

Norfolk Boreas Offshore Wind Farm

Appendix 22.4

Bat Activity Survey Reports

Environmental Statement

Volume 3

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Norfolk Boreas Bat activity surveys

Survey Scope :	Bat activity surveys
Prepared on behalf of :	Royal HaskoningDHV
Report reference :	2017/147.2
Date of survey/s :	April – October 2018

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Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).

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1. Executive Summary

1.1. Baseline data to inform the Norfolk Boreas Environment Impact Assessment (EIA) was collected in 2017 as part of the Norfolk Vanguard Project. Following a review of this baseline data, 15 'priority areas' were identified as locations for further ecological surveys for the Norfolk Boreas Project.

1.2. An Extended Phase 1 Habitat Survey of these priority areas conducted in Spring 2018 identified seven habitat networks within the priority areas which were regarded as providing 'high' suitability for supporting commuting and foraging bats.

1.3. The purpose of the surveys was to ascertain, based on transect and static detector surveys, whether bats are commuting and foraging within the seven habitat networks recognised as being of 'high' suitability as identified within Norfolk Boreas Offshore Wind Farm Environmental Impact Assessment: Phase 2 Ecological Surveys Scope (Royal HaskoningDHV, 2017), and if so, which species and in what numbers.

1.4. The following guidance document was used to inform development of the survey methodology: Bat surveys for professional ecologists: good practice guidelines. Bat Conservation Trust. (Collins (Ed), 2016). A specific protocol is set out in this document and any divergences in practice from this protocol during delivery have been noted.

1.5. Following a review of the priority areas identified during the Extended Phase 1 Habitat Survey by Norfolk Wildlife Services, it was decided to omit surveying the priority area 'Wendling Carr CWS HDD receptor site' adjacent to Dillington as the habitats of interest were covered by BACT26 for Norfolk Vanguard Project (Norfolk Wildlife Services Ltd, 2018) and to split priority area 'HDD receptor site and flood plain habitats at River Bure' into two transects as the suitable habitat was grouped into two distinct areas separated by the old Cromer Road.

1.6. In total seven transects were identified around the priority areas, with three static detector deployment locations along each transect.

1.7. Between April and October 2018, 8 walked transects were carried out at each survey location (7 dusk surveys and 1 dawn survey) resulting in a total of 56 transect surveys and 1023 complete nights of static detection at 21 locations. Recordings were subject to analysis using Kaleidoscope acoustic analysis software, and the results subsequently quality assured.

1.8. There were no significant limitations to the surveys.

1.9. Bats were recorded on all transects. In total seven species of bat were recorded across the survey period and across the survey area. A further three species aggregations, where calls could not be identified down to species level of 'large bats', '*Myotis spp.*' and '*Pipistrelle spp.*' were recorded. Evidence of the following species and aggregations were found within the study area:

Barbastelle	<i>Barbastella barbastellus</i>
Serotine	<i>Eptesicus serotinus</i>
Myotis aggregate	<i>Myotis spp.</i>
Noctule	<i>Nyctalus noctula</i>
Large bat aggregate	<i>Large Bat Spp.</i>
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>

Common pipistrelle	<i>Pipistrellus pipistrellus</i>
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>
Pipistrelle aggregate	<i>Pipistrellus spp.</i>
Brown long-eared	<i>Plecotus auritus</i>

1.10. Barbastelle bats were widespread across the survey area and were present on each transect. However, records were generally sparse. Most frequently recorded on BACT03, BACT06 and BACT07 where a maximum of 16, 9 and 11 passes respectively. For further details, refer to each individual transect summary report.

1.11. Summary results, including number of bat passes along key transect features for each species are presented for each survey location within this report and full survey results are given in a short separate 'Transect Summary' report for each location. Static and transect recordings are available on request from Norfolk Wildlife Services Ltd.

1.12. From this point onwards the term 'survey location' will be used to reference each transect route and 'locality' will be used to describe the nearest settlement for each survey location.

2. Introduction

2.1. Project background

2.1.1. The Norfolk Boreas Offshore Wind Farm site is located 73km off the coast of Norfolk, at the closest point. The project would comprise of an array of offshore wind turbines and offshore substations which will be connected to the shore by offshore export cables.

2.1.2. The project will also require onshore infrastructure in order to transmit and connect the offshore wind farm to the National Grid, which in summary would comprise:

- Landfall;
- Onshore cable route (60km);
- An onshore project substation; and
- Works at the Necton National Grid substation (including extension of the existing substation, interface cables, and modification of the overhead power lines).

2.1.3. Norfolk Boreas is the sister project to the proposed Norfolk Vanguard offshore wind farm project which will be located across two offshore wind farm sites, adjacent to the Norfolk Boreas offshore wind farm site. Norfolk Vanguard is being developed first and its Environmental Impact Assessment (EIA) and project design development are at a more advanced stage than for Norfolk Boreas. As both projects would connect to the existing Necton National Grid substation, there has been a strategic approach to identifying locations for all onshore infrastructure with the aim of optimising overall design and reducing impacts where practical.

2.2. Survey Scope

2.2.1. Development of Survey Scope

2.2.1.1. As Norfolk Boreas is a Nationally Significant Infrastructure Project (NSIP) an EIA is required as part of a Development Consent Order (DCO) application under the Planning Act 2008.

2.2.1.2. An Extended Phase 1 Habitat Survey of the 15 priority areas was conducted in February 2018 (Royal HaskoningDHV, 2018). The Extended Phase 1 Habitat Survey identified habitat networks within seven of the priority areas which were assessed as providing high potential to support commuting and foraging bats. The Extended Phase 1 Habitat Survey therefore recommended undertaking bat activity surveys of these habitat networks in order to understand the potential impacts of the Norfolk Boreas project upon the species utilising these habitats.

2.2.1.3. Norfolk Wildlife Services were appointed in February 2018 to undertake additional ecological surveys on the data gaps identified at these priority areas plus a 50m buffer.

2.2.1.4. Norfolk Boreas Offshore Wind Farm Environmental Impact Assessment: Phase 2 Ecological Surveys Scope (Royal HaskoningDHV, 2017), produced in December 2017, set out the Survey Scope for delivering bat activity surveys within the seven priority areas. Norfolk Wildlife Services used the Survey Scope to deliver the bat activity transect surveys. The approach used by Norfolk Wildlife Services to deliver this scope (herein the 'Survey Protocol') is set out in Section 3.

2.2.2. Survey Scope

Transects

2.2.2.1. The seven priority areas identified during the Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2018) each contained hedgerows, woodland edges, scrub vegetation or watercourses which are connected with the wider environment and therefore could provide commuting or foraging habitats for bats. The habitats within each priority area

were identified in the Survey Scope as a single habitat network. Therefore, for the purposes of this Survey Scope it has therefore been assumed that seven habitat networks (one per priority area) in total will require bat activity surveys.

2.2.2.2. The seven priority areas were proposed within the Survey Scope to be surveyed as seven bat activity transects, each indexed by a number (BACT01, BACT02, etc.) encompassing as far as possible the groupings of identified habitats of interest.

2.2.2.3. The locations of the seven priority areas described above are shown in *Appendix 1* of this report.

Statics

2.2.2.4. Along each transect static bat detectors were proposed to be placed at three specified locations to collect additional bat activity data over five consecutive nights. Each static detector location indexed by a number (BA01, BA02, etc.) was chosen by surveyors to encompass identified habitats of interest as far as possible.

2.2.2.5. The Survey Scope was put together following the guidelines set out in the Bat Conservation Trust's Good Practice Guidelines (Collins, 2016).

2.3. Aim of report

2.3.1. The aim of this report is to present the findings of the bat activity surveys conducted within the seven priority areas.

2.4. Survey objective

2.4.1. To determine the nature, frequency, species-composition and seasonal variability of bats commuting and foraging activity along all linear features within the priority areas identified by the Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2018) as potentially providing 'moderate' or 'high' suitability for supporting commuting or foraging bats.

3. Methodology

3.1. Section 3.1 sets out the proposed Survey Protocol as agreed between Royal HaskoningDHV and Norfolk Wildlife Services prior to any field work commencing, and Section 3.2 sets out how the surveys were delivered in relation to the protocol and identifies any deviations or modifications that took place during the delivery phase.

3.1. Survey Protocol

Relevant guidance

3.1.1. The following guidance document was used to inform development of the survey methodology: Collins, J. (Ed.). (2016). Bat surveys for professional ecologists: good practice guidelines. Bat Conservation Trust.

Survey locations

3.1.2. The survey locations are presented in *Appendix 1* and descriptions of these locations are summarised in *Table 1* below.

Table 1: Transect description and habitat suitability assessments

Transect reference	Locality	OS grid references	Habitat Suitability Assessment ¹	Description of transect context
BACT01	Ridlington	TG346305	High	Improved grassland used by grazing sheep. Deciduous woodland edge and drainage ditches.
BACT02	Witton	TG307320	High	Arable field. Mature native species hedgerows and deciduous woodland edge along the eastern boundaries.
BACT03	Bure North: Aylsham	TG193285	High	Arable field, deciduous woodland edge towards the east, surrounded by native species hedgerow.
BACT04	Bure South: Aylsham	TG188279	High	Arable field and improved grassland used for grazing by cattle. Woodland edge and established hedgerows.
BACT05	Salle	TG128244	High	Arable field with established hedgerows around the boundary.
BACT06	Reepham	TG097240	High	Improved grassland used for grazing by cattle, central stream and thick gorse run through the middle (north to south). Surrounded by mature trees and established hedgerow.
BACT07	Sparham	TG068205	High	Arable field and semi-improved grassland. Woodland edge and stream.

Survey methodology

3.1.3. A full technical protocol for the collection of data using static bat detectors (SM4s) and subsequent bat call analysis is given in Annex 1: Process for auto identification is available on request.

Transects

3.1.4. Proposed transect routes will be designed in seven priority areas. Each one will encompass three static detector locations.

¹ Habitat suitability assessment is based upon guidelines set out in BCT good practice guidelines (Collins, 2016)

3.1.5. All habitat networks scoped into the assessment will be subject to a bat activity transect survey, which will cover the full extent of each habitat network as far as possible.

3.1.6. Transect surveys will involve walking at a constant speed along each linear bat habitat (or the one edge of the two-dimensional bat habitat) recording observations such as number of bats, flight direction, flight height, behaviour, appearance, relative speed and location of observations. Weather conditions including temperature, wind speed and precipitation, will be recorded at the start and end of each survey visit.

3.1.7. Field observation will be relied upon as the primary method for species identification. Bat detectors will be used to listen to bats during surveys. An SM4 ZC bat detector unit with an attached GPS will be used to make a permanent record of the transect.

3.1.8. A field recording set will be retained in the compressed Zero Crossing Analysis (ZCA) format. Laboratory sound-analysis will subsequently be used to identify the calls of all bat species recorded during the transect surveys.

Statics

3.1.9. For all transects surveyed, static detector surveys will be set up in parallel.

3.1.10. These will involve placement of a static detector at locations identified as suitable through judgement of the surveying ecologist whilst on site. SM4 ZC recorders will be deployed in suitable locations separated from stock and other potential hazards. Where an SM4 ZC fails during deployment, the survey will be repeated.

3.1.11. Data from these surveys will be recorded and subject to sound-analysis to identify species and pass numbers following the survey.

Survey timing and weather conditions

Transects

3.1.12. For transects of “high” suitability for commuting or foraging bats (i.e. all transects scoped into the bat activity surveys), these will be subject to one survey visit per month from April to October including one dusk and pre-dawn survey within a 24-hour period (8 visits).

3.1.13. The transect surveys will commence at sunset, and cease a minimum of 2 hours after sunset. Sunset and sunrise times will be standardised using the time and date website: <https://www.timeanddate.com/sun/uk/norwich>.

3.1.14. Surveys will not be carried out when the temperature is below 10°C at sunset/sunrise, or during heavy rain or strong wind unless justified by the surveying ecologist.

Statics

3.1.15. The surveys will use SM4 ZC static detectors. Deployment of SM4 ZC recorders will follow the user guide².

3.1.16. For transects identified as being of high suitability for commuting or foraging bats, static bat detector surveys will take place at three locations on five consecutive nights per month between April and October.

3.1.17. Static detector surveys will be programmed to commence 30 minutes before sunset, and cease 30 minutes after sunrise.

3.1.18. Periods of prolonged bad weather will be noted for static detectors.

Equipment

² <https://www.wildlifeacoustics.com/images/documentation/SM4-BAT-ZC-USER-GUIDE.pdf>

3.1.19. Whilst walking the transect, surveyors will use SM4 ZCA units with an attached GPS as well as their personal bat detectors to listen to any echolocation calls. The make of bat detector used by each surveyor will be recorded.

3.1.20. Wildlife Acoustics Kaleidoscope software will be used for analysis.

Personnel

3.1.21. All surveys will be undertaken by suitably experienced bat surveyors, who will either be members of the Chartered Institute of Ecology and Environmental Management (CIEEM) or act according to its code of conduct.

3.1.22. No lone working is permitted, each transect will be undertaken by a single surveyor. An additional safety worker will be present, but will only assist the surveyor (e.g. by note taking).

3.2. Survey delivery

3.2.1. The protocol was followed for the activity surveys as far as possible or reasonable. Variations from this are noted in 4.2.2. Limitations.

3.2.1. Survey methodology as delivered

Access to survey locations

3.2.1.1. It was decided to omit surveying the priority area 'Wendling Carr CWS HDD receptor site' adjacent to Dillington as the habitats of interest were covered by BACT26 for Norfolk Vanguard Project (Norfolk Wildlife Services Ltd, 2018).

3.2.1.2. It was decided to split priority area 'HDD receptor site and flood plain habitats at River Bure' into two transects as the suitable habitat was grouped into two distinct areas separated by the old Cromer Road.

3.2.1.3. Access was possible to all seven of the final agreed survey locations (BACT01-BACT07).

3.2.1.4. Details of each transect and static detector location are given in Appendices 2-3.

3.2.1.5. An alternative transect route was walked on one occasion at BACT01, due to lack of access in April 2018 and a diversion of the transect route was taken at BACT03 and BACT04 due to the presence of livestock within a section of the transect.

