A303 Amesbury to Berwick Down

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6.3 Environmental Statement Appendices

Appendix 8.17 Bat activity report

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A303 Stonehenge

Amesbury to Berwick Down

Bat Activity Survey Report 2017

Arup Atkins Joint Venture

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Foreword

The A303/A358 corridor is a vital connection between the South West and London and the South East. While the majority of the road has been dualled, there are still over 35 miles of single carriageway. These sections act as bottlenecks for users of the route resulting in congestion, particularly in the summer months and at weekends, delays to traffic travelling between the M3 and the South West and an increased risk of accidents. The A303 passes through the Stonehenge, Avebury and Associated Sites World Heritage Site, separating the stones from other scheduled monuments and severely limiting the enjoyment of the wider site.

The A303 Stonehenge (Amesbury to Berwick Down) scheme is part of the wider package of proposals for the A303/A358 corridor designed to transform the connectivity to and from the South West by creating an expressway. This would comprise consistently good dual carriageway roads with grade-separated junctions, giving most users a motorway-quality journey. The A303/A358 package was identified in the 2014 National Infrastructure Plan as one of the country's Top 40 priority infrastructure projects.

The proposals by Highways England to upgrade the A303 past Stonehenge consist of an eight mile (13 kilometre) stretch from Amesbury in the east, through the Stonehenge World Heritage Site (WHS) and the village of Winterbourne Stoke, to Berwick Down in the west. Proposals include a 1.8 mile (2.9 kilometre) tunnel with approach roads inside the WHS, a new bypass for Winterbourne Stoke (passing either north or south of the village) and improvements to existing junctions with the A345 and A360.

Highways England (HE) commissioned the Arup-Atkins Joint Venture (AAJV) to undertake the Options Phase for the scheme starting in January 2016. The AAJV was also commissioned by HE to undertake bat surveys along these proposed route options in order to de-risk the next stages of the project, due to the fast-tracked nature of the scheme. This report presents the findings of the 2016/2017 bat activity surveys, and should be read in conjunction with the other bat survey reports (namely the 2017 Bat Crossing Point Survey Report[1], the 2017 Bat Roost Report (in prep), and the 2017 bat trapping and radiotracking report[2] to gain a full appreciation of the overall bat activity and species assemblages across the route options. The AAJV would like to thank all the landowners for their considerable help and consideration during the course of the surveys.

[1] AAJV (2017). A303 Stonehenge Amesbury to Berwick Down Bat Crossing Point Survey Report 2017. Document reference HE551506-AA-EBD-SWI-SU-YE-000017.
[2] AAJV (2017). A303 Stonehenge Amesbury to Berwick Down Advanced Bat Surveys. Document reference HE551506-AA-EBD-SWI-SU-YE-000016.

Executive Summary

The AAJV were commissioned by Highways England in summer 2016 to undertake bat activity surveys as part of a programme of ecological surveys to inform the design of the proposed A303 Amesbury to Berwick Down road improvement scheme. These activity surveys entailed a combination of walked transect surveys and static automated surveys.

This report presents the baseline survey results recorded during the 2016 and 2017 bat activity surveys across each of the three route options proposed at the time. It is intended that the information in this report will be used to identify and assess the potential implications of the scheme and inform mitigation and compensation for the species.

A framework of international (European), national and local legislation and planning policy guidance exists to protect and conserve bats.

Following an assessment of each route options against the habitat features that would be affected by them, eight transect routes were surveyed monthly between May and September inclusive, following the route of the scheme options but also encompassing features in the wider landscape due to the open nature of the land along the scheme options.

Static automated monitoring of bat activity was conducted during 2016 and 2017, at 39 monitoring points distributed across the project landscape, between Amesbury and Berwick St James.

The static detectors recorded over 325,000 bat passes during the five months surveyed in 2016 and the seven months surveyed in 2017. The levels of activity were variable across the different locations. Soprano pipistrelle were the most commonly recorded species, followed by common pipistrelle, and *Myotis* species. Most notably recorded were lesser and greater horseshoe bats, and barbastelle, all of which are protected under Annex 2 of the European Habitats Directive. Other species recorded include serotine bat, Brandt's bat, Daubenton's bat, Natterer's bat, whiskered bat, Leisler's bat, noctule, and Nathusius' pipistrelle.

These surveys fulfilled their objectives in providing baseline information about the species of bats present and their use of the landscape across the three route options. A complete assessment of potential impacts to bats will be undertaken within the Environmental Impact Assessment for the preferred route option, along with details of mitigation and compensation measures as appropriate.

1 Introduction

1.1 Project Background

1.1.1 The A303 Stonehenge (Amesbury to Berwick Down) scheme forms part of the A303/A30 trunk route, which provides vital east-west connectivity between London and the South West and is also part of the Trans-European Network-Transport (TEN-T). The A303, which runs for approximately 150km from Junction 8 of the M3 near Basingstoke towards Taunton and Exeter, serves not only long distance traffic but also intermediate regional destinations via connecting major north-south route options as well as local small and medium sized settlements along the route.

1.1.2 Recognising the importance of the A303/A358 Corridor and the problems along it, the Government has committed in its Road Investment Strategy (RIS) to create an 'Expressway' to the South West via the A303/A358 route by 2029. The A303 Stonehenge scheme, involving dualling the A303 between Amesbury and Berwick Down and including the construction of a tunnel at least 1.8 miles (2.9 kilometres) long as the road passes Stonehenge, has been prioritised within the first RIS period (2015/16 to 2019/20).

1.1.3 Following public consultation in January 2017, three routes were recommended for detailed assessment during 2017, Route Options 1Na, 1Sa and 1Nd.

1.2 Scope

1.2.1 This report presents the baseline survey results recorded during the 2016 and 2017 bat activity surveys. It is intended that the information in this report will be used with the results of other ecological surveys to identify and assess the potential implications of the scheme and inform mitigation and compensation for bats.

1.2.2 This baseline report can be used to accompany any future planning application and associated Environmental Impact Assessment (EIA) for the proposed scheme.

1.3 Survey Objectives

1.3.1 The surveys were conducted with the following objectives:

- To record bat activity levels and make observations on bat behaviour on eight walked transects, sampling habitats within the study area;
- To record and identify levels of bat activity, using static bat detectors, at 39 locations spaced within the study area;
- To identify the range of species present and their relative abundance in terms of activity levels at these locations.

1.4 Legislation

1.4.1 Bats are a European Protected Species (EPS), and are protected under the Conservation of Habitats and Species Regulations 2017, known as the Habitats Regulations.

1.4.2 Under the Habitats Regulations, it is an offence to deliberately capture, injure or kill any wild animal of an EPS, deliberately disturb wild animals of any such species, deliberately take or destroy the eggs of such an animal or damage or destroy a breeding site or resting place of such an animal.

1.4.3 Bats receive further protection through inclusion on Schedule 5 of the Wildlife and Countryside Act (WCA) 1981 (as amended). Under this Act it is an offence to intentionally kill, injure or take any protected species; intentionally or recklessly damage, destroy or obstruct access to any structure or place which a protected species uses for shelter or protection; and intentionally or recklessly disturb any protected species while it is occupying a structure or place which it uses for shelter or protection.

1.4.4 Actions that are prohibited by legislation can be made lawful on the approval and granting of a licence from Natural England (NE), subject to conditions.

1.4.5 The reader should refer to the original legislation for the definitive interpretation.

2 Methodology

2.1 Survey Area

2.1.1 The survey area included the three proposed route options being considered during 2017: Option 1Na, Option 1Sa and Option 1Nd. A location overview of the transect surveys can be found on **Figure HE551506-AA-EBD-D_SWI-DR-YE-000011**, and the position of the static detectors can be found on **Figure HE551506-AA-EBD-D_SWI-DR-YE-000020.**

2.2 Walked Activity Transect Surveys

2.2.1 Walked transect surveys are multipurpose and are designed to identify species composition and general distribution along the length of the scheme. Transects were generally circular, with eight transect routes (of c.6 km each) following the route of the scheme options but also encompassing features in the wider landscape due to the open nature of the land along the scheme options.

2.2.2 The eight transects were surveyed at dusk once per month from May to September 2017 inclusive. In addition, the August 2017 surveys were followed by dawn transect surveys within the same 24h period. A minimum of six five-minute 'stop and listen' locations (referred to as "Point Count") were included per transect, with each transect taking approximately 3 hours to complete commencing at sunset (longer transect routes had additional Point Counts). The transect routes were kept largely the same during each visit to allow the data to be as comparable as possible; however, some variations were necessary in some cases due to access, health and safety, and due to the presence of breeding stone curlew across the survey area (the AAJV worked closely with the RSPB to ensure that any stone curlew breeding nest information was shared immediately and any slight alterations to the transect surveys applied in order to minimise disturbance).

2.2.3 The suitability of the foraging and commuting habitat along the route options is variable, ranging from low to high. Low value habitats are considered to be intensively farmed areas containing large arable fields. High value habitats are less intensively managed, with larger areas of woodland and smaller fields generally managed as pasture, and river corridors.

2.2.4 In terms of survey effort, best practice guidance (Collins, 2016) recommends one survey visit per season (spring, summer, autumn) for low suitability habitat, one survey visit per month (April to October, weather dependent) for moderate suitability habitat, and two survey visits per month for high suitability habitat. The proposed survey effort of once per month (May to September) adopts the 'moderate' survey effort as an average (to ensure consistency across the route and avoid bias to the higher suitability habitats, which would make qualitative spatial comparisons difficult). This effort is considered adequate for the assessment, given that this will be supplemented by the crossing point surveys which are targeted on the higher quality habitats (as described below), the static detector monitoring and the radiotracking work. April and October were not included due to the inconsistent weather throughout the months; however, data was still collected during these months using static detector monitoring (see below) to provide some baseline information.

2.3 Static Bat Activity Monitoring

2.3.1 Static automated monitoring of bat activity was conducted during 2016 and 2017, at monitoring points distributed across the project landscape, between Amesbury and Berwick St James.

2.3.2 The project landscape has been assessed to offer moderate to high habitat suitability for bats, with some habitats (such as the river corridors and woodlands) offering greater suitability, whilst other areas (such as the isolated beech clumps, exposed chalk downland and arable farmland) offering reduced suitability. Collins et al (2016)[3] indicates a requirement for 2-3 static detector monitoring points per transect with data to be collected on five consecutive nights during the months of April to October. Given the scale of the landscape, its exposed and isolated habitats, and the volume of additional bat survey methods employed within this project, as well as typically low levels of bat activity across much of this landscape, this requirement was reduced. For example, bat activity levels in April and October were typically very low and the deployment of static detectors during these months was undertaken only when weather conditions were considered adequate to support bat foraging activity.

2.3.3 Where possible recording intervals were four weeks between deployments, and at least two weeks, as required in Collin (2016); towards the end of the season in 2017, poor weather resulted a two-week interval in the final deployment rounds.

2.3.4 Monitoring locations were selected, based upon their proximity to one or more of the proposed A303 routes, their position within one of the bat activity survey transects, permission to access the land and position within bat foraging habitat or on likely commuting features. The landscape of the World Heritage Site is comprised mainly of chalk downland and arable farmland and much of the landscape lacks typical features that bats may use for commuting or foraging; every effort was therefore made to ensure that monitoring points were on features likely to be used by foraging or commuting bats to minimise an under-estimation of bat activity.

2.3.5 In all, 70 locations were included in the monitoring programme but not all these received a complete suite of surveys (i.e. a full season of monitoring, April to September) and so the final analyses relate to a short list of 39 sites (see **Appendix B** and Figure HE551506-44-EBD-D_SWI-DR-YE-000020 for the list of monitoring sites included in final analyses, with national grid reference and site description).

2.4 Data Collection

Walked Activity Transect Surveys

2.4.1 Each lead surveyor was equipped with a full spectrum Anabat Walkabout, which was supplemented by either a Bat Box Duet or an Elekon stereo BatScanner heterodyne / frequency division bat detector, used by the second surveyor, in order to help detect and identify any bats observed. Following the surveys, all bat recordings were analysed to identify species using the relevant bat analysis

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

software packages (e.g. Analook, BatSound and Kaleidoscope Viewer), to species level where possible.

Static Activity Monitoring

Equipment & settings

2.4.2 A bank of eight Wildlife Acoustics Song Meter 4 (SM4 Bat FS) were used throughout 2016 and 2017; in 2016 these were also supplemented by a number of Wildlife Acoustics Song Meter 2 Bat+ bat detectors.

2.4.3 These detectors are full spectrum detectors that are triggered automatically to record bat echolocation calls. These detectors can be deployed and left to record bat activity remotely for a period of several nights, typically for a week at each location to ensure five or more nights of survey data in good weather conditions. Detectors were deployed from mid-May 2016 until October 2017.

2.4.4 The detectors were programmed to begin recording at sunset and continue until sun rise, which allowed continuous monitoring to take place during the period when bats are active. During 2017 this recording period was extended to 30 minutes before sunset to 30 minutes after sunrise. The SM4 BatFS is pre-programmed with the latitude and longitude of the survey location enabling the software to calculate the local sunset and sun rise times; additional programming can commence recording before and after these periods. The SM2 is simply pre-programmed manually with the current sunset and sun rise times, which therefore requires updating each week.

2.4.5 The Songmeter SM4 was configured as follows:

- Standard settings were used, gain 128dB
- Sample rate 256khz, min duration 1.5ms, Min trigger frequency 16khz
- Trigger level 12 dB, Max length 15s; and
- Writing uncompressed .wav files to an SDHC memory card.

2.4.6 The Songmeter SM2 was configured as follows;

- Preamplifier switches configured with the analogue high-pass filter set to 1khz and the gain set for +36dB;
- Single channel with a sample rate of 384,000khz, Dig HPF fs/24, Trg Lvl 12SNR, Trg Win 2.0 seconds; and
- Writing uncompressed .wav files to an SDHC card. (One SM2 unit recorded to .WAC files).

Deployment

2.4.7 Detectors were deployed each week through the season (mid-May to October in 2016, mid-April to October in 2017). For each monitoring location the date, location description, national grid reference (using Garmin eTrex GPS or

http://gridreferencefinder.com/), direction of microphone, weather conditions during deployment and weather forecast for the forthcoming week were recorded.

2.4.8 In order to ensure that all locations received monthly visits, a detail programme of deployment was developed and followed; on this basis a monthly cycle of recording commenced at the middle of the month (because monitoring commenced at the beginning of the year in mid-April, for example).

2.4.9 Detectors were deployed at 4 metres above the ground, using a 4 metre-sectional ladder. This ensured that detectors were above the height of grazing animals and above the eyeline of members of the public. In all cases, omni-directional microphones were used, but efforts were made to ensure that microphones were pointing over open space and not blocked by vegetation or buildings, that microphones would not be impacted by rustling leaves or running water, and that microphones pointed towards the likely commuting routes and foraging areas of bats. i.e. every effort was made to maximise the recording of bat passes, across a variety of habitats.

2.5 Data Processing and Analysis

2.5.1 Bat detectors were programmed to record to uncompressed .wav files, ensuring high quality recordings. To facilitate rapid analyses, these were converted to zero-crossing files (zc) files using Kaleidoscope (version 2.0.4 and version 4.5.0) in order to enable analysis using Analook software. The Kaleidoscope software creates sound files of varying lengths (minimum 2 seconds, maximum 10 seconds). Using Analook (version 0.4.1.20, and latterly 4.2n), a species label was attached to each sound file corresponding to each species recorded within the file. Where it was clear that two or more species were flying together, files were labelled appropriately. Where analysis of the higher quality wav files was helpful, the original files were also assessed to confirm identification if required, using Kaleidoscope Viewer.

2.5.2 Calls were analysed and identified in line with Russ (2012). Dr Sandie Sowler was consulted for a second opinion, in relation to confirming 12 passes of Leisler's bat. For the purpose of the analysis a bat pass is defined as a single, uninterrupted sequence of an echolocation calls lasting a maximum of 15 seconds. Only call sequences of three or more calls were identified and labelled. The following species labels were used (the call parameters that were used are specified for those species with overlapping ranges):

Table 2-1 Species labels and call parameters

Species Label	Species name	call parameters
LHS	Lesser horseshoe	
GHS	Greater horseshoe	
Daub	Daubenton's bat	NB: ID to species based on social calls
Natt	Natterer's bat	NB: ID to species based on social calls
Bran	Brandt's bat	
Myst	Whiskered bat	
Noct	Noctule bat	
Leisl	Leisler's bat	

Species Label	Species name	call parameters
Sero	Serotine bat	
Pip45	Common pipistrelle	42-49khz
Pip55	Soprano pipistrelle	>51khz
Pip nat	Nathusius' pipistrelle	<39khz
Barb	Barbastelle bat	
The following categories were used for calls which could not be identified with confidence due to the overlap in call characteristics between species or species groups;		
Myotis sp	*Myotis* species	
Nyct	*Nyctalus* species	
Pip sp	*Pipistrellus* species	49-50khz
Plec	*Plecotus* species	
Plec_Myo	indet *Plecotus* / *Myotis* call	
Plec_Sero	indet *Plecotus* / Serotine call	
Big bat	indet Noctule, Leisler's, Serotine	

2.5.3 Pipistrelle bats can typically be identified to species with some confidence. File comprising only social calls (because low frequency social calls travel further than higher frequency echolocation calls) were typically omitted from the analyses.

2.5.4 Daubenton's and Natterer's bats may be determined to species level using social calls but in general these analyses for their stated purpose didn't require identification of *Myotis* bats to species level. On occasion there is overlap in call parameters of *Myotis* and *Plecotus* bats in which case the relevant label was used.

2.5.5 The horseshoe bats and Barbastelle bats can be determined to species level without difficulty.

2.5.6 The "big bats" create some difficulty for whilst clear call sequence of Noctule, Leisler's and Serotine can be obvious, there is considerable overlap in their call parameters, requiring use of alternative labels including *Nyctalus* sp. (noctule or Leisler's bat) and Big Bat (either noctule, Leisler's or serotine bat). Overlapping call parameters of *Plecotus* and serotine calls also necessitated use of an additional category.

2.5.7 Sound files of anything other than identifiable and labelled bats were left unlabelled and omitted from further analyses.

2.5.8 The numbers of passes per minute per species label were outputted for each night of recording and collated in excel.

Analysis

2.5.9 The number of files (sound clips) recorded by the detectors each night was taken as a proxy value to the number of bat passes. This was then used to calculate a Bat Activity Index (BAI) for each species at each location during each session. The BAI is the average number of bat passes per night, based on the first five nights recorded each month.

2.5.10 In some cases, the detector also recorded data on more than five nights. These additional nights have been excluded from the BAI calculation. However, where rarer or more notable species were recorded on these additional nights at locations where they had not been recorded on the first five nights, the details have been summarised within the relevant results sections to ensure their representation in terms of species diversity. The rarer or more notable species include those protected under Annex 2 of the European Habitats Directive (barbastelle bats, lesser horseshoe bats, and greater horseshoe bats), and Nathusius' pipistrelle which is only considered to have been breeding in the UK in the last fifteen to twenty years. Prior to this, Nathusius' pipistrelle was generally considered a vagrant species[4].

2.5.11 The average BAIs for all species at each location has been calculated over the active months from June to October 2016 and from April to October 2017.

2.6 Weather Conditions

2.6.1 Weather conditions (temperature, wind speed, wind direction and general condition) during the bat activity transect surveys were recorded at the time of survey. Weather conditions were recorded to assess the impact of weather on bat activity (**see Appendix A**).

2.7 Limitations and Assumptions

2.7.1 Due to the subjective element within professional judgement of bat call analysis, it is possible that other ecologists may differ in opinion on the identification of calls; however current reference works[5] have been used and all analyses were undertaken by experienced ecologists.

2.7.2 Due to the geographical location, desk study information and habitat structure within the survey area, every *Plecotus* bat recorded was assumed to be a brown long-eared bat.

2.7.3 The echolocation calls of *Myotis*[6] species are notoriously difficult to separate[7,8] during sound analysis. Analysis of calls determined to species level should therefore be treated with caution. Where it was not possible to differentiate calls to species level, the genus or likely bat species are documented instead. Calls from long-eared bats are directional and usually very quiet, which makes them difficult to pick up using the detector. In order to reduce the significance of this

[4] Russ, J.M., Hutson, A.M., Montgomery, W.I., Racey, P.A., and Speakman, J.R. (2001). The Status of Nathusius' pipistrelle (*Pipistrellus nathusii* Keyserling & Blasius, 1839) in the British Isles. Journal of Zoology, London 254: 91-100

[5] Russ, J. (2012). British Bat Calls: A Guide to Species Identification. Exeter: Pelagic Publishing, and Middleton, N., Froud, A., & French, K. (2014). Social Calls of the Bats of Britain and Ireland. Exeter: Pelagic Publishing.

[6] The *Myotis* bats: Daubenton's, Bechstein's, whiskered, Brandt's and alcathoe bats (and often Natterer's Bat) are difficult to differentiate from call analysis alone. Considering the rarity of greater mouse-eared bat in the UK, this species is highly unlikely to be present.

[7] Parsons, S. and Jones, G. (2000) *Acoustic identification of 12 species of echolocating bat by discriminant function analysis and artificial neural networks*. Journal of Experimental Biology 203: 2641–2656.

[8] Walters, C.L., Freeman, R., Collen, A., Dietz, C., Fenton, M.B., Jones, G., Obrist, M.K., Puechmaille, S.J., Sattler, T., Siemers, B.M., Parsons, S. and Jones, K.E. (2012) *A continental-scale tool for acoustic identification of European bats*. Journal of Applied Ecology 49: 1064–1074.

limitation, visual observation was used to complement recordings, which enabled the confirmation of species identification in many cases.

