS, Ash piece and Spinningwheel copse. The core foraging area was centred over south Binsted Woods Complex LWS.
25	Bechstein's bat	Female	N/A (Juvenile)	10.09.18	7	The roosting location for Bat 25 could not be identified.	No flight lines were observed for Bat 25.	The peripheral foraging area for Bat 25 spread over Tortington common, Steward's copse, Scotland barn and Pinewoods. The core foraging area for Bat 25 was over north Tortington common and Scotland barn.
26	Whiskered bat	Female	Parous	10.09.18	7	The roosting location for Bat 26 could not be identified.	No flight lines were observed for Bat 26.	The peripheral foraging area for Bat 26 was scattered over small segments over Lake copse, The Shaw, Ash piece, Spinningwheel copse and Binsted Woods Complex LWS. The core foraging area for Bat 26 was identified over the woodland boundary of Lake copse and the woodland to the east of Lake copse.
27	Barbastelle	Female	Parous	10.09.18	7	Bat 27 was found to be roosting in a dead sweet chestnut tree in north Steward's copse (approximate grid reference TQ 00332 06969).	No flight lines were observed for Bat 27.	The peripheral foraging area for Bat 27 was around its roost in Steward's copse, east Scotland barn and Park farm. The core foraging area for Bat 27 was in the north-east corner of Steward's copse, adjacent to and above the A27. Another small area of core foraging was identified over Park farm, north of the A27.

Bat No.	Species	Sex	Breeding Status	Date Caught	Trapping Location	Roost	Flight Lines	Foraging Areas
28	Barbastelle	Male	N/A	10.09.18	14	Bat 28 was found to be roosting in two separate locations. The first roost was identified in an oak tree in Brickkiln copse (approximate grid reference SU 98552 07089). The second roost was identified in an agricultural unit at Marsh farm (approximate grid reference SU 98890 04873).	Bat 28 was identified flying north from Lake copse, through The Shaw towards Ash piece and Binsted Woods Complex LWS. Bat 28 was also identified flying from Lake copse, north-east towards Tortington common and Binsted Woods Complex LWS.	The peripheral foraging area for Bat 28 was spread in small segments from its roost in Brickkiln copse, north-east to Screens wood and south over Lake Copse, The Shaw and the agricultural fields between these woodlands and Marsh farm, where the bat was also found to be roosting. The core foraging area for Bat 28 was centred around the bats roost at Marsh farm.
29	Natterer's bat	Female	Non-parous	11.09.18	~~6~~19	The roosting location for Bat 29 could not be identified	No flight lines could be identified for Bat 29.	No foraging areas could be identified for Bat 29.
30	Barbastelle	Male	N/A	11.09.18	7	The roosting location for Bat 30 could not be identified.	Bat 30 was identified to be flying north from Marsh farm towards Lake copse.	Peripheral foraging for Bat 30 was identified south of the Field Study Area towards Ford village and Yapton and as far north as the Whiteways lodge roundabout, Arundel Park and South Stoke. The core foraging area for Bat 30 was identified in a small area north of the Whiteways roundabout.
31	Bechstein's bat	Female	Parous	11.09.18	1	Bat 31 was found to be roosting in a beech tree on the western boundary of Steward's copse (approximate grid reference TQ 00284 06878). The radio-transmitter tag remained within the roost during the remainder of the study period.	No flight lines could be identified for Bat 31.	No foraging areas could be identified for Bat 31.

Appendix C - Figures



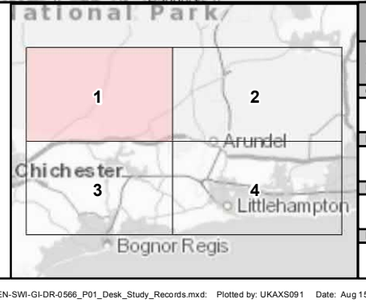
KEY:

ROOST TYPE

OPTION 1V5	DROPPINGS
OPTION 1V9	HIBERNACULA ROOST
OPTION 3V1	MATERNITY ROOST
OPTION 4/5AV1	MATERNITY ROOST; DROPPINGS
OPTION 4/5AV2	MATERNITY ROOST; FEEDING ROOST
OPTION 5BV1	UNSPECIFIED ROOST
OPTION 5AV3	UNSPECIFIED ROOST; DROPPINGS

MAVES 2016-17

- MATERNITY ROOST
- UNSPECIFIED ROOST



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	--	--	--	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 1.1:
DESK STUDY
PAGE 1 OF 4

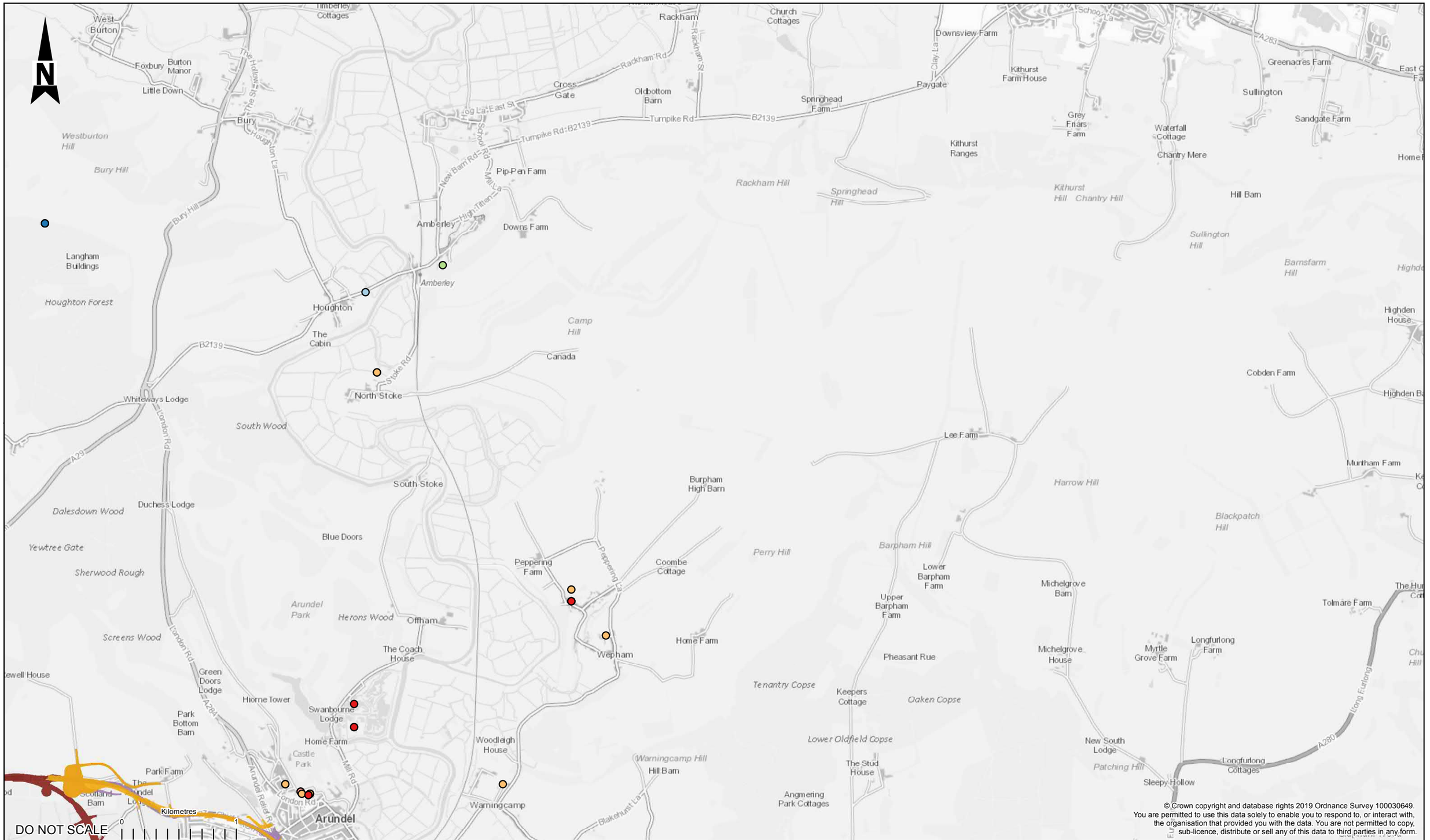
Scale	Drawn	Checked	Approved	Authorised
1:31,000	CB	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0565

Project Ref. No.: 70052558

Revision: P01

Path: \\uk.wspgroup.com\central data\Projects\700525xx\70052558 - CDF A27 AB Further Consultation\02 WIP\GI GIS\Mxd\Environment\Bats\HE551523-WSP-GEN-SWI-GI-DR-0566_P01_Desk_Study_Records.mxd: Plotted by: UKAXS091 Date: Aug 15, 2019 - 11:07AM



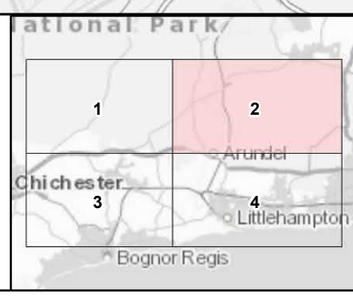
KEY:

ROOST TYPE

OPTION 1V5	DROPPINGS
OPTION 1V9	HIBERNACULA ROOST
OPTION 3V1	MATERNITY ROOST
OPTION 4/5AV1	MATERNITY ROOST; DROPPINGS
OPTION 4/5AV2	MATERNITY ROOST; FEEDING ROOST
OPTION 5BV1	UNSPECIFIED ROOST
OPTION 5AV3	UNSPECIFIED ROOST; DROPPINGS

MAVES 2016-17

- MATERNITY ROOST
- UNSPECIFIED ROOST



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	--	--	--	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 1.1:
DESK STUDY
PAGE 2 OF 4

Scale	Drawn	Checked	Approved	Authorised
1:31,000	CB	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number
Project | Originator | Volume
HE551523-WSP-GEN-SWI-GI-DR-0565
Location | Type | Role | Number

Project Ref. No.: 70052558

Revision: P01

Path: \\uk.wspgroup.com\central data\Projects\700525xx\70052558 - CDF A27 AB Further Consultation\02 WIP\GI GIS\Mxd\Environment\Bats\HE551523-WSP-GEN-SWI-GI-DR-0566_P01_Desk_Study_Records.mxd: Plotted by: UKAXS091 Date: Aug 15, 2019 - 11:07AM

KEY:

- OPTION 1V5
- OPTION 1V9
- OPTION 3V1
- OPTION 4/5AV1
- OPTION 4/5AV2
- OPTION 5BV1
- OPTION 5AV3

ROOST TYPE

- DROPPINGS
- HIBERNACULA ROOST
- MATERNITY ROOST
- MATERNITY ROOST; DROPPINGS
- MATERNITY ROOST; FEEDING ROOST
- UNSPECIFIED ROOST
- UNSPECIFIED ROOST; DROPPINGS

MAVES 2016-17

- MATERNITY ROOST
- UNSPECIFIED ROOST

Kilometres

DO NOT SCALE 0 1

1 2 3 4

Arundel Chichester Littlehampton Bognor Regis

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	--	--	--	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING FIGURE 1.1: DESK STUDY PAGE 3 OF 4

Scale	Drawn	Checked	Approved	Authorised
1:31,000	CB	JH	AB	PA

Original Size	Date	Date	Date	Date
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0565

Project Ref. No.: 70052558

Revision: P01

Path: \\uk.wspgroup.com\central data\Projects\700525xx\70052558 - CDF A27 AB Further Consultation\02 WIP\GI GIS\Mxd\Environment\Bats\HE551523-WSP-GEN-SWI-GI-DR-0566_P01_Desk_Study_Records.mxd: Plotted by: UKAXS091 Date: Aug 15, 2019 - 11:08AM

KEY:

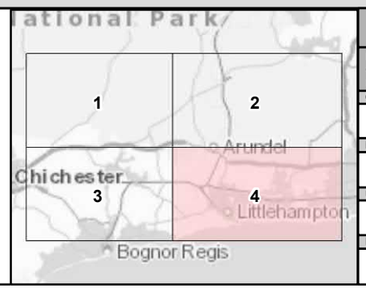
- OPTION 1V5
- OPTION 1V9
- OPTION 3V1
- OPTION 4/5AV1
- OPTION 4/5AV2
- OPTION 5BV1
- OPTION 5AV3