3.2.1.6. Details of any deviations to the transects made due to changes in access permission are outlined in *Table 2* below.

Table 2 Summary of access arrangements made for transects.

Transect reference	Details of access	Changes to transect
BACT01	Access not granted until May 2018	Alternative route walked to the west of the transect in April 2018. Then identified transect route walked from May - October 2018
BACT02	Access granted	None
BACT03	Livestock grazing within the grassland to the east of the transect June to September	Diverted route undertaken June to September
BACT04	Livestock grazing within the grassland to the south of the transect in May, July and October	Diverted route undertaken in May, July and October
BACT05	Access granted	None
BACT06	Bull in field in July	Attempted to carry out dawn and dusk back to back survey in July. However, due to livestock these surveys were aborted but were carried out once the cattle had been removed
BACT07	Access granted	None

Equipment used

3.2.1.7. Equipment used for the surveys is detailed below:

- Head torch with extra fully charged batteries
- Bat detectors (any type) and recording equipment with GPS and microphone
- SM4 ZC static detectors with microphone and GPS x 3
- Bungee ties
- Thermometer
- Mobile phone
- Weather writer and pen
- Bat activity transect survey recording form and map
- Toolbox talk form

Survey effort

Transects

3.2.1.8. A summary of survey effort by month is given in *Table 3* below. Where two dates are given in any one month this highlights the dusk and dawn back to back survey. Where these dates are both the same, this indicates that the dawn survey was carried out before the dusk survey.

Table 3 Bat activity transect survey effort by month.

Transect reference	April	May	June	July	August	September	October	Total number of surveys
BACT01	26.04.2018	21.05.2018	13.06.2018	11.07.2018	08.08.2018	12.09.2018 12.09.2018	10.10.2018	8
BACT02	20.04.2018	10.05.2018	14.06.2018	11.07.2018	10.08.2018	13.09.2018 14.09.2018	11.10.2018	8
BACT03	13.04.2018	15.05.2018	18.06.2018	19.07.2018	21.08.2018	25.09.2018 26.09.2018	15.10.2018	8
BACT04	13.04.2018	22.05.2018	18.06.2018	18.07.2018	23.08.2018	17.09.2018 18.09.2018	15.10.2018	8
BACT05	19.04.2018	09.05.2018	27.06.2018	19.07.2018	16.08.2018	26.09.2018 27.09.2018	18.10.2018	8
BACT06	16.04.2018	01.05.2018	05.06.2018	03.07.2018	16.08.2018	04.09.2018	02.10.2018 03.10.2018	8
BACT07	19.04.2018	03.05.2018	21.06.2018	05.07.2018	02.08.2018	06.09.2018 06.09.2018	03.10.2018	8

Static detector

3.2.1.9. Full dates for static detector deployments are given in *Appendix 4*.

3.2.1.10. A summary of static detector effort by month is given in *Table 4* below.

Table 4 Static detector deployment effort by month.

Static detector reference	Associated transect reference	April	May	June	July	August	September	October	Total number of compliant surveys
BA01	BACT01	8	8	6	6	6	6	7	7
BA02	BACT01	8	8	6	6	6	6	7	7
BA03	BACT01	8	8	6	6	6	6	7	7
BA04	BACT02	6	6	6	6	6	6	6	7
BA05	BACT02	6	6	6	6	6	6	6	7
BA06	BACT02	6	6	6	6	6	6	6	7

Static detector reference	Associated transect reference	April	May	June	July	August	September	October	Total number of compliant surveys
BA07	BACT03	6	6	7	6	6	7	7	7
BA08	BACT03	6	6	7	6	6	7	7	7
BA09	BACT03	6	6	7	6	6	7	7	7
BA10	BACT04	6	7	7	7	8	7	7	7
BA11	BACT04	6	7	7	7	8	7	7	7
BA12	BACT04	6	7	7	7	8	7	7	7
BA13	BACT05	7	6	6	11	7	6	6	7
BA14	BACT05	7	6	6	11	7	6	6	7
BA15	BACT05	7	6	6	11	7	6	6	7
BA16	BACT06	7	5	6	7	6	14	7	7
BA17	BACT06	7	5	6	0	6	14	7	6
BA18	BACT06	7	5	6	7	6	14	7	7
BA19	BACT07	7	7	8	5	6	13	14	7
BA20	BACT07	7	7	8	5	6	13	14	7
BA21	BACT07	7	7	8	5	6	13	14	7

Timing and weather conditions

3.2.1.11. The weather conditions and timings during the surveys are given in *Table 11* in *Appendix 3*. An assessment of any related limitations for each survey can be found in 3.2.2. Limitations.

3.2.1.12. In general, the weather throughout the 2018 survey season was exceptionally hot and dry with light wind conditions and periods of drought. These conditions were consistent with the suitable survey conditions, as set out in the Survey Protocol (Section 3.2). Only occasional surveys were postponed due to bad weather.

3.2.1.13. During two dawn surveys in September and October, the temperature at dawn fell to just below the 10°C specified in the Survey Protocol, although the surveys were compliant at the beginning of the survey.

Personnel

3.2.1.14. All surveys were undertaken by experienced bat surveyors, who are listed below in the table below. Other named staff on surveys were safety workers: Nicky Talbot, Joseph Hassall, Piranesi O'Hare Evans, Stephanie Ford, Jamie Murphy, Aidan Holden, Carolyn Smith, Rebecca Banks, Lisa Treadwell and Martin Parker.

3.2.1.15. Bat surveys were recorded using an SM4 ZC bat detector, but surveyors also had personal equipment as shown below.

Table 5 Surveyor experience

Team member	Experience	Memberships	Equipment used
James Allitt	15 years' experience of ecological surveying, including bats	-	Batbox Duet
Ben Christie	6 years' experience in ecological surveying, including bats. Holds a level 1 bat licence (Licence reference: 2017-30047-CLS-CLS)	ACIEEM	Batbox Duet/Echometer Touch
Ben Moore	3 years' experience of ecological surveying, including bats	GradCIEEM	Batbox Duet
Sally McColl	11 years' experience of ecological surveying, including bats	MCIEEM	Batbox Duet

3.2.2. Limitations

3.2.2.1. A summary of the survey limitations encountered for all transects is set out below. Detailed limitations for each survey transect, including any notable limitations which may affect data quality, are set out in *Table 7*.

Survey timing

3.2.2.2. Eight surveys were carried out at each transect. However, a full transect was not undertaken at BACT06 in July as the survey was aborted as a result of aggressive cattle behaviour and BA17 was not deployed on this occasion. There was sufficient data collected from other static deployments and walked surveys at this survey location to deem this as an insignificant limitation.

3.2.2.3. Three surveys were just under the specified two-hour survey length in April 2018, by a maximum of five minutes. This was not seen as a significant limitation.

3.2.2.4. BA15 had no recordings in July as the microphone was destroyed by farm machinery and BA13 had no recordings in August due to a SIM card error. In addition, static detectors on an additional 12 occasions, recorded on fewer than the deployed number of days. It is unclear whether this was an equipment malfunction, although no equipment appeared faulty on inspection, or whether there were genuinely no bats recorded on the additional dates that the detectors were deployed. Sufficient data was still collected by these deployments which hadn't any recordings on certain nights to consider this as an insignificant limitation.

3.2.2.5. The duration of transect surveys is given in *Appendix 3*. Static detector deployment details are given in *Appendix 4*.

Weather conditions

3.2.2.6. In general, the weather throughout the survey programme was warm and dry which correlated with the heatwave observed across the country throughout the summer which led into a prolonged mild autumn.

3.2.2.7. Weather was calm, dry and mild during October 2018, and early autumn coverage for bats was therefore good where access was available to carry out the surveys. Weather conditions encountered during each survey are provided within *Table 11*.

3.2.2.8. On two occasions the temperature was 8°C at dawn for BACT03 and BACT06 (during September and October respectively). All other surveys were compliant with Survey Protocol. This was not seen as a significant limitation as this temperature was recorded at the end of these two surveys after the bats had been recorded during the transect surveys.

Survey approach

3.2.2.9. Transects were limited in length by landownership boundaries in relation to habitats of interest. All surveys were designed to be of a length to ensure that two circuits of the same route which lasted two hours for consistency between transects.

3.2.2.10. No behavioural observations were available for static detector surveys, when deployed following transect surveys, but this was not seen as significant limitation. In practice since all transect surveys continued until complete darkness, surveyors' observations would have been limited to contacts on bat detectors with bats without further details (e.g. on their exact locations or direction of flight, etc). In total there were 1023 complete nights of static detection compared to 56 transects.

3.2.2.11. Statics were deployed by attachment to suitable objects such as trees and could not be placed in the open due to farming operations. The microphones on the statics are affected by surrounding clutter for example trees and buildings, but also the availability of suitable deployment sites which means that they cannot be placed in open wetland areas. This is not seen as a major limitation, but may alter relative numbers of tracks.

Data analysis

3.2.2.12. Detectability of bats varies by species and the intensity and loudness of their calls, this is particularly the case with brown long-eared bats *Plecotus auritus*. A classification for this is given within Barataud (2015). In general, this is not seen as presenting a significant limitation to the survey results but means that numerical results between species are not comparable.

3.2.2.13. It is likely that brown long-eared bats, which are exceptionally quiet in echolocating, will be underrepresented within the results. Russ (2012) states that brown long-eared bats whisper their calls and to stand a chance of getting a quality recording they need to be calling within close proximity of the bat detector (within 5m). However, there is no evidence to indicate the scale of the effect this has on this species. Therefore, brown long-eared bats may be present at sites where survey results indicate absence. This is a known issue when undertaking bat activity surveys and provided that this caveat is placed on the data, no other constraints are envisaged.

3.2.2.14. Some species identifications were aggregated during analysis due to detectability issues. These included all bats in the *Myotis* genus of which any species from within this group was analysed as *Myotis* species aggregate ('MYOSPP'). Likewise, due to the nature of difficulties in distinguishing some calls between *Nyctalus noctula*, *Nyctalus leisleri* and *Eptesicus serotinus* where call parameters were sometimes vague, these were classified as Large Bat aggregate ('LGEBAT'). Similarly, where calls belonging to individuals of the *Pipistrellus* genus which couldn't clearly be separated to one species or another, these were analysed as *Pipistrellus* species aggregate ('PIPSPP') (see *Table 8*).

Limitations by transect

3.2.2.15. *Table 6* compares the number of survey visits achieved for each transect throughout the year against the recommended number of visits set out in the Survey Protocol.

3.2.2.16. *Table 7* summarises the limitations for each transect: access limitations, including any visibility issues, weather and survey effort limitations for transects and static detector deployments. It makes a categorical assessment as to whether these limitations significantly affect the quality of the data.

Table 6 : Details of specified transect visit effort versus actual survey effort

Transect reference	Habitat Suitability Assessment	SPRING		SUMMER			AUTUMN		Total number of surveys undertaken	Proposed survey effort	Variation from proposed survey effort
		April 2018	May 2018	June 2018	July 2018	August 2018	September 2018	October 2018			
BACT01	High	1	1	1	1	1	1	1	8	8	None
BACT02	High	1	1	1	1	1	1	1	8	8	None
BACT03	High	1	1	1	1	1	1	1	8	8	None
BACT04	High	1	1	1	1	1	1	1	8	8	None
BACT05	High	1	1	1	1	1	1	1	8	8	None
BACT06	High	1	1	1	1	1	1	1	8	8	None
BACT07	High	1	1	1	1	1	1	1	8	8	None

Table 7 : Survey limitations – combined static and transect surveys

Transect reference	Habitat Suitability Assessment	Access limitations, including any visibility issues	Weather limitations	Static detector limitations	Transect survey limitations	Limitation to survey results
BACT01	High	Land owner permission not granted until May 2018 – an alternative transect route was carried out in April 2018.	None	September – BA01 - recordings for 2 days only October – BA01 - recordings for 3 days only	26.04.2018 – Survey time of 01:55	No significant impact. Sufficient survey data to indicate bat activity.
BACT02	High	None	None	N/A	20.04.2018 – Survey time of 01:59	No significant impact. Sufficient survey data to indicate bat activity.
BACT03	High	Livestock grazing within the grassland to the east of the transect June to September – diverted route undertaken.	26.09.2018 – 8°C at dawn	October – BA09 – recordings for 3 days only	N/A	No significant impact. Sufficient survey data to indicate bat activity.
BACT04	High	Livestock grazing within the grassland to the south of the transect May, July and October – diverted route undertaken.	None	July – BA10 – recordings for 3 days only July – BA12 – recordings for 1 day only August – BA10 & BA11 – recordings for 1 day only	23.08.2018 – Transect recorded on Echometer Touch due to SM4 malfunction	No significant impact. Sufficient survey data to indicate bat activity.
BACT05	High	None	None	June – BA14 – recordings for 4 days only July - BA15 – Microphone destroyed by farm machinery – no recordings August - BA13 – No data returned September – BA13 – recordings for 2 days only	N/A	No significant impact. Sufficient survey data to indicate bat activity.
BACT06	High	None	03.10.2018 – 8°C at dawn	July - BA17 – Not deployed due to aggressive livestock September – BA18 – recordings for 3 days only	03.07.2018 – Survey time of 00:22, aborted due to aggressive livestock	No significant impact. Sufficient survey data to indicate bat activity.
BACT07	High	None	None	August – BA19 – recordings on 3 days only October – BA20 – recordings on 1 day only	19.04.2018 – Survey time of 01:56	No significant impact. Sufficient survey data to indicate bat activity.

4. Results

4.1. Summary results for each transect are given in *Table 9: Summary results for each transect* below.

4.2. Full results are provided in the standalone 'Transect Summary' documents provided alongside this report.

4.3. In total seven species of bat were recorded across the survey period and across the survey area. A further three species aggregations, where calls could not be identified down to species level of 'large bats', '*Myotis spp.*' and '*Pipistrelle spp.*' were recorded. (See *Table 8*).