2.7.4 Whilst effort was made to programme and undertake surveys during suitable weather conditions, the nature of the static activity monitoring surveys, undertaken over a five-night recording session and including surveys in April and October, means that on some occasions these surveys included nights during which there were lower temperatures, periods of rainfall and strong winds. However, the recordings provide an indication of bat activity levels across the site during these different weather conditions.

2.7.5 Any limitations specific to individual walked transect surveys can be found in the Results Section at the end of each transect summary, for ease of reference.

2.7.6 It should be stressed that the findings presented in this study represent those at the time of survey and reporting, and data collected from available sources. Ecological surveys are limited by factors which affect the presence of species, such as temporal weather conditions, migration patterns and behaviour.

2.7.7 Nevertheless, these surveys were conducted at the optimal survey periods. Every effort has been made to ensure that the findings of the study present as accurate an interpretation as possible of the status of bats within the survey area. The results of this survey work are therefore considered sufficient to inform an ecological impact assessment.

3 Results

3.1 Walked Activity Transect Surveys

3.1.1 The results of the walked bat transect surveys are summarised below and individual transect results are shown on **Figures HE551506-AA-EBD-D_SWI-DR-YE-000012** to **HE551506-AA-EBD-D_SWI-DR-YE-000019.**

Transect 1: Scotland Lodge Farm/Parsonage Down

3.1.2 Seven individual bat species were recorded during the transect surveys. These species were soprano pipistrelle, common pipistrelle, serotine, noctule, brown long-eared bat, barbastelle and a *Myotis* species. The common pipistrelle was the most commonly recorded species on five of the six surveys undertaken. Soprano pipistrelle was the only other species recorded on all surveys with *Myotis* species and serotines also consistently recorded. Noctules, brown long-eared bats and barbastelle bats were recorded less frequently. The July survey recorded the largest diversity of bats with six species recorded during the transect. Other transects generally recorded four or five species with the September survey recording only pipistrelle species and an unconfirmed big bat species.

3.1.3 Bat activity was recorded around the entire transect at various times but the most consistent activity was recorded between Point Count 1 and 2. Species recorded here were common and soprano pipistrelle species, a *Myotis* species, serotine and noctule bats all foraging or commuting along the line of mature trees adjacent to the track running between the horse paddocks. The survey in May also recorded a lot of serotine foraging activity along the arable field margin adjacent to the A303 between PC 5 and 6, but activity reduced on subsequent surveys, and nothing was recorded soon after sunset when the survey started at this location, which indicates that no roosts are likely to be present in the vicinity of these points. The field margin was mown later in the summer which may have had an effect on the available food resource at the time.

3.1.4 A barbastelle bat was recorded along the coniferous strip of trees north of the horse paddocks during the August dawn survey at 04:50 and potentially along the northern edge of the transect near the beech copse adjacent to Parsonage Down at 22:00 during the May dusk survey.

Table 3-1 Comparison of the time of the first and last bat registration and sunset / sunrise time for each transect survey

Survey date (dusk)	Time of first bat	Species	Minutes after sunset time	Location
16/05/2017	21:08	Soprano pipistrelle	+16 mins	Recorded at the end of the track north of Scotland Lodge Farm (Point Count 2)
14/06/2017	22:18	Serotine	+55 mins	A brief and high pass recorded at the beginning of the tree lined track at Point Count 1 just north of Scotland Lodge Farm car park and adjacent to horse grazed pasture.
26/07/2017	21:30	Soprano pipistrelle and *Myotis* species	+28 mins	Bats recorded at the track junction and edge of wooded strip to the north of the horse pastures at Scotland Lodge Farm. Activity

				was concentrated around a trailer of compost material at the edge of the woodland.
22/08/2017	20:59	Common pipistrelle	+47 mins	Several passes recorded along the track to the west of the horse paddocks at Scotland Lodge Farm
20/09/2017	19:29	Common pipistrelle	+16 mins	Bat recorded foraging down the track toward Point Count 2 by the compost and woodland strip.
Survey date (dawn)	**Time of last bat**	**Species**	**Minutes before sunrise time**	**Location**
23/08/2017	05:01	Common pipistrelle	65 mins	Constant foraging recorded up and down the track at Point Count 1 on the track north of Scotland Lodge Farm.

Limitations

3.1.5 This transect was originally planned to be a circular route continuing around the arable field bordering Parsonage Down. However, because of an active stone curlew nesting plot the transect doubled back on itself from PC 4 at the beech wood adjacent to Parsonage down and continuing back round to the arable field and PC 6 or vice versa. This meant that the section of transect around the fields of Scotland Lodge Farm was walked twice on each survey.

3.1.6 The Anabat Walkabout detector failed to record data during half of the September dusk survey, although the detector displayed results in the field so species were manually recorded.

3.1.7 Surveys were largely carried out in suitable weather conditions. Un-forecast rain did get heavier during the September transect and although bats were recorded throughout the survey this may account for a lesser diversity of species being recorded.

Transect 2: River Till North

3.1.8 Six individual bat species and one cryptic species group were recorded during the surveys of transect 2. These were common and soprano pipistrelle, noctule, serotine, brown long-eared bat, barbastelle and *Myotis* species. Soprano and common pipistrelle were the most frequently recorded species during the transect surveys, commuting and foraging along the north-south byway between Foredown Barn and Foredown House, around Foredown Barn and along the north-south hedgerow forming the eastern extent of transect 2. Pipistrelle commuting and foraging activity was also recorded around the pond east of the River Till.

3.1.9 Noctule were occasionally recorded foraging around Foredown Barn and the woodland margin immediately south of the barn, while serotine were frequently recorded foraging around Foredown Barn and commuting along the northern side of the A303. *Myotis* species were recorded mainly in eastern part of the transect, commuting and foraging along the hedgerow north of the A303, the eastern north-south hedgerow (mile-long / Grant's hedge) and the track between the A303 and Foredown Barn. Brown long-eared bats were recorded only occasionally along the eastern (mile-long / Grant's) hedgerow and along the A303.

3.1.10 A barbastelle was recorded twice – alongside the westernmost hedgerow in May, 2 hours 7 minutes after sunset, and close to the woodland south of Foredown Barn in September, 1 hour and 36 minutes after sunset.

3.1.11 Overall, the highest bat activity was concentrated around Foredown Barn and the adjacent wooded areas, especially in darkest areas around trees. All north-south tracks and hedgerows had moderate levels of bat activity, including where the western routes join the A303. Of note was that there was comparatively low bat activity on this transect in June and July despite optimal survey conditions and an abundance of insects.

Table 3-2 Comparison of the time of the first and last bat registration and sunset / sunrise time for each transect survey.

Survey date (dusk)	Time of first bat	Species	Minutes after sunset time	Location
23/05/2017	21:12	Common pipistrelle	10 mins	Close to Foredown House
14/06/2017	21:56	Unknown (peak frequency 30kHz)	23 mins	Along an east-west track between two arable fields, approximately 200m east of Foredown Barn
17/07/2017	21:49	Unknown (seen not heard)	35 mins	Around trees fringing north-south byway between Foredown Barn and Foredown House, immediately south of the River Till crossing
22/08/2017	20:41	Common pipistrelle	25 mins	Along north-south byway linking Foredown Barn and Foredown House, approximately 400m north of Foredown House
13/09/2017	20:02	Soprano pipistrelle	35 mins	At northern end of north-south hedgerow between arable fields east of the River Till
Survey date (dawn)	**Time of last bat**	**Species**	**Minutes before sunrise time**	**Location**
23/08/2017	05:35	Common pipistrelle	31 mins	Along north-south byway linking Foredown Barn and Foredown House.

Limitations

3.1.12 In general, surveys of this transect were carried out in good conditions and the transect was fully surveyed on all six occasions. On the 13th September survey, it was noted that visibility was poor due to low-lying clouds, which, while not impacting the detection of bats, reduced the ability of surveyors to observe commuting bats in the period following sunset and thus determine their direction of travel.

Transect 3: Berwick Down (south)

3.1.13 Five individual bat species and one unknown bat species were recorded during the transect surveys. These included common and soprano pipistrelle, noctule, serotine and *Myotis* species. Common and soprano pipistrelle bats were the most frequently recorded species during the transect surveys with noctule bats regularly recorded along the transect route.

3.1.14 *Myotis* species and serotine bats were only recorded on one survey each on the western side of the transect route, north of the byway which runs along the south of the transect. The majority of the bat activity was concentrated along the mature hedgerows and treelines adjacent to the byway as well as the woodland strip at the southwestern end of the site and the farm buildings within the centre of the transect.

3.1.15 Bat activity was greatest during the July and August dusk surveys, with common and soprano pipistrelle foraging activity recorded almost continually along the byway, within the woodland strip and around the farm buildings. During the dusk survey in August, the greatest number of species (four) were recorded; noctule, serotine, and common and soprano pipistrelle.

Table 3-3 Comparison of the time of the first and last bat registration and sunset / sunrise time for each transect survey.

Survey date (dusk)	Time of first bat	Species	Minutes after sunset time	Location
16/05/2017	22:05	Common pipistrelle	73 mins	Along the hedgerow boundary on the eastern side of the transect route
15/06/2017	22:13	Noctule	49 mins	Along the byway on the southern side of the transect, west of the chicken sheds
13/07/2017	22:25	Common pipistrelle	66 mins	Along the byway on the southern side of the transect, east of the farm buildings
15/08/2017	21:01	Common pipistrelle	32 mins	Along the farm track north of the farm buildings
18/09/2017	19:43	Soprano pipistrelle	28 mins	Around the farm buildings north of the byway
Survey date (dawn)	**Time of last bat**	**Species**	**Minutes before sunrise time**	**Location**
16/08/2017	05:09	Noctule	45 mins	Along the farm track north of the farm buildings

Limitations

3.1.16 There were some light rain showers recorded intermittently during the May, June and September bat surveys. However, bat activity was recorded before and after the rain showers on all three occasions suggesting that light rain did not stop bats from foraging and/or commuting. During the dusk survey in August, the arable fields were being harvested. Although the harvesters and tractors were using full beams and were operating throughout the survey, it was during this survey that the greatest number (four) of species were recorded in one survey.

Transect 4: River Till South

3.1.17 Six individual bat species were recorded at the River Till South transect. Fiver species were confirmed as soprano and common pipistrelle, serotine, noctule and a *Myotis* species. A brown long-eared bat was also potentially recorded during this transect but this could not be confirmed during sound analysis. Some recordings were identified as a 'big bat' species, which could be either one of the following species: noctule/serotine/Leisler's.

3.1.18 Common and soprano pipistrelle were the most frequently recorded species on all six surveys. Noctules and *Myotis* were consistently recorded at various locations

on the transect and serotines and a possible brown long-eared bat were recorded only during the June survey. The June survey recorded the most diversity of bats with six species, other surveys typically recorded three or four species.

3.1.19 Bat activity was recorded around the majority of the transect, especially the wooded and tree lined areas. No activity was recorded across the meadow (unit 2 of the River Till SSSI) between the start of the transect and Point Count 1. The most consistent activity was recorded along Duck Lane which is a gravel track providing a dark corridor through the woodland. Both common and soprano pipistrelle were recorded foraging or commuting here either before or soon after sunset. Two soprano pipistrelle bats were seen emerging from the converted barn building on Duck Lane during the September survey, which would account for the early records for this species. An earlier emergence of a medium size bat was also noted at 19:20, but the bat did not echolocate.

3.1.20 The first survey in May recorded a lot of soprano pipistrelle activity at Point Count 1, which is a foot bridge over the River Till (designated as a SSSI). However, subsequent surveys recorded less activity. *Myotis* species, a noctule and possibly a brown long-eared bat were also recorded here. A serotine bat was recorded during the June survey at the eastern extent of the transect commuting in a west to east direction across the field near Point Count 3. Common and soprano pipistrelle, noctule and *Myotis* species were also frequently recorded here using the line of beech trees as a foraging or commuting route between arable and cow grazed pasture.

Table 3-4 Comparison of the time of the first and last bat registration and sunset / sunrise time for each transect survey.

Survey date (dusk)	Time of first bat	Species	Minutes after sunset time	Location
03/05/2017	20:36	Pipistrelle species	+ 4 mins	Brief pass heard at the start of the transect on Duck Lane under tree canopy.
12/06/2017	21:30	Common pipistrelle	+8 mins 15 seconds	Recorded foraging up and down Duck Lane under the tree canopy.
05/07/2017	21:32	Soprano pipistrelle	+9 mins	Brief commuting pass recorded along Duck Lane under the tree canopy.
08/08/2017	21:09	Common pipistrelle	+28 mins	Brief pass recorded at Point Count 5 at exit from woodland tracks to arable field
21/09/2017	21:21	Noctule	+11 mins	Bat seen from car park flying in a north easterly direction towards the river.
Survey date (dawn)	**Time of last bat**	**Species**	**Minutes before sunrise time**	**Location**
09/08/2017	04:11	Soprano pipistrelle	-93 mins	Brief pass recorded at Point Count 4 at the top of the track between pasture and arable field.

Limitations

3.1.21 The majority of surveys were carried out in suitable weather conditions. There was light rain and a moderate breeze during the August dawn survey which may account for low activity. The July dusk survey was considered to record low bat activity despite the warm weather conditions and an abundance of insects but it

was a very moonlit night and a thunder storm was forecast for the morning which may have affected bat activity.

3.1.22 Unfortunately, the Anabat failed to record bat activity on the first transect in May, but the display worked and bat box duet was also used as a back up to enable identification of species present during the survey. The Anabat also failed to record from 21:09 pm on the August dusk survey (again a bat box duet was also used as back-up).

3.1.23 During the September survey, the transect route was diverted after Point Count 3 to avoid disturbing large numbers of partridge recently released into the arable field. The transect was diverted along the byway to Asserton Farm and re-joined the gravel track at Point Count 5.

Transect 5: The Park and Hill Farm

3.1.24 This transect comprised two halves with one circuit around a large field and barns at Hill Farm, followed by a circuit around the woodland surrounding 'The Park'. Surveyors drove from one location to the other and the start of the surveys was alternated between Hill Farm and The Park.

3.1.25 Six individual bat species were recorded during the surveys of Transect 5. These species were the common and soprano pipistrelle, serotine, noctule, barbastelle, and a *Myotis* species. Soprano and common pipistrelle were the most commonly recorded species on each survey. A barbastelle was recorded only once on the western extent of the Hill Farm transect between Point Count 2 & 3 (identified during sound analysis) during the June dusk survey at 23:27. Serotines were recorded infrequently during the July and August dusk surveys at The Park. A noctule was recorded once on the byway track to the north of The Park during the July survey, though the July, August and September surveys also recorded one occurrence of a 'big bat species' that could not be identified further from the sound analysis. A *Myotis* species was recorded infrequently during the May, July and September surveys at both Hill Farm and The Park. The July survey recorded the largest diversity of bats with five species during the transect. Other transects generally recorded three or four species.

3.1.26 There was very little activity during the dawn survey with only one common pipistrelle recorded at Hill Farm, but two small bats (potentially pipistrelle) were seen returning to roost at 05:22, twenty-four minutes before dawn. The bats entered the woodland from the gravel track to the north of The Park (near dormouse tube 2 at grid reference SU 09453 40268). No echolocation was detected.

3.1.27 The Hill Farm transect recorded low activity with individual bats recorded foraging or commuting along hedgerows and woodland strips. More activity was recorded within the woodland surrounding The Park, with concentrations of activity in the vicinity of the pheasant pens within woodland near Point Count 8 on the southern side of the transect and along the gravel track on the western side of the Park between Point Count 9 and the main byway, despite the fact that the dairy barn at the end of the track is brightly lit throughout the night.

Table 3-5 Comparison of the time of the first and last bat registration and sunset / sunrise time for each transect survey.

Survey date (dusk)	Time of first bat	Species	Minutes after sunset time	Location
17/05/2017	21:11	Common pipistrelle	+19 mins	Recorded and seen foraging along line of trees adjacent to A303 (Hill Farm field)
15/06/2017	21:48	Soprano pipistrelle	+25 mins 30 seconds	A brief pass recorded near the pheasant pen within the woodland belt to the south of 'The Park' field.
13/07/2017	22:18	Common pipistrelle	+59 mins (a very moonlit night)	Two bat passes recorded of bats commuting along the wooded strip between the field and Hill Farm derelict barn buildings (Point Count 5)
09/08/2017	21:31	Soprano pipistrelle	+54 mins	A brief pass recorded near the pheasant pen within the woodland belt to the south of 'The Park' field.
26/09/2017	21:13	Pipistrelle sp.	+17 mins	Brief pass recorded at Point Count 1 in the yard of the derelict barns of Hill Farm. At 21:14 a common pipistrelle was seen flying in a north to south direction across the yard into the adjacent field.
Survey date (dawn)	**Time of last bat**	**Species**	**Minutes before sunrise time**	**Location**
10/08/2017	04:11		+121 mins	A brief commuting pass recorded adjacent to woodland between Stop points 2 & 3. (Hill Farm field)

Limitations

3.1.28 The route between the two transect sections, Hill Farm and The Park was driven with no bat recordings undertaken from the car. and an initial area to be surveyed along the driveway to Hill Farm Cottages was removed to avoid active stone-curlew nests.

3.1.29 The walkabout failed to record the Hill Farm section of the August dusk survey and the entirety of the dawn survey but the visual display was still working to identify bat species and bat box duets were also used.

3.1.30 Surveys were largely carried out in suitable weather conditions. However, the weather during the dawn survey in August was recorded as a moderate breeze with gusts and cold for this time of year, with temperatures of 11 and 12°C. It was also a very clear and bright night due to a full moon. These conditions may account for the low activity and less diversity of species recorded.

Transect 6: Diamond Wood/Normanton Copse

3.1.31 Seven individual bat species were recorded during the transect surveys. These included common pipistrelle and soprano pipistrelle, noctule, serotine, *Myotis* species (including Natterer's), Leisler's bat and barbastelle. The soprano and common pipistrelle were the most commonly recorded species on each survey and noctules and serotine were consistently recorded during each transect. The August dusk survey recorded all seven species during the transect while the other surveys recorded four or five.

3.1.32 Bats were recorded at locations around the entire transect. Both common and soprano pipistrelle species were commonly recorded foraging and commuting along the byway between Normanton Gorse and Diamond Wood, between Point Counts 1 and 2. A barbastelle bat was recorded at 22:13, but unseen during the August dusk survey commuting along the western side of Diamond Wood. The June and August dusk surveys showed the most activity and of note, during the June survey, a large gathering of cockchafers was found along the byway which attracted foraging and feeding pipistrelles, noctules and serotines. The byway was a notable commuting route for species noted here, as well as for foraging. The dawn survey in August provided the least amount of activity with few passes of common and soprano pipistrelle (around Point Count 7) and noctule (around Point Count 2).

Table 3-6 Comparison of the time of the first and last bat registration and sunset / sunrise time for each transect survey.

Survey date (dusk)	Time of first bat	Species	Minutes after sunset time	Location
22/05/2017	22:10	Soprano pipistrelle	+69 mins	One bat heard several times at Point Count 4 foraging along woodland edge and woodland interior.
26/06/2017	22:03	Soprano pipistrelle	+36 mins	Multiple passes of same bat through woodland interior between Point Count 1 and 2.
20/07/2017	21:59	Noctule	+47 mins	Two passes, high overhead at Point Count 4 commuting in a south-east direction along field margin.
16/08/2017	20:48	Soprano pipistrelle	+18 mins	Heard at Point Count 1 commuting through Normanton Copse in a north to south direction.
22/09/2017	19:37	Serotine	+31 mins	Heard commuting and foraging along byway in a south to north direction, recorded between Point Counts 2 and 3.
Survey date (dawn)	**Time of last bat**	**Species**	**Minutes before sunrise time**	**Location**
17/08/2017	05:12	Noctule	-46 mins	Heard commuting overhead, passed three times along woodland edge at Point Count 2.

Limitations

3.1.33 All these activity surveys of this transect were carried out in suitable weather conditions and access was not hindered during any of the surveys. There was little activity during the August dawn survey, possibly due to decreasing temperature throughout the survey. The Anabat Walkabout detector only recorded noctule activity, missing pipistrelle passes. The survey route was altered after the first transect survey in May as follows: Point Count 3 was moved west to the south edge of Diamond Wood to avoid being stationary in close proximity to nervous pigs in the adjacent field. Secondly, the route between Point Count 1 and 2 was also altered slightly to go through Normanton Copse as a strip of land had been recently coppiced and provided a more suitable survey route avoiding barbed wire fences.

Transect 7: Bowtie Field/National Trust

3.1.34 Five individual bat species were recorded during the transect surveys. These included common pipistrelle and soprano pipistrelle, noctule, serotine and *Myotis* species. The soprano pipistrelle was the most commonly recorded species on each survey and noctules and common pipistrelle were consistently recorded during each transect. The June and July surveys recorded all five species during the transect with others recording three or four.

3.1.35 Bats were recorded at locations around the entire transect. Pipistrelle species were commonly recorded foraging up and down the byway running east west from Countess Road. On the three transects carried out in a clockwise direction a noctule was recorded flying from the A303 northwards along a hedgerow (between Point Counts 1 & 2) towards an oak tree at the northerly extent of the hedge, and on two (possibly three) occasions a noctule bat was the first bat recorded after sunset as shown in **Table 3-7** below. The September survey recorded the most amount of activity and of note, a lot of noctule activity was recorded at one of the more westerly beech copses (the Nile Clumps) with very loud social calls (type D) that could be heard without detectors and bats observed flying at canopy level. It is thought that these calls may be indicative of a lekking roost.

Table 3-7 Comparison of the time of the first and last bat registration and sunset / sunrise time for each transect survey.