ROOST TYPE

- DROPPINGS
- HIBERNACULA ROOST
- MATERNITY ROOST
- MATERNITY ROOST; DROPPINGS
- MATERNITY ROOST; FEEDING ROOST
- UNSPECIFIED ROOST
- UNSPECIFIED ROOST; DROPPINGS

MAVES 2016-17

- MATERNITY ROOST
- UNSPECIFIED ROOST



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	--	--	--	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 1.1:
DESK STUDY
PAGE 4 OF 4

Scale	Drawn	Checked	Approved	Authorised
1:31,000	CB	JH	AB	PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0565

Project Ref. No.: 70052558

Revision: P01

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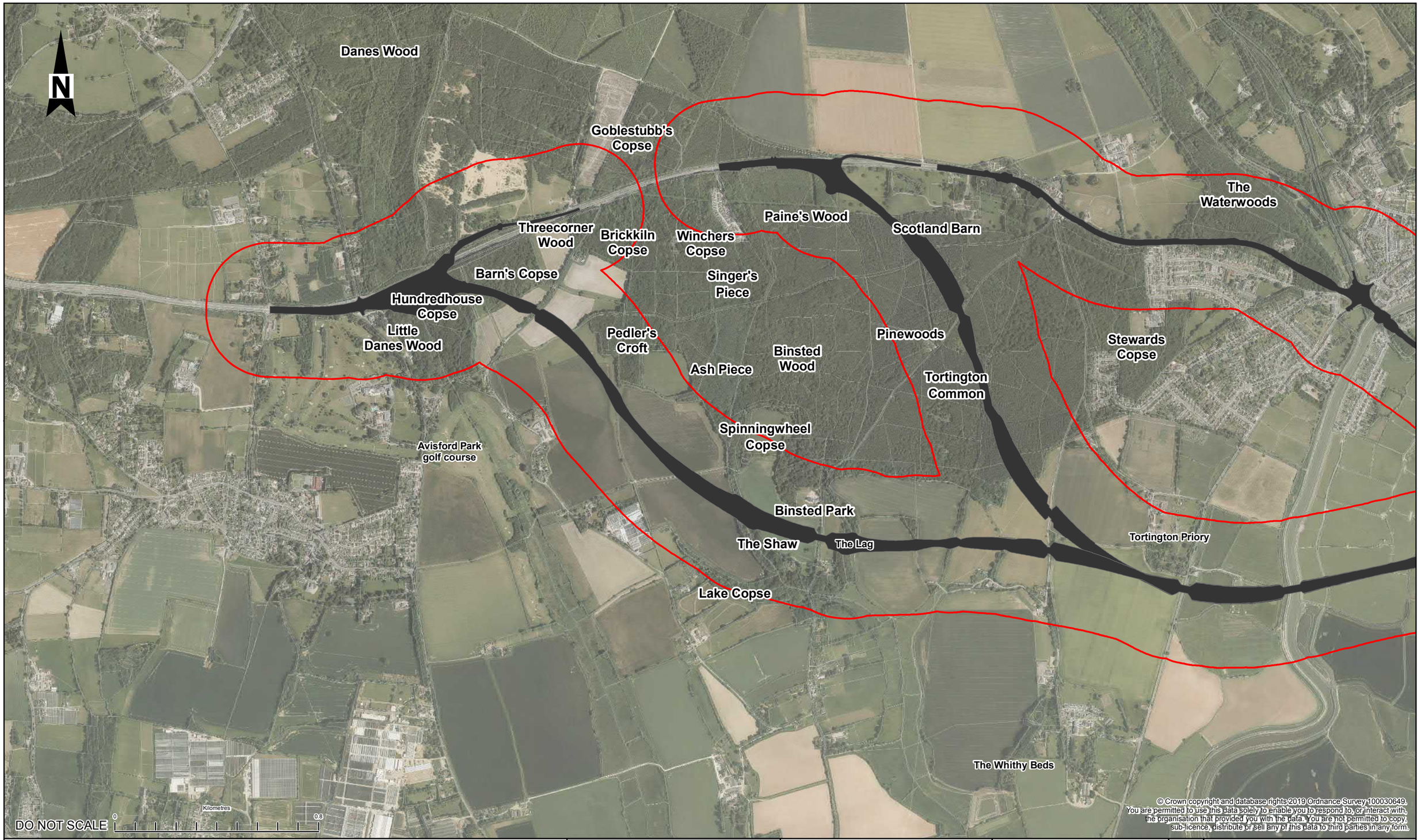

KEY:

FIELD SURVEY AREA

SCHEME OPTIONS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 1.2:
KEY GEOGRAPHIC LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:13,867	MG	JH	AB	AP
Original Size: A3	Date: 27/01/20	Date: 27/01/20	Date: 27/01/20	Date: 27/01/20

Drawing Number
Project | Originator | Volume | Location | Type | Role | Number
HE551523 -WSP - GEN - SWI- GI - DER - 0621

Project Ref. No.: 70052558

Revision: A

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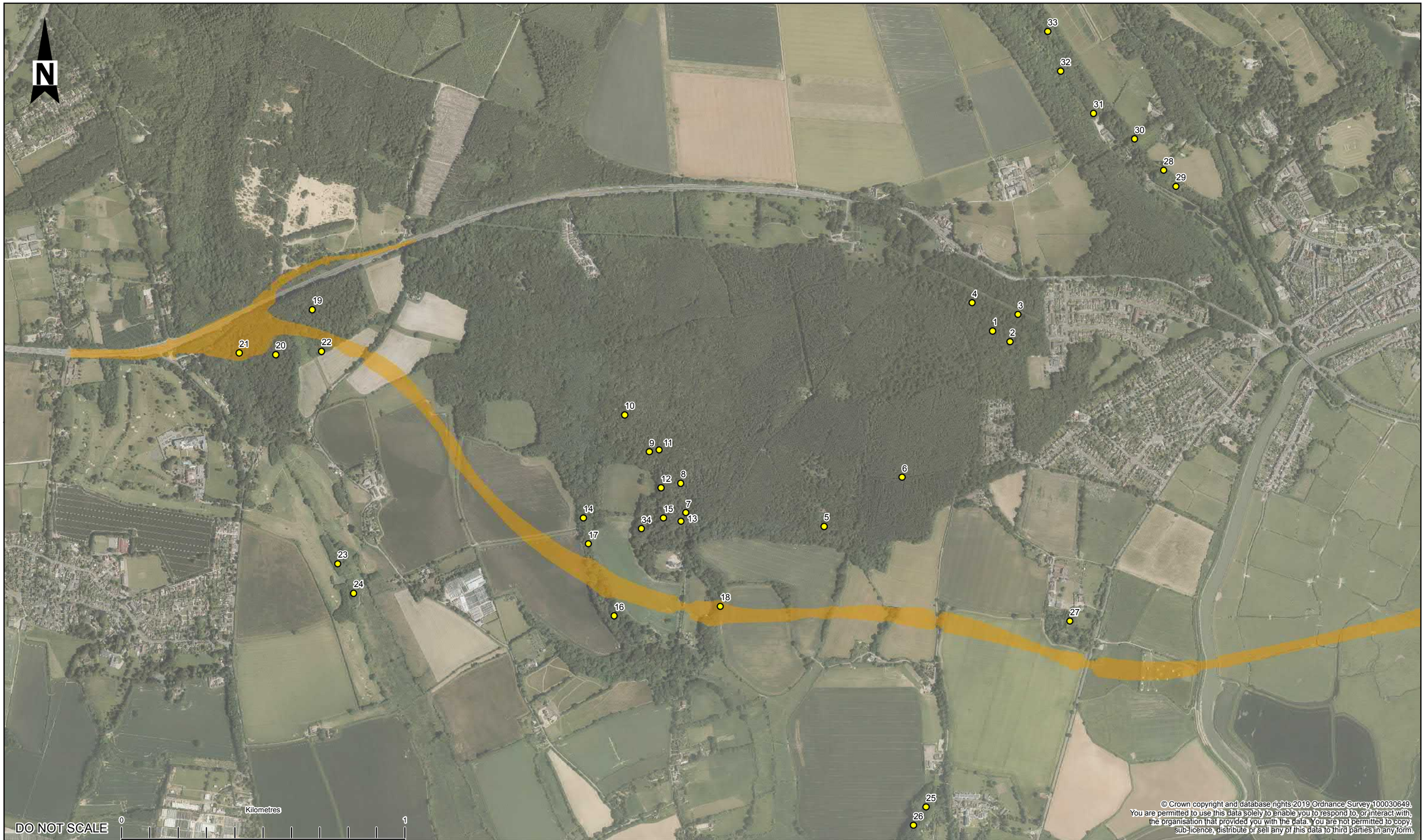

KEY:

OPTION 5A VARIANT 3

TRAPPING LOCATIONS MAY

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.1:
TRAPPING LOCATIONS MAY

Scale	Drawn	Checked	Aproved	Authorised
1:12,500	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	16/01/20	16/01/20	16/01/20	16/01/20

Drawing Number / Project: HE551523-WSP-GEN-SWI-GI-DR-0175 (Originator | Volume | Location | Type | Role | Number)

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

TRAPPING LOCATIONS JULY

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.2:
TRAPPING LOCATIONS JULY

Scale	Drawn	Checked	Aproved	Authorised
1:12,500	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: Project | Originator | Volume | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0176

Location

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

TRAPPING LOCATIONS AUGUST

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.3
TRAPPING LOCATIONS AUGUST

Scale	Drawn	Checked	Aproved	Authorised
1:12,500	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0176

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

TRAPPING LOCATIONS SEPTEMBER

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.4:
TRAPPING LOCATIONS SEPTEMBER

Scale	Drawn	Checked	Aproved	Authorised
1:12,500	MG	JH	AB	PA

Original Size	Date	Date	Date	Date
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0178

Project Ref. No.: 70052558

Revision: P01

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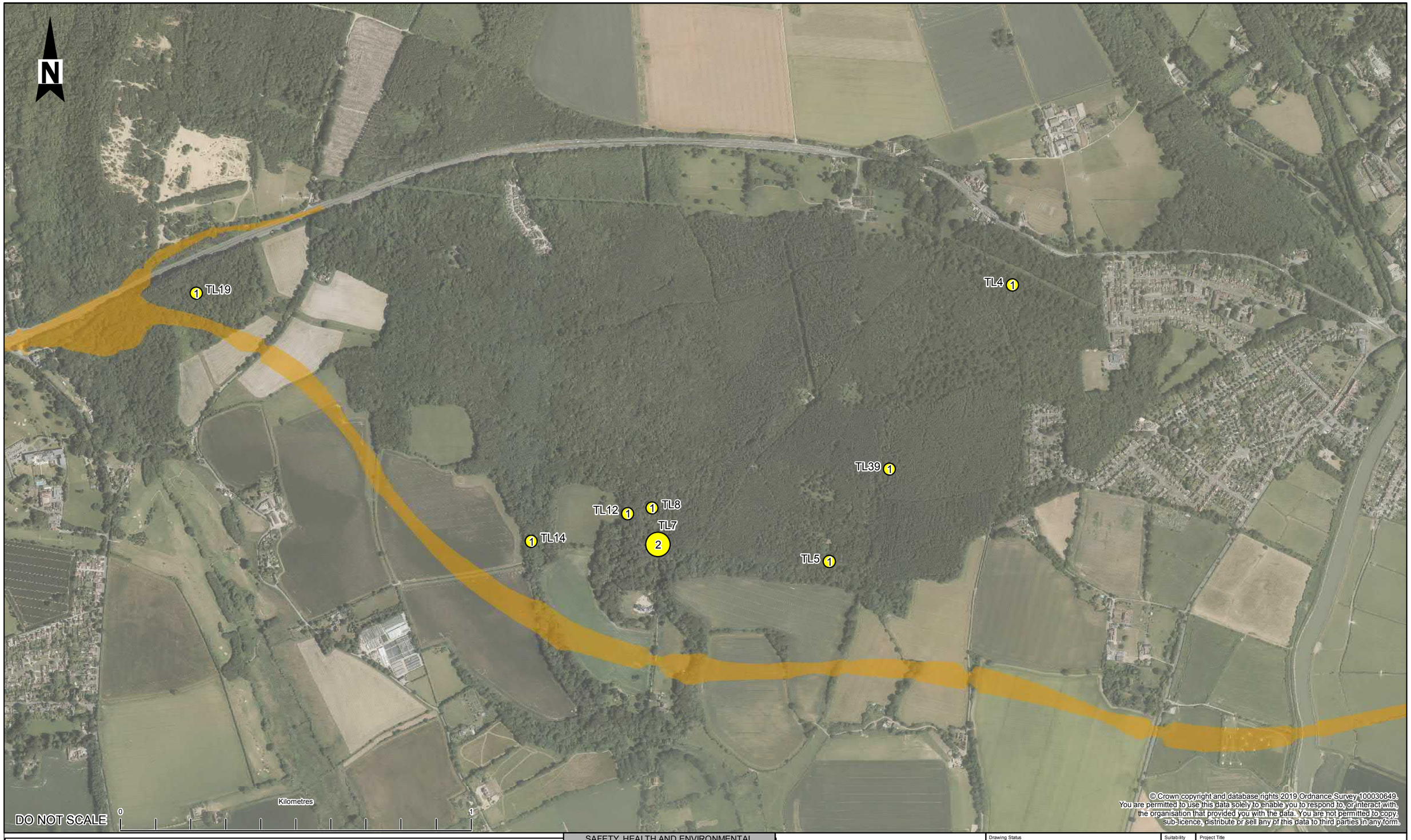

KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (BARBASTELLE)

1

2

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.5:
BARBASTELLE
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:10,000	MG	JH	AB	PA
Original Size: A3	Date: 27/01/20	Date: 27/01/20	Date: 27/01/20	Date: 27/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0179

Project Ref. No.: 70052558

Revision: P01

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TL3
1
TL21
1
TL20
3
TL6
1
TL7
1
TL16
1
TL18
1
Kilometres
DO NOT SCALE
0
1

KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (ALCATHOE BAT)

1

3

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.6:
ALCATHOE BAT
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:10,000	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0180

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (BRANDT'S/WISKERED/ALCATHOE BAT)

1

2

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.7:
BRANDT'S/WHISKERED/ALCATHOE BAT
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:10,000	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number Project | Originator | Volume | Location | Type | Role | Number: HE551523-WSP-GEN-SWI-GI-DR-0182

Project Ref. No.: 70052558

Revision: P01

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TL19 1
TL38 1
TL36 1
TL37 1
TL3 3
TL2 1
TL10 3
TL14 2
TL15 2
TL7 3
TL5 3
TL17 3
TL23 2
TL24 1
TL27 3
TL25 1
TL26 1

Kilometres
0 1
DO NOT SCALE

KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (WHISKERED BAT)

1
2
3

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL
Suitability: S0

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A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.8
WHISKERED BAT
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:10,000	MG	JH	AB	PA
Original Size	Date	Date	Date	Date
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: Project | Originator | Volume
HE551523-WSP-GEN-SWI-GI-DR-0183
Location | Type | Role | Number

Project Ref. No.: 70052558
Revision: P01

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KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (BECHSTEIN'S BAT)

1

3

4

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.9:
BECHSTEIN'S BAT
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:10,000	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	16/01/20	16/01/20	16/01/20	16/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0181

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (DAUBENTON'S BAT)

1

2

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.10:
DAUBENTON'S BAT
TRAPPING LOCATIONS

Scale	Drawn	Checked	Approved	Authorised
1:10,000	AS	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0183

Project Ref. No.: 70052558

Revision: P01

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N

TL19 2

TL21 3

TL37 1

TL4 2

TL10 1

TL6 1

TL14 2

TL5 3

TL17 2

TL16 1

TL18 1

TL26 1

DO NOT SCALE

Kilometres 0 1

KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (NATTERER'S BAT)

1

2

3

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.11:
NATTERER'S BAT
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:12,500	MG	JH	AB	PA
Original Size: A3	Date: 16/01/20	Date: 16/01/20	Date: 16/01/20	Date: 16/01/20

Drawing Number Project | Originator | Volume: HE551523-WSP-GEN-SWI-GI-DR-0185

Location | Type | Role | Number

Project Ref. No.: 70052558

Revision: P01

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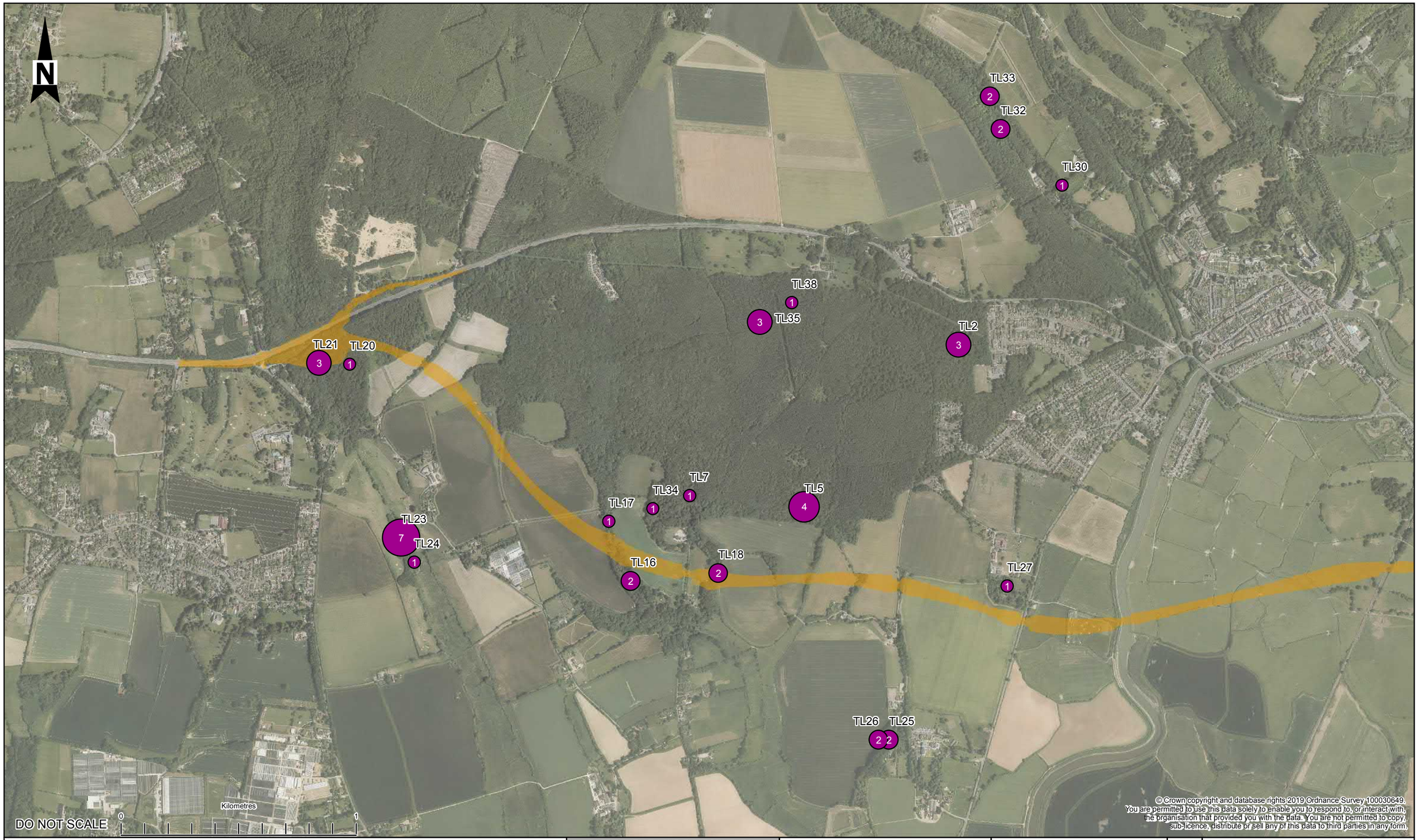

KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (COMMON PIPISTRELLE)

1
2
3
4
7

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

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Drawing Status: FINAL

Suitability: S0

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A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.12:
COMMON PIPISTRELLE
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:15,000	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: HE551523-WSP-GEN-SWI-GI-DR-0187
Project | Originator | Volume | Location | Type | Role | Number

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (NATHUSIUS' PIPISTRELLE)

1

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.13:
NATHUSIUS' PIPISTRELLE
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:10,000	MG	JH	AB	PA
Original Size: A3	Date: 16/01/20	Date: 16/01/20	Date: 16/01/20	Date: 16/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0215

Project Ref. No.: 70052558

Revision: P01

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N

TL8
1

TL16
1

TL18
1

TL25
2

DO NOT SCALE

Kilometres
0
1

KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (NOCTULE)

1

2

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 2.14:
NOCTULE TRAPPING LOCATIONS

Scale	Drawn	Checked	Approved	Authorised
1:15,000	AS	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number Project | Originator | Volume: HE551523-WSP-GEN-SWI-GI-DR-0186
Location | Type | Role | Number

Project Ref. No.: 70052558

Revision: P01

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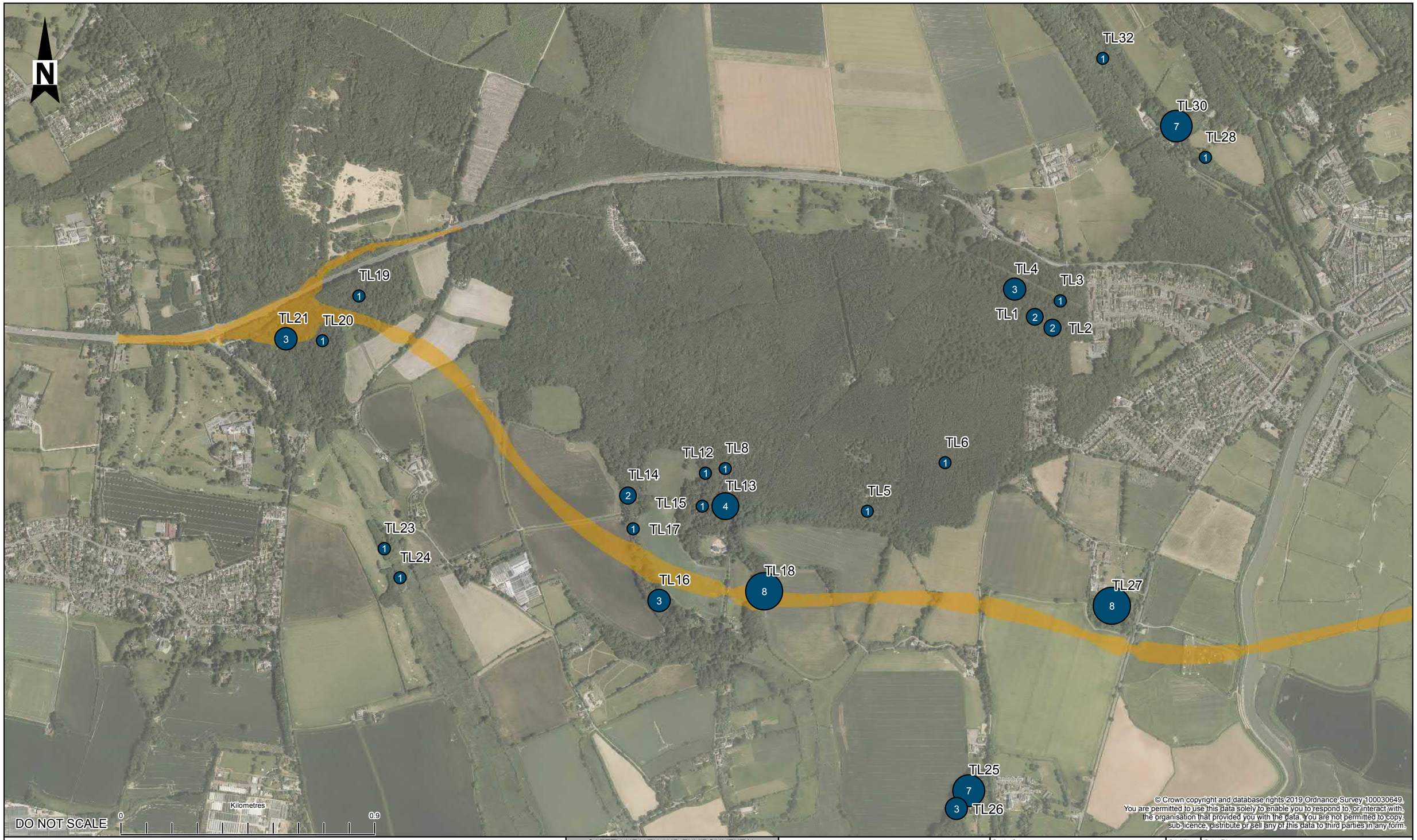

KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (SOPRANO PIPISTRELLE)

1
2
3
4
5 - 7
8

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decommissioning / Demolition

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Drawing Title: BAT RADIOTRACKING
FIGURE 2.15
SOPRANO PIPISTRELLE
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:12,500	MG	JH	AB	PA
Original Size: A3	Date 16/01/20	Date 16/01/20	Date 16/01/20	Date 16/01/20

Drawing Number Project | Originator | Volume | Location | Type | Role | Number: HE551523-WSP-GEN-SWI-GI-DR-0187

Project Ref. No.: 70052558

Revision: P01

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N

TL28 2

TL38 3
TL36 2
TL4 4
TL1 8
TL2 3
TL19 1
TL21 6
TL20 3
TL10 3
TL11 1
TL39 2
TL6 4
TL12 2
TL8 2
TL14 6
TL7 5
TL5 4
TL17 1
TL18 4
TL26 1

Kilometres
DO NOT SCALE 0 1

KEY:

OPTION 5A VARIANT 3

NO. OF BATS PER TRAPPING LOCATION (BROWN LONG-EARED BAT)

1
2
3
4
6
8

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

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Drawing Title: BAT RADIOTRACKING
FIGURE 2.16:
BROWN LONG-EARED BAT
TRAPPING LOCATIONS

Scale	Drawn	Checked	Aproved	Authorised
1:12,500	MG	JH	AB	PA

Original Size	Date	Date	Date	Date
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0189

Project Ref. No.: 70052558

Revision: P01

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KEY:

- OPTION 5A VARIANT 3

ROOTS

- BROWN LONG-EARED BAT
- NATTERER'S BAT
- WHISKERED BAT
- BARBASTELLE
- ALCATHOE BAT
- BECHSTEIN'S BAT
- DAUBENTON'S BAT

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL
Suitability: S0

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A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.1
ALL ROOSTS

Scale	Drawn	Checked	Approved	Authorised
1:15,500	AS	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0190

Project Ref. No.: 70052558

Revision: P01

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N

Bat 28

Bat 27

Bat 7

Bat 16

Bat 10

Bat 28

Kilometres

DO NOT SCALE

0

1

KEY:

OPTION 5A VARIANT 3

BARBASTELLE ROOSTS

BARBASTELLE FLIGHT LINES

BAT 7

BAT 10

BAT 16

BAT 23

BAT 28

BAT 30

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.2:
BARBASTELLE FLIGHT LINES

Scale	Drawn	Checked	Approved	Authorised
1:15,000	AS	JH	AB	PA

Original Size	Date	Date	Date	Date
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0208

Project Ref. No.: 70052558

Revision: P01

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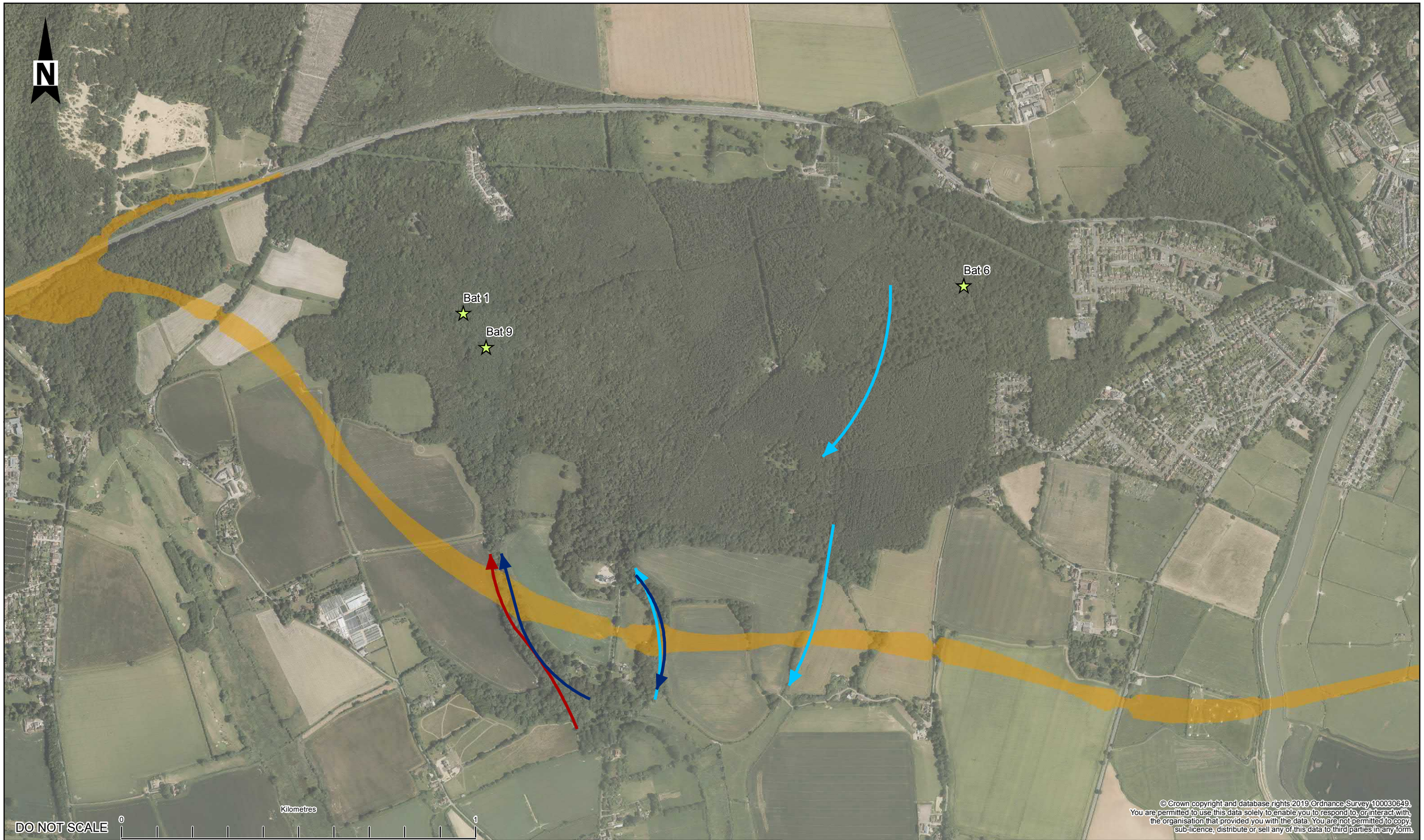

KEY:

OPTION 5A VARIANT 3

ALCATHOE BAT ROOSTS

ALCATHOE BAT FLIGHT LINES

BAT 1

BAT 6

BAT 9

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.3:
ALCATHOE BAT FLIGHT LINES

Scale	Drawn	Checked	Approved	Authorised
1:10,000	AS	JH	AB	PA

Original Size	Date	Date	Date	Date
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0209

Project Ref. No.: 70052558

Revision: P01

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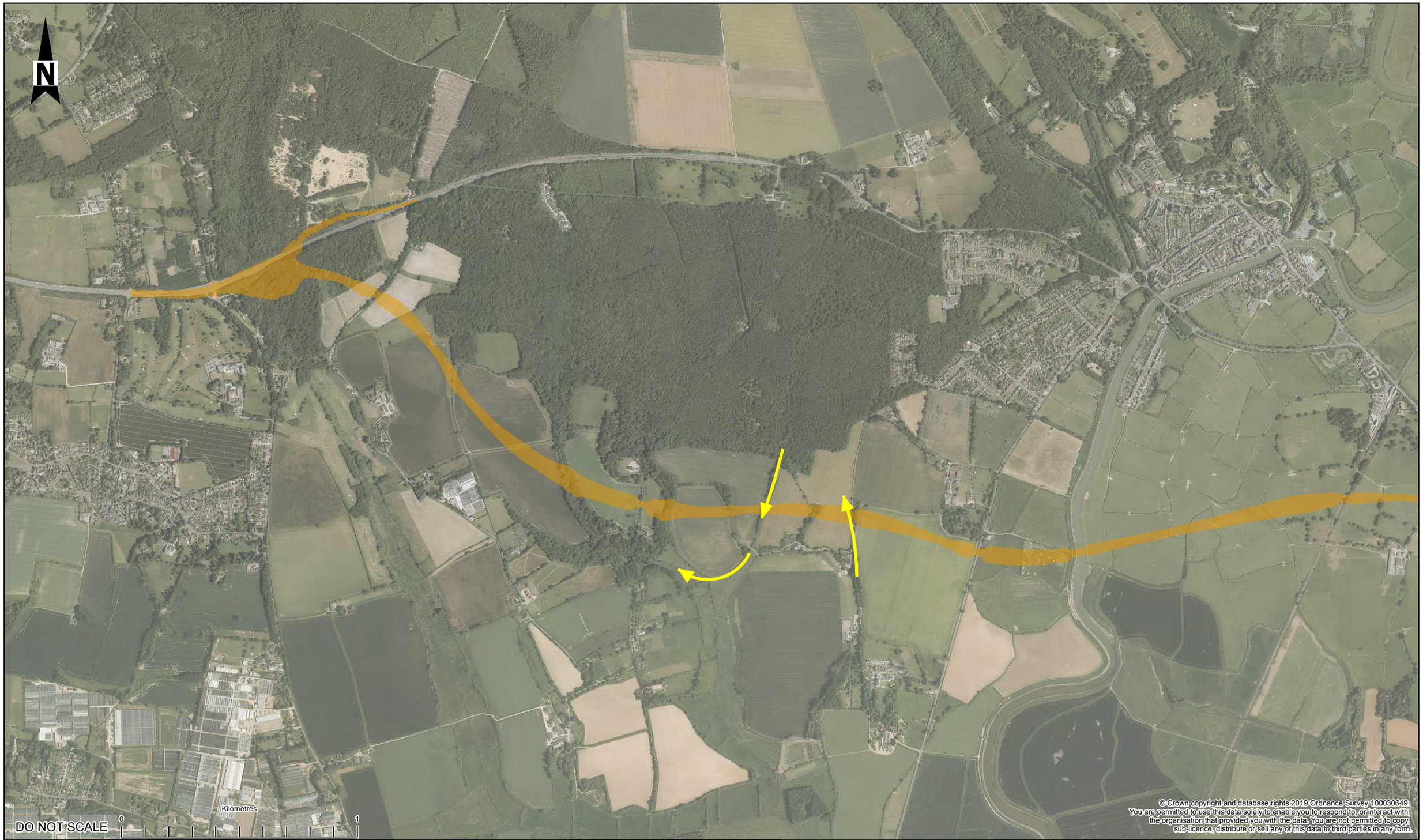

KEY:

OPTION 5A VARIANT 3

BECHSTEIN'S BAT FLIGHT LINES

BAT 18

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decommissioning / Demolition

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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.4:
BECHSTEIN'S BAT FLIGHT LINES

Scale	Drawn	Checked	Approved	Authorised
1:15,000	AS	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number Project | Originator | Volume | Location | Type | Role | Number: HE551523-WSP-GEN-SWI-GI-DR-0210