4.4. Barbastelles were widespread across the survey area and were present on each transect. However, records were generally sparse. Barbastelles were most frequently recorded on BACT03, BACT06 and BACT07 where a maximum of 16, 9 and 11 passes respectively.

4.5. Summary results, including number of bat passes along key transect features for each species are presented for each survey location within this report however, full survey results are given in a short separate 'Transect Summary' report for each survey location. Static and transect recordings are available on request from Norfolk Wildlife Services Ltd.

Table 8: Explanation of species, status and categories in results

Species	Scientific	Code	Notes ³	UK status ⁴
Barbastelle	<i>Barbastella barbastellus</i>	BARBAR	Sec 41; Annex II; IUCN NT	Rare
Serotine	<i>Eptesicus serotinus</i>	EPTSER	IUCN LT	Uncommon, largely restricted to south
Large bat aggregate	Not applicable	LGEBAT	Aggregated; Bat calls with FME<30kHz, but not identifiable further (covers serotine, noctule and Leisler's bats)	Not applicable
Myotis aggregate	<i>Myotis spp.</i>	MYOSPP	Aggregated; sometimes identifiable in field	Various
Leisler's bat	<i>Nyctalus leisleri</i>	NYCLEI	IUCN LT; confirmed potential calls from statics	Uncommon in GB although may be under recorded, common in Ireland
Noctule	<i>Nyctalus noctula</i>	NYCNOC	Sec 41; IUCN LT	Uncommon
Brown long-eared	<i>Plecotus auritus</i>	PLEAUR	Sec 41; IUCN LT; low detectability	Common
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	PIP NAT	IUCN LT	Uncommon but widespread, may be under recorded
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	PIPPIP	IUCN LT	Common
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	PIPPYG	Sec 41; IUCN LT	Common
Pipistrelle species aggregate	<i>Pipistrelle spp.</i>	PIPSPP	Aggregated; individuals belonging to the <i>Pipistrellus</i> genus calling at intermediate frequencies	Various
Noise	Not applicable	NOISE	Noise includes non-bat, environmental, biological and ambient sounds	Not applicable
NoID	Not applicable	NoID	Definite bat calls with <3 pulses and therefore not providing enough information to confirm a species ID	Not applicable

Abbreviations

*IUCN categories: LC is Least Concern, NT is Near Threatened, DD is Data deficient; see www.iucnredlist.org for more details.

Sec 41: Section 41 species of principal importance; often referred to as BAP species.

Annex II: Annex II of European Habitats Directive; all bats are protected under Annex IV.

³ Source: Bat Conservation Trust (2016) Table of legal and conservation status of UK bat species. https://cdn.bats.org.uk/pdf/Table_of_legal_and_conserv_status_of_UK_bats.pdf?mtime=20181101151557

⁴ Source: Bat Conservation Trust (2017) The state of the UK's bats 2017 National Bat Monitoring Programme Population Trends https://cdn.bats.org.uk/pdf/State_of_UKs_Bats_2017-2.pdf?mtime=20181101151557

Table 9 : Summary of results for each transect

Transect reference	Habitat suitability assessment	Species present	Key habitats and features for bats	Additional notes on bat activity
BACT01	High	BARBAR, EPTSER, LGEBAT, MYOSPP, NYCNOC, PLEAUR, PIPNAT, PIPPIP, PIPPYG, PIPSPP	<p>The block of woodland along the northern boundary and the stream along the western boundary were both key commuting and foraging features for bats.</p> <p>The eastern road and hedgerow was also important for commuting and foraging bats.</p> <p>The remainder of the transect was very quiet for bats, perhaps due to the open nature of the transect.</p>	Barbastelles recorded towards the western aspect of the transect
BACT02	High	BARBAR, EPTSER, LGEBAT, MYOSPP, NYCNOC, PLEAUR, PIPNAT, PIPPIP, PIPPYG, PIPSPP	<p>The eastern boundaries of the transect route saw the highest levels of common pipistrelle foraging activity, along the woodland edges and hedgerows.</p> <p>Common and soprano pipistrelles were noted to forage along the tree-lined, unnamed minor road which borders the northern boundary of the transect route.</p>	Isolated barbastelle passes towards the south of the transect on BA06.
BACT03	High	BARBAR, EPTSER, LGEBAT, MYOSPP, NYCNOC, PLEAUR, PIPNAT, PIPPIP, PIPPYG, PIPSPP	<p>Common and soprano pipistrelles were often observed foraging along the northern hedgerow.</p> <p>The woodland edge along the eastern section of the transect was a popular foraging route for pipistrelles and noctules.</p>	Several barbastelle records throughout the year. Predominantly recorded by BA07 towards the east of the transect.
BACT04	High	BARBAR, EPTSER, LGEBAT, MYOSPP, NYCNOC, PLEAUR, PIPNAT, PIPPIP, PIPPYG, PIPSPP	<p>Woodland edges were noted as key foraging areas for both common and soprano pipistrelles.</p> <p>The hedgerow along the southern boundary of the grazing meadow was a key foraging route for pipistrelle bats.</p> <p>Common and soprano pipistrelles were commonly observed and recorded foraging under mature oak standards along the western boundary of the transect.</p>	Barbastelles were occasionally recorded along the southern and western boundaries of the transects at BA10 and BA11 respectively.
BACT05	High	BARBAR, EPTSER, LGEBAT, MYOSPP, NYCNOC, PLEAUR, PIPNAT, PIPPIP, PIPPYG, PIPSPP	<p>Boundary hedgerows with trees were the key features used by bats for foraging and commuting, particularly the western boundary as this is functionally linked with surrounding habitat including the Reephams Stream, woodland and disused railway to the south.</p>	Few records of barbastelle recorded across the transect on each static detector.

Transect reference	Habitat suitability assessment	Species present	Key habitats and features for bats	Additional notes on bat activity
BACT06	High	BARBAR, EPTSER, LGEBAT, MYOSPP, NYCNOC, PLEAUR, PIPNAT, PIPPIP, PIPPYG, PIPSPP	<p>Common and soprano pipistrelles were commonly recorded foraging along the western and northern boundaries.</p> <p>The canopy of trees surrounding stop points 06 and 12 were popular foraging habitat for common and soprano pipistrelles, where the Marriott's Way footpath runs east to west just outside of the transect.</p> <p>Pipistrelles were frequently recorded foraging along the woodland edge on the eastern boundary at stop points 04 and 10.</p>	Records of barbastelle during the spring and autumn towards the northern end of the transect at BA16.
BACT07	High	BARBAR, EPTSER, LGEBAT, MYOSPP, NYCNOC, PLEAUR, PIPNAT, PIPPIP, PIPPYG, PIPSPP	<p>The northern boundary was used by common and soprano pipistrelles as a commuting route.</p> <p>The eastern boundary and south-east corner had mainly common pipistrelle foraging on the edge habitat.</p> <p>The western boundary along the woodland edge had occasional pipistrelle foraging and commuting.</p>	Infrequent barbastelle passes across the whole transect.

5. Conclusion

5.1. A total of seven bat activity transects were carried out within six priority areas identified by Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2018) as providing “high” habitat suitability for supporting commuting or foraging bats between April and October 2018.

5.2. Between April and October 2018, 8 walked transects were carried out at each survey location (7 dusk surveys and 1 dawn survey) resulting in a total of 56 transect surveys and 1023 complete nights of static detection at 21 locations.

5.3. In total seven species of bat were recorded across the survey period and across the survey area. A further three species aggregations, where calls could not be identified down to species level of ‘large bats’, ‘*Myotis spp.*’ and ‘*Pipistrelle spp.*’ were recorded.

5.4. Barbastelle bats were widespread across the survey area and were present on each transect. However, numbers of bats recorded were generally low.



6. References

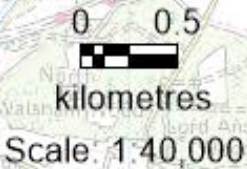
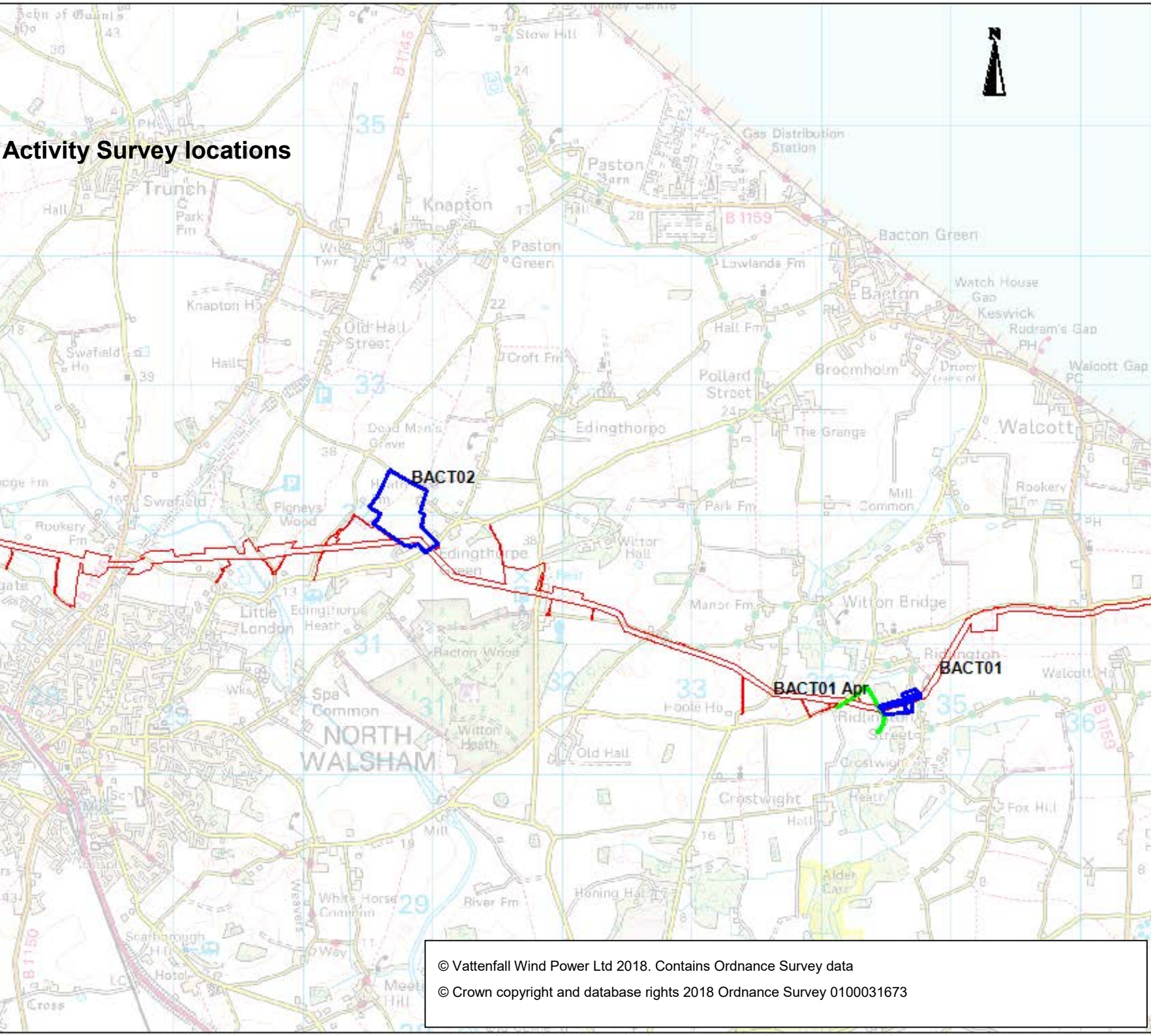
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Appendix 1: Bat Activity Survey locations


Project:		Report:	
Norfolk Boreas		Norfolk Boreas Bat Activity Transect Survey	
Title:			
Appendix 1: Bat Activity Survey Locations – Happisburgh to North Walsham			
Figure:		Drawing No:	
BACT-1		BACT-1-01-15112018	
Revision:	Date:	Size:	Scale:
01	15/11/2018	A4	1:40,000
Co-ordinate System: British National Grid			
Norfolk Wildlife Services			
22 Bewick House			
Thorpe Road			
Norwich			
NR1 1RY			