Survey date (dusk)	Time of first bat	Species	Minutes after sunset time	Location
24/05/2017	21:31	Unknown – no echolocation.	+22 mins	A large bat – possibly a noctule seen flying in a south to north direction along a hedgerow on northern side of A303 and west of Countess Farm.
28/06/2017	22:07	Noctule	+42 mins	Recorded at Stop point 6 at a junction of the byway track between arable and sheep grazed fields to the south of Long barrow and woodland strip.
25/07/2017	21:26	Noctule	+26 mins	Seen flying in a south to north direction very high above the canopy of an oak tree at the end of the hedgerow on northern side of A303 and west of Countess Farm
29/08/2017	20:18	Soprano pipistrelle	+19 mins	Heard foraging along byway track running east to west from Countess Road (A345). The same bat continued foraging along the length of the track.
19/09/2017	19:27	Common and Soprano pipistrelle	+16 mins	Two bats seen foraging over rooftops of residential houses on west side of Countess Road (A345) to the north of Countess Farmhouse.
Survey date (dawn)	**Time of last bat**	**Species**	**Minutes before sunrise time**	**Location**
30/08/2017	05:32	Soprano pipistrelle	15 mins	Seen foraging up and down the byway track (which runs in an east-west direction) and using adjacent sheep pasture and arable fields.

Limitations

3.1.36 All the activity surveys of this transect were carried out in suitable weather conditions and access was not hindered during any of the surveys. The Anabat detector malfunctioned and recorded no data during the August dusk and dawn surveys. Two bat box duet detectors were used instead set at higher and lower frequencies. The Anabat also failed to record after 20:30 on the September dusk survey. As in August, the remaining 1.5 hours of the transect was carried out using two bat box duet detectors set at different frequencies. There was comparatively little activity during the August surveys, especially the dawn survey which may be due to cooler conditions and higher wind levels.

Transect 8: Vespasian's Camp

3.1.37 Eight individual bat species were recorded during the transect surveys. These included common pipistrelle and soprano pipistrelle, noctule, serotine, Natterer's bat, barbastelle, brown long-eared bat and a *Myotis* bat species. The soprano and common pipistrelle were the most commonly recorded species on each survey. The August and September surveys recorded five species during the transect while the other surveys recorded four species each.

3.1.38 Bats were recorded at locations around the entire transect. Pipistrelle species were commonly recorded foraging and commuting along hedgerows and the A303 road. During the June survey, there was moderate pipistrelle activity at Vespasian's camp around Point Count 7 which could be suggestive of a nearby roost. There was also evidence that soprano pipistrelle, a *Myotis* species and brown long eared bat used the underpass for commuting. Noctule bats were noted foraging high over the arable fields and Vespasian's Camp at sunset on a number of visits. Natterer's and soprano pipistrelle bats were commuting parallel to the A303 road, this could be the route used between the known Natterer's roost in the bowtie field (found through radiotracking in May 2017 and tree inspection surveys) and Vespasian's Camp woodland, serotine and common pipistrelle were also foraging along this section of the transect. During the July survey, a brown long-eared bat was recorded using the underpass as a commuting route. During the August dawn survey, there was very little activity with only four bats recorded (noctule, a *Myotis* species, and soprano pipistrelle) at the start point and at the underpass. During the September dusk survey at 19:50, a barbastelle bat was recorded and seen foraging within woodland on the north side of Vespasian's Camp, moderately close to the A303.

Table 3-8 Comparison of the time of the first and last bat registration and sunset / sunrise time for each transect survey.

Survey date (dusk)	Time of first bat	Species	Minutes after sunset time	Location
26/05/2017	21:00	Soprano pipistrelle	4 mins before sunset	One bat seen foraging in clearing at edge of woodland at Point Count 1, repeated passes at 4.5m height.
15/06/2017	21:24	Soprano pipistrelle	+0 mins	Two bats seen commuting and continually foraging for 5 minutes at Point Count 1, between river and woodland.
25/07/2017	21:00	Soprano pipistrelle	3 mins before sunset	One bat heard foraging in woodland at Point Count 1.

Survey date (dusk)	Time of first bat	Species	Minutes after sunset time	Location
09/08/2017	20:43	Soprano pipistrelle	+1 min	One bat heard foraging in clearing at Point Count 1 at edge of woodland.
19/09/2017	19:10	Soprano pipistrelle	3 mins before sunset	At least 4 bats seen foraging around a mature beech tree at car parking location, possible emergence.
Survey date (dawn)	**Time of last bat**	**Species**	**Minutes before sunrise time**	**Location**
10/08/2017	04:54	Soprano pipistrelle	-70 mins	One bat foraging along slip road or tree canopy at north west corner of transect by A303.

Limitations

3.1.39 All these activity surveys of this transect were carried out in suitable weather conditions and access was not hindered during any of the surveys. During the September survey, additional recordings were taken using a Petersson D240X detector to confirm some species including the barbastelle bat (the Anabat Walkabout was not triggered by the barbastelle pass). The transect route was altered from the original plan between Point Counts 3, 4 and 5 to avoid dense thorny scrub to the east of the underpass that would have been difficult to cross in dark conditions.

3.2 Static Bat Detector Monitoring

3.2.1 Static detectors were deployed in suitable habitat at a total of 39 locations along the scheme options. Surveys were carried out in June to October 2016 and in April to October 2017. The months in which each location was surveyed are detailed in **Appendix C.** Due to lack of access, most locations could not be surveyed in every month of the survey period in 2016. Therefore, most locations were surveyed again in 2017 to ensure complete coverage. For locations that were surveyed in the same month in both 2016 and 2017, the average BAI for that month has been calculated. Therefore **Table 3-9** and the following tables show the average BAI for each month, regardless of the year. **Table 3-9** displays the BAIs during the entire season (April – October) and during the optimum bat activity period (May – September).

3.2.2 The static detectors recorded a total of over 325,000 bat passes during the five months surveyed in 2016 and the seven months surveyed in 2017. The levels of activity were variable across the different locations (see **Table 3-9**). Soprano pipistrelle were the most commonly recorded species, followed by common pipistrelle, and *Myotis* species. Most notably recorded were lesser and greater horseshoe bats, and barbastelle, all of which are protected under Annex 2 of the European Habitats Directive. Other species recorded include serotine bat, Brandt's bat, Daubenton's bat, Natterer's bat, whiskered bat, Leisler's bat, noctule, and Nathusius' pipistrelle. In order to help visualising the general findings of the passive monitoring, see **Figures HE551506-AA-EBD-D_SWI-DR-YE-000021** and **HE551506-AA-EBD-D_SWI-DR-YE-000022** which represent the species diversity and averaged BAIs across all static detector locations for the entire study period.

3.2.3 Most locations had six repeat visits within a month. However, as described above in **2.5 Data Processing and Analysis,** BAIs have been calculated based on a five-night recording window, so where a sixth or seventh night was recorded, this has been excluded from the analysis.

Table 3-9 Average Bat Activity Indexes during survey periods in 2016 and 2017.

Location	Average BAI April to October	Average BAI May to September
1	154.9	183.1
2	14.3	16.7
3	75.1	90.8
4	139	178.9
5	98.8	121.2
6	272.8	316.1
7	1,061.1	1,253.2
8	183	197.2
9	98.6	102.4
10	541.1	435.4
11	105.1	115.2
12	164.1	149.5
13	427.5	525.2
14	193.2	264.9
15	78.4	89.6
16	450.6	541.4
17	91.2	91.2
18	268	325.8
19	14.8	14.1
20	31.8	36.6
21	46.4	57.6
22	83	46.9
23	62.6	82.9
24	232.6	290
25	99.4	107.2
26	169.8	169.8
27	90.1	90.1
28	147.5	165
29	199.5	199.5
30	69.3	81.2
31	50.3	61.2
32	194.8	186.1
33	156.6	179.1
34	170.6	193.1
35	415.1	417.8
36	239	276
37	38.5	39.9

Location	Average BAI April to October	Average BAI May to September
38	1,639.3	1,482.4
39	176.5	183

April Monitoring Session

3.2.4 Location 10 within the woodland copse to the north of Winterbourne Stoke recorded the highest level of bat activity during this session with an average of 1,069.4 bat passes per night, of which 809.8 comprised common pipistrelle. This level of activity was approximately four times higher than that of the next highest locations as shown in

3.2.5 On the sixth night 51 barbastelle passes were recorded at location 23 and one barbastelle pass was recorded at location 24. As described above in **2.5 Data Processing and Analysis** this activity has not been included in the BAI calculations. However, since 51 barbastelle passes is relatively large, for the sake of comparison this level of activity is equivalent to a BAI of 10.2 at location 23, which is notably higher than that recorded at any other location in this session.

3.2.7 Table 3-10.

3.2.8 Most notably, low levels of barbastelle activity were recorded at eight of the 24 locations surveyed in this session, throughout the eastern half of the Scheme, and a single pass of lesser horseshoe bat was recorded at location 30 in the eastern half of the Scheme, just north of West Amesbury. The highest level of barbastelle activity was a BAI of 2 recorded at location 12 in Winterbourne Stoke. *Myotis* species and noctule bats were also recorded at a majority of locations.

3.2.9 On the sixth night 51 barbastelle passes were recorded at location 23 and one barbastelle pass was recorded at location 24. As described above in **2.5 Data Processing and Analysis** this activity has not been included in the BAI calculations. However, since 51 barbastelle passes is relatively large, for the sake of comparison this level of activity is equivalent to a BAI of 10.2 at location 23, which is notably higher than that recorded at any other location in this session.

Table 3-10: Bat Activity Indexes for individual species, and total BAI during April monitoring session

Location	Species BAI														Total BAI per location
	LHS	Daub	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip nat	Pip sp	Plec	Barb	Big bat	
2			0.8	0.4			0.8	2.2	0.4						**4.6**
4			7	0.8	0.2	0.4	20.8	69.2	8.8				0.2	8.4	**115.8**
5			12			0.2	2.4	40.6	11.4	0.2				0.4	**67.2**
6			17.2	0.4		1.6	0.2	7	29			0.2	0.2	0.2	**56**
7		1	8.8	0.8				8.2	80.6		0.6	0.2		0.4	**100.6**
8			1.8	0.4		0.4	0.6	72.4	35.8		0.2	0.2	0.2		**112**
9		0.2	1.4	0.2			0.4	42.2	29		0.2	6			**79.6**
10			4.8	0.6		0.4	2.4	809.8	249.8		0.2	1	0.4		**1,069.4**
11			2				0.6	13.2	37.8			0.6			**54.2**
12			1.8			0.6	0.6	117.8	82.8		0.4	0.6	2		**206.6**
13			0.2	0.2				14.4	22						**36.8**
14			1.2	0.6		0.4		12	55.8		0.2		0.6	0.2	**71**
15			2.2			0.2		17.6	2.2						**22.2**
16			0.4					59.6	27.6						**87.6**
18			2					12.2	22.6			0.2	0.2		**37.2**
19			0.4	3		0.2		7	7.2						**17.8**
20			1.4	0.2			0.2	2	8.4		0.2				**12.4**
21								0.2	1.2						**1.4**
22			1.4	0.2			0.8	228.8	49.4				0.2		**280.8**
23			0.6	0.4				0.2	0.4						**1.6**
24			0.4	0.4			0.4	1.6	0.4						**3.2**
28			0.8	7.6			0.2	2.4	49.4						**60.4**
30	0.2		3.6	1.4				0.2	4						**9.4**
31			3	1			0.2	0.8	1.8						**6.8**
Total BAI per species	**0.2**	**1.2**	**75.2**	**18.6**	**0.2**	**4.4**	**30.6**	**1,542**	**817.8**	**0.2**	**2**	**9**	**4**	**9.6**	

May Monitoring Session

Location 38 recorded the highest level of bat activity during the May monitoring session, with an average of 1,751.4 bat passes per night, of which 847 comprised soprano pipistrelle, and 718 comprised a *Myotis* species. Location 7 also recorded a relatively high level of activity during this session compared to other locations as shown in

3.2.11 Table 3-11.

3.2.12 Species composition was largely similar to that recorded in the April session, with the most notable exception being single passes of a greater horseshoe bat recorded at locations 36 and 37, just east of Countess Roundabout. These passes were both recorded on the 14th May 2017 at 21:35 and it is therefore likely that it is the same individual travelling along the River Avon. Barbastelle were again recorded at low levels, this time at 17 of the 37 locations surveyed in this session, throughout the Scheme, the highest of which was a BAI of 3.2 at location 23 in Normanton Gorse.

Table 3-11: Bat Activity Indexes for individual species, and total BAI during May monitoring session

Location	Species															Total BAI per location
	GHS	Daub	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip nat	Pip sp.	Plec	Plec_ Sero	Barb	Big bat	
2			2.6	0.6		1.2	10.6	11.8	1.8		0.4	0.2		0.4	0.2	**29.8**
4			0.2	2.4		1.6	38.4	64.6	0.6			0.8			2	**110.6**
5			1.6	1		0.4	6.4	56.2	4.2			0.2		0.2	1.6	**71.8**
6		1.2	159.4	0.4		1.2	7.4	35.8	131.4		0.6	9.2	9.8		0.4	**356.8**
7		1	547.8	0.8		0.4	1	339	232.2			1.8		0.2	0.4	**1,124.6**
8			6	1.8		0.2		96	64.8			1		0.2	1.2	**171.2**
9		0.2	1.4	2			1.6	32.6	81.6			6.6		0.2		**126.2**
10			11	3			5.6	246.8	128.8	0.2	0.2			0.2	1.2	**397**
11			2					34.8	67.4			2.8				**107**
12			2.4	1.6		0.2	4.2	46	53					0.8		**108.2**
13			0.6	1.2			0.4	50.8	18.2						0.4	**71.6**
14			6.6	0.6			1.2	98	172		0.8		0.2	0.2	0.8	**280.4**
15			2.6	2			1.8	24.2	18.4		0.2			1.2		**50.4**
16			9.8	0.6				444.4	184.6		2				0.2	**641.6**
17			0.4	0.6				51.2	2.2							**54.4**
18			7.4	0.2				151.2	85.6							**244.4**
19			0.8	5.6				2.8	21.4					0.6		**31.2**
20			0.6	2.4		0.2	0.8	9	4.4			0.2			0.2	**17.8**
21			0.6	5.4		1.4	4.4	5.8	39.4			0.2				**57.2**
22			2.4	1			11.8	19.6	38.6			0.2		2		**75.6**
23			1.2	2			3.4	3.4	4.2			0.6		3.2	0.2	**18.2**
24			7.8	10.4			13.2	51.2	137.8			0.8		1.8		**223**
25			25.2	1.6		0.2	0.4	3.8	8.2		0.2			2	0.4	**42**
26			1	3			0.2	10.8	79.4							**94.4**

Location	Species															Total BAI per location
	GHS	Daub	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip nat	Pip sp.	Plec	Plec_ Sero	Barb	Big bat	
27			0.4	8.4		0.2	0.2	4	32.4		0.6			0.4	0.2	**46.8**
28			6.2	6.4		2.4	2.8	9.6	202.2			1.4		0.2	0.2	**231.4**
29			7.2	1.8		0.6		0.6	5.2			0.2				**15.6**
30			19	17.4	0.4	0.8	2	13.8	47.4			0.4				**101.2**
31			3.6	9			1.6	10.4	11.4			0.2			0.4	**36.6**
32			35.4	0.2		0.2			99.4							**135.2**
33			21.8	1		0.2	0.2	0.6	217.2						0.4	**241.4**
34			0.8	3		0.4		2.6	8.8					0.2		**15.8**
35			0.2	1.8		0.2		0.4	8.8							**11.4**
36	0.2		2	1.6			0.2	12.4	90.8							**107.2**
37	0.2	0.2	2	4.6		0.2	0.2	11.8	30.8		0.2	0.8				**51**
38		32.6	718	14		1.4	1.2	136	847			1			0.2	**1,751.4**
39		0.2	4.6	7.2		0.4	0.4	37.8	87.4	0.2	0.2	1.2				**139.6**
Total BAI per species	**0.4**	**35.4**	**1622.6**	**126.6**	**0.4**	**14**	**121.6**	**2130**	**3269**	**0.4**	**5.4**	**29.8**	**10**	**14**	**10.6**	

June Monitoring Session

3.2.13 As with the May monitoring session, location 38 again recorded the highest level of bat activity, with an average of 1,655.9 bat passes per night, of which 964.2 comprised soprano pipistrelle, and 563 comprised a *Myotis* species. Again, location 7 recorded relatively high levels of activity as well along with location 13, as shown in

3.2.14 On the sixth night, two barbastelle passes were recorded at location 30 and three barbastelle passes were recorded at location 34. As described above in **2.5 Data Processing and Analysis** this activity has not been included in the BAI calculations.

3.2.15 Table 3-12.

3.2.16 Species composition varied from that recorded in April and May. Additional species recorded include singles passes of Brandt's bat at location 29, Natterer's bat at location 30, and whiskered bat recorded at location 32. Barbastelle were recorded again, this time at slightly higher levels at twelve of the 33 locations surveyed in this session, throughout the scheme, the highest of which was a BAI of 9 at location 29. No greater or lesser horseshoe were recorded in this session.

3.2.17 On the sixth night, two barbastelle passes were recorded at location 30 and three barbastelle passes were recorded at location 34. As described above in **2.5 Data Processing and Analysis** this activity has not been included in the BAI calculations.

Table 3-12: Bat Activity Indexes for individual species, and total BAI during June monitoring session

Location	Species																	Total BAI per location
	Daub	Natt	Bran	Myst	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip sp.	Plec	Plec_ Myo	Plec_ Sero	Barb	Big bat	
1					11					514.8	5					0.2		**531**
2					1.6	1.4		0.4	0.4	6.4	0.8						0.4	**11.4**
3					4.2	3.6	0.2	1.2	0.6	107.4	57		0.6					**174.8**
4						0.2		2	0.8	282.6	9		0.6				2.8	**298**
5					9.5	2.2		29.5	0.8	114.9	14.3	0.6	0.5			0.2	0.6	**173.1**
6					116.4	8.8			2.6	20.2	100.4	0.2	0.4				0.2	**249.2**
7	1.2				20	7.6		0.4	1.4	624	558.4		1.4		0.2	0.8	0.2	**1215.6**
8					6	17.8	0.2	5.6	10.2	139.8	45		0.2					**224.8**
9	0.1				1.7	1.9		0.6	0.5	36.7	45.4		4.4			0.3	0.2	**91.8**
10					9.5	1.3		0.2	0.1	150.6	139.1		0.1			1.7		**302.6**
11					2.6	1.4				77.4	87.4		0.6			0.2		**169.6**
12					1	0.2		0.8		3.2	28.6					0.2		**34**
13					1	4.2		4.2	3.6	679	383.6						0.4	**1076**
14					5.2			14.8	1	277.4	15.8		0.2				1.6	**316**
15					44.4	0.8		0.2	0.4	54.2	20.2		0.2			0.2		**120.6**
16					3.2	1.2		0.6	0.2	286.4	112.6		0.2					**404.4**
17					3.4	1.8		0.2	4.8	162.6	38.6					0.6		**212**
18					13.2				2.2	297	101.8	1.8	9.8				0.4	**426.2**
19					0.6	0.8				2.8	10.8		1	0.4				**16.4**
25					2	13.2	7.2	5.8	13.8	140.6	80.2	0.2	1.4			0.2	1.4	**266**
26					3	7.8		5.2	1.6	140.4	71.4		0.2				0.4	**230**
27					6.1	9.9	0.2	2	2.9	11.1	67.1	0.2	0.8			0.4	0.3	**101**
28					5.8	1.8		5	1	33	63.8	1.6					0.8	**112.8**
29	0.4		0.1		35.3	3.1		0.9	3.2	82.9	143.4	0.4	0.7		0.1	9	0.4	**279.9**

Location	Species																Total BAI per location
	Daub	Natt	Bran	Myst	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip sp.	Plec	Plec_ Myo	Plec_ Sero	Barb	Big bat	
30		0.6			27	4.2		4.8	0.2	29	65.4	1.6	0.4				0.2	**133.4**
32				0.2	24.2	2.2				2.6	115.8		0.2					**145.2**
33					6.4	5		0.2		0.6	189.2		0.4					**201.8**
34					1	35.2	1	1.4		7.2	33.2		0.8					**79.8**
35					1	3.6		2	0.2	47	226	24.6					0.2	**304.6**
36	1.2				4.2	2.6				31.6	131.8	1	0.6					**173**
37					2.2	10.4	0.4	2	0.2	10.2	14.8	1.6						**41.8**
38	16.5				563	7.6		0.5	1.8	98.7	964.2	3.2	0.4					**1655.9**
39	0.1				6.5	11.1	0.1	0.6	7.8	64.4	78	12.6	0.4				0.1	**181.7**
Total BAI per species	**19.5**	**0.6**	**0.1**	**0.2**	**942.2**	**172.9**	**9.3**	**91.1**	**62.3**	**4536.7**	**4018.1**	**49.6**	**26.5**	**0.4**	**0.3**	**14**	**10.6**	

July Monitoring Session

3.2.18 Location 7 recorded the highest level of bat activity in July, with an average of 2,154.2 bat passes per night, of which 1,330.4 comprised soprano pipistrelle. As in May and June, location 38 also recorded relatively high levels of activity compared to other locations, as shown in Species composition was similar to that recorded in April and May. Again, barbastelles were recorded at low levels at ten of the 31 locations surveyed in this session, throughout the scheme, with the highest level of activity being a BAI of 1.2 at location 10. Single passes of lesser horseshoe bats were recorded at locations 6 and 7 just north of Berwick St James.

3.2.19 On the sixth night, one lesser horseshoe bat pass was recorded at location 11. As described above in **2.5 Data Processing and Analysis** this activity has not been included in the BAI calculations.