Project Ref. No: 70052558

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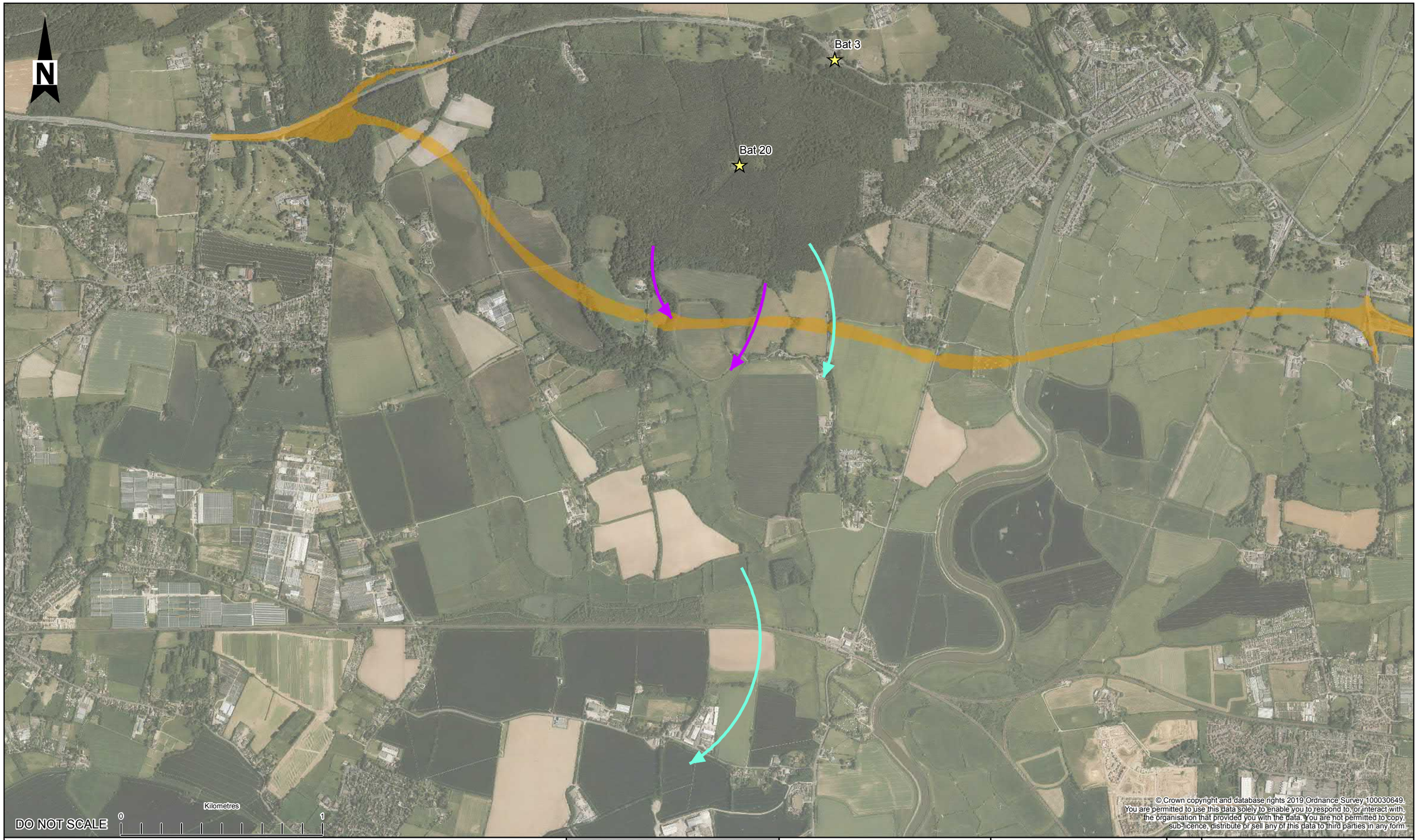

KEY:

OPTION 5A VARIANT 3

☆ WHISKERED BAT ROOSTS

WHISKERED BAT FLIGHT LINES

BAT 3

BAT 20

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.5:
WHISKERED BAT FLIGHT LINES

Scale	Drawn	Checked	Aproved	Authorised
1:17,500	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	17/01/20	17/01/20	17/01/20	17/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0211

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

NATTERER'S BAT ROOSTS

NATTERER'S BAT FLIGHT LINES

BAT 15

BAT 8

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decommissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.6:
NATTERER'S BAT FLIGHT LINES

Scale	Drawn	Checked	Approved	Authorised
1:10,000	AS	JH	AB	PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0212

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

BROWN LONG-EARED BAT ROOSTS

BROWN LONG-EARED BAT FLIGHT LINES

BAT 5

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decommissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.7:
BROWN LONG-EARED BAT
FLIGHT LINES

Scale	Drawn	Checked	Approved	Authorised
1:20,000	AS	JH	AB	PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0213

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3 **FORAGING AREAS**

ALCATHOE BAT FLIGHT LINES

- BAT 1
- BAT 6
- BAT 9

- 100% MCP - MAXIMUM HOME RANGE
- 50% KDE - CORE FORAGING AREAS
- 95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.8:
ALCATHOE BAT FORAGING AREAS

Scale	Drawn	Checked	Approved	Authorised
1:20,000	AS	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0219

Project Ref. No: 70052558

Revision: P01

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N

Bat 7

Bat 10

Kilometres

DO NOT SCALE

0 2

KEY:

OPTION 5A VARIANT 3

BARBASTELLE ROOSTS

BARBASTELLE FLIGHT LINES

BAT 7

BAT 10

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.9:
BARBASTELLE FORAGING AREAS - MAY

Scale	Drawn	Checked	Approved	Author
1:20,000	AS	JH	AB	PA
Original Size	Date	Date	Date	Date
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0208

Project Ref. No.: 70052558

Revision: P01

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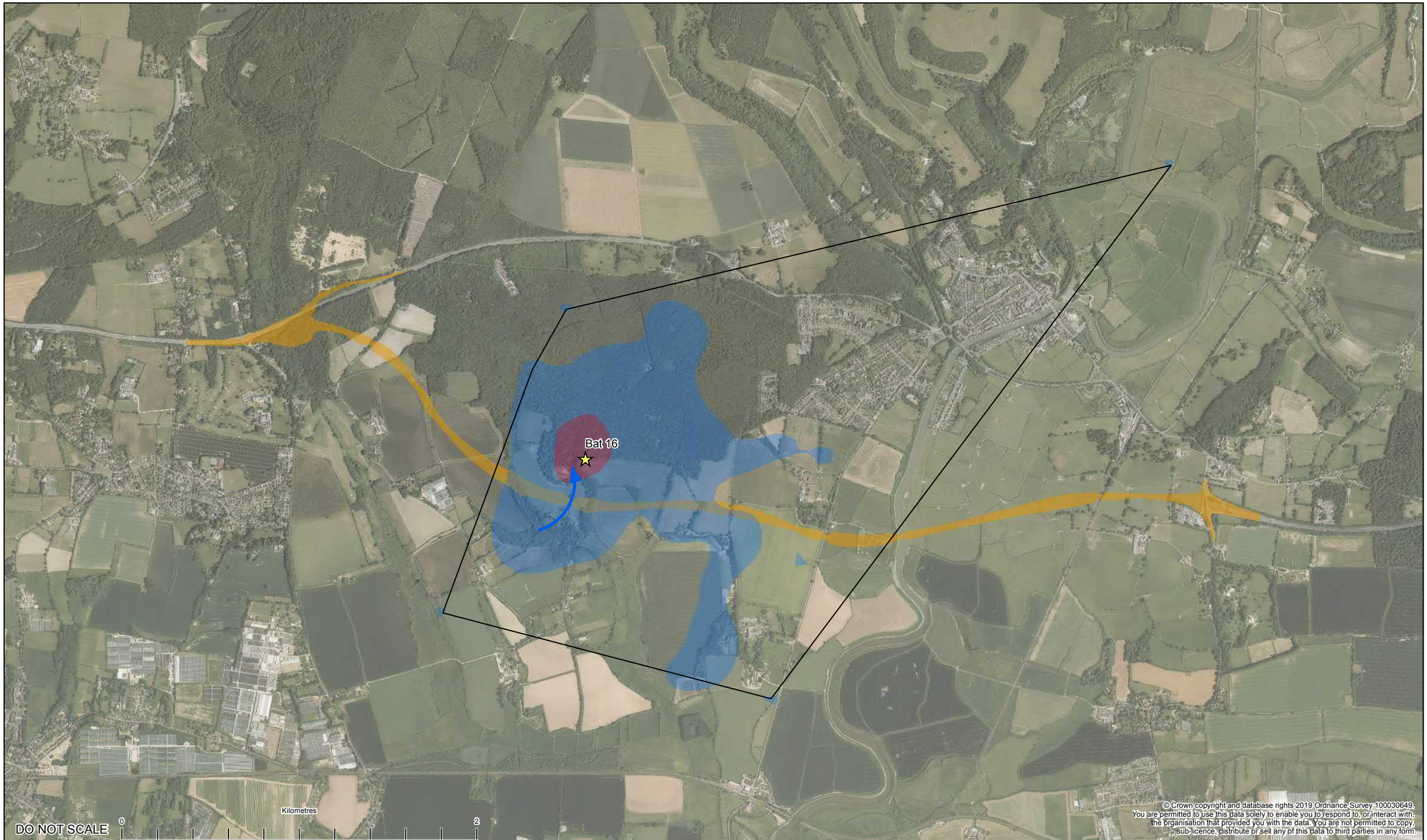

KEY:

OPTION 5A VARIANT 3

BARBASTELLE ROOSTS

BARBASTELLE FLIGHT LINES

BAT 16

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.10:
BARBASTELLE FORAGING AREAS - JULY

Scale	Drawn	Checked	Aproved	Authorised
1:20,000	MG	JH	AB	PA

Original Size	Date	Date	Date	Date
A3	17/01/20	17/01/20	17/01/20	17/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0217

Project Ref. No.: 70052558

Revision: P01

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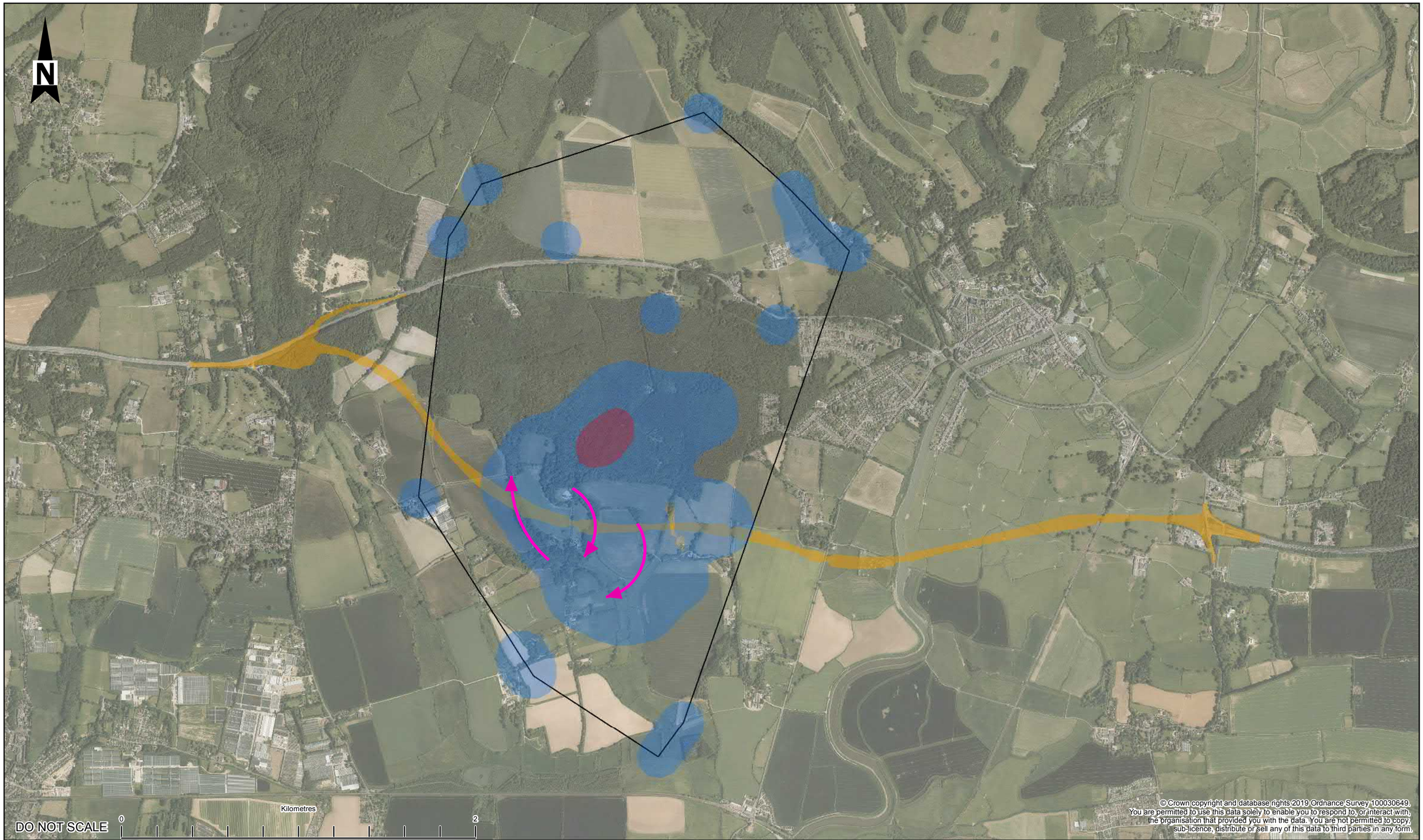