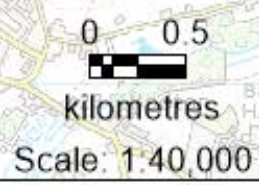
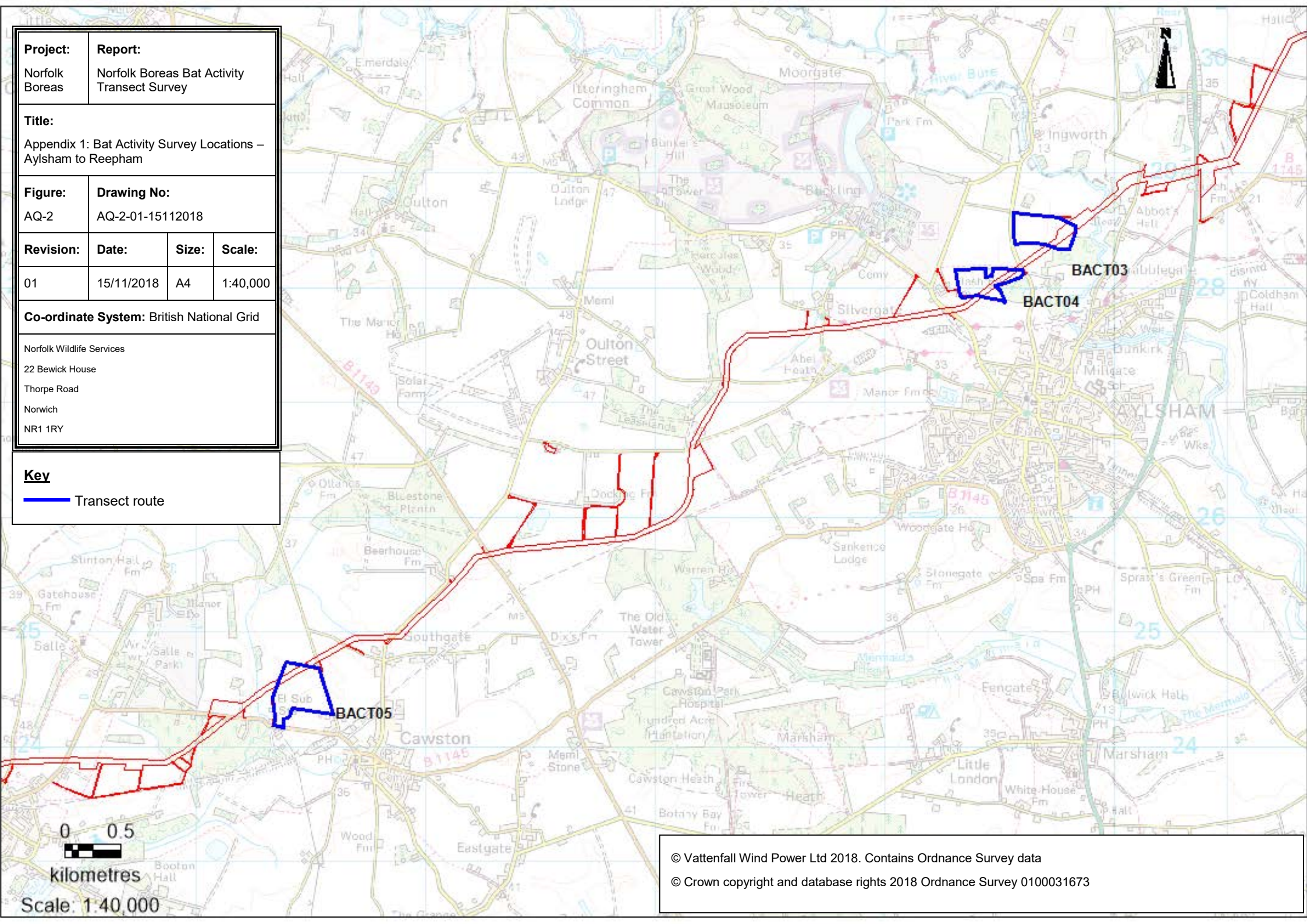
Key	
	Transect route
	Temporary transect route



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Project: Norfolk Boreas	Report: Norfolk Boreas Bat Activity Transect Survey		
Title: Appendix 1: Bat Activity Survey Locations – Aylsham to Reepham			
Figure: AQ-2	Drawing No: AQ-2-01-15112018		
Revision:	Date:	Size:	Scale:
01	15/11/2018	A4	1:40,000
Co-ordinate System: British National Grid			
Norfolk Wildlife Services 22 Bewick House Thorpe Road Norwich NR1 1RY			

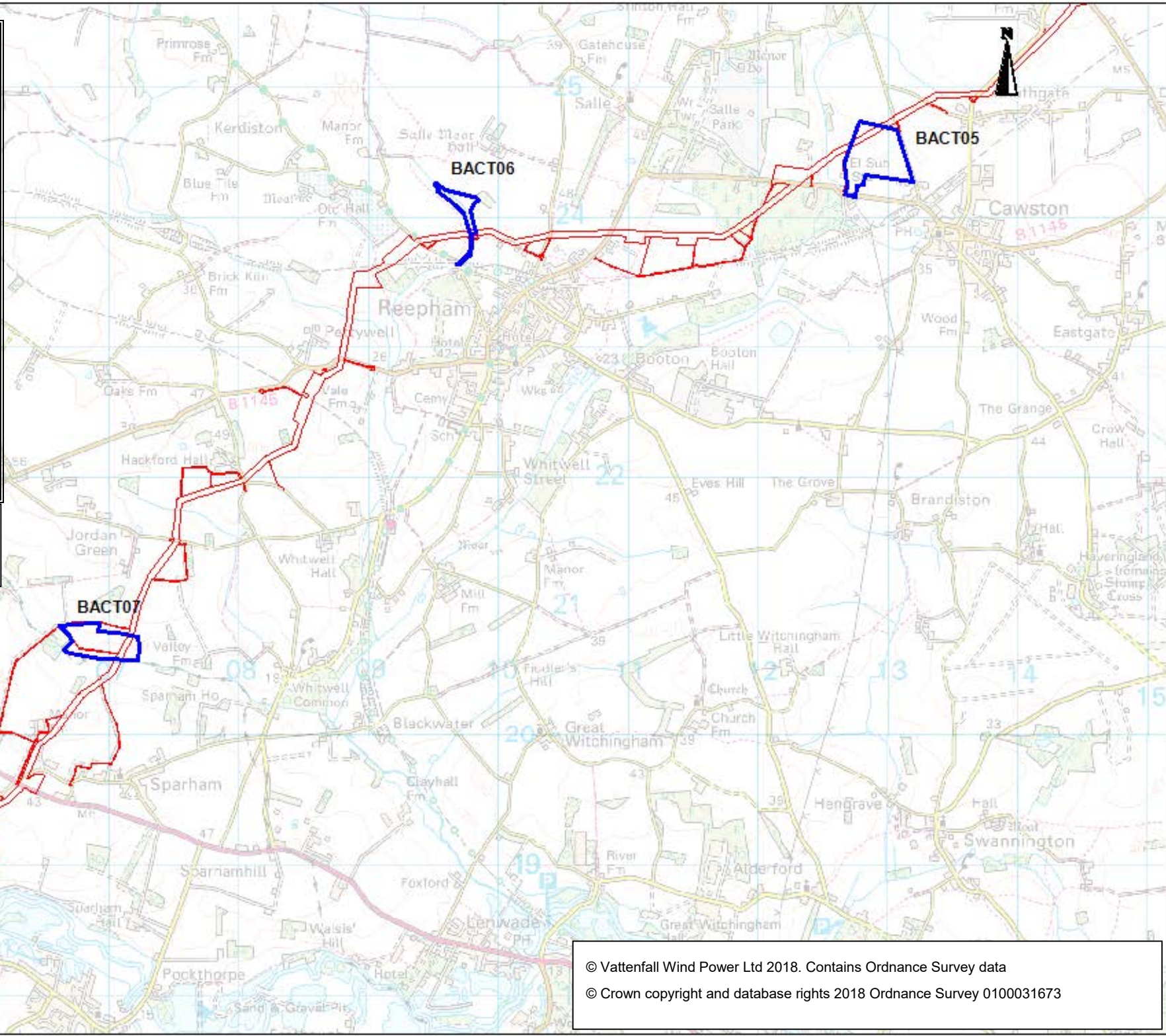
Key
 Transect route



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Project: Norfolk Boreas	Report: Norfolk Boreas Bat Activity Transect Survey		
Title: Appendix 1: Bat Activity Survey Locations – Sparham to Dereham			
Figure: AQ-3	Drawing No: AQ-3-01-18102018		
Revision: 01	Date: 15/11/2018	Size: A4	Scale: 1:40,000
Co-ordinate System: British National Grid			
Norfolk Wildlife Services 22 Bewick House Thorpe Road Norwich NR1 1RY			

Key
 Transect route



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Appendix 2: Static locations descriptions

Table 10: Static detector locations.

Transect reference	Static point	Grid reference	Static position
BACT01	BA01	TG3461830618	Semi mature oak situated alongside broadleaved woodland and improved grassland
BACT01	BA02	TG3445630499	Semi mature silver birch tree situated alongside stream
BACT01	BA03	TG3476830589	Semi mature oak situated adjacent to a minor road 'The Street'
BACT02	BA04	TG3069932324	Situated on a semi mature oak standard alongside arable field margin
BACT02	BA05	TG3090431939	Situated on an established field maple hedgerow
BACT02	BA06	TG3091431738	Situated on a semi mature oak standard alongside arable field margin
BACT03	BA07	TG1965128528	Situated on a mature oak standard alongside arable field margin
BACT03	BA08	TG1959328331	Situated on a semi mature cherry tree along deciduous woodland edge and arable field
BACT03	BA09	TG1924428387	Situated on a mature oak standard alongside arable field margin
BACT04	BA10	TG1914228082	Situated on a mature sycamore along deciduous woodland edge and arable field
BACT04	BA11	TG1864928162	Mature oak within native species hedgerow along boundary between two arable fields
BACT04	BA12	TG1890428091	Situated on a mature sycamore along deciduous woodland edge and arable field
BACT05	BA13	TG1267924484	Situated on mature hawthorn within established native species hedgerow
BACT05	BA14	TG1304424682	Mature oak within native species hedgerow along boundary between two arable fields
BACT05	BA15	TG1288524318	Mature oak within native species hedgerow along boundary between two arable fields
BACT06	BA16	TG0952724266	Situated on a fence post alongside established native species hedgerow
BACT06	BA17	TG0978724060	Situated on mature hazel within established native species hedgerow
BACT06	BA18	TG0980623881	Mature hawthorn adjacent to stream
BACT07	BA19	TG0664520672	Semi mature alder on woodland edge
BACT07	BA20	TG0691220605	Semi mature alder in a small copse surrounded by semi improved grassland
BACT07	BA21	TG0721620631	Semi mature oak with established native species hedgerow

Appendix 3: Transect survey effort

Table 11: Surveyor and weather details for each bat activity survey.

Transect reference	Surveyor	Date	Sunrise/Sunset	Start	End	Start Temp	End Temp	Wind (BWS)	Cloud cover	Precipitation
BACT01	BM ⁵ , SF ⁶	26.04.2018	20:10	20:05	22:00	12°C	11°C	1	2/8	None
BACT01	SM, SF	21.05.2018	20:53	21:13	23:14	11°C	9°C	1	2/8	None
BACT01	SM, POE ⁷	13.06.2018	21:18	21:24	23:24	18°C	14°C	2	8/8	None
BACT01	SM ⁸ , SF	11.07.2018	21:15	21:21	23:21	15°C	15°C	1	8/8	None
BACT01	SM, POE	08.08.2018	20:35	20:43	22:52	20°C	16°C	1	3/8	None - misty after 1st hour
BACT01	SM, LT ⁹	12.09.2018	06:24	04:30	06:30	13°C	12°C	2	8/8	Light Drizzle
BACT01	SM, POE	12.09.2018	19:18	19:22	21:23	16°C	9°C	1	3/8	None - misty at ground
BACT01	SM, JM ¹⁰	10.10.2018	18:11	18:23	20:24	16°C	13°C	1	3/8	None
BACT02	BM, JH ¹¹	20.04.2018	20:01	20:01	22:00	15°C	13°C	0	0/8	None
BACT02	BM, JH	10.05.2018	20:36	20:36	22:36	10°C	7°C	0	3/8	None
BACT02	BM, JH	14.06.2018	21:19	21:19	23:20	16°C	13°C	0	1/8	None

⁵ Ben Moore

⁶ Stephanie Ford

⁷ Piranesi O'Hare Evans

⁸ Sally McColl

⁹ Lisa Treadwell

¹⁰ Jamie Murphy

¹¹ Joseph Hassall

Transect reference	Surveyor	Date	Sunrise/Sunset	Start	End	Start Temp	End Temp	Wind (BWS)	Cloud cover	Precipitation
BACT02	BM, JH	11.07.2018	21:14	21:15	23:15	15°C	14°C	0	8/8	None
BACT02	BM, JH	10.08.2018	20:33	20:30	22:30	12.5°C	11°C	0	4/8	None - heavy shower prior
BACT02	BM, AH ¹²	13.09.2018	19:15	19:15	21:15	17°C	16°C	0	2/8	None
BACT02	BM, AH	14.09.2018	06:27	04:27	06:28	12°C	12°C	1	8/8	None
BACT02	BM, JM	11.10.2018	18:09	18:09	20:13	18°C	17°C	3	7/8	None
BACT03	SM, CS2 ¹³	13.04.2018	19:49	19:50	21:53	10°C	9°C	1	8/8	None
BACT03	SM, BM	15.05.2018	20:44	20:44	22:47	10°C	8°C	1	8/8	None
BACT03	SM, SF	18.06.2018	21:21	21:22	23:24	21°C	17°C	4	7/8	None
BACT03	SM, POE	19.07.2018	21:07	21:13	23:14	20°C	16°C	1	3/8	None
BACT03	SM, POE	21.08.2018	20:08	20:08	22:09	21°C	18°C	1	5/8	None
BACT03	JA ¹⁴ , LT	25.09.2018	18:47	18:47	20:47	16°C	16°C	1	1/8	None
BACT03	SM, RB ¹⁵	26.09.2018	06:47	04:48	06:49	10°C	8°C	2	4/8	None
BACT03	SM, AH	15.10.2018	18:00	18:07	20:09	14°C	13°C	2	8/8	Light drizzle
BACT04	BM, SF	13.04.2018	19:49	19:49	22:05	10°C	12°C	0	8/8	None
BACT04	BM, SF	22.05.2018	20:54	20:54	22:54	11°C	9°C	3	8/8	None

¹² Aidan Holden

¹³ Carolyn Smith

¹⁴ James Allitt

¹⁵ Rebecca Banks

Transect reference	Surveyor	Date	Sunrise/Sunset	Start	End	Start Temp	End Temp	Wind (BWS)	Cloud cover	Precipitation
BACT04	BM, NT ¹⁶	18.06.2018	21:21	21:20	23:23	19°C	18°C	3	7/8	None
BACT04	BM, JH	18.07.2018	21:08	21:05	23:05	18°C	17°C	0	4/8	None
BACT04	SM, BC ¹⁷	23.08.2018	20:04	20:04	22:04	19°C	19°C	2	8/8	None
BACT04	BM, SM	17.09.2018	19:06	19:06	21:07	20°C	14°C	2	3/8	None
BACT04	BM, JH	18.09.2018	06:34	04:33	06:33	17°C	17°C	2	0/8	None
BACT04	BM, JH	15.10.2018	18:00	18:00	20:00	13°C	12°C	2	8/8	Light drizzle
BACT05	BC, JH	19.04.2018	20:00	20:00	22:00	21°C	17°C	1	2/8	None
BACT05	JA, SF	09.05.2018	20:36	20:35	22:40	15°C	13°C	1	7/8	None
BACT05	SM, POE	27.06.2018	21:22	21:23	23:26	15°C	12°C	2	7/8	None
BACT05	JA, NT	19.07.2018	21:07	21:02	23:02	21°C	20°C	1	1/8	None
BACT05	JA, JH	16.08.2018	20:19	20:23	22:23	16°C	16°C	2	2/8	None
BACT05	JA, AH	26.09.2018	18:44	18:45	20:45	17°C	17°C	1	0/8	None
BACT05	BC, AH	27.09.2018	06:49	04:50	06:55	13°C	10°C	1	1/8	None
BACT05	BC, JM	18.10.2018	17:53	17:53	20:06	13°C	11°C	1	7/8	None
BACT06	BM, MP ¹⁸	16.04.2018	19:54	19:54	21:56	11°C	9°C	0	1/8	None
BACT06	BM, SF	01.05.2018	20:20	20:20	22:21	12°C	9°C	2	1/8	None