3.2.21 Table 3-13.

3.2.22 Species composition was similar to that recorded in April and May. Again, barbastelles were recorded at low levels at ten of the 31 locations surveyed in this session, throughout the scheme, with the highest level of activity being a BAI of 1.2 at location 10. Single passes of lesser horseshoe bats were recorded at locations 6 and 7 just north of Berwick St James.

3.2.23 On the sixth night, one lesser horseshoe bat pass was recorded at location 11. As described above in **2.5 Data Processing and Analysis** this activity has not been included in the BAI calculations.

Table 3-13: Bat Activity Indexes for individual species, and total BAI during July monitoring session

Location	Species															Total BAI per location
	LHS	Daub	Natt	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip sp.	Plec	Plec_ Sero	Barb	Big bat	
1				10.2	0.4				102	2.6		2		0.2		**117.4**
3				3.8	3.2		0.6	0.2	84.2	3.2	0.2	0.8		0.2		**96.4**
5				6.6	4.4	0.6	2.6	0.6	167	13.8	1.2	1.2		0.4	1	**199.4**
6	0.2	1		209.6	1.8	0.4	16.6	47.4	264.8	38.8					1.4	**582**
7	0.4	0.4		171.4	5		1.4	1.2	643.6	1330.4		0.4				**2,154.2**
8				4.8	2.6	2.6	8	2.6	153.6	82.6		0.4		0.2	0.8	**258.2**
9		0.2		5.2	4.6		0.6	1.4	44	25.8		5.8				**87.6**
10				14.8	2.4		1.2		97	93	1.6	0.4		1.2		**211.6**
11				1.6				1.2	32.4	63.8		1	3			**103**
15				28.6	3.8		0.8	0.8	114.2	14.4	3.6				0.4	**166.6**
17				0.2	6.6		9.2	0.4	28	28.4	0.2					**73**
20				1.9	11.5		23.1	2.8	45.6	15.6		0.6			0.7	**101.8**
21			0.1	3.9	15.8		33.4	28.8	9.8	21.9	0.5	2.4			0.4	**117**
22				0.8	9.8		15.8	2.2	4.6	10.6		0.4				**44.2**
23				14.6	9.9	0.9	31.1	33.5	51.2	30.3		1.1			0.6	**173.2**
24				21.3	20.3	1.8	4.6	25.9	139.9	63.4	0.4	0.3		0.2	3.7	**281.8**
25				23.2	14.9	0.1	21.5		35.8	64	0.7	16.8				**177**
26				13.4	242.6	0.3	57	6.3	33.8	70.4	1.3	0.4		0.5	2.1	**428.1**
27				9.8	54.2		10.4	0.4	19.2	57.2	0.2	0.4				**151.8**
28				10	57.4	0.1	28.3	13.8	15.2	102.2		11.8	0.4		7.4	**246.6**
29				59.2	9.9		2.7	1.3	40.9	94	1.7	1.6		3		**214.3**
30		0.1	0.1	22.2	25.2		4.8	1.2	16	16.3	0.1	1		0.1		**87.1**
31				19.6	16	0.7	2.7	2.7	12.1	27.8	0.3	1.2	0.1	0.2	0.2	**83.6**
32				28.8	8.4				34.2	204.4	3.8	0.4				**280**

Location	Species															Total BAI per location
	LHS	Daub	Natt	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip sp.	Plec	Plec_ Sero	Barb	Big bat	
33		0.2		15.6	13.8		4		0.2	77.2		0.2	1			**112.2**
34				6.6	72.8	2.4	72		42.6	415.8	13.4	2.2	0.2		0.2	**628.2**
35		4.6		110	2.8		0.4		0.8	124.6	0.4					**243.6**
36		0.9		5	2.4			0.2	81.5	416.2	0.5	0.8				**507.5**
37				5.2	11.8		0.8		3.2	18.8	1					**40.8**
38		11.6		400.6	12.8		1.4	0.4	100.4	813	0.4	0.4				**1341**
39				9.8	21		1.2	1.8	32.4	65.8	3.4	0.4				**135.8**
Total BAI per species	**0.6**	**19**	**0.2**	**1,238.3**	**668.1**	**9.9**	**356.2**	**177.1**	**2,450.2**	**4,406.3**	**34.9**	**54.4**	**4.7**	**6.2**	**18.9**	

August Monitoring Session

3.2.25 As in May and June, location 38 again recorded the highest levels of bat activity, with an average of 1,833.6 bat passes per night, of which 1,307.4 comprised soprano pipistrelle. Again, location 7 also recorded relatively high levels of activity along with location 35, as shown in Species composition was similar to that recorded in April, May and July, with barbastelle and lesser horseshoe bats again being recorded. In contrast to previous sessions, barbastelles were recorded at a much higher level of activity, across 26 of the 39 locations surveyed in this session with a BAI of 22.8 at location 10. Single passes of lesser horseshoe bats were recorded at locations 8, 20, and 36.

3.2.26 Table 3-14.

3.2.27 Species composition was similar to that recorded in April, May and July, with barbastelle and lesser horseshoe bats again being recorded. In contrast to previous sessions, barbastelles were recorded at a much higher level of activity, across 26 of the 39 locations surveyed in this session with a BAI of 22.8 at location 10. Single passes of lesser horseshoe bats were recorded at locations 8, 20, and 36.

Table 3-14: Bat Activity Indexes for individual species, and total BAI during August monitoring session

Location	Species																Total BAI per location
	LHS	Daub	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip nat	Pip sp.	Plec	Plec_ Myo	Plec_ Sero	Barb	Big bat	
1			5			0.2		39.4	0.8						1.2		**46.6**
2			2.4	0.5		2.2	0.1	8.1	3.1			1.2	0.1	0.6	0.3		**18.6**
3			3.4	6.8				30.2	5.6		0.4	2.2			0.6		**49.2**
4			7.2	1.6		6	4.1	92.7	6.1		0.1	1				0.5	**119.3**
5			2.5	1.7	1	3.2	0.1	44.6	30.9		0.1	0.7			0.2		**85**
6			74.6	11.6		0.4		2.4	30.6								**119.6**
7			282.6	6.8	0.2	3.2	1.8	142.8	1143.6			1.8			0.2		**1583**
8	0.2		8.4	8.4		2.8		58.8	65			0.8			1.4	0.4	**146.2**
9			3.4	0.2			0.8	59.8	13.4			3	1.6	3	0.6	0.2	**86**
10			12	0.2		0.4		444.2	130			0.6		0.2	22.8	0.2	**610.6**
11			5.6					14.6	62.2			0.4			2.6		**85.4**
12			2.1	0.5		1.1	7.2	82.4	35		0.1	0.1	0.4	0.2	0.4	0.4	**129.9**
13			1.4	1	2.4	17.8	0.6	387.6	63							0.2	**474**
14			4.9	0.7	0.4	1.9	0.9	207.2	22.5	0.1	0.2	0.5		0.3	1.3	1.1	**242**
15			6.3	1.6	2	17.5	5	14.6	17			0.6	7.8	5.9	0.7		**79**
16			4.2	1.2	0.2	1.4	0.8	469.4	278.4			0.6					**756.2**
17			2.8	3.4		0.4	0.4	71.2	13.2			6.8			0.6		**98.8**
18			9.4	0.2		42.4	13.2	97.4	128.6			0.4				0.4	**292**
19			2.8			0.2		0.4	0.4								**3.8**
20	0.6		3	3.4		2.8	0.2	2.2	7.2			0.2	2		0.2		**21.8**
21			5.2			3.8	0.4	4.8	6	0.2			0.6				**21**
22			2.2	0.8	0.4	1.2	4.2	13.2	33.6			1.4			1.4		**58.4**
23			6.4	8.6		3.8	18.4	5.2	4.2				8.2	1.6	1		**57.4**
24			2	1.6		6.2	0.4	34.4	3.4			2.6	3.4	1.2			**55.2**

Location	Species																Total BAI per location
	LHS	Daub	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip nat	Pip sp.	Plec	Plec_ Myo	Plec_ Sero	Barb	Big bat	
25									19.8								**19.8**
26									44.8								**44.8**
27			2.6	2.6		2.4	2.8	4.8	12.4		0.4	0.2	3.2	0.6	0.2		**32.2**
28			2.2			0.4	0.8	7	28				0.6		0.2		**39.2**
29			34.8	0.2		0.2	9.6	129.8	202.2		0.2		0.4	2	3.2	0.8	**383.4**
30			9.4	1.8		5.2	5	3	14.6				6.4	1.2	1.6	0.2	**48.4**
31			2.6	0.2		5.8	11.4	7.2	16.4			0.2	7	6			**56.8**
32		0.1	47.6	1.6		0.1		7.3	201.1			0.4		0.1			**258.3**
33		1	44.4	1.5		1.1	0.9	1.6	161.5		0.1	1.6	3.9	0.7	0.2	4.8	**223.3**
34			1.4	9.5	8.3	18.3	0.8	9.8	92.6		0.4	0.8	0.2	0.5	0.4		**143**
35		10.4	669.6	9.4		9		4.8	458		0.2						**1,161.4**
36	0.1	2.2	11.3	0.5		0.2		44.3	250.8		6.2		0.2	0.3	0.1	0.1	**316.3**
37			3.7	4		1.2		5.5	28.8		1.8	0.1			0.1	0.5	**45.7**
38		4.2	349.4	17.2		1.7		152.8	1307.4			0.4	0.3	0.1	0.1		**1,833.6**
39		0.1	10.7	11.7	0.1	1.7	0.1	66.8	199		2	0.9	0.4	0.1	0.8		**294.4**
Total BAI per species	**0.9**	**18**	**1,649.5**	**121**	**15**	**166.2**	**90**	**2,772**	**5,141.2**	**0.3**	**12.2**	**29.5**	**46.7**	**24.6**	**42.4**	**9.8**	

September Monitoring Session

3.2.28 As with May, June, and August, location 38 again recorded the highest levels of bat activity, with an average of 830.2 bat passes per night, of which 570.6 comprised soprano pipistrelle. Location 10 and location 24 also recorded relatively high levels of bat activity as compared to other locations, as shown in Slightly higher levels of barbastelle activity were again recorded at 20 of the 37 locations surveyed in this session, the highest of which being a BAI of 5.4 at location 15. Both greater and lesser horseshoe bats were recorded in this session. A single pass of greater horseshoe bat was recorded at location 3, whilst single passes of lesser horseshoe bats were recorded at 9 locations.

3.2.29 On the sixth night, two barbastelle passes and five Nathusius' pipistrelle passes were recorded at location 16, and on the seventh night, eight barbastelle passes were recorded at location 22. As described above in **2.5 Data Processing and Analysis** this activity has not been included in the BAI calculations.

3.2.30 Table 3-15.

3.2.31 Slightly higher levels of barbastelle activity were again recorded at 20 of the 37 locations surveyed in this session, the highest of which being a BAI of 5.4 at location 15. Both greater and lesser horseshoe bats were recorded in this session. A single pass of greater horseshoe bat was recorded at location 3, whilst single passes of lesser horseshoe bats were recorded at 9 locations.

3.2.32 On the sixth night, two barbastelle passes and five Nathusius' pipistrelle passes were recorded at location 16, and on the seventh night, eight barbastelle passes were recorded at location 22. As described above in **2.5 Data Processing and Analysis** this activity has not been included in the BAI calculations.

Table 3-15: Bat Activity Indexes for individual species, and total BAI during September monitoring session

Location	Species																	Total BAI per location
	LHS	GHS	Daub	Natt	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip nat	Pip sp.	Plec	Plec_ Myo	Plec_ Sero	Barb	Big bat	
1					2			0.2		28.8	5.8						0.6		**37.4**
2					1.6	1				0.2	0.6			0.2			3.4		**7**
3		0.2			1.6	2.4		0.8	0.4	33.6	2.2		0.4	0.8			0.2		**42.6**
4					2.2			3.6		179.4	1.8			0.2				0.6	**187.8**
5					1	1.6		5.4		53.4	14.8			0.4					**76.6**
6			0.8		215.2	5.4	0.2	2		23	26.2			0.2					**273**
7	0.2		0.6		18	5.6		2.2		18	141.6			1			1	0.2	**188.4**
8	0.2				8.8	13.6	1	6.4		93.8	58.6		0.6	0.6		0.4	1.6		**185.6**
9					4.4	7.8		0.8	2.6	59.2	39.8	0.6	0.2	4		0.2		0.6	**120.2**
10					47.2	1		0.2		363.8	238.2		0.2	0.4			4	0.4	**655.4**
11					6.2				4.4	21.4	78						1.2		**111.2**
12	0.2				55.6	0.6		1.2	0.2	63	202.8						2.2		**325.8**
13					0.8	2.4		3.4	2.4	452.2	16.8						0.2	0.8	**479**
14	0.2				17	0.4		2.4	0.6	142	54.6		0.2	0.2			3.6		**221.2**
15	0.2				2.6	2.6			0.2	8.4	9.4	0.2	0.8	1.6			5.4	0.2	**31.6**
16					7.2	1.4		0.4	0.8	211	137.2		5.2	0.2					**363.4**
17					0.2	1.2			0.2	1.8	0.8			9.6			3.8		**17.6**
18	0.4				31	0.4				148.2	151.4		0.2	6.8			2		**340.4**
19					2.4	0.4				0.6	0.8			0.2			0.4		**4.8**
20					1.2	1.2			0.2	0.8	0.8		0.2	0.4			0.2		**5**
21					3.2	3.6	0.2	0.8	0.8	14.4	10.2			1.4		0.2	0.4		**35.2**
22					0.6	0.6		0.2		1.6	6			0.4					**9.4**
24			0.2		25.2	15		1.4	67.6	362.6	110.8		12.4	1.2		1.4		2.2	**600**
25					3.2	1		2.4		2.4	16		0.4	4.4	0.2		1		**31**
26					4.4	4.8		1.8		14.6	25			1					**51.6**

Location	Species																	Total BAI per location
	LHS	GHS	Daub	Natt	Myotis sp.	Noct	Leisl	Nyct	Sero	Pip45	Pip55	Pip nat	Pip sp.	Plec	Plec_ Myo	Plec_ Sero	Barb	Big bat	
27					10.4	8.8		1	0.6	16	76.2		0.2	5.2				0.2	**118.6**
28					3.8	3.6		0.6		7.2	177.8			1.2				0.6	**194.8**
29	0.2				17.4	7		0.4	1	29.8	40.2	0.2	0.2	3			4.4	0.4	**104.2**
30				0.4	8	5.4		3.8	0.6	6.6	7.6		0.2	1.8				1.6	**36**
31					4.4	3.4		1.4	4.2	20.8	23		2	5.6				3	**67.8**
32					29.6					0.2	82					0.2			**112**
33			0.2		8.4	4.2				0.4	102.2			1				0.4	**116.8**
34	0.1				0.5	1.6	0.3	1.4	0.5	10.6	79.9	0.1		3.4			0.1	0.2	**98.7**
35			7.6		321.2	0.6				0.8	37.2		0.2				0.2		**367.8**
37	0.2				0.8	1.4		0.2		1.2	16.2							0.2	**20.2**
38			4.2		151.6	7		0.2	0.2	96.4	570.6								**830.2**
39					23.8	6.2				48.2	83.6		1.2	0.2		0.4			**163.6**
Total BAI per species	**1.9**	**0.2**	**13.6**	**0.4**	**1,042.7**	**123.2**	**1.7**	**44.6**	**87.5**	**2,536.4**	**2,646.7**	**1.1**	**24.8**	**56.6**	**0.2**	**2.8**	**35.9**	**11.6**	

October Monitoring Session

3.2.33 As in previous months, location 38 again recorded the highest levels of bat activity, with an average of 2,423.8 bat passes per night, of which 1,412.4 comprised a *Myotis* species, and 899.2 comprised soprano pipistrelle. This level of activity was approximately six times higher than that of the next highest locations, as shown in As in August and September, high levels of barbastelle activity were again recorded at six of the 16 locations surveyed in this session, with a BAI of 19.4 at location 12, and a BAI of 12.8 at location 1. Single passes of lesser horseshoe bat were recorded at locations 22, 34, and 35.

3.2.34 Table 3-16.

3.2.35 As in August and September, high levels of barbastelle activity were again recorded at six of the 16 locations surveyed in this session, with a BAI of 19.4 at location 12, and a BAI of 12.8 at location 1. Single passes of lesser horseshoe bat were recorded at locations 22, 34, and 35.

Table 3-16: Bat Activity Indexes for individual species, and total BAI during October monitoring session

Location	Species													Total BAI per location
	LHS	Daub	Myotis sp.	Noct	Nyct	Sero	Pip45	Pip55	Pip nat	Pip sp.	Plec	Barb	Big bat	
1			1.4	0.2			13.4	14			0.2	12.8		**42**
3			0.4	1.8		0.2	8.6	0.6			0.8	0.2		**12.6**
4				0.4	0.2		1.2	0.2					0.2	**2.2**
5				0.2	0.2		12	5.4		0.2	0.8			**18.8**
12			3.8	0.4			74	82.6				19.4		**180.2**
14			1				11.2	16				0.4		**28.6**
22	0.2		2	0.2			8.6	16.6			0.6	1.2		**29.4**
25			2.6	1.6		0.2	47	6.4			1.4	1.2		**60.4**
32			68.2	0.2			1	168.2			0.6			**238.2**
33			13.8				1.2	28.8						**43.8**
34	0.2		3.4	4	0.6		4.4	43.8			1.8			**58.2**
35	0.2	3	299.4	0.6			2.2	96.4						**401.8**
36		8.6	42				1.2	39		0.2				**91**
37			2	1.4			1.9	25.8		0.1	0.5			**31.7**
38		19.6	1,412.4	1			88.2	899.2	0.2	0.4	2.8			**2,423.8**
39			4				41	98.8		0.2				**144**
Total BAI per species	**0.6**	**31.2**	**1,856.4**	**12**	**1**	**0.4**	**317.1**	**1,541.8**	**0.2**	**1.1**	**9.5**	**35.2**	**0.2**	

Summary

3.2.36 The highest total number of bat passes was recorded during the August session as shown on Figure 1.

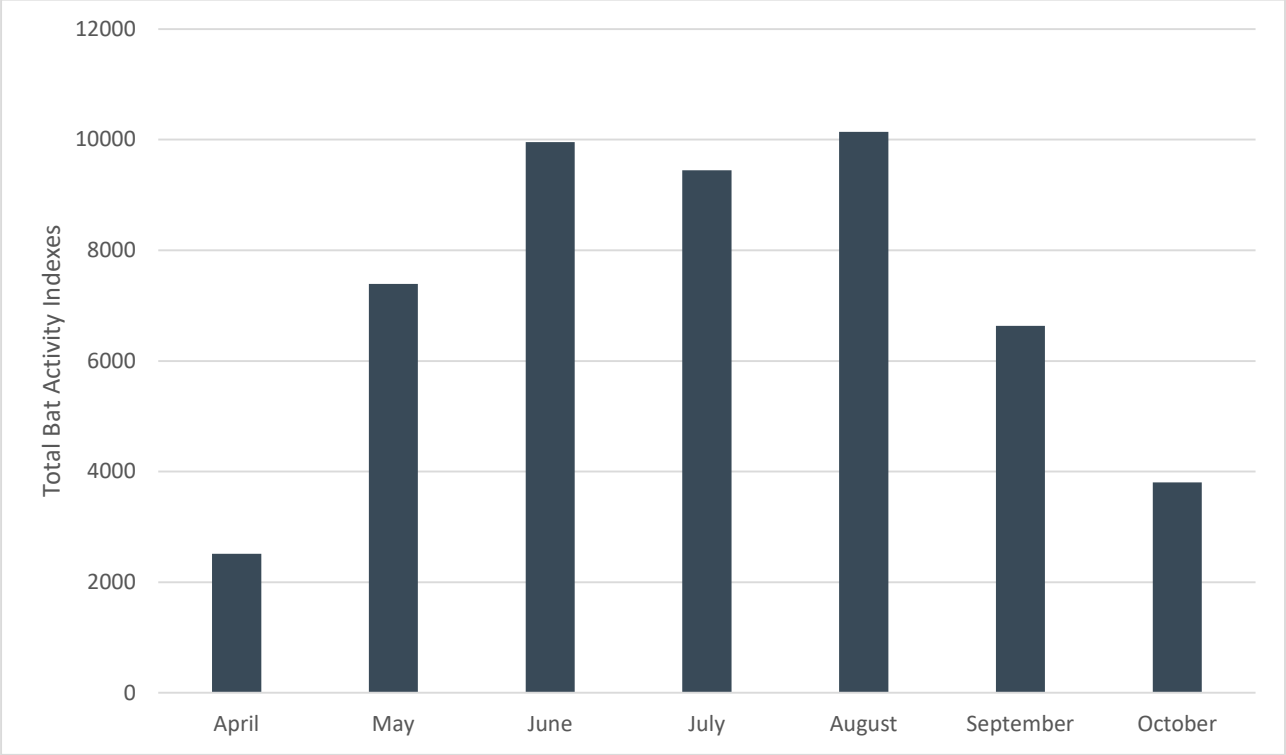


Figure 1: Total Bat Activity Indexes for every location during each monthly monitoring session

3.2.37 On average, across the April to October survey period, location 38 recorded the highest level of activity, with an average BAI of 1,639.3, which was just over one and a half times that of the next highest level, which was an average BAI of 1,061.1 at location 7. Locations 2, 19, 20, 37, and 21 recorded the lowest levels of activity, with average BAIs of less than 50 (see Figure 2).