KEY:

OPTION 5A VARIANT 3

BARBASTELLE FLIGHT LINES

BAT 23

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.11:
BARBASTELLE FORAGING AREAS - AUGUST

Scale	Drawn	Checked	Aproved	Authorised
1:20,000	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	17/01/20	17/01/20	17/01/20	17/01/20

Drawing Number Project | Originator | Volume | Location | Type | Role | Number: HE551523-WSP-GEN-SWI-GI-DR-0218

Project Ref. No.: 70052558

Revision: P01

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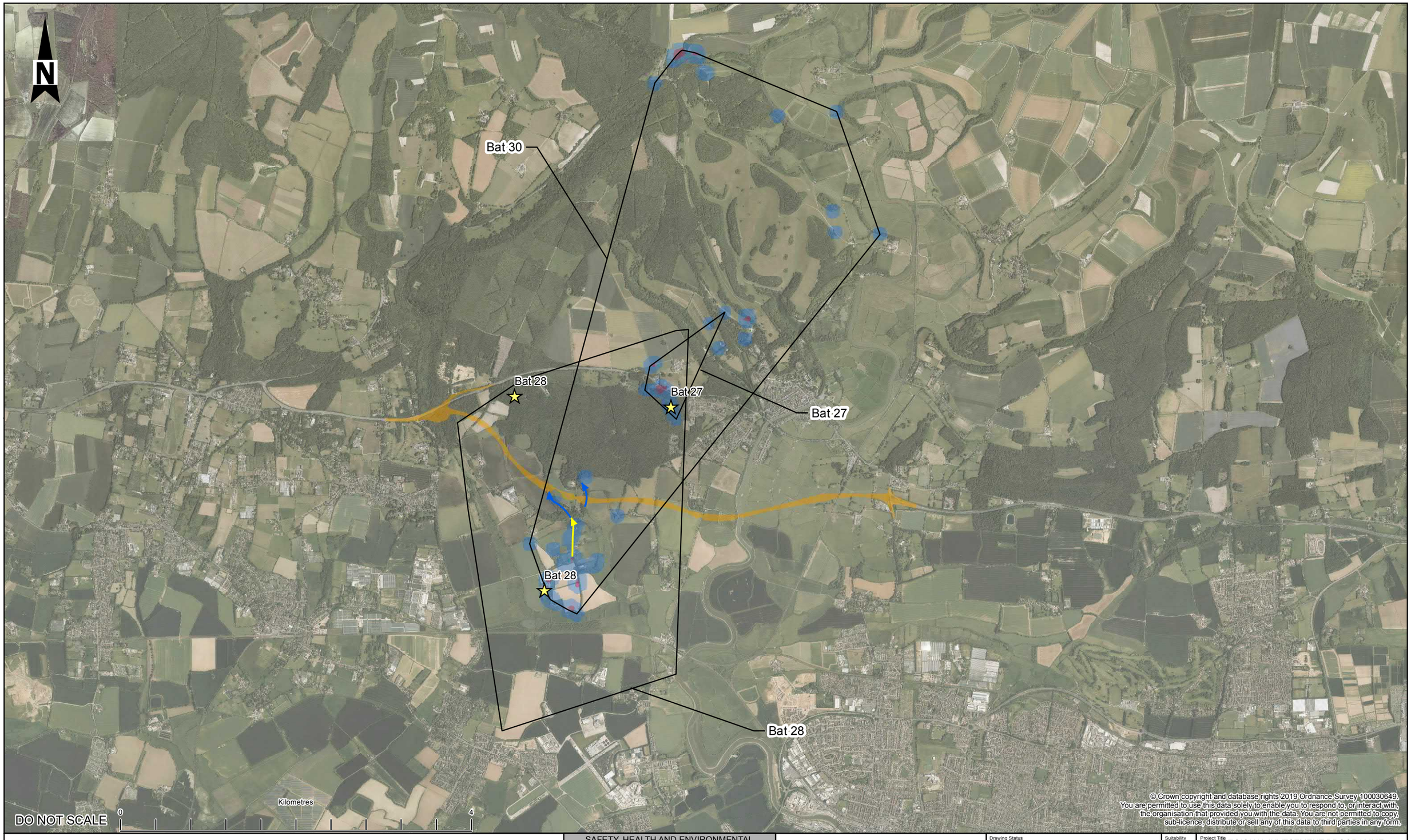

KEY:

OPTION 5A VARIANT 3

BARBASTELLE ROOSTS

BARBASTELLE FLIGHT LINES

BAT 30

BAT 28

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.12:
BARBASTELLE FORAGING AREAS - SEPTEMBER

Scale	Drawn	Checked	Approved	Authorised
1:40,000	AS	JH	AB	PA
Original Size: A3	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19	Date: 15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0219

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Revision: P01

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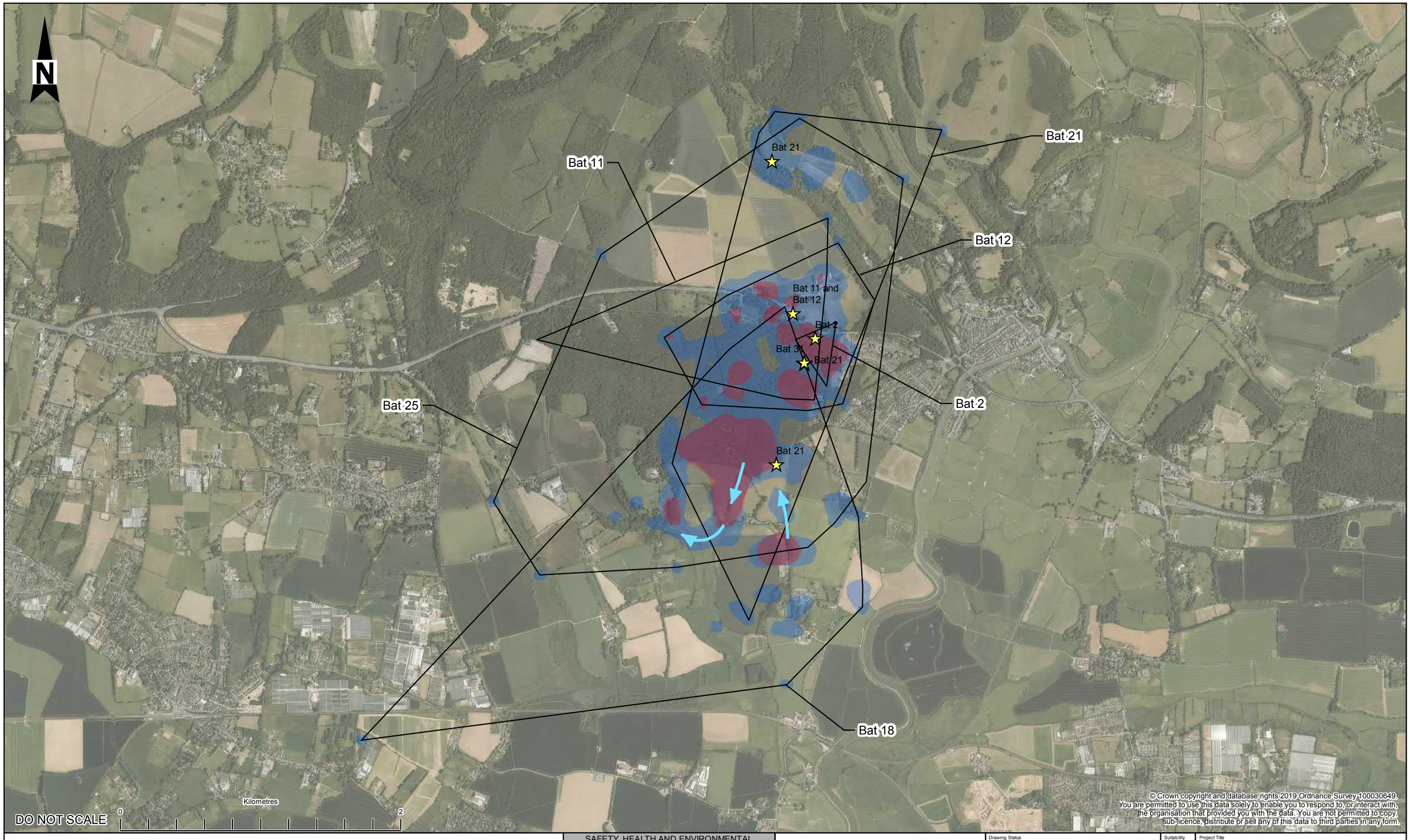

KEY:

OPTION 5A VARIANT 3

BECHSTEIN'S BAT ROOSTS

BECHSTEIN'S BAT FLIGHT LINES

BAT 18

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING FIGURE 3.13: BECHSTEIN'S BAT FORAGING AREAS

Scale	Drawn	Checked	Aproved	Authorised
1:25,000	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0221

Project Ref. No.: 70052558

Revision: P01

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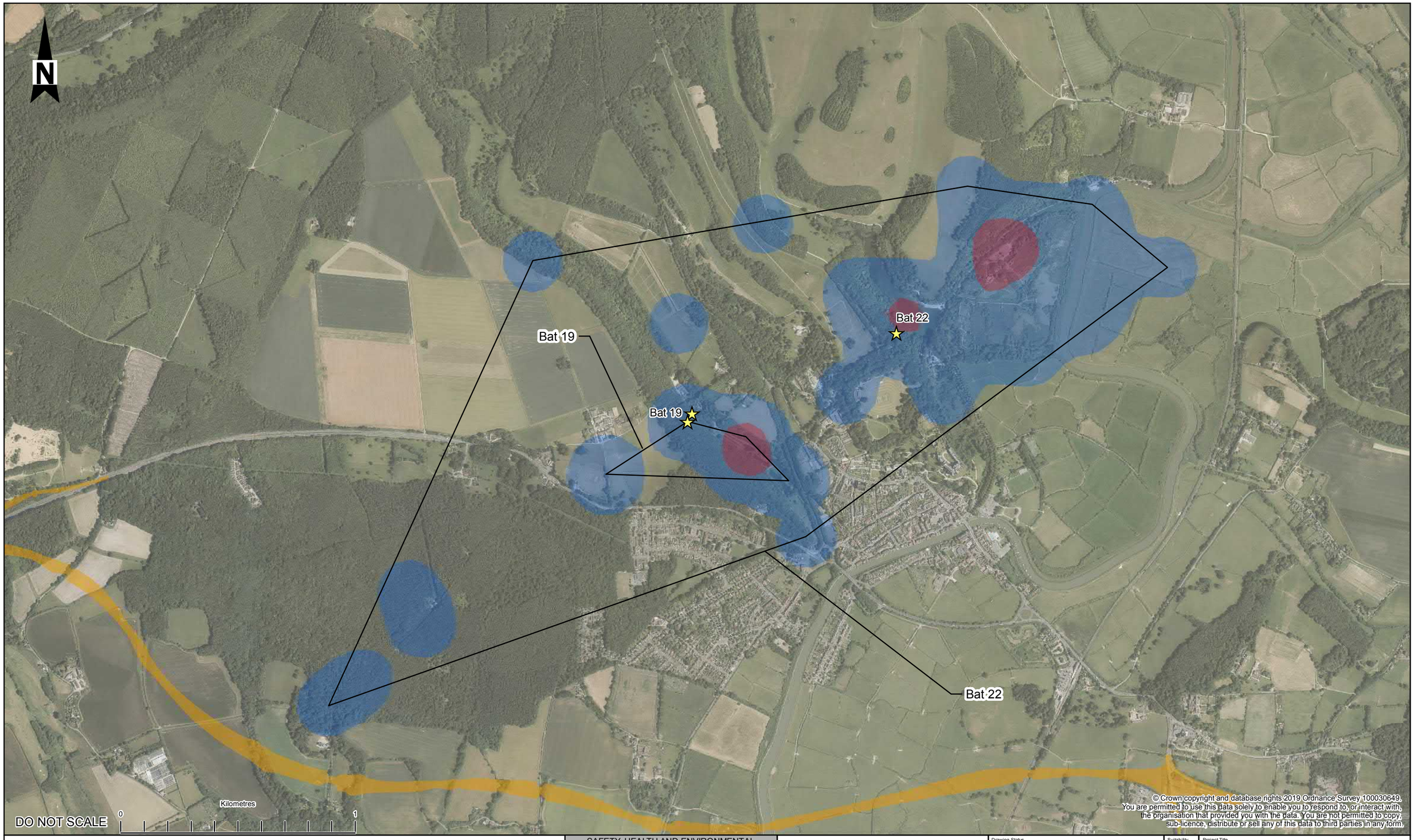