¹⁶ Nicky Talbot

¹⁷ Ben Christie

¹⁸ Martin Parker

Transect reference	Surveyor	Date	Sunrise/Sunset	Start	End	Start Temp	End Temp	Wind (BWS)	Cloud cover	Precipitation
BACT06	BM, SF	05.06.2018	21:12	21:13	23:30	11°C	9°C	2	7/8	None
BACT06	BM, SF	03.07.2018	21:20	21:19	21:41	15°C	15°C	2	2/8	None
BACT06	BM, POE	16.08.2018	20:19	20:22	22:24	16°C	16°C	0	0/8	None
BACT06	BM, POE	04.09.2018	19:37	19:37	21:37	15°C	13°C	2	7/8	None
BACT06	BM, AH	02.10.2018	18:30	18:30	20:30	16°C	14°C	2	7/8	None
BACT06	BM, AH	03.10.2018	06:59	04:59	06:59	10°C	8°C	0	0/8	None
BACT07	JA, SF	19.04.2018	20:00	20:00	21:56	19°C	15°C	1	0/8	None
BACT07	JA, JH	03.05.2018	20:24	20:24	22:24	13°C	11°C	1	6/8	None
BACT07	JA, NT	21.06.2018	21:22	21:22	23:26	16°C	13°C	1	4/8	None
BACT07	JA, JH	05.07.2018	21:19	21:16	23:16	17°C	17°C	1	1/8	None
BACT07	BM, JH	02.08.2018	20:46	20:48	22:49	25°C	21°C	0	0/8	None
BACT07	JA, JH	06.09.2018	06:15	04:13	06:13	14°C	14°C	2	4/8	Light rain/low cloud
BACT07	JA, JH	06.09.2018	19:30	19:33	21:33	17°C	13°C	3	8/8	None
BACT07	JA, JM	03.10.2018	18:28	18:27	20:27	16°C	13°C	2	7/8	None

Appendix 4: Details of static detector deployments

Table 12: Deployment details for each static deployment

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA01	BACT01	24.04.2018	02.05.2018	8
BA01	BACT01	21.05.2018	29.05.2018	8
BA01	BACT01	13.06.2018	19.06.2018	6
BA01	BACT01	11.07.2018	17.07.2018	6
BA01	BACT01	08.08.2018	14.08.2018	6
BA01	BACT01	12.09.2018	18.09.2018	6
BA01	BACT01	10.10.2018	17.10.2018	7
BA02	BACT01	24.04.2018	02.05.2018	8
BA02	BACT01	21.05.2018	29.05.2018	8
BA02	BACT01	13.06.2018	19.06.2018	6
BA02	BACT01	11.07.2018	17.07.2018	6
BA02	BACT01	08.08.2018	14.08.2018	6
BA02	BACT01	12.09.2018	18.09.2018	6
BA02	BACT01	10.10.2018	17.10.2018	7
BA03	BACT01	24.04.2018	02.05.2018	8
BA03	BACT01	21.05.2018	29.05.2018	8
BA03	BACT01	13.06.2018	19.06.2018	6

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA03	BACT01	11.07.2018	17.07.2018	6
BA03	BACT01	08.08.2018	14.08.2018	6
BA03	BACT01	12.09.2018	18.09.2018	6
BA03	BACT01	10.10.2018	17.10.2018	7
BA04	BACT02	20.04.2018	26.04.2018	6
BA04	BACT02	10.05.2018	16.05.2018	6
BA04	BACT02	14.06.2018	20.06.2018	6
BA04	BACT02	11.07.2018	17.07.2018	6
BA04	BACT02	10.08.2018	16.08.2018	6
BA04	BACT02	13.09.2018	19.09.2018	6
BA04	BACT02	11.10.2018	17.10.2018	6
BA05	BACT02	20.04.2018	26.04.2018	6
BA05	BACT02	10.05.2018	16.05.2018	6
BA05	BACT02	14.06.2018	20.06.2018	6
BA05	BACT02	11.07.2018	17.07.2018	6
BA05	BACT02	10.08.2018	16.08.2018	6
BA05	BACT02	13.09.2018	19.09.2018	6
BA05	BACT02	11.10.2018	17.10.2018	6
BA06	BACT02	20.04.2018	26.04.2018	6

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA06	BACT02	10.05.2018	16.05.2018	6
BA06	BACT02	14.06.2018	20.06.2018	6
BA06	BACT02	11.07.2018	17.07.2018	6
BA06	BACT02	10.08.2018	16.08.2018	6
BA06	BACT02	13.09.2018	19.09.2018	6
BA06	BACT02	11.10.2018	17.10.2018	6
BA07	BACT03	13.04.2018	19.04.2018	6
BA07	BACT03	15.05.2018	21.05.2018	6
BA07	BACT03	18.06.2018	25.06.2018	7
BA07	BACT03	19.07.2018	25.07.2018	6
BA07	BACT03	21.08.2018	27.08.2018	6
BA07	BACT03	25.09.2018	02.10.2018	7
BA07	BACT03	15.10.2018	22.10.2018	7
BA08	BACT03	13.04.2018	19.04.2018	6
BA08	BACT03	15.05.2018	21.05.2018	6
BA08	BACT03	18.06.2018	25.06.2018	7
BA08	BACT03	19.07.2018	25.07.2018	6
BA08	BACT03	21.08.2018	27.08.2018	6
BA08	BACT03	25.09.2018	02.10.2018	7

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA08	BACT03	15.10.2018	22.10.2018	7
BA09	BACT03	13.04.2018	19.04.2018	6
BA09	BACT03	15.05.2018	21.05.2018	6
BA09	BACT03	18.06.2018	25.06.2018	7
BA09	BACT03	19.07.2018	25.07.2018	6
BA09	BACT03	21.08.2018	27.08.2018	6
BA09	BACT03	25.09.2018	02.10.2018	7
BA09	BACT03	15.10.2018	22.10.2018	7
BA10	BACT04	13.04.2018	19.04.2018	6
BA10	BACT04	22.05.2018	29.05.2018	7
BA10	BACT04	18.06.2018	25.06.2018	7
BA10	BACT04	18.07.2018	25.07.2018	7
BA10	BACT04	27.08.2018	04.09.2018	8
BA10	BACT04	17.09.2018	24.09.2018	7
BA10	BACT04	17.10.2018	24.10.2018	7
BA11	BACT04	13.04.2018	19.04.2018	6
BA11	BACT04	22.05.2018	29.05.2018	7
BA11	BACT04	18.06.2018	25.06.2018	7
BA11	BACT04	18.07.2018	25.07.2018	7

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA11	BACT04	27.08.2018	04.09.2018	8
BA11	BACT04	17.09.2018	24.09.2018	7
BA11	BACT04	15.10.2018	22.10.2018	7
BA12	BACT04	13.04.2018	19.04.2018	6
BA12	BACT04	22.05.2018	29.05.2018	7
BA12	BACT04	18.06.2018	25.06.2018	7
BA12	BACT04	18.07.2018	25.07.2018	7
BA12	BACT04	27.08.2018	04.09.2018	8
BA12	BACT04	17.09.2018	24.09.2018	7
BA12	BACT04	15.10.2018	22.10.2018	7
BA13	BACT05	19.04.2018	26.04.2018	7
BA13	BACT05	09.05.2018	15.05.2018	6
BA13	BACT05	21.06.2018	27.06.2018	6
BA13	BACT05	19.07.2018	30.07.2018	11
BA13	BACT05	16.08.2018	23.08.2018	7
BA13	BACT05	26.09.2018	02.10.2018	6
BA13	BACT05	18.10.2018	24.10.2018	6
BA14	BACT05	19.04.2018	26.04.2018	7
BA14	BACT05	09.05.2018	15.05.2018	6

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA14	BACT05	21.06.2018	27.06.2018	6
BA14	BACT05	19.07.2018	30.07.2018	11
BA14	BACT05	16.08.2018	23.08.2018	7
BA14	BACT05	26.09.2018	02.10.2018	6
BA14	BACT05	18.10.2018	24.10.2018	6
BA15	BACT05	19.04.2018	26.04.2018	7
BA15	BACT05	09.05.2018	15.05.2018	6
BA15	BACT05	21.06.2018	27.06.2018	6
BA15	BACT05	19.07.2018	30.07.2018	11
BA15	BACT05	16.08.2018	23.08.2018	7
BA15	BACT05	26.09.2018	02.10.2018	6
BA15	BACT05	18.10.2018	24.10.2018	6
BA16	BACT06	16.04.2018	23.04.2018	7
BA16	BACT06	01.05.2018	06.05.2018	5
BA16	BACT06	05.06.2018	11.06.2018	6
BA16	BACT06	03.07.2018	10.07.2018	7
BA16	BACT06	16.08.2018	22.08.2018	6
BA16	BACT06	04.09.2018	18.09.2018	14
BA16	BACT06	02.10.2018	09.10.2018	7

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA17	BACT06	16.04.2018	23.04.2018	7
BA17	BACT06	01.05.2018	08.05.2018	7
BA17	BACT06	06.06.2018	10.06.2018	5
BA17	BACT06	-	-	0
BA17	BACT06	16.08.2018	22.08.2018	6
BA17	BACT06	04.09.2018	18.09.2018	14
BA17	BACT06	03.10.2018	08.10.2018	5
BA18	BACT06	16.04.2018	23.04.2018	7
BA18	BACT06	01.05.2018	06.05.2018	5
BA18	BACT06	05.06.2018	11.06.2018	6
BA18	BACT06	03.07.2018	10.07.2018	7
BA18	BACT06	16.08.2018	22.08.2018	6
BA18	BACT06	04.09.2018	18.09.2018	14
BA18	BACT06	02.10.2018	09.10.2018	7
BA19	BACT07	19.04.2018	26.04.2018	7
BA19	BACT07	03.05.2018	10.05.2018	7
BA19	BACT07	21.06.2018	29.06.2018	8
BA19	BACT07	05.07.2018	10.07.2018	5
BA19	BACT07	02.08.2018	08.08.2018	6

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA19	BACT07	06.09.2018	19.09.2018	13
BA19	BACT07	03.10.2018	17.10.2018	14
BA20	BACT07	19.04.2018	26.04.2018	7
BA20	BACT07	03.05.2018	10.05.2018	7
BA20	BACT07	21.06.2018	29.06.2018	8
BA20	BACT07	05.07.2018	10.07.2018	5
BA20	BACT07	02.08.2018	08.08.2018	6
BA20	BACT07	06.09.2018	19.09.2018	13
BA20	BACT07	03.10.2018	17.10.2018	14
BA21	BACT07	19.04.2018	26.04.2018	7
BA21	BACT07	03.05.2018	10.05.2018	7
BA21	BACT07	21.06.2018	29.06.2018	8
BA21	BACT07	05.07.2018	10.07.2018	5
BA21	BACT07	02.08.2018	08.08.2018	6
BA21	BACT07	06.09.2018	19.09.2018	13
BA21	BACT07	03.10.2018	17.10.2018	14



Norfolk Boreas Bat Activity Surveys Transect Summary: BACT01

Survey scope:	Bat activity surveys: Transect Summary
Prepared on behalf of:	Royal HaskoningDHV
Report reference:	2017/147.2: BACT01
Date of survey/s:	April – October 2018

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Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).

Report prepared by :	Checked by :	Approved by :	Status :
Sally McColl Date : 15.11.2018	Ben Christie 15.11.2018	Chris Smith 15.11.2018	V1 - DRAFT FOR CLIENT COMMENT
Ben Moore Date : 17.12.2018	Sally McColl 17.12.2018	Sally McColl 17.12.2018	V2 – SECOND DRAFT FOR CLIENT COMMENT
Ben Moore Date : 07.01.2019	Sally McColl 07.01.2019	Sally McColl 07.01.2019	V3 - FINAL

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1. Transect summary: BACT01, Ridlington

- 1.1. Grid reference: TG346305.
1.2. Transect habitat suitability assessment: High quality.
1.3. Static detectors: BA01, BA02, BA03.

2. Description of transect

Land use at transect

- 2.1. The transect route was situated within a series of grazing marshes which were bordered on all sides by steeply sided ditches which held little water and were densely vegetated. The western boundary was a flowing stream, which drains into Hundred Stream and eventually into the River Ant. The eastern boundary was a road, bordered by an unmanaged hedgerow on the western side.
- 2.2. Adjacent to the majority of the northern boundary was an area of deciduous woodland (4.9ha).
- 2.3. There were hedgerows around the eastern end of the transect, scattered trees and scrub along the western boundary and scattered trees along the ditches.
- 2.4. Land use to the west and east was arable; woodland and grassland to the north; and grazing marsh to the south.
- 2.5. Sheep were rotated around the fields to graze within the transect so sward height varied from 5cm in recently grazed areas to up to 30cm in ungrazed areas.

Key commuting and foraging features

- 2.6. The block of woodland along the northern boundary and the stream along the western boundary were both key commuting and foraging features for bats. The majority of bat passes were recorded during the transect surveys along the edges of these features.
- 2.7. The eastern road and hedgerow was also important for commuting and foraging bats.
- 2.8. The remainder of the transect was very quiet for bats, perhaps due to the open nature of the transect.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of three static detectors over five consecutive nights.