3.2.38 Overall, thirteen distinct species were recorded throughout the static bat detector monitoring sessions, as well as seven groups that could not be identified to species level. The most commonly recorded species were soprano pipistrelle with a total BAI of 21,840.9, followed by common pipistrelle with a total BAI of 16,284.4. Other species recorded at a relatively high level of activity include *Myotis* species, noctule, *Nyctalus* species, and serotine bats. Species recorded with the lowest levels of activity include Brandt's bat, whiskered bat, and greater horseshoe bat, all of which have a total BAI of less than one (see Figure 3).

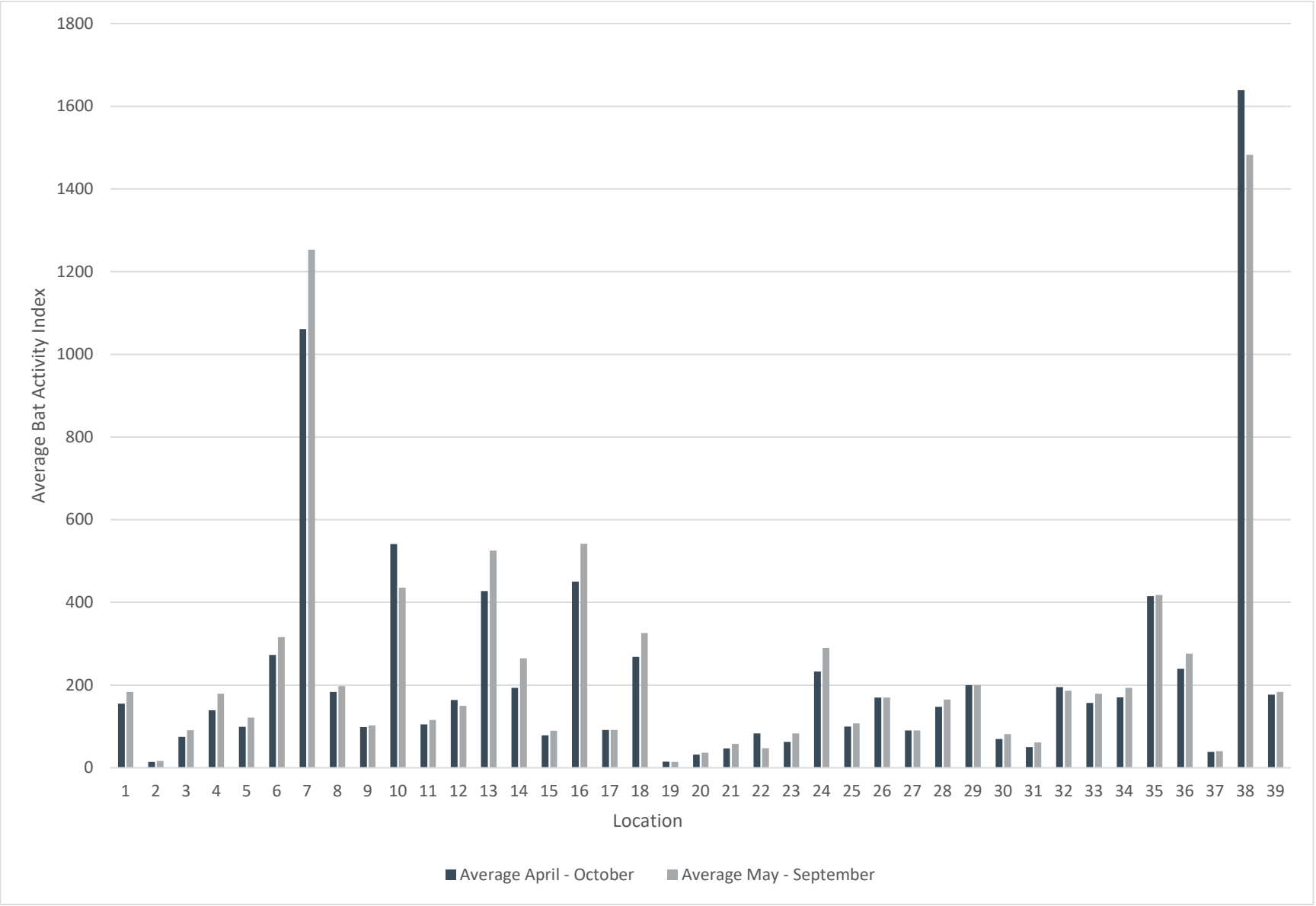


Figure 2: Average BAIs over the entire season and optimum bat activity periods

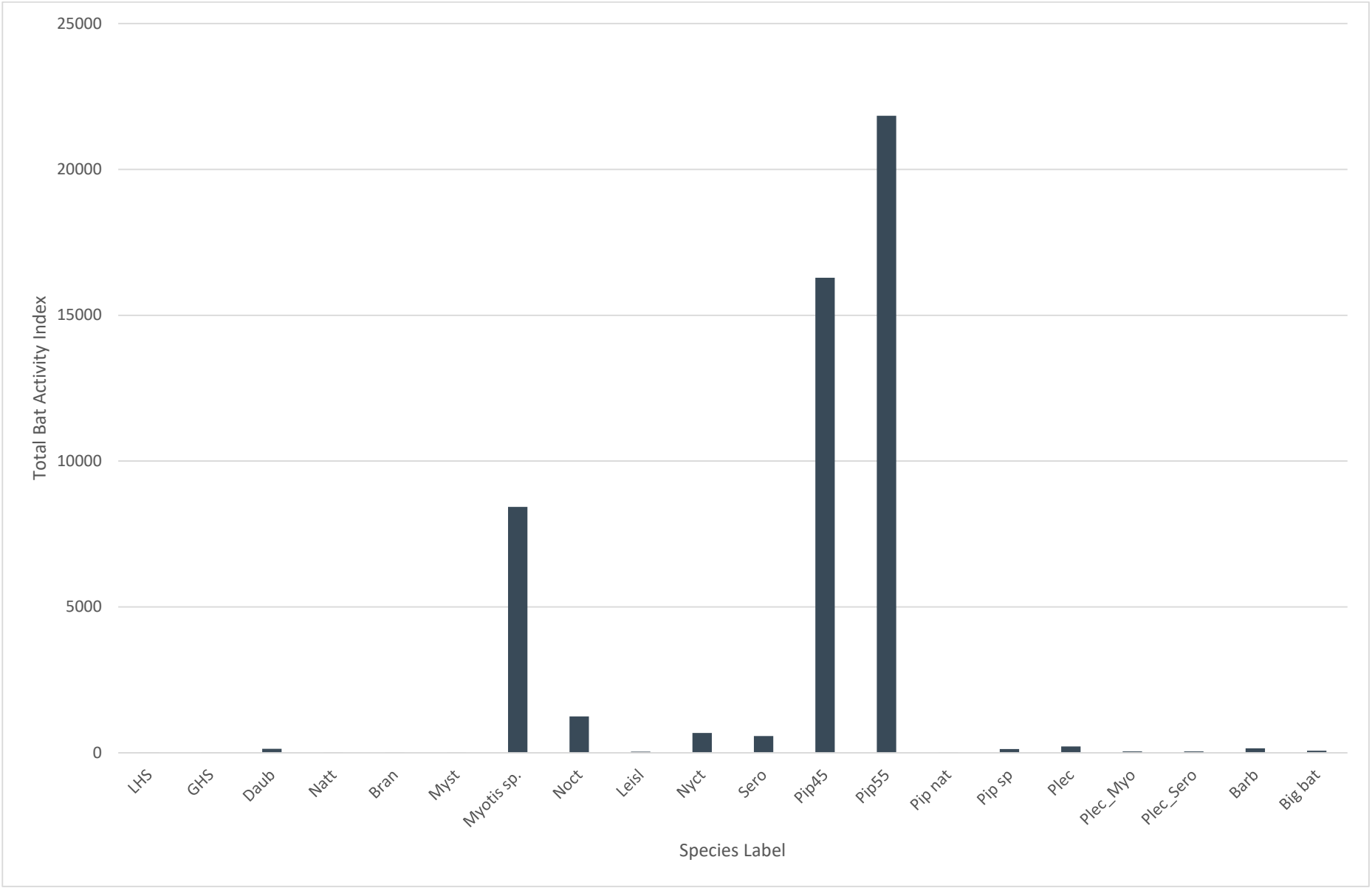


Figure 3: Total BAIs for each species throughout season at every location

3.2.39 Barbastelle bats were recorded at every location except locations 6 and 32. Locations 1 and 39 are separate by over 10.5km. Research suggests that barbastelles will travel 7 to 7.5km from roosts to forage, although some do travel further[9][10]. Radiotracking studies for this scheme[11] found that Grovely Wood (approximately 6km to the south west of Winterbourne Stoke) and adjacent copses are likely to support a breeding population of barbastelle bats. Therefore, it is possible that those individuals recorded at location 39 (over 12km away) are from a different roost / local population to those recorded at location 1.

3.2.40 Throughout the monitoring session, a total of 957 barbastelle passes were recorded. **Figure 4** shows a breakdown of the total BAIs for each month for barbastelle. The highest level of activity was recorded in August, closely followed by that in September and in October. The highest levels of activity recorded seem to be located in the area to the north and east of Winterbourne Stoke, specifically at locations 1, 10, and 12. However, peaks in activity were also recorded at the easternmost and westernmost points of the Scheme. A peak of 51 barbastelle bat passes was also recorded on the sixth night in the April monitoring session at location 23 (Normanton Copse, in proximity to the proposed western portal), although this has not been included in the overall BAI calculations as the species was not recorded during the first five nights at this location.

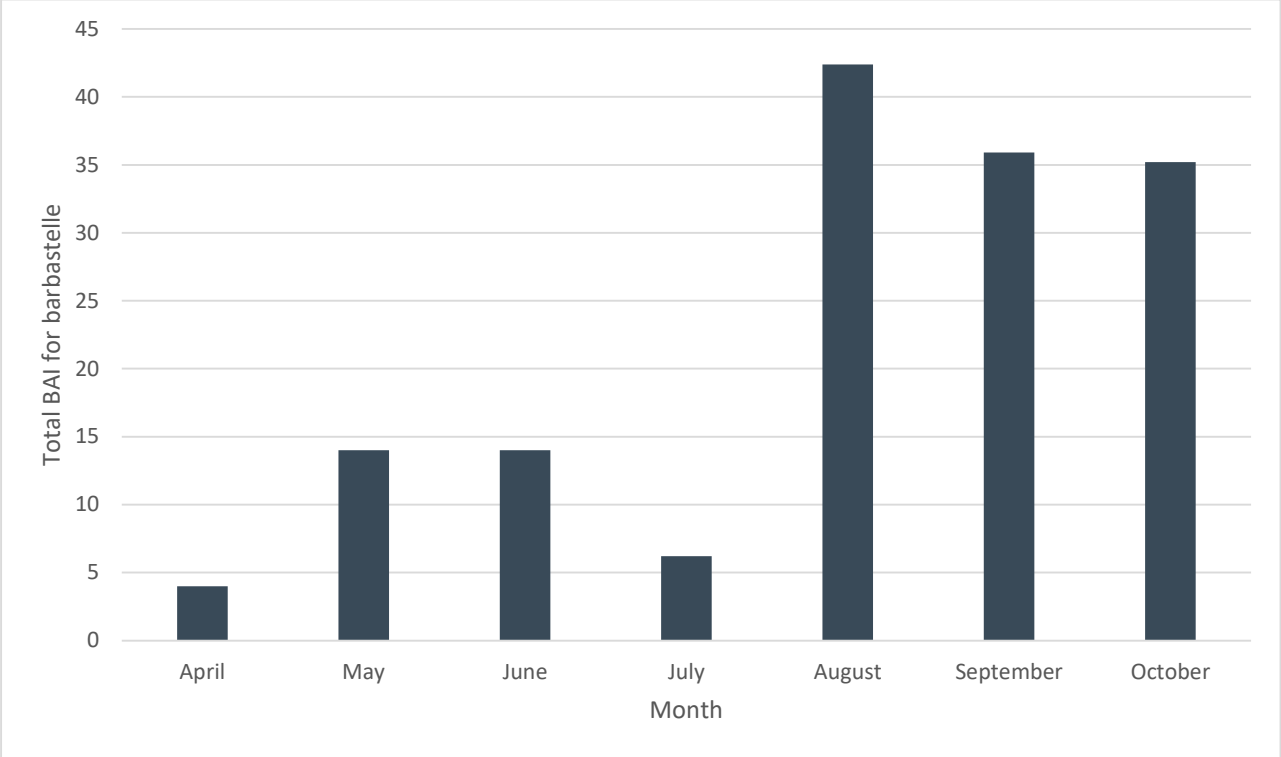


Figure 4: Total BAI for each month across all locations for barbastelle

3.2.41 Lesser horseshoe bats were recorded at locations 6, 7, 8, 12, 14, 15, 18, 20, 22, 29, 30, 34, 35, 36, and 37. Overall, this species was recorded at low levels of

9 Zeale, M.R.K, Davidson-Watts, I, and Jones, G. Home range use and habitat selection by barbastelle bats (*Barbastella barbastellus*): implications for conservation. 2012. Journal of Mammalogy, 93(4): 1110-1118. American Society of Mammalogists.
10 Jonathan Cox Associates. Mottisfont Bats Special Area of Conservation (SAC) Protocol for Planning Officers. Report to Natural England. 2010.
11 See A303 2017 Advanced Bat Surveys report reference HE551506-AA-EBD-SWI-SU-YE-000016.

activity, with a total of 27 passes being recorded throughout all monitoring sessions. This species tends to forage within a radius of 4 – 5km of its summer roosts with a Core Sustenance Zone of only 3km[12]. Locations 6 and 37 are separated by over 8km, and it is therefore considered unlikely that the lesser horseshoe bats recorded at location 6, 7, and 8 are from the same roost as those recorded at 35, 36, and 37.

3.2.42 Greater horseshoe bats were recorded at locations 3, 36, and 37. A single pass of greater horseshoe bat was recorded at locations 36 and 37 within a minute of each other on the same night in May, indicating that this may have been the same individual, possibly travelling from north to south along the River Avon corridor. Another single pass of greater horseshoe bat was recorded at location 3 in September. The foraging area of this species normally extends up to approximately 6km[13] from their roosts with a Core Sustenance Zone of 4km[12]. Location 3 is separated from locations 36 and 37 by over 9.5km, and it is therefore considered unlikely that the greater horseshoe bat recorded at location 3 are from the same roost as that recorded at 36 and 37.

3.2.43 The raw data for greater and lesser horseshoe bats has been included in **Appendix D**. The raw data for barbastelle has not been included, due to comprising over 900 records.

12 Bat Conservation Trust. Core Sustenance Zones: Determining Zone Size. 2014. Bat Conservation Trust. London
13 Burrows, L. Somerset Biodiversity Offsetting Strategy and Methodology. 2013. Somerset County Council. Taunton

4 Conclusions

4.1 Transect Surveys

4.1.1 Eight transects were surveyed and levels of activity were variable across the different routes. At least eight species were recorded: soprano pipistrelle, common pipistrelle, serotine, noctule, Leisler's, brown long-eared bat, barbastelle and one or more *Myotis* species. Greater horseshoe, lesser horseshoe and Nathusius' pipistrelle bats were not picked up during the transect surveys.

4.2 Static Detectors

4.2.1 Levels of activity were variable across the different locations. Soprano pipistrelle were the most commonly recorded species, followed by common pipistrelle, and *Myotis* species. Most notably recorded were lesser and greater horseshoe bats, and barbastelle, all of which are protected under Annex 2 of the European Habitats Directive. Barbastelles were recorded across the study area at low density. Other species recorded include serotine, Brandt's, Daubenton's, Natterer's, whiskered bat, Leisler's, noctule, and Nathusius' pipistrelle.

4.2.2 Bat activity indices were the highest along the River Avon corridor north of the A303, and the River Till corridor, south of the A303.

Figures

Transect surveys:

HE551506-AA-EBD-D_SWI-DR-YE-000011

HE551506-AA-EBD-D_SWI-DR-YE-000012

HE551506-AA-EBD-D_SWI-DR-YE-000013

HE551506-AA-EBD-D_SWI-DR-YE-000014

HE551506-AA-EBD-D_SWI-DR-YE-000015

HE551506-AA-EBD-D_SWI-DR-YE-000016

HE551506-AA-EBD-D_SWI-DR-YE-000017

HE551506-AA-EBD-D_SWI-DR-YE-000018

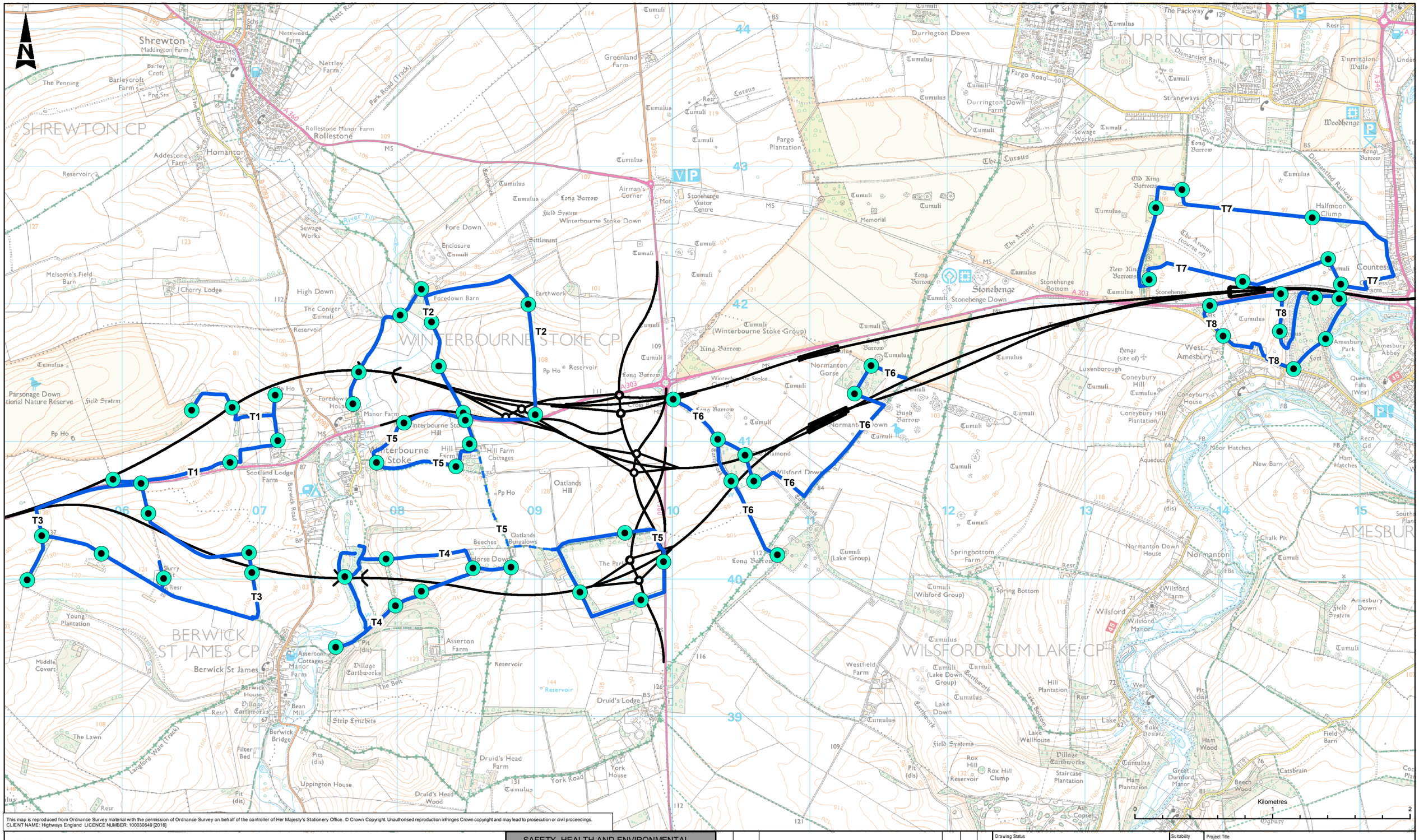
HE551506-AA-EBD-D_SWI-DR-YE-000019

Static monitoring:

HE551506-44-EBD-D_SWI-DR-YE-000020

HE551506-AA-EBD-D_SWI-DR-YE-000021

HE551506-AA-EBD-D_SWI-DR-YE-000022



LEGEND

- ROUTE OPTIONS
- POINT COUNT
- TRANSECT - T1 - T8
- DRIVEN SECTION

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
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 in the design hazard log)
Construction
None
Maintenance / Cleaning
None
Use
None
Decommission / Demolition
None

Rev	Date	Description	By	Chk'd	App'd
P01	20/02/18	FIT FOR INTERNAL REVIEW AND COMMENT	EA	RJS	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