KEY:

OPTION 5A VARIANT 3

DAUBENTON'S BAT ROOSTS

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.14:
DAUBENTON'S BAT
FORAGING AREAS

Scale	Drawn	Checked	Aproved	Authorised
1:15,000	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	17/01/20	17/01/20	17/01/20	17/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0222

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

NATTERER'S BAT ROOSTS

NATTERER'S BAT FLIGHT LINES

BAT 8

BAT 15

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.15:
NATTERER'S BAT
FORAGING AREAS

Scale	Drawn	Checked	Approved	Authorised
1:15,000	AS	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number Project | Originator | Volume | Location | Type | Role | Number: HE551523-WSP-GEN-SWI-GI-DR-0226

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

WHISKERED BAT ROOSTS

WHISKERED BAT FLIGHT LINES

BAT 3

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.16:
WHISKERED BAT
FORAGING AREAS - MAY

Scale	Drawn	Checked	Aproved	Authorised
1:30,000	MG	JH	AB	PA

Original Size	Date	Date	Date	Date
A3	17/01/20	17/01/20	17/01/20	17/01/20

Drawing Number: Project | Originator | Volume
HE551523-WSP-GEN-SWI-GI-DR-0223
Location | Type | Role | Number

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

WHISKERED BAT ROOSTS

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

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Drawing Status: FINAL

Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.17:
WHISKERED BAT
FORAGING AREAS - JULY

Scale	Drawn	Checked	Aproved	Authorised
1:15,000	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: HE551523-WSP-GEN-SWI-GI-DR-0224
Project | Originator | Volume | Location | Type | Role | Number

Project Ref. No.: 70052558

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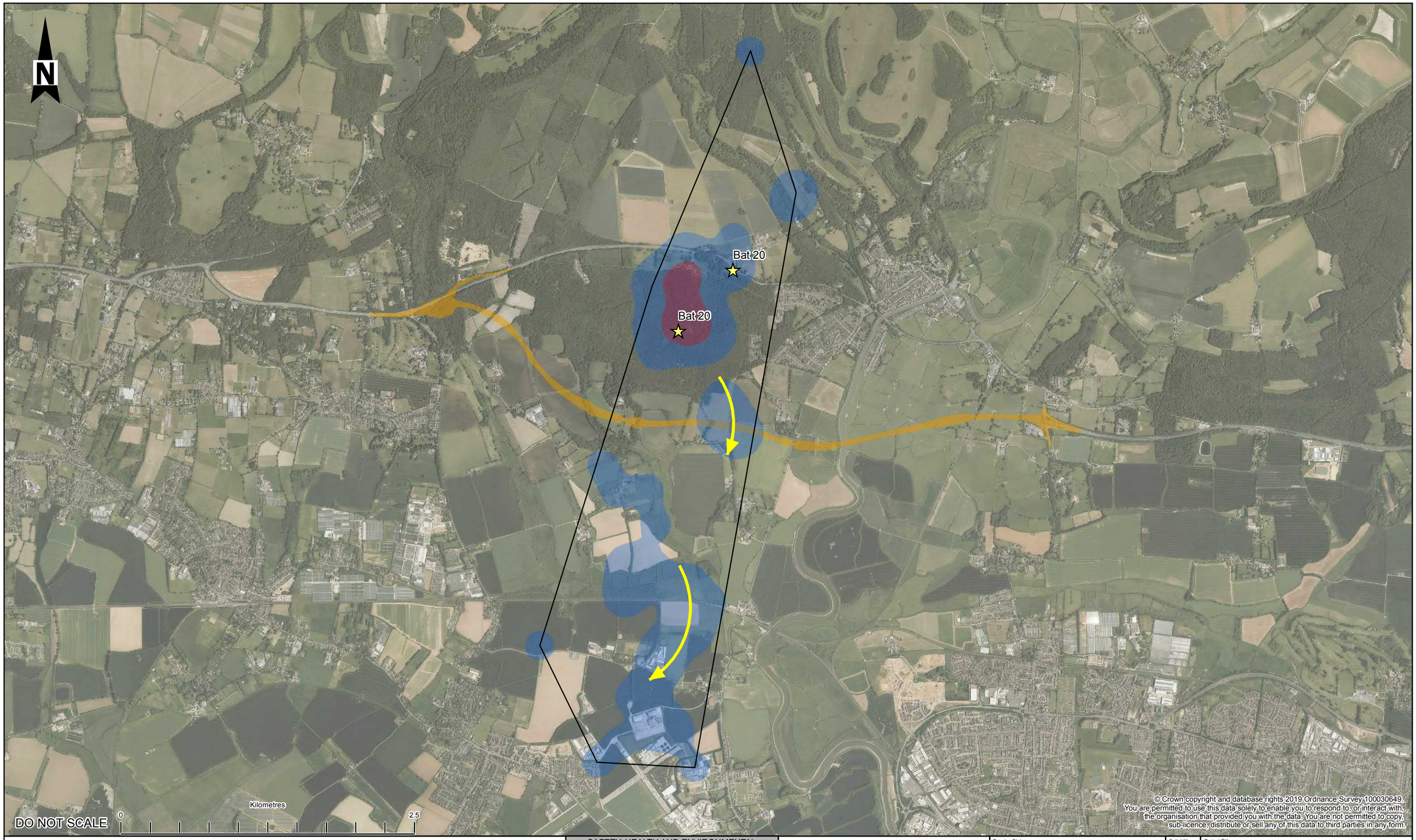

KEY:

OPTION 5A VARIANT 3

WHISKERED BAT ROOSTS

WHISKERED BAT FLIGHT LINES

BAT 20

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decomissioning / Demolition

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Drawing Status: FINAL

Suitability: S0

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A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.18:
WHISKERED BAT FORAGING AREAS - AUGUST

Scale	Drawn	Checked	Approved	Authorised
1:30,000	AS	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0225

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Revision: P01

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N

Bat 26

Kilometres

DO NOT SCALE 0 1

KEY:

OPTION 5A VARIANT 3

FORAGING AREAS

- 100% MCP - MAXIMUM HOME RANGE
- 50% KDE - CORE FORAGING AREAS
- 95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON

In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).

Construction

Maintenance / Cleaning

Use

Decomissioning / Demolition

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Suitability: S0

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Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.19:
WHISKERED BAT FORAGING AREAS - SEPTEMBER

Scale	Drawn	Checked	Aproved	Authorised
1:10,000	MG	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	27/01/20	27/01/20	27/01/20	27/01/20

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0274

Project Ref. No.: 70052558

Revision: P01

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KEY:

OPTION 5A VARIANT 3

BROWN LONG-EARED BAT ROOSTS

BROWN LONG-EARED BAT FLIGHT LINES

BAT 5

FORAGING AREAS

100% MCP - MAXIMUM HOME RANGE

50% KDE - CORE FORAGING AREAS

95% KDE - PERIPHERAL FORAGING AREAS

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATON
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following significant residual risks (Reference shall also be made to the design hazard log).
Construction
Maintenance / Cleaning
Use
Decomissioning / Demolition

Rev.	Date	Description	By	Chk'd	App'd
P01.1	---	First Issue	---	---	---

Drawing Status: FINAL

Suitability: S0

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Client: Working on behalf of highways england

Project Title: REGIONAL INVESTMENT PROGRAMME
A27 ARUNDEL BYPASS

Drawing Title: BAT RADIOTRACKING
FIGURE 3.20:
BROWN LONG-EARED BAT
FORAGING AREAS

Scale	Drawn	Checked	Approved	Authorised
1:15,000	AS	JH	AB	PA
Original Size	**Date**	**Date**	**Date**	**Date**
A3	15/08/19	15/08/19	15/08/19	15/08/19

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551523-WSP-GEN-SWI-GI-DR-0227

Project Ref. No.: 70052558

Revision: P01

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Appendix D – Desk Study Data

Desk Study: European protected species licences within 2 km

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	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	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	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	2015-13198-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	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	EPSM2008-946
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	04/08/2010
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

Appendix E - Radio-Tracked Bats: Emergence Survey Data & DNA Analysis Results

Table E-1: Day roost search survey dates and teams

Team	Date	Surveyors	Bats Tracked
1	15/05/2018	2	2,3,4,5,6
1	16/05/2018	2	1,2,3,4,5,6,8,9
1	17/05/2018	2	10
1	18/05/2018	2	1,5,7,8,9,10
1	19/05/2018	2	1,3,4,6,7,8,9
1	17/07/2018	2	11,12,13,14
1	18/07/2018	2	11,12,13,14,15,16,17
1	19/07/2018	2	11,12,13,14,15,16,17,18,19
1	20/07/2018	2	11,12,13,15,16,17,18,19
1	25/08/2018	2	20,21,22,23
1	11/09/2018	2	27,28
1	12/09/2018	2	28,31
1	13/09/2018	2	28,31
1	14/09/2018	2	28

Table E-2: Radio-tracking survey dates and surveyors

Team	Dates	Surveyors	Bats Tracked
RT 1	15/05/2018-16/05/2018	2	Bats 1,2,3,4, 5, 6 and 7 between 20:44 and 02:11
RT 2	15/05/2018-16/05/2018	2	Bats 2,3,4,5,6,7 and 9 between 20:45 and 02:56
RT 3	15/05/2018-16/05/2018	2	Bats 1,2,3,4,5,6 and 7 between 22:20 and 02:56
RT 1	16/05/2018-17/05/2018	2	Bats 1,3,4,6,7,8,9 and 10 between 21:20 and 01:51
RT 2	16/05/2018-17/05/2018	2	Bats 1,3,4,6,7,8,9 and 10 between 21:20 and 01:25
RT 3	16/05/2018-17/05/2018	2	Bats 1,3,4,5,7,8,9 and 10 between 21:23 and 02:47
RT 1	17/05/2018-18/05/2018	2	Bats 2,3,4,5,6,7 and 8 between 20:55 and 03:28
RT 2	17/05/2018-18/05/2018	2	Bat 10 between 00:25 and 00:31
RT 3	17/05/2018-18/05/2018	2	Bats 2, 3,5 and 8 between 01:50 and 02:47
RT 4	17/05/2018-18/05/2018	2	Bat 10 between 21:22 and 21:43
RT 1	18/05/2018-19/05/2018	2	Bats 3,4,5,6,7,8 and 10 between 21:40 and 01:59
RT 2	18/05/2018-19/05/2018	2	Bats 1,3,4,5,6,7,9 and 10 between 20:46 and 02:25
RT 3	18/05/2018-19/05/2018	2	Bats 1 and 7 between 23:01 and 23:14
RT 1	17/07/2018-18/07/2018	2	Bats 11,12,13,14 and 15
RT 2	17/07/2018-18/07/2018	2	Bats 11,12 and 13 between 23:11 and 01:50
RT 3	17/07/2018-18/07/2018	2	Bats 11,12,13 and 14 between 21:58 and 02:40
RT 4	17/07/2018-18/07/2018	1	Bat 12 between 22:17 and 22:22
RT 1	18/07/2018-19/07/2018	2	Bats 11,12,13,15 and 16 between 22:57 and 02:20
RT 2	18/07/2018-19/07/2018	2	Bats 11,12,14,15, 16 and 17 between 21:50 and 01:41
RT 3	18/07/2018-19/07/2018	2	Bats 11,12,13,15,16 and 18