3.2. The transect was walked eight times from April to October.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA01	1	24.04.2018	02.05.2018	8
BA01	2	21.05.2018	29.05.2018	8
BA01	3	13.06.2018	19.06.2018	6
BA01	4	11.07.2018	17.07.2018	6
BA01	5	08.08.2018	14.08.2018	6
BA01	6	12.09.2018	18.09.2018	6
BA01	7	10.10.2018	17.10.2018	7
BA02	1	24.04.2018	02.05.2018	8
BA02	2	21.05.2018	29.05.2018	8
BA02	3	13.06.2018	19.06.2018	6
BA02	4	11.07.2018	17.07.2018	6
BA02	5	08.08.2018	14.08.2018	6
BA02	6	12.09.2018	18.09.2018	6
BA02	7	10.10.2018	17.10.2018	7
BA03	1	24.04.2018	02.05.2018	8
BA03	2	21.05.2018	29.05.2018	8
BA03	3	13.06.2018	19.06.2018	6
BA03	4	11.07.2018	17.07.2018	6
BA03	5	08.08.2018	14.08.2018	6
BA03	6	12.09.2018	18.09.2018	6
BA03	7	10.10.2018	17.10.2018	7

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, SF	26.04.2018	20:05	22:00
2	Dusk	SM, SF	21.05.2018	21:13	23:14
3	Dusk	SM, POE	13.06.2018	21:24	23:24
4	Dusk	SM, SF	11.07.2018	21:21	23:21
5	Dusk	SM, POE	08.08.2018	20:43	22:52
6	Dawn	SM, LT	12.09.2018	04:30	06:30
7	Dusk	SM, POE	12.09.2018	19:22	21:23
8	Dusk	SM, JM	10.10.2018	18:23	20:24

¹ Surveyor initials are referenced with full names in Appendix 4 in the overarching Norfolk Boreas Bat Activity Surveys Report 2017.147.2 (November 2018).

4. Bat observations

4.1. Bat activity by species

4.1.1. A summary of the bat activity on the transect, based on the transect and static data from all visits is given in Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species	Code	Presence Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	x	✓ ²	Recorded mostly to the west of the transect on static detector BA02 with one recording from BA01.	Calls recorded throughout the season.	N/A
Serotine	EPTSER	✓ ³²	✓	Recorded mostly to the west of the transect on static detector BA02 with a few recordings from BA01 and BA03.	Calls recorded in early evening soon after sunset throughout the season.	N/A
Large bat species	LGESPP	✓ ²	✓	Recorded mostly to the west and east of the transect on static detectors BA01 and BA02 with a few recordings on BA03.	Calls recorded throughout the season.	N/A
Myotis spp.	MYOSPP	✓ ²	✓	Recorded mostly to the west of the transect on static detector BA02 with a few recordings from BA01 and BA03.	Calls recorded throughout the season.	N/A
Noctule	NYCNOC	✓ ²	✓	Recorded mostly to the west and east of the transect on static detectors BA01 and BA02 with a few recordings on BA03.	Calls recorded throughout the season.	N/A
Brown long-eared	PLEAUR	✓ ²	✓	Recorded mostly to the west of the transect on static detector BA02 with a few recordings from BA01.	Calls recorded throughout the season, mostly prior to midnight.	N/A
Nathusius' pipistrelle	PIP NAT	✓ ²	✓	Recorded mostly to the west of the transect on static detector BA02 with a few recordings from BA01 and BA03.	Calls recorded throughout the season, except for April and August.	N/A
Common pipistrelle	PIPPIP	✓	✓	Observed foraging along western, eastern and northern boundaries. Recorded in high numbers at all static locations.	Calls recorded throughout the season but peak number of calls in June, July and October.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Observed foraging along western, eastern and northern boundaries. Recorded at all static locations.	Calls recorded throughout the season but peak number of calls in June and July.	N/A
Pipistrelle spp.	PIPSPP	✓	✓	Recorded to the north, east and west of the transect and observed foraging along western, eastern and northern boundaries.	Calls recorded throughout the season but peak number of calls in June and July.	N/A

² Limited recordings collected by static detectors (less than 10 records)

³ Only found to be present through analysis of transect acoustic recordings (Table 5, compiled acoustic data).

4.2. Transect survey data

Table 4: Summary from transect data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp (°C)	End Temp (°C)	Wind (Beaufort Scale)	Cloud (/8)	Precipitation	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID ⁴	Total bats ⁵
1	Dusk	26.04.2018	20:05	22:00	12	11	1	2/8	None	0	0	0	0	0	0	0	7	0	6	0	13
2	Dusk	21.05.2018	21:13	23:14	11	9	1	2/8	None	0	0	0	0	0	0	0	12	0	0	0	12
3	Dusk	13.06.2018	21:24	23:24	18	14	2	8/8	None	0	0	0	0	0	0	1	4	9	2	0	16
4	Dusk	11.07.2018	21:21	23:21	15	15	1	8/8	None	0	0	0	0	0	1	0	17	2	5	1	26
5	Dusk	08.08.2018	20:43	22:52	20	16	1	3/8	None, misty after 1st hour	0	0	0	0	0	0	0	14	3	2	0	19
6	Dawn	12.09.2018	04:30	06:30	13	12	2	8/8	Light drizzle	0	0	0	1	0	0	0	1	1	1	0	4
7	Dusk	12.09.2018	19:22	21:23	16	9	1	3/8	None, ground mist	0	0	0	1	0	0	0	8	3	1	0	13
8	Dusk	10.10.2018	18:23	20:24	16	13	1	3/8	None	0	0	0	2	0	1	0	10	5	3	0	21

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID	Total bats	NOISE ⁶
1	Dusk	26.04.2018	0	0	0	0	0	0	0	3	0	0	1	4	1252
2	Dusk	21.07.2018	0	0	0	0	0	0	1	21	5	0	3	30	1181
3	Dusk	13.06.2018	0	0	1	1	0	1	0	37	28	0	10	78	885
4	Dusk	11.07.2018	0	0	0	0	0	0	0	0	0	0	0	0	193
5	Dusk	08.08.2018	0	1	1	0	1	0	0	31	2	1	6	43	1568
6	Dawn	12.09.2018	0	0	0	0	0	0	0	4	1	0	1	6	652
7	Dusk	12.09.2018	0	0	0	1	0	0	0	29	1	0	6	37	1249
8	Dusk	10.10.2018	0	0	0	0	0	0	0	11	3	0	7	21	1070

⁴ All bats not identified to species level.

⁵ 'Total bats' refers to the total number of confirmed bat passes.

⁶ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA01.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
24.04.2018	0	0	3	1	158	1	0	24	3	0	72	262	7096
21.05.2018	0	0	0	0	1	0	0	39	0	0	36	76	544
14.06.2018	1	1	7	0	58	0	2	1066	18	7	169	1329	1729
11.07.2018	0	2	6	2	22	1	2	528	92	15	226	896	1997
08.08.2018	0	0	0	0	7	0	0	57	1	1	58	124	59624
12.09.2018	0	0	0	0	8	0	0	1	0	0	6	15	5697
10.10.2018	0	0	2	0	14	0	1	967	4	3	330	1321	7231
Grand Total	1	3	18	3	268	2	5	2682	118	26	897	4023	83918

Table 7: Static data from BA point BA02.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
24.04.2018	1	0	2	0	206	1	0	26	1	1	63	301	1110
21.05.2018	2	2	10	47	18	27	43	1173	148	43	242	1755	1620
14.06.2018	0	0	0	0	4	0	1	11	0	2	5	23	32
11.07.2018	1	3	9	3	34	3	10	369	10	16	129	587	2280
08.08.2018	0	5	3	3	3	2	0	163	9	10	65	263	22502
12.09.2018	0	0	4	8	21	4	1	148	14	5	89	294	3761
10.10.2018	2	1	4	3	22	5	1	84	23	2	64	211	17020
Grand Total	6	11	32	64	308	42	56	1974	205	79	657	3434	48325

Table 8: Static data from BA point BA03.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
24.04.2018	0	0	0	0	29	0	0	94	4	0	32	159	2000
21.05.2018	0	0	0	0	0	0	0	0	0	0	0	0	1008
14.06.2018	0	0	0	0	41	0	0	304	56	10	77	488	1966
11.07.2018	0	1	0	0	95	0	0	606	33	10	123	868	1396
08.08.2018	0	0	0	0	0	0	0	8	0	0	15	23	9015
12.09.2018	0	0	0	1	28	0	1	1942	24	12	332	2340	18160
10.10.2018	0	0	0	0	17	0	1	608	16	5	161	808	73373
Grand Total	0	1	0	1	210	0	2	3562	133	37	740	4686	106918

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

DateSpecies	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total Bats	Noise
24.04.2018	0	0	0	0	0	0	0	44	1	0	1	46	1794
25.04.2018	0	0	0	0	23	0	0	14	0	0	13	50	1503
26.04.2018	1	0	1	0	59	1	0	39	2	1	37	141	334
27.04.2018	0	0	0	1	82	0	0	1	2	0	40	126	1852
28.04.2018	0	0	0	0	76	0	0	0	0	0	15	91	902
29.04.2018	0	0	0	0	19	0	0	0	0	0	5	24	354
30.04.2018	0	0	2	0	20	0	0	0	0	0	0	22	2666
01.05.2018	0	0	1	0	41	1	0	45	3	0	26	117	433
02.05.2018	0	0	1	0	73	0	0	1	0	0	30	105	368
21.05.2018	0	0	0	2	0	0	2	29	1	2	13	49	135
22.05.2018	0	0	1	4	0	2	6	212	2	6	56	289	835
23.05.2018	0	0	0	9	0	1	5	209	26	4	37	291	389
24.05.2018	0	0	0	2	3	3	3	204	12	7	34	268	408
25.05.2018	0	0	1	3	0	3	4	96	4	4	10	125	532
26.05.2018	1	1	0	8	1	5	9	199	75	8	51	358	312
27.05.2018	1	1	7	10	14	4	4	79	22	5	47	194	258
28.05.2018	0	0	1	9	1	4	7	139	6	3	26	196	255
29.05.2018	0	0	0	0	0	5	3	45	0	4	4	61	48
13.06.2018	0	0	0	0	5	0	0	87	5	2	13	112	337
14.06.2018	0	0	0	0	11	0	0	205	10	1	32	259	685
15.06.2018	0	0	0	0	15	0	0	116	7	6	28	172	460
16.06.2018	0	0	0	0	31	0	0	117	8	3	33	192	487
17.06.2018	0	0	0	0	14	0	1	235	4	4	44	302	708
18.06.2018	1	1	7	0	13	0	1	454	15	2	76	570	697

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total Bats	Noise
19.06.2018	0	0	0	0	14	0	1	167	25	1	25	233	353
11.07.2018	1	0	1	0	5	1	0	102	5	1	24	140	578
12.07.2018	0	3	4	2	5	0	1	162	74	5	100	356	1072
13.07.2018	0	1	1	0	15	0	2	322	24	6	60	431	1080
14.07.2018	0	2	6	1	15	0	2	268	10	7	67	378	580
15.07.2018	0	0	1	1	90	2	2	286	12	9	80	483	982
16.07.2018	0	0	1	1	18	1	4	249	5	5	92	376	919
17.07.2018	0	0	1	0	3	0	1	114	5	8	55	187	462
08.08.2018	0	2	1	2	2	1	0	27	0	0	34	69	17728
09.08.2018	0	2	2	0	3	1	0	85	6	3	45	147	20054
10.08.2018	0	0	0	0	0	0	0	80	3	8	26	117	6110
11.08.2018	0	1	0	1	4	0	0	7	0	0	6	19	7066
12.08.2018	0	0	0	0	0	0	0	12	0	0	12	24	16663
13.08.2018	0	0	0	0	1	0	0	5	0	0	10	16	14679
14.08.2018	0	0	0	0	0	0	0	12	1	0	5	18	8841
12.09.2018	0	0	0	0	4	0	0	2	0	0	5	11	849
13.09.2018	0	0	0	1	15	0	1	129	2	2	37	187	6031
14.09.2018	0	0	0	1	5	0	0	869	8	2	165	1050	5745
15.09.2018	0	0	1	1	7	0	1	280	3	2	71	366	3686
16.09.2018	0	0	2	1	2	3	0	403	22	8	78	519	3913
17.09.2018	0	0	1	4	20	1	0	329	2	3	54	414	2007
18.09.2018	0	0	0	1	4	0	0	79	1	0	17	102	5387
10.10.2018	0	0	0	1	6	0	2	63	10	0	25	107	12445
11.10.2018	1	1	0	0	9	2	0	306	18	3	78	418	32829
12.10.2018	0	0	1	2	12	1	0	642	1	2	219	880	23584
13.10.2018	0	0	3	0	4	1	1	347	3	2	115	476	12841

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total Bats	Noise
14.10.2018	1	0	2	0	16	1	0	137	5	2	25	189	565
15.10.2018	0	0	0	0	0	0	0	38	0	0	34	72	5607
16.10.2018	0	0	0	0	5	0	0	47	5	0	25	82	4628
17.10.2018	0	0	0	0	1	0	0	79	1	1	34	116	5125
Grand Total	7	15	50	68	786	44	63	8218	456	142	2294	12143	239161