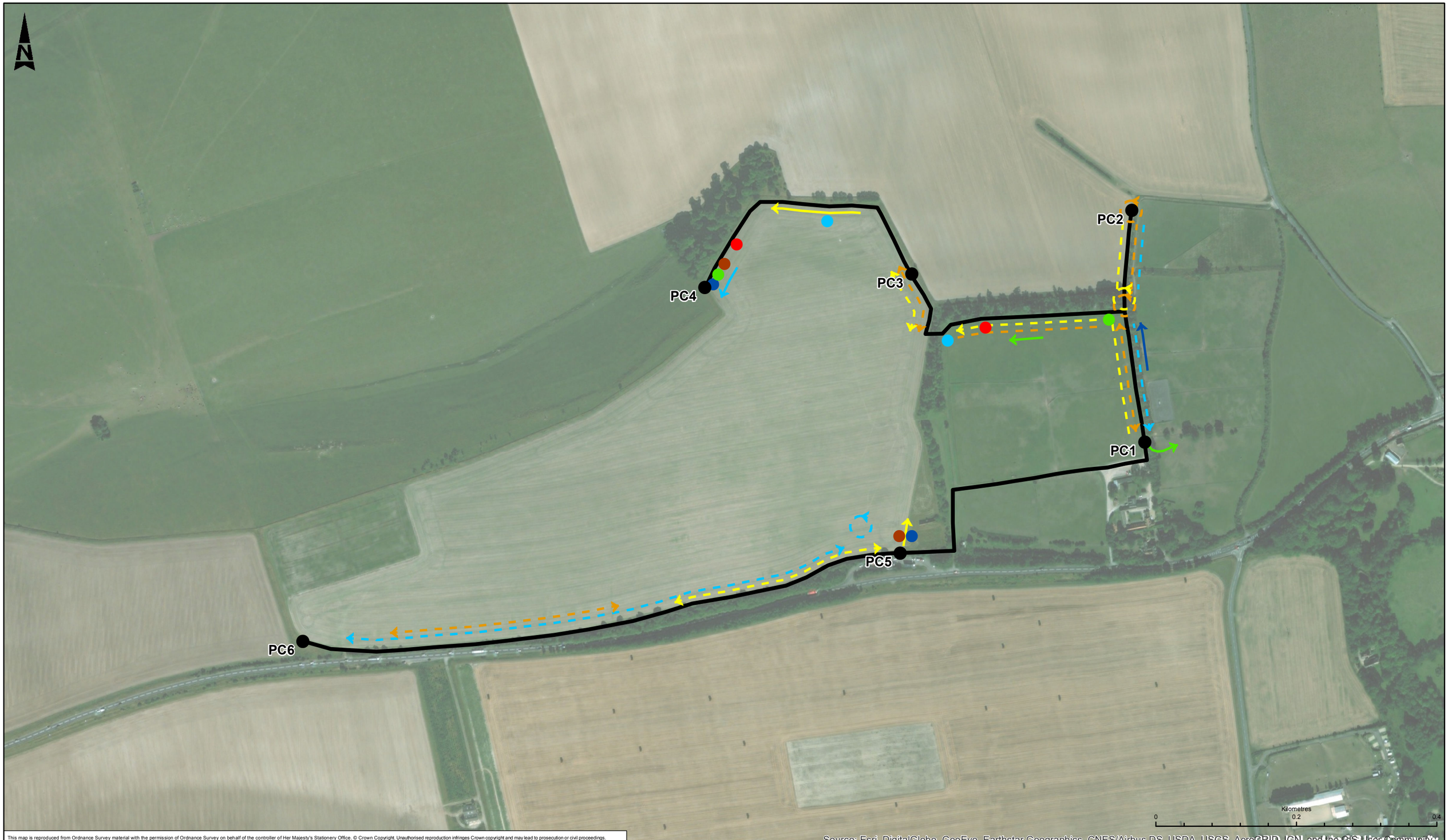
Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: BAT ACTIVITY TRANSECTS - LOCATION OVERVIEW

Scale	Designed / Drawn	Checked	Approved	Authorised
1:25,000	EA	RJS	LB	AK
Original Size	Date	Date	Date	Date
A3	20/02/18	20/02/18	20/02/18	20/02/18

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551506-AA-EBD-D_SWI-DR-YE-000011

Revision: P01



LEGEND

- TRANSECT ROUTE
- POINT COUNT
- COMMON PIPISTRELLE COMMUTING
- COMMON PIPISTRELLE FORAGING
- SOPRANO PIPISTRELLE FORAGING
- NOCTULE COMMUTING
- NOCTULE RECORD
- MYOTIS SPECIES (INC. NATTERER'S) COMMUTING
- MYOTIS RECORD
- SEROTINE FORAGING
- SEROTINE RECORD
- BROWN LONG-EARED RECORD
- BARBASTELLE RECORD

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
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 in the design hazard log)
Construction
None
Maintenance / Cleaning
None
Use
None
Decommission / Demolition
None

Rev	Date	Description	By	Chk'd	App'd
P01	20/02/18	FIT FOR INTERNAL REVIEW AND COMMENT	EA	RJS	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: BAT ACTIVITY TRANSECT 1 - SCOTLAND LODGE / PARSONAGE DOWN

Scale	Designed / Drawn	Checked	Approved	Authorised
1:5,000	EA	RJS	LB	AK

Original Size	Date	Date	Date	Date
A3	20/02/18	20/02/18	20/02/18	20/02/18

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551506-AA-EBD-D_SWI-DR-YE-000012

Revison: P01

LEGEND

- TRANSECT ROUTE
- POINT COUNT
- COMMON PIPISTRELLE COMMUTING
- COMMON PIPISTRELLE FORAGING
- COMMON PIPISTRELLE RECORD
- SOPRANO PIPISTRELLE COMMUTING
- SOPRANO PIPISTRELLE FORAGING
- SOPRANO PIPISTRELLE RECORD
- NOCTULE FORAGING
- NOCTULE RECORD
- MYOTIS SPECIES (INC. NATTERER'S) COMMUTING
- MYOTIS SPECIES (INC. NATTERER'S) FORAGING
- MYOTIS SPECIES (INC. NATTERER'S) RECORD
- BIG BAT SPECIES COMMUTING
- BIG BAT SPECIES RECORD
- UNKNOWN SPECIES COMMUTING
- UNKNOWN SPECIES RECORD
- SEROTINE COMMUTING
- SEROTINE FORAGING
- BROWN LONG-EARED COMMUTING
- BROWN LONG-EARED FORAGING
- BARBASTELLE RECORD

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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 in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Rev	Date	Description	By	Chk'd	App'd
P01	20/02/18	FIT FOR INTERNAL REVIEW AND COMMENT	EA	RJS	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: BAT ACTIVITY TRANSECT 2
RIVER TILL NORTH

Scale	Designed / Drawn	Checked	Approved	Authorised
1:5,000	EA	RJS	LB	AK

Original Size	Date	Date	Date	Date
A3	20/02/18	20/02/18	20/02/18	20/02/18

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551506-AA-EBD-D_SWI-DR-YE-000013

Revision: P01

PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8

Kilometres
0 0.2 0.4

LEGEND

- TRANSECT ROUTE
- POINT COUNT
- COMMON PIPISTRELLE COMMUTING
- COMMON PIPISTRELLE FORAGING
- COMMON PIPISTRELLE RECORD
- SOPRANO PIPISTRELLE COMMUTING
- SOPRANO PIPISTRELLE FORAGING
- NOCTULE COMMUTING
- NOCTULE RECORD
- MYOTIS SPECIES (INC. NATTERER'S) FORAGING
- SEROTINE RECORD

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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 in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Rev	Date	Description	By	Chk'd	App'd
P01	20/02/18	FIT FOR INTERNAL REVIEW AND COMMENT	EA	RJS	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

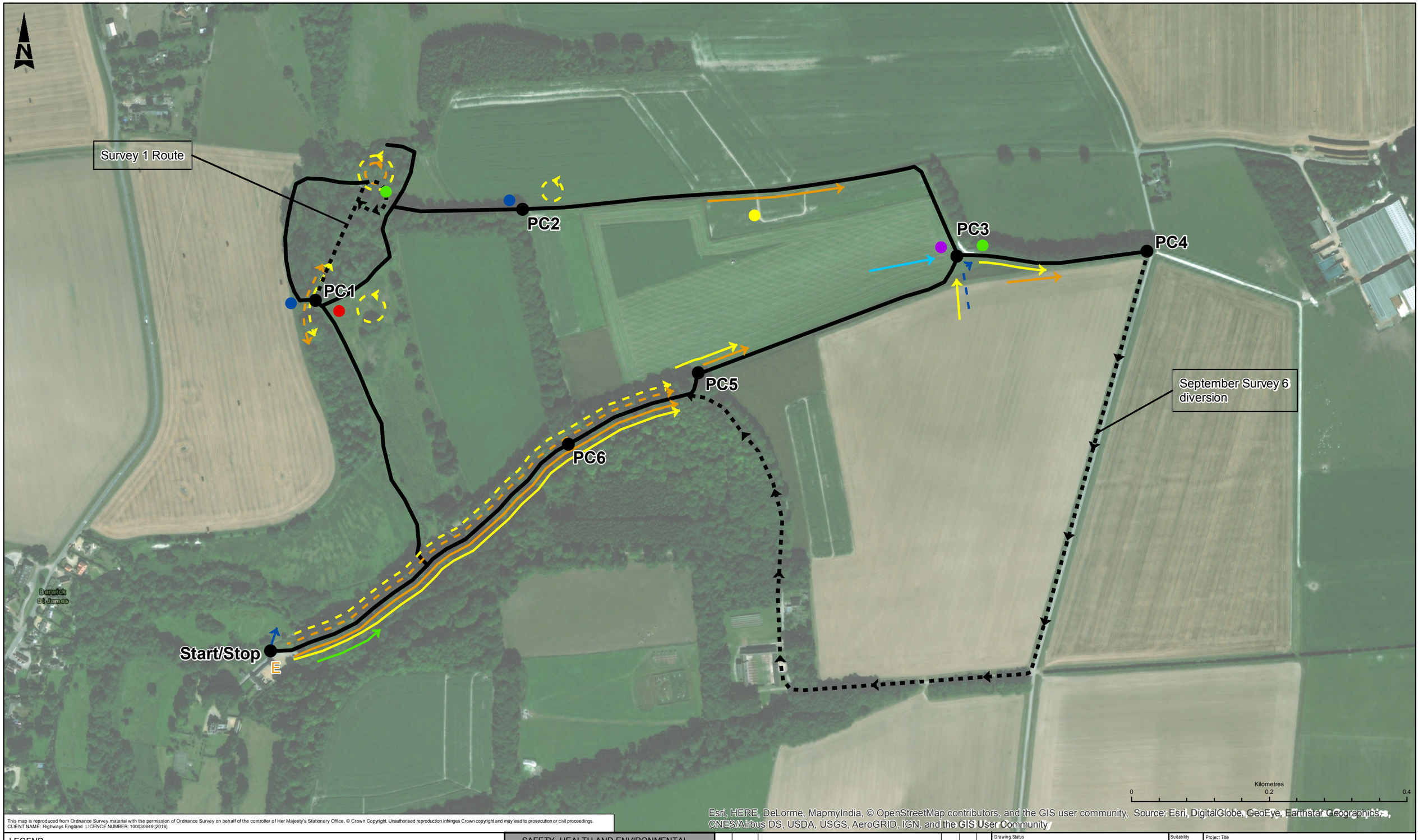
Drawing Title: BAT ACTIVITY TRANSECT 3 - BERWICK DOWN SOUTH

Scale	Designed / Drawn	Checked	Approved	Authorised
1:5,000	EA	RJS	LB	AK

Original Size	Date	Date	Date	Date
A3	20/02/18	20/02/18	20/02/18	20/02/18

Drawing Number: Project | Originator | Volume
HE551506-AA-EBD-D_SWI-DR-YE-000014
Location | Type | Role | Number

Revison: P01



LEGEND

- TRANSECT ROUTE
- VARIED TRANSECT ROUTE
- POINT COUNT
- COMMON PIPISTRELLE COMMUTING
- COMMON PIPISTRELLE FORAGING
- COMMON PIPISTRELLE RECORD
- SOPRANO PIPISTRELLE COMMUTING
- SOPRANO PIPISTRELLE FORAGING
- NOCTULE COMMUTING
- NOCTULE FORAGING
- NOCTULE RECORD
- MYOTIS SPECIES (INC. NATTERER'S) COMMUTING
- MYOTIS RECORD
- BIG BAT SPECIES RECORD
- BARBASTELLE RECORD

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION
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 in the design hazard log)
Construction
None
Maintenance / Cleaning
None
Use
None
Decommission / Demolition
None

Rev	Date	Description	By	Chk'd	App'd
P01	20/02/18	FIT FOR INTERNAL REVIEW AND COMMENT	EA	RJS	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

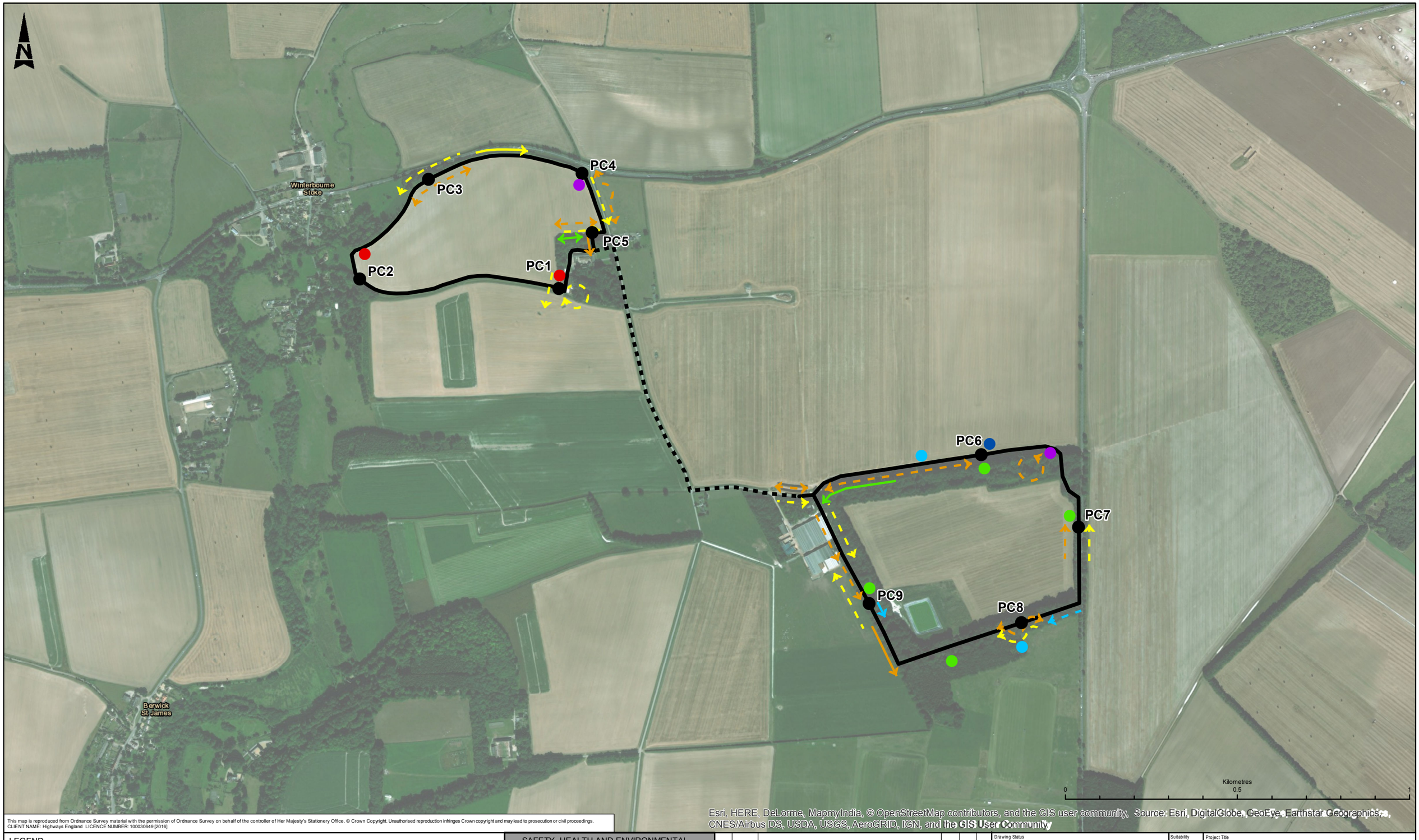
Drawing Title: BAT ACTIVITY TRANSECT 4 - RIVER TILL SOUTH

Scale	Designed / Drawn	Checked	Approved	Authorised
1:5,000	EA	RJS	LB	AK

Original Size	Date	Date	Date	Date
A3	20/02/18	20/02/18	20/02/18	20/02/18

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551506-AA-EBD-D_SWI-DR-YE-000015

Revision: P01



LEGEND

- TRANSECT ROUTE
- DRIVEN SECTION
- POINT COUNT
- COMMON PIPISTRELLE COMMUTING
- COMMON PIPISTRELLE FORAGING
- SOPRANO PIPISTRELLE COMMUTING
- SOPRANO PIPISTRELLE FORAGING
- SOPRANO PIPISTRELLE RECORD
- MYOTIS SPECIES (INC. NATTERER'S) COMMUTING
- MYOTIS SPECIES RECORD
- SEROTINE COMMUTING
- SEROTINE FORAGING
- SEROTINE RECORD
- NOCTULE RECORD
- BROWN LONG-EARED RECORD
- BIG BAT SPECIES RECORD
- BARBASTELLE RECORD

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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 in the design hazard log)

Construction
None

Maintenance / Cleaning
None

Use
None

Decommission / Demolition
None

Rev	Date	Description	By	Chk'd	App'd
P01	20/02/18	FIT FOR INTERNAL REVIEW AND COMMENT	EA	RJS	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

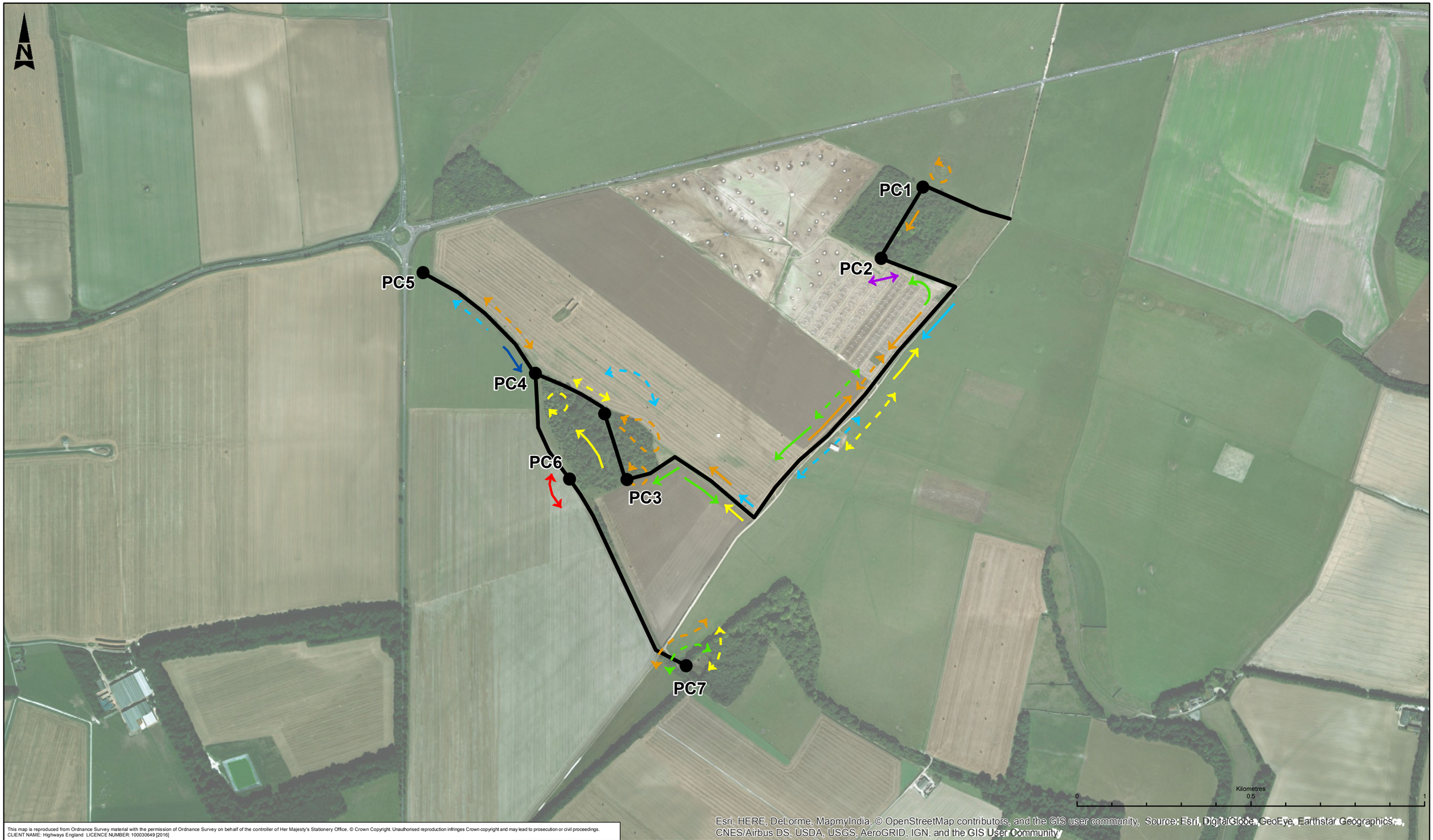
Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: BAT ACTIVITY TRANSECT 5 - HILL FARM AND THE PARK

Scale	Designed / Drawn	Checked	Approved	Authorised
1:10,000	EA	RJS	LB	AK

Original Size	Date	Date	Date	Date
A3	20/02/18	20/02/18	20/02/18	20/02/18

Drawing Number: Project | Originator | Volume: HE551506-AA-EBD-D_SWI-DR-YE-000016
Location | Type | Role | Number
Revison: P01



LEGEND

- TRANSECT ROUTE
- POINT COUNT
- COMMON PIPISTRELLE COMMUTING
- COMMON PIPISTRELLE FORAGING
- SOPRANO PIPISTRELLE COMMUTING
- SOPRANO PIPISTRELLE FORAGING
- NOCTULE COMMUTING
- SEROTINE COMMUTING
- SEROTINE FORAGING
- MYOTIS SPECIES (INC. NATTERER'S) COMMUTING
- MYOTIS SPECIES (INC. NATTERER'S) FORAGING
- BIG BAT SPECIES COMMUTING
- BARBASTELLE COMMUTING