Team	Dates	Surveyors	Bats Tracked
RT1	19/07/2018-20/07/2018	2	Bats 11,13,15,16 and 18 between 21:56 and 02:38
RT 2	19/07/2018-20/07/2018	2	Bats 13,15,16,18 and 19 between 21:29 and 00:58
RT 3	19/07/2018-20/07/2018	2	Bats 11 and 13 between 22:50 and 23:45
RT 4	19/07/2018-20/07/2018	2	Bats 13,15,16 and 18 between 21:40 and 23:39
RT 1	20/07/2018-21/07/2018	2	Bats 15, 16 and 18 between 21:39 and 03:07
RT 2	20/07/2018-21/07/2018	2	Bats 11,12,16 and 18 between 23:40 and 03:07
RT 3	20/07/2018- 21/07/2018	2	Bats 11,15,16 and 18 between 21:35 and 03:38
RT 1	21/08/2018-22/08/2018	2	Bats 20 and 21 between 21:06 and 01:57
RT 2	21/08/2018-22/08/2018	2	Bats 20 and 21 between 20:58 and 01:46
RT 3	21/08/2018-22/08/2018	2	Bat 20 between 21:36 and 01:46
RT 1	22/08/2018-23/08/2018	2	Bats 20 and 21 between 20:33 and 02:39
RT 2	22/08/2018-23/08/2018	2	Bats 20 and 21 between 20:35 and 02:38
RT 3	22/08/2018-23/08/2018	2	Bats 20 and 21 between 20:35 and 02:39
RT 1	23/08/2018-24/08/2018	2	Bats 21,22 and 23 between 22:11 and 02:16
RT 2	23/08/2018-24/08/2018	2	Bats 21 and 22 between 21:05 and 02:16
RT 3	23/08/2018-24/08/2018	2	Bats 20,21 and 23 between 21:03 and 02:19
RT 1	24/08/2018-25/08/2018	2	Bats 21 and 23 between 20:18 and 00:23
RT 2	24/08/2018-25/08/2018	2	Bats 21,22 and 23 between 20:13 and 00:14
RT 3	24/08/2018-25/08/2018	2	Bats 21,22 and 23 between 20:21 and 00:37
RT 1	11/09/2018-12/09/2018	2	Bats 24, 26, 28 and 30 between 19:31 and 01:35
RT 2	11/09/2018-12/09/2018	2	Bats 26,27,28 and 30 between19:33 and 01:38
RT 3	11/09/2018-12/09/2018	2	Bats 24,26,27, 28 and 30 between 19:47 and 01:35
RT 1	12/09/2018-13/09/2018	2	Bats 28 and 30 between 19:57 and 00:38
RT 2	12/09/2018-13/09/2018	2	Bats 28 and 30 between 19:56 and 01:30
RT 3	12/09/2018-13/09/2018	2	Bats 28 and 30 between 21:25 and 23:59
RT 1	13/09/2018-14/09/2018	2	Bats 28 and 30 between 21:25 and 23:56
RT 2	13/09/2018-14/09/2018	2	Bats 28 and 30 between 20:31 and 00:27
RT 3	13/09/2018-14/09/2018	2	Bats 28 and 30 between 20:12 and 00:35
RT 1	13/09/2018-14/09/2018	2	Bats 25, 27 and 28 between 20:03 and 23:24
RT 2	13/09/2018-14/09/2018	2	Bats 25,27,28 and 30 between 20:03 and 23:40
RT 3	13/09/2018-14/09/2018	2	Bat 28 between 20:03 and 20:42

Table E-3: Emergence survey locations

Date	Easting	Northing	Location details	Equipment
15/05/2018	500446	106970	Mature oak in Stewards copse (bat 5)	Batlogger M

Date	Easting	Northing	Location details	Equipment
15/05/2018	500362	107051	Semi mature ash tree with knot hole at 6m height, NW elevation (bat 2)	Batlogger M, Canon XA20 Infra-red video camera
15/05/2018	500231	206904	Oak tree adjacent to Tortington lane (bat 6)	Batlogger M
16/05/2018	500181	107210	East lodge, Top of Tortington lane (bats 3 and 4)	Batlogger M
17/05/2018	498874	104904	Marsh farm (bat 10) access and visibility restricted	Batlogger M
18/05/2018	498817	106826	Ash oak tree in Binsted Woods Complex LWS (bat 1)	Batlogger M
18/05/2018	498867	104926	Marsh farm, lean too barn with dense ivy (bat 10)	Batlogger M, Canon XA20 Infra-red video camera
19/05/2018	498906	105761	Ash tree in Lake Copse (bat 8)	Batlogger M, Canon XA20 Infra-red video camera
17/07/2018	499708	106685	House at Pinewoods, SE corner of property (bat 13)	Batlogger M, EMT and IPhone 7
17/07/2018	500224	107924	Sycamore tree on northern perimeter of White Swan Hotel carpark, Chichester rd (bats 11 and 12)	Batlogger M, Canon XA20 Infra-red video camera
17/07/2018	497903	106941	Beech tree in Barn's Copse (Bat 14)	Batlogger M, Canon XA20 Infra-red video camera
18/07/2018	499333	106166	Large oak tree on woodland edge, south of Binsted Woods Complex LWS. Multiple features (Bat 16)	Batlogger M, Batbox Duet, EMT, IPhone 7
18/07/18	500224	107924	Sycamore tree on northern perimeter of White Swan Hotel carpark, Chichester Rd.	Batlogger M, Canon XA20 Infra-red video camera
18/07/18	499708	106685	House at Pinewoods, SE corner of property.	Batlogger M, EMT and IPhone 7

Date	Easting	Northing	Location details	Equipment
19/07/2018	499305	106906	Oak tree within Binsted Woods Complex LWS (bat 15)	Batlogger M, Canon XA20 Infra-red video camera
20/07/2018	500793	107490	Group of ash and beech trees, exact roosting location could not be identified (Bat 19)	Batlogger M, Canon XA20 Infra-red video camera
21/08/2018	499708	106685	House at Pinewoods, SE corner of property (bat 20)	Batlogger M
22/08/2018	500085	106151	Large mature oak, southern perimeter of Tortington common (bat 21)	Batlogger M, Canon XA20 Infra-red video camera
23/08/2018	500175	107205	West lodge, Tortington lane (Bat 20)	Batlogger M
23/08/2018	500085	106151	Large mature oak, southern perimeter of Tortington common (bat 21)	Batlogger M
11/09/2018	500332	106969	Leaning sweet chestnut (bat 27)	Batlogger M
12/09/2018	500284	106878	Early mature beech located in Steward's Copse (bat 31)	Batlogger M, Canon XA20 Infra-red video camera
12/09/2018	498552	107089	Mature oak in Brickkiln Copse (bat 28)	Batlogger M, Canon XA20 Infra-red video camera
13/09/2018	498890	104873	Agricultural unit at Marsh Farm (bat 28)	Batlogger M

Table E-4: Radio-tagging data

Species	No. of bats radio-tagged	Bat identification numbers
Alcathoe bat	4	Bat 1, Bat 6, Bat 9 and Bat 24
Barbastelle	7	Bat 7, Bat 10, Bat 16, Bat 23, Bat 27, Bat 28 and Bat 30
Bechstein's bat	7	Bat 2, Bat 11, Bat 12, Bat 18, Bat 21, Bat 25 and Bat 31
Brown long-eared bat	2	Bat5 and Bat 14
Daubenton's bat	2	Bat 19 and Bat 22
Natterer's bat	3	Bat 8, Bat 15 and Bat 29
Whiskered bat	6	Bat 3, Bat 4, Bat 13, Bat 17, Bat 20 and Bat 26
Total	**31**	

Table E5: 100% MCP, 95% KDE and 50% KDE for all bats

Month	Bat Identification No.	Species	100%MCP (ha)	95%KDE (ha)	50% KDE (ha)
May	1	Alcathoe	150.6	14.5	16.4
May	2	Bechstein's	6.1	N/A*	3.5
May	3	Whiskered	329.1	237.4	35.3
May	4	Whiskered	310.3	296.1	19.6
May	5	Brown long-eared	102.6	83.4	9.3
May	6	Alcathoe	208.0	269.3	23.4
May	7	Barbastelle	223.3	342.6	63.8
May	8	Natterer's	172.3	241.4	51.9
May	9	Alcathoe	118.8	125.8	12.3
May	10	Barbastelle	213.9	95.2	4.9
July	11	Bechstein's	136.2	64.5	6.3
July	12	Bechstein's	116.6	98.03	3.4
July	13	Whiskered	195.6	238.5	34.8
July	14	Brown long-eared	15.7	5.4	0.3
July	15	Natterer's	140.8	238.1	55.0
July	16	Barbastelle	601.0	137.8	15.4
July	17	Whiskered	N/A*	N/A*	N/A*
July	18	Bechstein's	513.0	282.4	40.1
July	19	Daubenton's	10.9	37.8	3.7
~~July~~August	20	Whiskered	648.9	306.8	23.2
August	21	Bechstein's	335.5	41.3	1.2
August	22	Daubenton's	371.5	149.6	8.4
August	23	Barbastelle	572.5	237.4	N/A*
September	24	Alcathoe	161.6	285.6	46.9
September	25	Bechstein's	639.1	N/A*	15.3
September	26	Whiskered	61.7	21.3	0.8
September	27	Barbastelle	41.1	19.6	1.0
September	28	Barbastelle	907.5	62.7	0.3
September	29	Natterer's	N/A*	N/A*	N/A*
September	30	Barbastelle	1245.4	81.7	2.3
September	31	Bechstein's	N/A*	N/A*	N/A*

Analysis results for bats not identified to species level in the field

Results

The identification results are based on the percentage similarity (% ID) of the generated sequences to the BOLD database.

NM ID	Sample ID	Binomial	Vernacular species name	% ID
4603	1	*Myotis alcathoe*	Alcathoe bat	99
4604	2	NA	NA	NA
4605	3	*Myotis mystacinus*	Whiskered bat	100
4606	4	*Myotis alcathoe*	Alcathoe bat	99
4607	5	*Myotis mystacinus*	Whiskered bat	100
4608	6	*Myotis mystacinus*	Whiskered bat	100
4609	7	*Myotis alcathoe*	Alcathoe bat	99
4610	8	*Myotis mystacinus*	Whiskered bat	100
4611	9	*Myotis mystacinus*	Whiskered bat	100
4612	10	NA	NA	NA
4613	11	*Myotis mystacinus*	Whiskered bat	100
4614	12	*Myotis mystacinus*	Whiskered bat	100
4615	13	*Myotis mystacinus*	Whiskered bat	100
4616	14	*Myotis mystacinus*	Whiskered bat	100
4617	15	*Myotis mystacinus*	Whiskered bat	100
4618	16	*Myotis mystacinus*	Whiskered bat	100
4619	17	*Myotis mystacinus*	Whiskered bat	100

Methods & Quality Control

DNA from each faecal pellet was extracted using a commercial DNA extraction kit with a protocol modified to increase DNA yields. This DNA was purified to remove PCR inhibitors, and a nested PCR approach was adopted to amplify a bat specific fragment of the cytochrome oxidase *c* subunit 1 (COI) gene. All PCRs were performed in the presence of both a negative control and a positive control sample. Amplification success was determined by gel electrophoresis.

Comment: PCR reactions for 16 DNA extractions were successful. Electrophoresis bands were strong and of the expected size. 1 sample did not amplify with the bat specific primers. It is unlikely that the DNA is degraded or inhibited because the first PCR with the more universal primer set was successful.

The successful PCR products were purified and Sanger sequenced. Raw sequences were trimmed and cleaned of low-quality base calls to increase the confidence of identification. After cleaning, sequences were identified using the BOLD reference database. By default, the BOLD identification algorithm is very stringent and only provides species-level identifications if the sequence matches the reference by at least 98%. The presented species-level identification is the top hit on the BOLD database based on species identity.

Comment: The quality of the sequences were high and in all cases clear enough to identify all of the sample (average > 70% HQ). The sequence length obtained was sufficient for conclusive identification for all samples (> 170 bp). The quality and length of the sequence for one sample (#10, NMID#4612) was too low to confidently identify the sample.

End of report

Report issued by: Dr. Cuong Tang

Contact: ct@naturemetrics.co.uk | 01491 829042

Understanding your results

Positive — The species identity returned is one of the 17 British species. The quality and length of the sequence was high enough to confidently return a taxonomic identity and all controls behaved as expected.

Inconclusive — We cannot conclusive identify the species of bat. This could be for a number of reasons: The sample is not from a bat, the concentration of bat DNA is below our limit of detection, the DNA has degraded beyond our limit of detection, the extracted DNA is inhibited, or the quality of the sequence is not high enough to confidently identify the sequence. The sample is unlikely to be inhibited because the extracted DNA is re-purified using a commercial kit. Poor quality sequences are repeated free of charge but will add additional time.