4.5. Map showing key bat activity

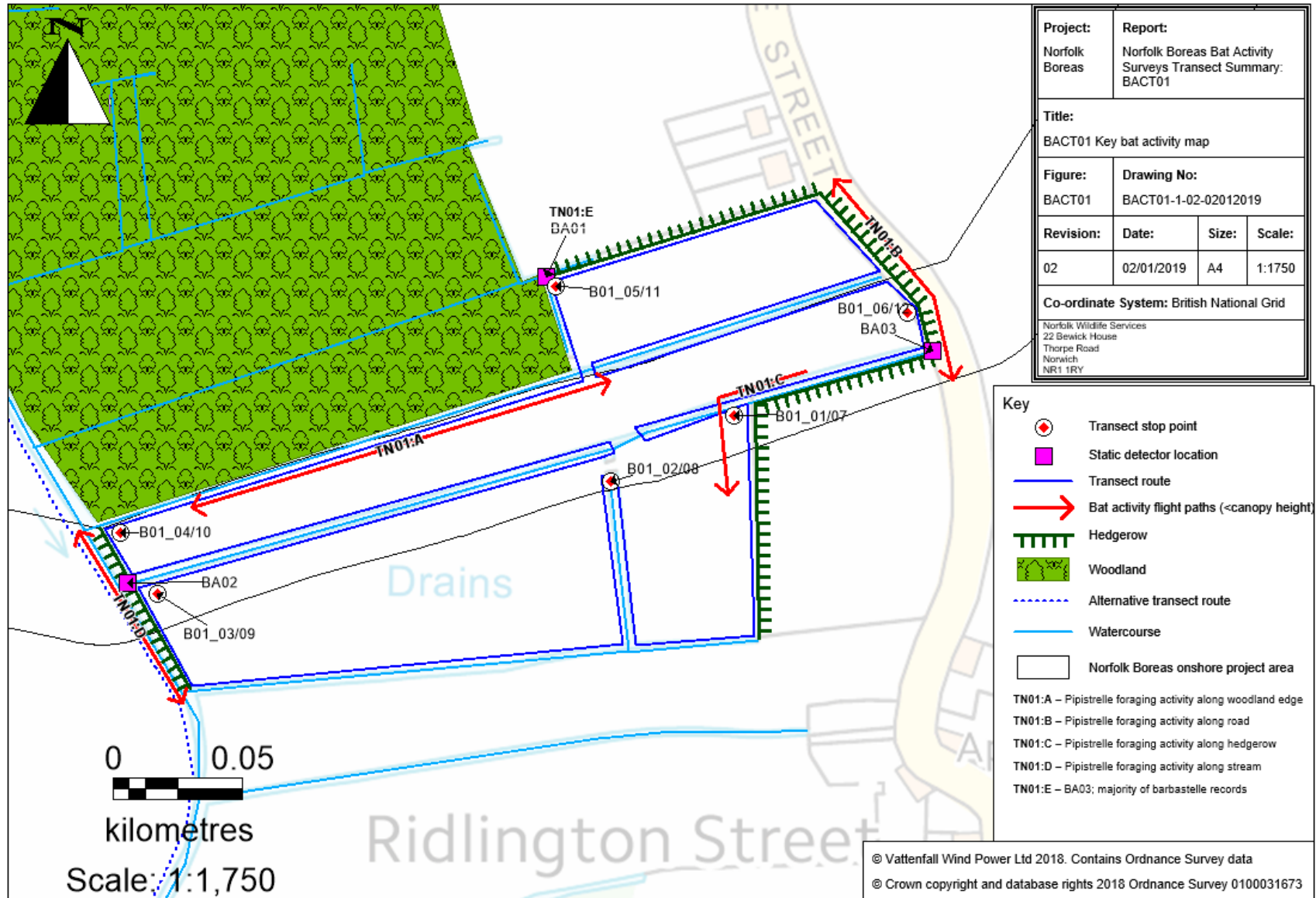


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3. Transect stop point associated code (e.g. B01_01/07) is reference to transect number (B01) and the transect stop numbers (01 and 07).



Norfolk Boreas Bat Activity Surveys Transect Summary: BACT02

Survey scope:	Bat activity surveys: Transect Summary
Prepared on behalf of:	Royal HaskoningDHV
Report reference:	2017/147.2: BACT02
Date of survey/s:	April – October 2018

Bewick House, 22 Thorpe Road, Norwich, NR1 1RY, T: 01603 625540, F: 01603 598300.

Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).

Report prepared by :	Checked by :	Approved by :	Status :
Ben Moore Date : 15.11.2018	Ben Christie 15.11.2018	Chris Smith 15.11.2018	V1 - DRAFT FOR CLIENT COMMENT
Ben Moore Date : 17.12.2018	Sally McColl 17.12.2018	Sally McColl 17.12.2018	V2 – SECOND DRAFT FOR CLIENT COMMENT
Ben Moore Date : 07.01.2019	Sally McColl 07.01.2019	Sally McColl 07.01.2019	V3 - FINAL

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1. Transect summary: BACT02, Witton

- 1.1. Grid reference: TG307320.
- 1.2. Transect habitat suitability assessment: High quality.
- 1.3. Static detectors: BA04, BA05, BA06.

2. Description of transect

Land use at transect

- 2.1. The transect route was situated around the edge of a large arable field. The field itself was set within an arable landscape with adjacent arable fields on the northern, southern and western boundaries.
- 2.2. The eastern boundary bordered the small settlement of Edingthorpe Green and bordered a small number of houses and their associated gardens.
- 2.3. There were two small copses of broadleaved deciduous woodland situated towards the southern aspect of the transect. The transect was located less than 0.5km north of Bacton Woods (approximately 112ha of primarily commercial coniferous plantation with areas of mixed woodland).
- 2.4. An established hedgerow ran nearly uninterrupted along the south eastern, eastern and north eastern boundaries. The remaining north western, western and south western boundaries were very exposed with only a handful of scattered mature oak standards along the field margin.

Key commuting and foraging features

- 2.5. The eastern boundaries of the transect route recorded the highest levels of common pipistrelle foraging activity, along the woodland edges and hedgerows.
- 2.6. Common and soprano pipistrelles were noted to forage along the tree-lined, unnamed minor road which bordered the northern boundary of the transect route.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of three static detectors over five consecutive nights.

3.2. The transect was walked eight times from April to October.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA04	1	20.04.2018	26.04.2018	6
BA04	2	10.05.2018	16.05.2018	6
BA04	3	14.06.2018	20.06.2018	6
BA04	4	11.07.2018	17.07.2018	6
BA04	5	10.08.2018	16.08.2018	6
BA04	6	13.09.2018	19.09.2018	6
BA04	7	11.10.2018	17.10.2018	6
BA05	1	20.04.2018	26.04.2018	6
BA05	2	10.05.2018	16.05.2018	6
BA05	3	14.06.2018	20.06.2018	6
BA05	4	11.07.2018	17.07.2018	6
BA05	5	10.08.2018	16.08.2018	6
BA05	6	13.09.2018	19.09.2018	6
BA05	7	11.10.2018	17.10.2018	6
BA06	1	20.04.2018	26.04.2018	6
BA06	2	10.05.2018	15.05.2018	6
BA06	3	14.06.2018	20.06.2018	6
BA06	4	11.07.2018	17.07.2018	6
BA06	5	10.08.2018	16.08.2018	6
BA06	6	13.09.2018	19.09.2018	6
BA06	7	11.10.2018	17.10.2018	6

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, JH	20.04.2018	20:01	22:00
2	Dusk	BM, JH	10.05.2018	20:36	22:36
3	Dusk	BM, JH	14.06.2018	21:19	23:20
4	Dusk	BM, JH	11.07.2018	21:15	23:15
5	Dusk	BM, JH	10.08.2018	20:30	22:30
6	Dusk	BM, AH	13.09.2018	19:15	21:15
7	Dawn	BM, AH	14.09.2018	04:27	06:28
8	Dusk	BM, JM	11.10.2018	18:09	20:13

¹ Surveyor initials are referenced with full names in Appendix 4 in the overarching Norfolk Boreas Bat Activity Surveys Report 2017.147.2 (November 2018).

4. Bat observations

4.1. Bat activity by species

4.1.1. A summary of the bat activity on the transect, based on the transect and static data from all visits is given in Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species	Code	Presence confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	x	✓ ³	Recorded in the southern corner of the transect (BA06). Isolated passes.	Isolated tracks, recorded during July and August.	N/A
Serotine	EPTSER	x	✓	Multiple records recorded in the southern corner of the transect (BA06).	Recorded within the first 2 hours after sunset during July and August only.	N/A
Large bat species	LGESPP	✓ ²³	✓	Multiple records across the transect.	Recorded throughout the survey period but with a peak in recordings during August.	N/A
Myotis spp.	MYOSPP	✓ ³	✓	Multiple records across the transect.	Recorded during May, August and September.	N/A
Noctule	NYCNOC	✓ ³	✓	Seen on two occasions during the walked transects. Commuting behaviour observed flying north to south over the south eastern corner of the transect.	Noctules were seen approximately 30 minutes after sunset. This was thought to be down to habitat suitability in a particular portion of the transect route rather than distance from their roost site. Recorded between July and October.	N/A
Brown long-eared	PLEAUR	✓ ³	✓ ³	Recorded by statics in the north and south of the transect (BA04 and BA06).	Recorded on all static detector locations throughout the survey period.	N/A
Nathusius' pipistrelle	PIP NAT	✓ ³	✓	Few records throughout the season, recorded across all static detectors.	Several records throughout the survey period.	N/A
Common pipistrelle	PIPIPI	✓	✓	Recorded along the entire transect. Most notable along the eastern boundary.	Consistently recorded from dusk to dawn throughout the survey period.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Recorded along the entire transect. Most notable along the eastern boundary.	Consistently recorded from dusk to dawn throughout the survey period.	N/A
Pipistrelle spp.	PIPSPP	✓	✓	Recorded along the entire transect. Most notable along the eastern boundary.	Consistently recorded from dusk to dawn throughout the survey period.	N/A

² Only found to be present through analysis of transect acoustic recordings (Table 5, compiled acoustic data).

³ Indicates limited records (less than 10 records).

4.2. Transect survey data

Table 4: Summary from transect data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp (°C)	End Temp (°C)	Wind (Beaufort Scale)	Cloud (/8)	Precipitation	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID ⁴	Total bats ⁵
1	Dusk	20.04.2018	20:01	22:00	15	13	0	0/8	None	0	0	0	0	0	0	0	26	0	0	0	26
2	Dusk	10.05.2018	20:36	22:36	10	7	0	3/8	None	0	0	0	0	0	0	0	8	0	0	0	8
3	Dusk	14.06.2018	21:19	23:20	16	13	0	1/8	None	0	0	0	0	0	0	0	15	3	0	0	18
4	Dusk	11.07.2018	21:15	23:15	15	14	0	8/8	None	0	0	0	0	1	0	0	11	0	1	0	13
5	Dusk	10.08.2018	20:30	22:30	12.5	11	0	4/8	None - Heavy shower prior	0	0	0	0	0	0	0	6	1	1	0	8
6	Dusk	13.09.2018	19:15	21:15	17	16	0	2/8	None	0	0	0	0	0	0	0	14	3	2	0	19
7	Dawn	14.09.2018	04:27	06:28	12	12	1	8/8	None	0	0	0	0	0	0	0	10	1	1	0	12
8	Dusk	11.10.2018	18:09	20:13	18	17	3	7/8	None	0	0	0	0	1	0	0	17	0	1	0	19

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID	Total bats	NOISE ⁶
1	Dusk	20.04.2018	0	0	0	0	0	0	0	15	1	0	3	19	973
2	Dusk	10.05.2018	0	0	0	0	0	0	1	14	3	3	6	27	1568
3	Dusk	14.06.2018	0	0	2	0	0	1	0	43	2	1	10	59	1134
4	Dusk	11.07.2018	0	0	1	1	0	1	0	38	3	0	12	56	1217
5	Dusk	10.08.2018	0	0	0	0	0	0	0	0	0	0	1	1	210
6	Dusk	13.09.2018	0	0	0	0	0	0	0	16	1	0	1	18	147
7	Dawn	14.09.2018	0	0	0	0	0	0	0	0	0	0	0	0	22
8	Dusk	11.10.2018	0	0	3	0	1	1	1	43	3	2	9	63	981

⁴ All bats not identified to species level.

⁵ 'Total bats' refers to the total number of confirmed bat passes.

⁶ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA04.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
20.04.2018	0	0	0	0	0	0	0	14	5	0	12	31	1882
10.05.2018	0	0	0	0	0	0	0	82	6	1	12	101	991
14.06.2018	0	0	0	0	0	0	0	2	0	0	4	6	348
11.07.2018	0	0	0	0	1	0	2	517	93	2	251	866	2364
10.08.2018	0	0	1	1	14	0	0	3094	64	52	340	3566	8604
13.09.2018	0	0	1	1	3	0	0	177	39	12	27	260	1802
11.10.2018	0	0	0	0	5	0	0	285	23	7	97	417	3974
Grand Total	0	0	2	2	23	0	2	4171	230	74	743	5247	19965

Table 7: Static data from BA point BA05.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
20.04.2018	0	0	2	0	0	2	0	52	4	2	13	75	2252
10.05.2018	0	0	1	5	0	0	2	76	8	2	6	100	1145
14.06.2018	0	0	0	0	2	0	0	44	2	0	9	57	398
12.07.2018	0	0	0	0	0	0	0	0	0	0	0	0	1
10.08.2018	0	0	0	0	0	0	0	0	0	0	0	0	3809
13.09.2018	0	0	1	7	47	0	3	365	71	6	67	567	1101
12.10.2018	0	0	0	0	0	0	0	1	0	0	0	1	2
Grand Total	0	0	4	12	49	2	5	538	85	10	95	800	8708

Table 8: Static data from BA point BA06.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
20.04.2018	0	0	0	0	0	0	0	223	4	1	19	247	139
10.05.2018	0	0	0	0	0	0	0	0	0	0	0	0	951
14.06.2018	0	0	0	0	0	0	0	0	0	0	0	0	70
11.07.2018	1	2	1	0	45	1	6	34	10	4	31	135	474
10.08.2018	2	52	53	0	118	1	0	162	73	2	92	555	803
13.09.2018	0	0	0	8	5	2	1	140	19	1	27	203	1333
11.10.2018	0	0	0	0	0	0	0	0	0	0	1	1	9015
Grand Total	3	54	54	8	168	4	7	559	106	8	170	1141	12785