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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 in the design hazard log)

Construction	None
Maintenance / Cleaning	None
Use	None
Decommission / Demolition	None

Rev	Date	Description	By	Chk'd	App'd
P01	20/02/18	FIT FOR INTERNAL REVIEW AND COMMENT	EA	RJS	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

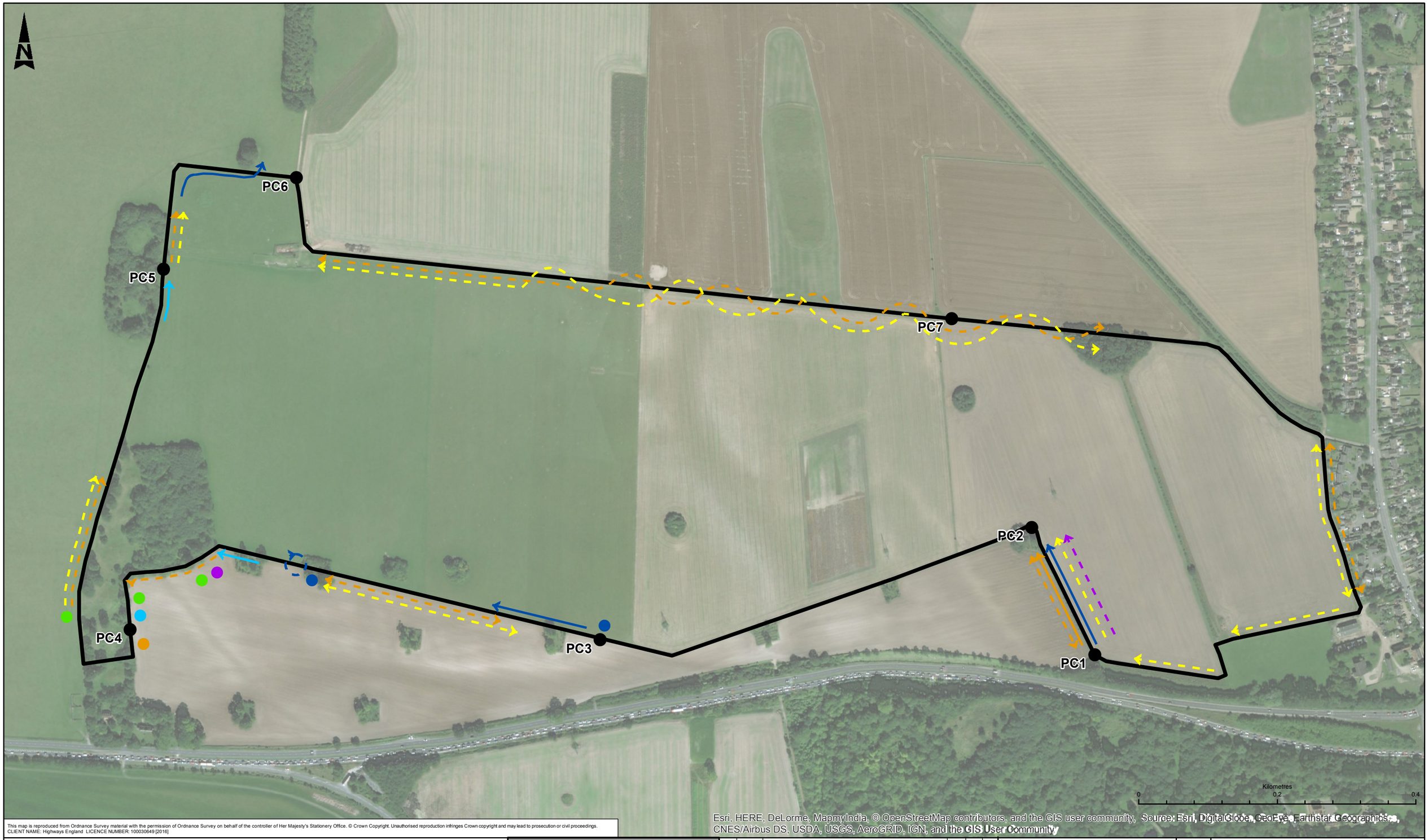
Drawing Title: BAT ACTIVITY TRANSECT 6 - DIAMOND WOOD / NORMANTON COPSE

Scale	Designed / Drawn	Checked	Approved	Authorised
1:10,000	EA	RJS	LB	AK

Original Size	Date	Date	Date	Date
A3	20/02/18	20/02/18	20/02/18	20/02/18

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551506-AA-EBD-D_SWI-DR-YE-000017

Revison: P01



LEGEND

- TRANSECT ROUTE
- POINT COUNT
- COMMON PIPISTRELLE COMMUTING
- COMMON PIPISTRELLE FORAGING
- SOPRANO PIPISTRELLE COMMUTING
- SOPRANO PIPISTRELLE FORAGING
- SOPRANO PIPISTRELLE RECORD
- NOCTULE COMMUTING
- NOCTULE FORAGING
- NOCTULE RECORD
- SEROTINE COMMUTING
- SEROTINE RECORD
- BIG BAT SPECIES FORAGING
- BIG BAT SPECIES RECORD
- MYOTIS RECORD

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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 in the design hazard log)

Construction	None
Maintenance / Cleaning	None
Use	None
Decommission / Demolition	None

Rev	Date	Description	By	Chk'd	App'd
P01	20/02/18	FIT FOR INTERNAL REVIEW AND COMMENT	EA	RJS	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

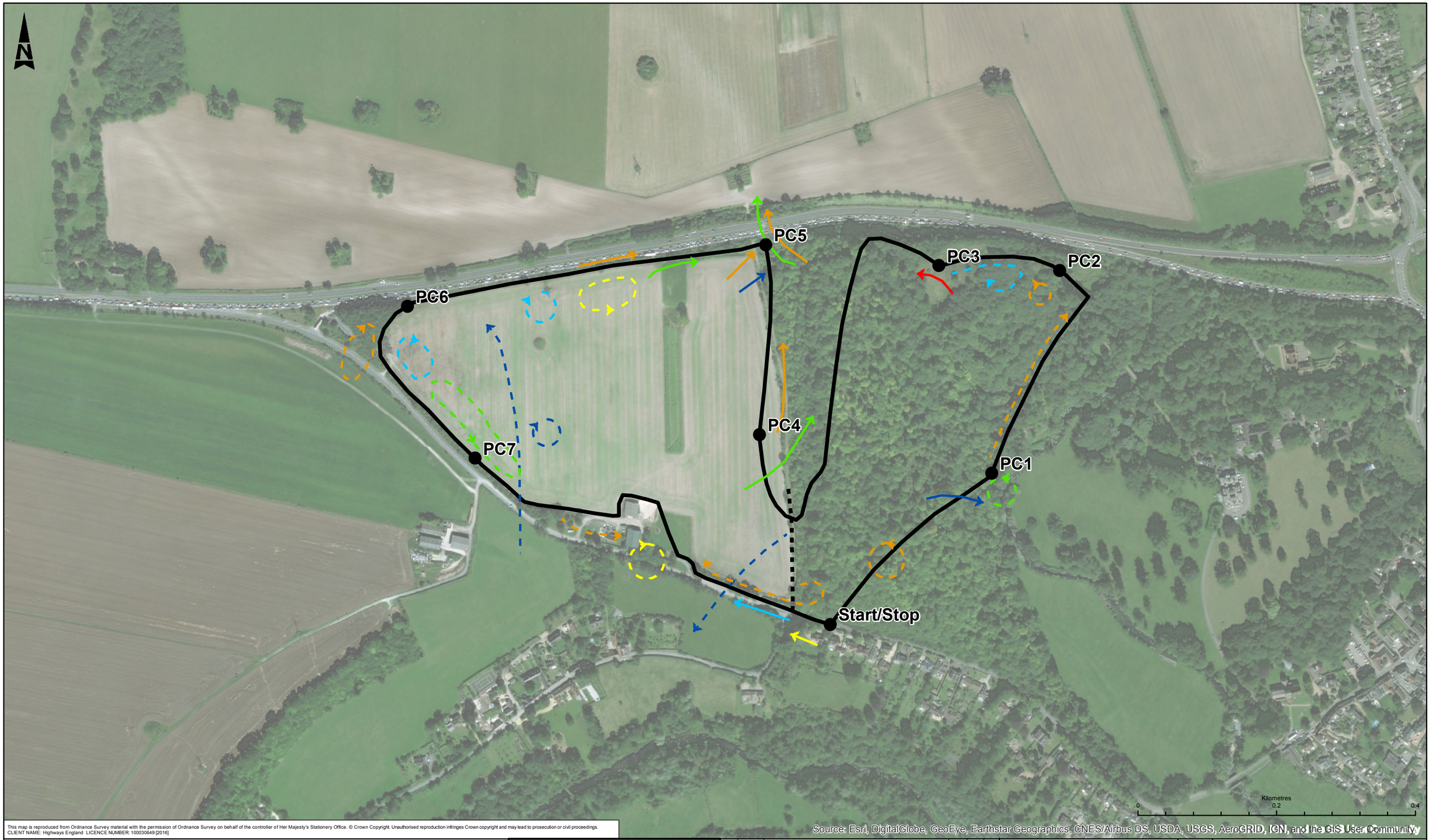
Drawing Title: BAT ACTIVITY TRANSECT 7 - COUNTESS FARM / KINGS BARROW

Scale	Designed / Drawn	Checked	Approved	Authorised
1:5,000	EA	RJS	LB	AK

Original Size	Date	Date	Date	Date
A3	20/02/18	20/02/18	20/02/18	20/02/18

Drawing Number: HE551506-AA-EBD-D_SWI-DR-YE-000018 (Project | Originator | Volume | Location | Type | Role | Number)

Revison: P01



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- TRANSECT ROUTE
- ALTERED TRANSECT ROUTE
- POINT COUNT
- COMMON PIPISTRELLE COMMUTING
- COMMON PIPISTRELLE FORAGING
- SOPRANO PIPISTRELLE COMMUTING
- SOPRANO PIPISTRELLE FORAGING
- NOCTULE COMMUTING
- NOCTULE FORAGING
- SEROTINE COMMUTING
- SEROTINE FORAGING
- MYOTIS SPECIES (INC. NATTERER'S) COMMUTING
- MYOTIS SPECIES (INC. NATTERER'S) FORAGING
- BARBASTELLE COMMUTING

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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 in the design hazard log)

Construction	None
Maintenance / Cleaning	None
Use	None
Decommission / Demolition	None

Rev	Date	Description	By	Chk'd	App'd
P01	20/02/18	FIT FOR INTERNAL REVIEW AND COMMENT	EA	RJS	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: BAT ACTIVITY TRANSECT 8 - VESPISIAN'S CAMP

Scale	Designed / Drawn	Checked	Approved	Authorised
1:5,000	EA	RJS	LB	AK

Original Size	Date	Date	Date	Date
A3	20/02/18	20/02/18	20/02/18	20/02/18

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551506-AA-EBD-D_SWI-DR-YE-000019

Revison: P01

LEGEND

- ROUTE 1Na 75M BUFFER
- ROUTE 1Nd 75M BUFFER
- ROUTE 1Sa 75M BUFFER

TRANSECT

- T1
- T2
- T3
- T4
- T5
- T6
- T7
- T8
- STATIC BAT DETECTOR

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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 in the design hazard log)

Construction	NONE
Maintenance / Cleaning	NONE
Use	NONE
Decommission / Demolition	NONE

Rev	Date	Description	By	Chk'd	App'd
P02	28/02/18	FIRST ISSUE	SB	CD	LB

Drawing Status: FIT FOR INTERNAL REVIEW AND COMMENT
Suitability: S3

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: STATIC BAT DETECTOR LOCATIONS AND TRANSECTS

Scale	Designed / Drawn	Checked	Approved	Authorised
1:30,000	SB	CD	LB	AK

Original Size	Date	Date	Date	Date
A3	28/02/18	28/02/18	28/02/18	28/02/18

Drawing Number: HE551506-AA-EBD-D_ SWI-DR-YE-000020
(Project | Originator | Volume | Location | Type | Role | Number)

Revision: P02

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

LEGEND

65

- BARBASTELLE BAT
- BIG BAT
- SEROTINE BAT
- DAUBENTON'S BAT
- MYOTIS SPECIES
- LEISLER'S BAT
- NOCTULE BAT
- NYCTALUS SPECIES
- NATHUSIUS' PIPISTRELLE
- COMMON PIPISTRELLE
- SOPRANO PIPISTRELLE
- PIPISTRELLUS SPECIES
- LONG-EARED BAT SPECIES
- LESSER HORSESHOE BAT
- EPTESICUS OR MYOTIS SPECIES
- GREATER HORSESHOE BAT
- WHISKERED BAT
- MYOTIS OR PLECOTUS SPECIES
- NATTERER'S BAT
- BRANDT'S BAT
- ROUTE 1NA 75M BUFFER
- ROUTE 1ND 75M BUFFER
- ROUTE 1SA 75M BUFFER
- ROUTE OPTION 1NA
- ROUTE OPTION 1ND
- ROUTE OPTION 1SA

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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 in the design hazard log)

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommission / Demolition
NONE

Rev	Date	Description	By	Chk'd	App'd
P02	14/02/18	FIRST ISSUE	SB	CD	LB

Drawing Status: FIT FOR INFORMATION
Suitability: S2

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

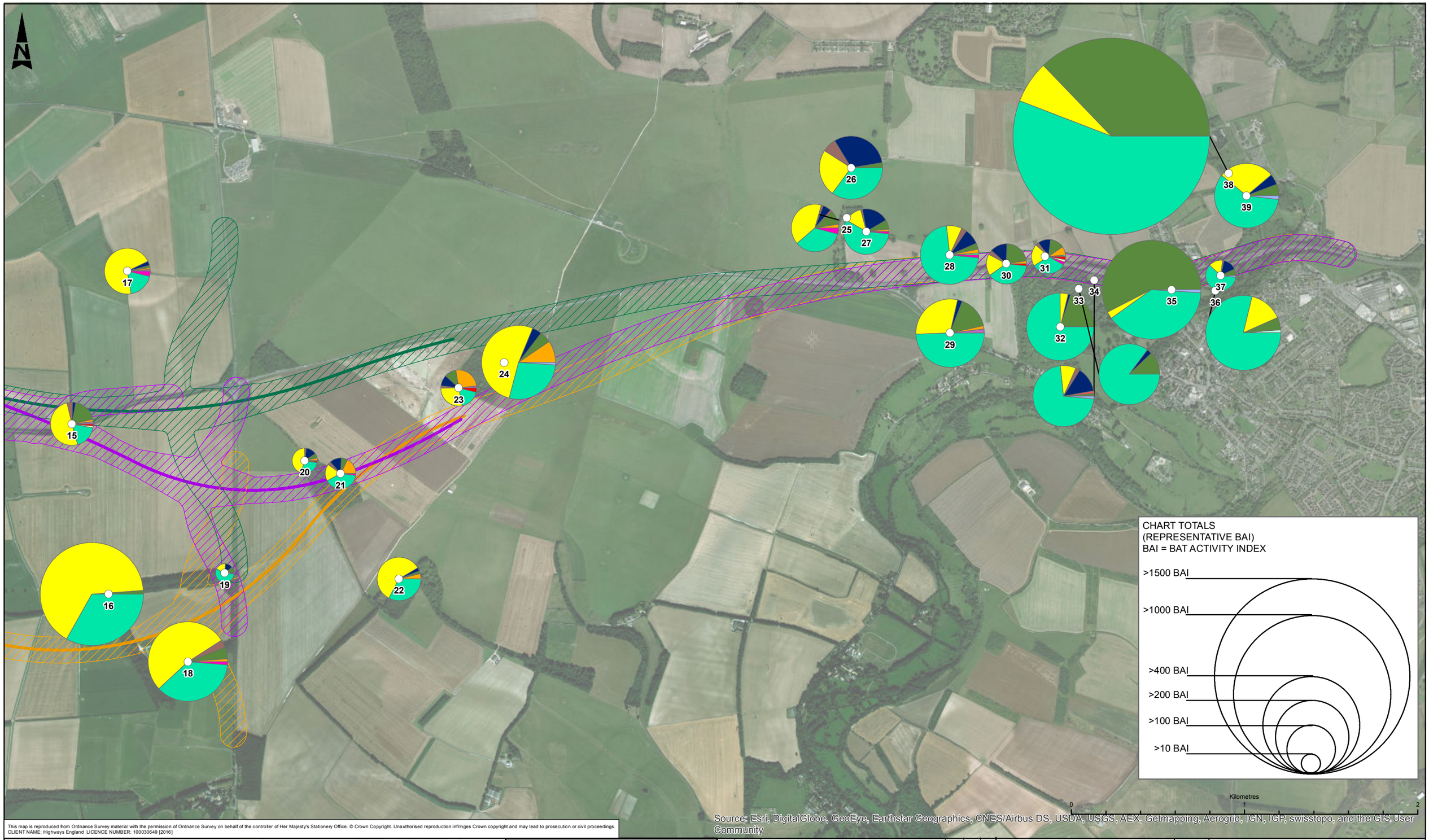
Drawing Title: STATIC BAT DETECTOR SPECIES DIVERSITY SHEET 1 OF 2

Scale	Designed / Drawn	Checked	Approved	Authorised
1:20,000	SB	CD	LB	AK

Original Size	Date	Date	Date	Date
A3	14/02/18	14/02/18	14/02/18	14/02/18

Drawing Number: HE551506-AA-EBD-D_SWI-DR-YE-000021
(Project | Originator | Volume | Location | Type | Role | Number)

Revison: P02



LEGEND

65

- BARBASTELLE BAT
- BIG BAT
- SEROTINE BAT
- DAUBENTON'S BAT
- MYOTIS SPECIES
- LEISLER'S BAT
- NOCTULE BAT
- NYCTALUS SPECIES
- NATHUSIUS' PIPISTRELLE
- COMMON PIPISTRELLE
- SOPRANO PIPISTRELLE
- PIPISTRELLUS SPECIES
- LONG-EARED BAT SPECIES
- LESSER HORSESHOE BAT
- EPTESICUS OR MYOTIS SPECIES
- GREATER HORSESHOE BAT
- WHISKERED BAT
- MYOTIS OR PLECOTUS SPECIES
- NATTERER'S BAT
- BRANDT'S BAT
- ROUTE 1NA 75M BUFFER
- ROUTE 1ND 75M BUFFER
- ROUTE 1SA 75M BUFFER
- ROUTE OPTION 1NA
- ROUTE OPTION 1ND
- ROUTE OPTION 1SA

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

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 in the design hazard log)

Construction
NONE

Maintenance / Cleaning
NONE

Use
NONE

Decommission / Demolition
NONE

Rev	Date	Description	By	Chk'd	App'd
P02	14/02/18	FIRST ISSUE	SB	CD	LB

Drawing Status: FIT FOR INFORMATION
Suitability: S2

Client: highways england

Designers: ARUP ATKINS

Project Title: A303 AMESBURY TO BERWICK DOWN

Drawing Title: STATIC BAT DETECTOR SPECIES DIVERSITY SHEET 2 OF 2

Scale	Designed / Drawn	Checked	Approved	Authorised
1:20,000	SB	CD	LB	AK

Original Size	Date	Date	Date	Date
A3	14/02/18	14/02/18	14/02/18	14/02/18

Drawing Number: Project | Originator | Volume | Location | Type | Role | Number
HE551506-AA-EBD-D_SWI-DR-YE-000022

Revison: P02

Appendices

Appendix A Weather Conditions

A.1 May 2017 (Dusk)

Transect Name / Number	Date of Survey	Sunset / Sunrise	Survey times		Temperature (ºC)		Humidity (%)		Wind Speed (Beaufort) / Direction		Cloud cover		Weather the night before	General Conditions
			Start	End	Start	End	Start	End	Start	End	Start	End		
T1 - Parsonage Down	16/05/17	20:52	20:43	23:10	13	14	95	-	2	2	8	8	Damp / rain	Intermittent light – moderate rain, low wind
T2 - River Till North	23/05/17	21:02	21:02	00:06	17	13	80	80	0	2	1	0	Warm / dry	Cool and clear
T3 - Berwick Down South	16/05/17	20:52	20:52	23:33	16	17	-	-	0	0	7	7	-	Intermittent light rain and light breeze
T4 - River Till South	03/05/17	20:32	20:32	23:00	10	10	-	-	2	0-2	8	-	Dry	Intermittent wind/ stable temperature and dry
T5 - The Park/ Hill Farm	17/05/17	20:52	20:45	11:23	12	11	90	-	2	4	8	8	Intermittent rain showers	Intermittent breeze
T6 - Diamond/ Normanton	22/05/17	21:01	21:01	23:10	17.5	15	-	-	2(W)	2(W)	2	3	Still, warm and dry	Dry
T7 - Bowtie field/National Trust	24/05/17	21:05	21:09	23:48	19	15	0	0	0	0	0	0	Dry, windy and mild temperature	Mild turning cooler, clear skies
T8 - Vespasian's Camp	26/05/17	21:04	21:00	23:25	17	16	-	-	0	0	0	0	Warm and dry	Dry

A.2 June 2017 (Dusk)

Transect Name / Number	Date of Survey	Sunset / Sunrise	Survey times		Temperature (ºC)		Humidity (%)		Wind Speed (Beaufort) / Direction		Cloud cover		Weather the night before	General Conditions
			Start	End	Start	End	Start	End	Start	End	Start	End		
T1 - Parsonage Down	14/06/17	21:23	21:20	23:45	19	13	64	64	-	-	2	2	Clear and dry	Warm, still and clear night
T2 - River Till North	14/06/17	21:23	21:30	00:15	19	13	73	69	0	0	0	0	Dry	Dry and mild
T3 - Berwick Down South	15/06/17	21:24	21:35	00:17	13	11.5	-	-	6(NW)	6(NW)	3	2	Dry, still and mild	Slight drizzle and Strong breeze around 23:00
T4 - River Till South	12/06/17	21:22	21:10	12:00	13	12	-	78	0	-	0	-	-	-

Transect Name / Number	Date of Survey	Sunset / Sunrise	Survey times		Temperature (ºC)		Humidity (%)		Wind Speed (Beaufort) / Direction		Cloud cover		Weather the night before	General Conditions
			Start	End	Start	End	Start	End	Start	End	Start	End		
T5 - The Park/ Hill Farm	15/06/17	21:23	21:23	23:55	15	13	67	76	11(SW)	9(SW)	6	6	Clear and mild	Dry, light breeze
T6 - Diamond/ Normanton	26/06/17	21:27	21:10	00:30	18.3	18.9	73	72	0	1	7	6	Warm and dry	Dry
T7 - Bowtie field/National Trust	26/06/17	21:25	21:25	23:40	14	13	91	90	2	2	8	8	Heavy rain, Warm	Dry
T8 - Vespasian's Camp	15/06/17	21:24	21:09	23:33	15	-	-	-	4(W)	3(W)	7	7	-	Dry

A.3 July 2017 (Dusk)

Transect Name / Number	Date of Survey	Sunset / Sunrise	Survey times		Temperature (ºC)		Humidity (%)		Wind Speed (Beaufort) / Direction		Cloud cover		Weather the night before	General Conditions
			Start	End	Start	End	Start	End	Start	End	Start	End		
T1 - Parsonage Down	26/07/17	21:03	21:11	23:24	17	14	77	80	2(WSW)	4(WSW)	3	3	Dry and warm	Dry, wind picked up at 22:40 (gusty)
T2 - River Till North	17/07/17	21:14	21:14	00:05	21	19	50	59	1	1	5	5	Overcast, dry and warm	Calm and dry
T3 - Berwick Down South	13/07/17	21:19	21:22	23:30	16	14	73	65	3(SW)	1(SW)	4	4	-	-
T4 - River Till South	05/07/17	21:23	21:22	23:45	22	18	68	78	0	0	1	0	Clear and dry	Dry, strong moonlight
T5 - The Park/ Hill Farm	13/07/17	21:19	21:19	23:50	17	14	66	86	2(SW)	0(SW)	4	2	Dry	Very light night, constant weather, no changes
T6 - Diamond/ Normanton	20/07/17	21:12	21:10	23:45	16	14.6	58	75	4(SW)	3(SW)	2	2	Rain	Dry
T7 - Bowtie field/National Trust	25/07/17	21:03	21:03	23:24	19	17	77	80	0	0	2	0	Clear and dry	Warm and humid night- lots of insects. Dry and clear.
T8 -Vespasian Vespasian's Camp	25/07/17	21:03	21:00	23:30	19	21.3	93	60	1	0	8	1	-	Dry. Clouds cleared and temperature dropped over higher ground and arable fields. Within woodland, it was warm and humid.

A.4 August 2017 (Dusk)

Transect Name / Number	Date of Survey	Sunset / Sunrise	Survey times		Temperature (ºC)		Humidity (%)		Wind Speed (Beaufort) / Direction		Cloud cover		Weather the night before	General Conditions
			Start	End	Start	End	Start	End	Start	End	Start	End		
T1 – Parsonage Down	22/08/17	20:12	20:15	22:26	19	17	84	89	1	1	4	2	-	Short shower before survey but dry during. Very warm and humid. Lightning at 22:00.
T2 - River Till North	22/08/17	20:16	20:16	22:53	19	18	82	88	2 (E/SE)	1 (E/SE)	3	1		Dry
T3 - Berwick Down South	15/08/17	20:29	20:29	22:30	15.4	13.8	-	-	1(SW)	1(SW)	1	0	-	Dry
T4 - River Till South	08/08/17	20:41	20:40	22:50	13	13	92	92	1	1	7	4	-	Raining until 21:10
T5 - The Park/ Hill Farm	09/08/17	20:37	21:00	23:16	14	13	85	86	2 (N)	2	8	1	-	Sky cleared at around 22:30. Dry. Almost full moon.
T6 - Diamond/ Normanton	16/08/17	20:30	20:30	22:35	16.6	15.5	75	84	4(E)	6(S)	8	8	Rain shower overnight	Light rain showers throughout survey. Heavy rain shower after survey completed.
T7 - Bowtie field/National Trust	29/08/17	19:59	20:15	22:20	18	17	78	-	2 (NNW)	-	7	7	Warm, dry, clear	Dry and clear but cooler and damp
T8 - Vespasian's Camp	09/08/17	20:42	20:42	23:10	15	16.3	86	75	0	0	8	7	-	Dry during survey (although rain within the day)

A.5 August 2017 (Dawn)

Transect Name / Number	Date of Survey	Sunset / Sunrise	Survey times		Temperature (ºC)		Humidity (%)		Wind Speed (Beaufort) / Direction		Cloud cover		Weather the night before	General Conditions
			Start	End	Start	End	Start	End	Start	End	Start	End		
T1 - Parsonage Down	23/08/17	05:50	03:48	06:00	16	17	97	97	0	0	8	8	Dry but humid with lightning	Dry at start of the survey with some drizzle during. Still and warm with some mist.

Transect Name / Number	Date of Survey	Sunset / Sunrise	Survey times		Temperature (ºC)		Humidity (%)		Wind Speed (Beaufort) / Direction		Cloud cover		Weather the night before	General Conditions
			Start	End	Start	End	Start	End	Start	End	Start	End		
T2 - River Till North	23/08/17	06:06	03:50	06:00	17	16	94	97	0 E/SE	1S	1	8		Falling light mist and light rain
T3 - Berwick Down South	16/08/17	05:54	03:41	05:40	10.7	10.8	-	-	0	0	3	4	-	Dry
T4 - River Till South	09/08/17	05:44	03:24	05:30	12	12	95	97	2NW	2NW	6	8		Light rain and light breeze
T5 - The Park/ Hill Farm	10/08/17	05:46	03:27	05:35	11	12	86	86	4 (N)	2 (N)	4	4	Rain showers	Cold, clear night with gusts of wind. Dry. Very bright full moon.
T6 - Diamond/ Normanton	17/08/17	05:58	03:00	05:35	14	11	66	70	0	0	4	3	-	Dry. Clouds cleared and temperature dropped during survey. Very dewy.
T7 - Bowtie field/National Trust	30/08/17	06:17	04:05	06:15	13	13	-	-	2(NNW)	4(NNW)	6	6	Dry, cool and damp	Dry throughout survey but rain imminent at the end.
T8 - Vespasian's Camp	10/08/17	05:44	03:15	05:25	13.8	12	74	81	4(NW)	0	4	0	Dry	Dry. Bright full moon.

A.6 September 2017 (Dusk)

Transect Name / Number	Date of Survey	Sunset / Sunrise	Survey times		Temperature (ºC)		Humidity (%)		Wind Speed (Beaufort) / Direction		Cloud cover		Weather the night before	General Conditions
			Start	End	Start	End	Start	End	Start	End	Start	End		
T1 - Parsonage Down	20/09/17	19:09	19:10	21:40	16	16	71	71	2(SSW)	2(SSW)	8	8	Cold, clear, damp	Light rain at start of survey, intermittent showers throughout survey.
T2 - River Till North	13/09/17	19:27	19:27	21:57	13	11	69	81	4 (WSW)	2(WSW)	1	3	Heavy rain and strong winds	Short rain shower at 21:00 but otherwise dry. Wind dropped at start and stayed calm throughout survey.
T3 - Berwick Down South	18/09/17	19:15	19:14	21:04	11.5	11.3	-	-	0	1	8	8	-	Intermittent light rain showers during survey.
T4 - River Till South	21/09/17	19:10	19:15	21:35	14	14	75	71	2(W)	0	2	0	Rain	Dry
T5 - The Park/ Hill Farm	26/09/17	18:56	19:08	21:40	17	14	79	94	1(SE)	0	8	6	Light rain	Warm but misty. Very still. Dry.

Transect Name / Number	Date of Survey	Sunset / Sunrise	Survey times		Temperature (ºC)		Humidity (%)		Wind Speed (Beaufort) / Direction		Cloud cover		Weather the night before	General Conditions
			Start	End	Start	End	Start	End	Start	End	Start	End		
T6 - Diamond/ Normanton	22/09/17	19:06	19:06	21:10	16	14	67	70	3(SW)	4(SW)	6	7	-	Dry
T7 - Bowtie field/National Trust	19/09/17	19:11	19:20	21:49	15	11	73	96	3(SW)	3(SW)	4	2	Cold, Dry	Dry. Sky cleared and temperature dropped by end of survey.
T8 - Vespasian's Camp	19/09/17	19:13	19:05	21:00	16	17	75	67	0	0	1	1	-	Dry

Appendix B List of static monitoring sites included in the final analyses

Location ID	Static monitoring location	National Grid reference	Site description (MP = Monitoring Point)
1	BerwickDown_copseoffbyway	SU0541240197	MP located in tree overlooking a small track within a copse, located to the south of the byway west of Berwick St James. Overlooking track and woodland edge.
2	WestofWinterbourneStoke	SU0600740718	MP is on the north side of the hedgerow on the north side of the A303; a likely commuting route in an otherwise open landscape.
3	BerwickDown_barnoffbyway	SU0618040480	MP located on a barn wall overlooking a track which runs north-south between the A303 and the byway west of Berwick St James. Overlooking track and arable margins.
4	NE_ParsonageDownCopse	SU0649441270	MP lies within The Beeches, a copse on the southern edge of Parsonage Down; a likely commuting route in an otherwise open landscape
5	South of ParsonageDown, the Barb Gap	SU06746 41357	MP lies on end of tree line on field boundary overlooking Parsonage Down NNR; this is an important commuting route identified in previous A303 work
6	Asserton_Tillbridge	SU0760939911	Asserton Farm lies to the south of Winterbourne Stoke, on the northern edge of Berwick St James on the Till corridor. MP was a mature willow overlooking the Till within a wooded section of the river.
7	Asserton_Tillduckpond	SU0767040217	Asserton Farm lies to the south of Winterbourne Stoke, on the northern edge of Berwick St James on the Till corridor. MP was a mature willow situated between the duck ponds and the adjacent Till.
8	Asserton_Whitelodge	SU0784339658	Asserton Farm lies to the south of Winterbourne Stoke, on the northern edge of Berwick St James on the Till corridor. MP was a beech on the bank above the farm track / byway on the woodland edge overlooking White Lodge Cottage.
9	Till, willow pollard	SU0775241389	MP is on a willow pollard, within 50 metres of the river Till; an obvious commuting route north of Winterbourne Stoke.
10	Till_bywaycopse	SU0791441908	MP is in a small copse, on the byway extending north from Winterbourne Stoke, an obvious commuting route and foraging area, in an otherwise open landscape.
11	Asserton_woodlandcorner	SU0817839892	Asserton Farm lies to the south of Winterbourne Stoke, on the northern edge of Berwick St James on the Till corridor. MP was a mature tree on the corner of the woodland and the corner of the byway, overlooking the woodland edge.
12	HillBarn_SW	SU0844340827	Hill Barn lies on the northern edge of Druids Lodge estate, to the east of Winterbourne Stoke; MP was a tree on the SW corner, on a tree belt overlooking arable farmland and field margins connected to Winterbourne Stoke.

Location ID	Static monitoring location	National Grid reference	Site description (MP = Monitoring Point)
13	Asserton_end of beechline	SU0857340112	Asserton Farm lies to the south of Winterbourne Stoke, on the northern edge of Berwick St James on the Till corridor. MP was a mature beech on the beech line overlooking the arable fields towards the Till corridor.
14	HillBarn_NE	SU0858840952	Hill Barn lies on the northern edge of Druids Lodge estate, to the east of Winterbourne Stoke; MP was a tree on the NE corner, on a tree belt.
15	MileHedge_A303	SU0900741190	MP is on the southern end of Grants Hedge, within 30 metres of the A303; a likely commuting route extending north towards Shrewton.
16	The Park_NW	SU0921840208	The Park is a square tree belt abutting the A360, with the dairy unit on the western side. MP was on the NW corner, close to the dairy farm and overlooking a woodland clearing and adjacent arable farmland.
17	ManorFarm_barn on hill	SU0932742072	MP is on an isolated barn on a hilltop, south-west of Shrewton and to the west of the Stonehenge visitors centre.
18	The Park_south	SU0967739818	The Park is a square tree belt abutting the A360, with the dairy unit on the western side. MP was on the southern tree belt, mid-way, overlooking the woodland ride, which is likely to be used by commuting and foraging bats.
19	The Park_North	SU0989040329	The Park is a square tree belt abutting the A360, with the dairy unit on the western side. MP was on the northern tree belt, close to the A360, overlooking a clearing within the woodland, and pointing towards the A360 to record bats commuting across the road.
20	Diamond Wood_NW pines	SU1035240978	Diamond Wood is an almost-isolated copse, midway between Longbarrow Copse and Lake Wood connected by field boundaries. MP was on the NW edge, on a pine tree, overlooking the field boundary and field margin between Lake Wood and Longbarrow copse. Overlooking field margin and pasture.
21	Diamond Wood_overlookingpigs	SU1055840904	Diamond Wood is an almost-isolated copse, midway between Longbarrow Copse and Lake Wood connected by field boundaries. MP was on the NE edge immediately overlooking the pig farm and woodland edge.
22	Lake Wood	SU1089640295	Lake Wood is a long woodland and tree belt that connects this downland landscape with the Avon and the Woodford Valley. MP was on the northern corner of the wood, pointing NW over the species-rich grassland.
23	NormantonCopse_SW	SU1124141397	Normanton Copse is an isolated copse close to Normanton Down and the A303, with no connectivity to the wider landscape. MP was a mature beech on the SW edge, overlooking the pig farm and large arable fields; MP overlooked the woodland edge and field margins.
24	NormantonCopse_birch	SU1150441545	Normanton Copse is an isolated copse close to Normanton Down and the A303, with no connectivity to the wider landscape. MP was a mature birch on the northern edge, overlooking the woodland edge and adjacent pastures.

Location ID	Static monitoring location	National Grid reference	Site description (MP = Monitoring Point)
25	NT_Kingsbarrow_south	SU1348142378	MP is on a young ash on the edge of a copse, behind the veteran beech trees; MP overlooks woodland edge and grassland clearing, on a likely commuting route.
26	NT_Kingsbarrow_north	SU1350642668	Surrounded by pasture, this MP is on clump of mature trees within the WHS; MP overlooks the track and the adjacent reverted grasslands.
27	WestAmesbury_Bowtie_NW corner	SU1359442300	MP is on a small tree, on woodland edge, on the NW corner of the "Bow-tie" field (Nile Clumps), overlooking the woodland edge, an arable field and pasture.
28	WestAmesbury_Bowtie_middle of bowtie	SU1407542165	MP is on a veteran beech tree of one of the Nile Clumps; located in the centre of the field.
29	WestAmesbury_the Barb hedge	SU1407841714	This hedge connects the Woodford Valley / river Avon with the open downland of the WHS and is likely an important commuting route for bats; numerous passes of Barbastelle bat recorded here.
30	WestAmesbury_Bowtie_underpass	SU1440342114	MP is located on the top of the underpass, microphone hanging over the portal of the underpass to record commuting bats using this feature.
31	WestAmesbury_Bowtie_overcutting	SU1462642156	MP is located on the top of the cutting overlooking the A303; MP overlooks the field margin, a possible commuting route for bats flying west from Countess Road, Amesbury.
32	Vespasians Camp_clearing sycamore	SU1471441750	MP is a sycamore overlooking a small clearing and track on the eastern edge of Vespasian's Camp.
33	Vespasians Camp_base of slope	SU1482041969	MP is a small tree overlooking the springs, backwater and channel of the Avon.
34	Abbey_Blickmead_east	SU1491142021	MP is a small willow on the eastern edge of the clearing, overlooking the scrub edge and clearing, close to the existing A303.
35	Countess Roundabout_combined locations	SU1535841965	Data combined from two locations immediately overlooking the SW and SE edges of the roundabout, adjacent to subchannels of the Avon. MP located in mature trees overlooking the roundabout.
36	South of A303_by side channel	SU1560941959	MP is in a mature sycamore on a side channel / tree line, adjacent to the Avon, within a wooded section of the river corridor. Opposite Lords Walk.
37	South of A303_hedgerow opposite bridge by A303	SU1564142047	MP is the field boundary on the edge of the A303, within mature blackthorn, overlooking the pastures adjacent to the Avon.
38	NorthofA303_by bench	SU1568642636	MP is a semi-mature willow, overlooking the Avon where the corridor bottlenecks due to scrub. An obvious narrow point for commuting bats.
39	NorthofA303_in scrub	SU1579042507	MP is mature goat willow on scrub edge, overlooking scrub edge and fen clearing, close to the Avon.

Appendix C Static Bat Detector Monitoring: Months Surveyed

C.1 Static Bat Detector Monitoring: Months Surveyed

Table 0-1: Months in which each static bat detector monitoring location was surveyed

Location	2016 (Surveyed = Y)					2017 (Surveyed = Y)						
	Jun	Jul	Aug	Sep	Oct	Apr	May	Jun	Jul	Aug	Sep	Oct
1	Y	Y	Y	Y	Y							
2	Y		Y	Y		Y	Y			Y		
3	Y	Y	Y	Y	Y							
4	Y		Y	Y	Y	Y	Y			Y		
5	Y	Y	Y	Y	Y	Y	Y	Y		Y		
6	Y	Y	Y	Y		Y	Y					
7	Y	Y	Y	Y		Y	Y					
8	Y	Y	Y	Y		Y	Y					
9	Y	Y	Y	Y		Y	Y	Y				
10	Y	Y	Y	Y			Y	Y				
11	Y	Y	Y	Y		Y	Y					
12	Y		Y	Y	Y	Y	Y			Y		
13	Y		Y	Y		Y	Y					
14	Y		Y	Y	Y	Y	Y			Y		
15	Y	Y	Y	Y		Y	Y			Y		
16	Y		Y	Y		Y	Y					
17	Y	Y	Y	Y			Y					
18	Y		Y	Y		Y	Y					
19	Y		Y	Y		Y	Y					
20		Y	Y	Y		Y	Y		Y			
21		Y	Y	Y		Y	Y		Y			
22		Y	Y	Y	Y	Y	Y					
23		Y	Y			Y	Y		Y			
24		Y	Y	Y		Y	Y		Y			
25	Y	Y	Y	Y	Y		Y		Y			
26	Y	Y	Y	Y			Y		Y			
27	Y	Y	Y	Y			Y	Y				
28	Y	Y	Y	Y		Y	Y		Y			
29	Y	Y	Y	Y			Y	Y	Y			
30	Y	Y	Y	Y		Y	Y		Y			
31		Y	Y	Y		Y	Y		Y			

Location	2016 (Surveyed = Y)					2017 (Surveyed = Y)						
	Jun	Jul	Aug	Sep	Oct	Apr	May	Jun	Jul	Aug	Sep	Oct
32	Y	Y	Y	Y	Y		Y			Y		
33	Y	Y	Y	Y	Y		Y			Y		
34	Y	Y	Y	Y	Y		Y			Y	Y	
35	Y	Y	Y	Y	Y		Y					
36	Y	Y	Y		Y		Y		Y	Y		
37	Y	Y	Y	Y	Y		Y			Y		Y
38		Y	Y	Y	Y		Y			Y		
39	Y	Y	Y	Y	Y		Y	Y		Y		

Appendix D Raw Static Bat Detector Monitoring Data for Annex 2 Species

D.1 Raw Static Bat Detector Monitoring Data for Greater Horseshoe Bats

Table 0-2: Raw static bat detector monitoring data for greater horseshoe bats

Species	Date	Location	Time	Number of Bat Passes
Rhinolophus ferrumequinum	14/05/2017	36	21:35	1
Rhinolophus ferrumequinum	14/05/2017	37	21:35	1
Rhinolophus ferrumequinum	21/09/2017	3	23:17	1

D.2 Raw Static Bat Detector Monitoring Data for Lesser Horseshoe Bats

Table 0-3: Raw static bat detector monitoring data for lesser horseshoe bats

Species	Date	Location	Time	Number of Bat Passes
Rhinolophus hipposideros	03/08/2016	36	10:59	1
Rhinolophus hipposideros	28/08/2016	20	09:55	1
Rhinolophus hipposideros	28/08/2016	20	15:30	1
Rhinolophus hipposideros	29/08/2016	20	14:03	1
Rhinolophus hipposideros	07/09/2016	12	11:53	1
Rhinolophus hipposideros	07/09/2016	14	14:03	1
Rhinolophus hipposideros	14/09/2016	29	09:04	1
Rhinolophus hipposideros	22/09/2016	15	13:21	1
Rhinolophus hipposideros	27/04/2017	30	12:31	1
Rhinolophus hipposideros	26/07/2017	7	14:03	1
Rhinolophus hipposideros	27/07/2017	6	13:10	1
Rhinolophus hipposideros	30/07/2017	7	13:12	1
Rhinolophus hipposideros	31/07/2017	11	09:54	1
Rhinolophus hipposideros	29/08/2017	8	16:54	1
Rhinolophus hipposideros	09/09/2017	18	13:06	1
Rhinolophus hipposideros	09/09/2017	18	13:59	1
Rhinolophus hipposideros	13/09/2017	34	13:55	1
Rhinolophus hipposideros	13/09/2017	37	10:20	1

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