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
20.04.2018	0	0	0	0	0	0	0	23	9	0	9	41	142
21.04.2018	0	0	1	0	0	0	0	170	3	1	18	193	146
22.04.2018	0	0	0	0	0	2	0	88	1	1	13	105	261
23.04.2018	0	0	0	0	0	0	0	3	0	1	3	7	1100
24.04.2018	0	0	0	0	0	0	0	3	0	0	0	3	1695
25.04.2018	0	0	1	0	0	0	0	2	0	0	0	3	848
26.04.2018	0	0	0	0	0	0	0	0	0	0	1	1	81
10.05.2018	0	0	0	2	0	0	0	14	0	0	4	20	300
11.05.2018	0	0	0	3	0	0	2	35	6	1	2	49	182
12.05.2018	0	0	1	0	0	0	0	54	4	0	5	64	153
13.05.2018	0	0	0	0	0	0	0	45	2	1	2	50	703
14.05.2018	0	0	0	0	0	0	0	7	1	0	3	11	966
15.05.2018	0	0	0	0	0	0	0	3	1	1	2	7	730
16.05.2018	0	0	0	0	0	0	0	0	0	0	0	0	53
14.06.2018	0	0	0	0	0	0	0	10	0	0	1	11	75
15.06.2018	0	0	0	0	0	0	0	18	0	0	2	20	75
16.06.2018	0	0	0	0	0	0	0	7	0	0	3	10	144
17.06.2018	0	0	0	0	0	0	0	2	0	0	2	4	90
18.06.2018	0	0	0	0	1	0	0	4	1	0	0	6	193
19.06.2018	0	0	0	0	1	0	0	5	0	0	3	9	146
20.06.2018	0	0	0	0	0	0	0	0	1	0	2	3	93
11.07.2018	0	0	0	0	10	0	0	102	3	0	15	130	177
12.07.2018	0	0	0	0	6	0	1	120	13	1	25	166	242

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
13.07.2018	0	0	0	0	6	0	1	99	73	1	51	231	452
14.07.2018	0	2	0	0	8	0	4	42	7	1	35	99	310
15.07.2018	1	0	0	0	7	1	2	80	1	2	48	142	588
16.07.2018	0	0	1	0	9	0	0	78	5	1	74	168	657
17.07.2018	0	0	0	0	0	0	0	30	1	0	34	65	413
10.08.2018	0	0	0	0	0	0	0	155	48	7	12	222	513
11.08.2018	0	0	1	0	3	0	0	316	5	10	50	385	1253
12.08.2018	2	4	4	1	18	0	0	1351	20	13	140	1553	1359
13.08.2018	0	0	0	0	0	0	0	479	17	11	42	549	2056
14.08.2018	0	27	35	0	42	0	0	394	17	6	84	605	1649
15.08.2018	0	21	14	0	67	1	0	551	30	7	100	791	5446
16.08.2018	0	0	0	0	2	0	0	10	0	0	4	16	940
13.09.2018	0	0	0	0	3	0	0	31	5	0	8	47	183
14.09.2018	0	0	0	4	17	0	0	184	18	1	17	241	592
15.09.2018	0	0	1	1	5	1	1	92	30	9	29	169	358
16.09.2018	0	0	0	6	25	0	1	90	28	1	26	177	855
17.09.2018	0	0	0	3	4	0	1	153	23	7	20	211	386
18.09.2018	0	0	1	1	10	1	1	96	21	1	12	135	1273
19.09.2018	0	0	0	1	0	0	0	36	4	0	9	50	589
11.10.2018	0	0	0	0	0	0	0	26	0	0	7	33	1131
12.10.2018	0	0	0	0	0	0	0	14	0	1	4	19	2503
13.10.2018	0	0	0	0	0	0	0	1	0	0	0	1	1059
14.10.2018	0	0	0	0	0	0	0	50	0	2	14	66	4251
15.10.2018	0	0	0	0	2	0	0	105	12	1	23	143	472
16.10.2018	0	0	0	0	3	0	0	41	9	1	32	86	2914
17.10.2018	0	0	0	0	0	0	0	49	2	2	18	71	661

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
Grand Total	3	54	60	22	240	6	14	5268	421	92	1008	7188	41458

4.5. Map showing key bat activity

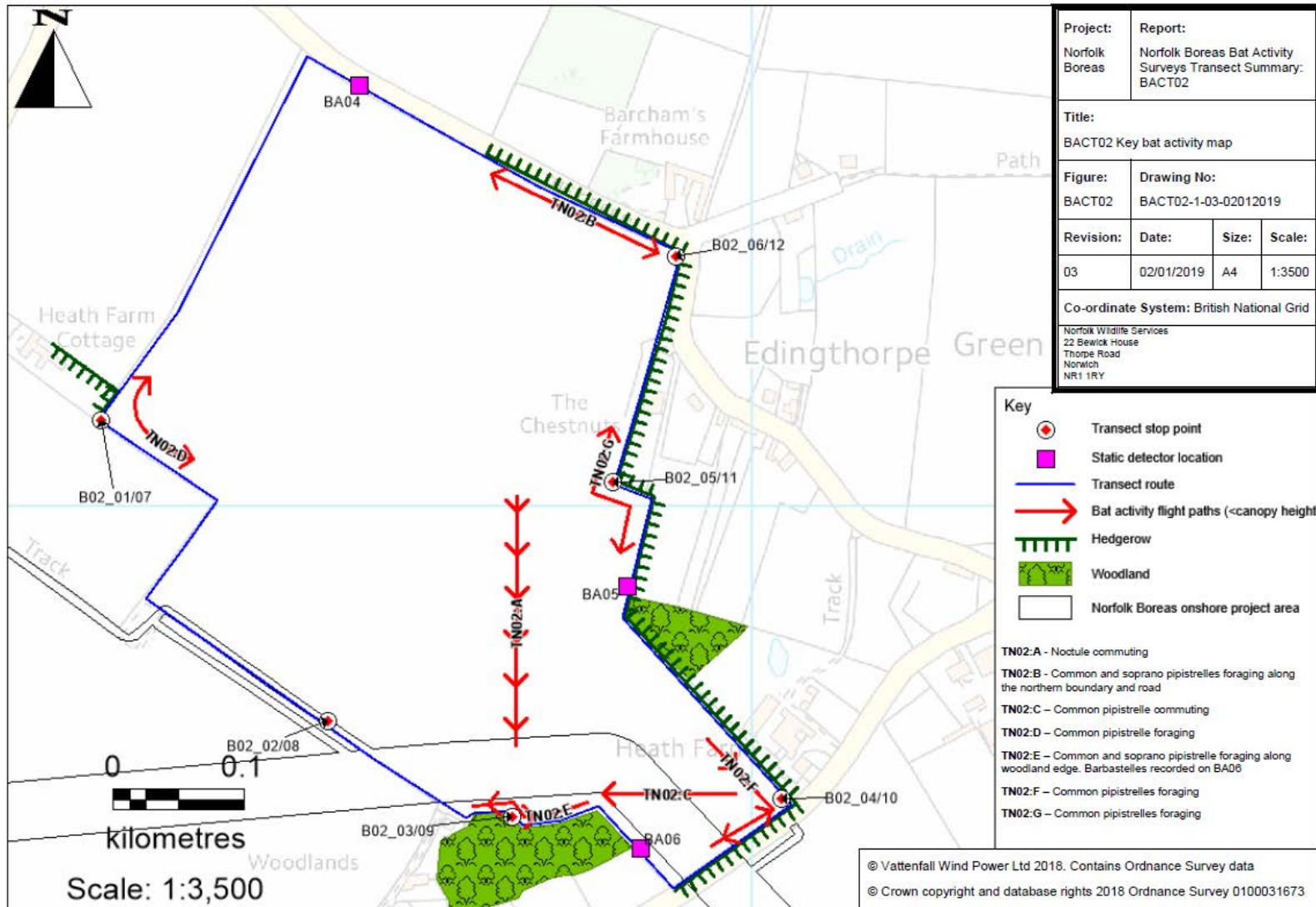


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3. Transect stop point associated code (e.g. B02_01/07) is reference to transect number (B02) and the transect stop numbers (01 and 07).



Norfolk Boreas Bat Activity Surveys Transect Summary: BACT03

Survey scope:	Bat activity surveys: Transect Summary
Prepared on behalf of:	Royal HaskoningDHV
Report reference:	2017/147.2: BACT03
Date of survey/s:	April – October 2018

*Bewick House, 22 Thorpe Road, Norwich, NR1 1RY, T: 01603 625540, F: 01603 598300.
Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).*

Report prepared by :	Checked by :	Approved by :	Status :
Sally McColl Date : 15.11.2018	Ben Moore 15.11.2018	Chris Smith 15.11.2018	V1 - DRAFT FOR CLIENT COMMENT
Ben Moore Date : 17.12.2018	Sally McColl 17.12.2018	Sally McColl 17.12.2018	V2 – SECOND DRAFT FOR CLIENT COMMENT
Ben Moore Date : 07.01.2019	Sally McColl 07.01.2019	Sally McColl 07.01.2019	V3 - FINAL

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1. Transect summary: BACT03, Bure North: Aylsham

- 1.1. Grid reference: TG193285.
- 1.2. Transect habitat suitability assessment: High quality.
- 1.3. Static detectors: BA07, BA08, BA09.

2. Description of transect

Land use at transect

2.1. The transect route bordered an arable field and a smaller field set to grass which was used occasionally for grazing by cattle.

2.2. The transect was set within an arable landscape with arable fields along the northern, southern and western aspects. Adjacent to the eastern aspect a 0.8ha broadleaved deciduous woodland was situated as well as wet grazing grassland.

2.3. Along northern, eastern and southern aspects of the transect, established native species hedgerows were situated. The western aspect was immediately bordered by a road. An additional small copse of deciduous woodland was situated adjacent to the northern boundary.

Key commuting and foraging features

2.4. Common and soprano pipistrelles were often observed foraging along the northern hedgerow.

2.5. The woodland edge along the eastern section of the transect was a popular foraging route for pipistrelles and noctules.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of three static detectors over five consecutive nights.

3.2. The transect was walked eight times from April to October.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA07	1	13.04.2018	19.04.2018	6
BA07	2	15.05.2018	21.05.2018	6
BA07	3	18.06.2018	25.06.2018	7
BA07	4	19.07.2018	25.07.2018	6
BA07	5	21.08.2018	27.08.2018	6
BA07	6	25.09.2018	02.10.2018	7
BA07	7	15.10.2018	22.10.2018	7
BA08	1	13.04.2018	19.04.2018	6
BA08	2	15.05.2018	21.05.2018	6
BA08	3	18.06.2018	25.06.2018	7
BA08	4	19.07.2018	25.07.2018	6
BA08	5	21.08.2018	27.08.2018	6
BA08	6	25.09.2018	02.10.2018	7
BA08	7	15.10.2018	22.10.2018	7
BA09	1	13.04.2018	19.04.2018	6
BA09	2	15.05.2018	21.05.2018	6
BA09	3	18.06.2018	25.06.2018	7
BA09	4	19.07.2018	25.07.2018	6
BA09	5	21.08.2018	27.08.2018	6
BA09	6	25.09.2018	02.10.2018	7
BA09	7	15.10.2018	22.10.2018	7

Transect dates

Table 2: Transect dates summary.

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	SM, CS2	13.04.2018	19:50	21:53
2	Dusk	SM, BM	15.05.2018	20:44	22:47
3	Dusk	SM, SF	18.06.2018	21:22	23:24
4	Dusk	SM, POE	19.07.2018	21:13	23:14
5	Dusk	SM, POE	21.08.2018	20:08	22:09
6	Dusk	JA, LT	25.09.2018	18:47	20:47
7	Dawn	SM, RB	26.09.2018	04:48	06:49
8	Dusk	SM, AH	15.10.2018	18:07	20:09

¹ Surveyor initials are referenced with full names in Appendix 4 in the overarching Norfolk Boreas Bat Activity Surveys Report 2017.147.2 (November 2018).

4. Bat observations

4.1. Bat activity by species

4.1.1. A summary of the bat activity on the transect, based on the transect and static data from all visits is given in Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species	Code	Presence confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓ ²	✓	Recorded in October during transect. Peak activity for this species was recorded on BA07.	Recorded throughout the survey period from April to October.	N/A
Serotine	EPTSER	✓ ²	✓ ³	Recorded in August during transect, and sporadically at all three statics.	Recorded between May and August.	N/A
Large bat species	LGESPP	✓	✓	Recorded from occasional transect visits and all three static detectors, isolated passes.	Recorded throughout the survey period.	N/A
Myotis spp.	MYOSPP	✓ ²	✓	Recorded from occasional transect visits and all three static detectors, isolated passes.	Recorded throughout the survey period.	N/A
Noctule	NYCNOC	✓	✓	Recorded from occasional transect visits. Frequently recorded at BA08, with a peak in activity in October.	Recorded throughout the survey period but with a peak in recordings during October.	N/A
Brown long-eared	PLEAUR	✓ ²	✓	Two isolated records during transects in April and August. Recorded on all three static detectors with the majority being recorded on BA07.	Recorded throughout the survey period, however, no calls were recorded during June and July.	N/A
Nathusius' pipistrelle	PIP NAT	x	✓	Recorded from all three static detectors, isolated passes.	Recorded throughout the survey period.	N/A
Common pipistrelle	PIPPIP	✓	✓	Consistently recorded along the transect, and by all static detectors. Flight lines present along hedgerows.	Recorded throughout the survey period but with a peak in recordings during August.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Consistently recorded along the transect, and by all static detectors. Flight lines present along hedgerows	Recorded throughout the survey period.	N/A
Pipistrelle spp.	PIPSPP	✓	✓	Consistently recorded along the transect, and by all static detectors.	Recorded throughout the survey period.	N/A

² Only found to be present through analysis of transect acoustic recordings (Table 5, compiled acoustic data).

³ Indicates limited records (less than 10 records).

4.2. Transect survey data

Table 4: Summary from transect data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp (°C)	End Temp (°C)	Wind (Beaufort Scale)	Cloud (/8)	Precipitation	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID ⁴	Total bats ⁵
1	Dusk	13.04.2018	19:50	21:53	10	9	1	8/8	None	0	0	0	0	0	0	0	8	2	1	0	11
2	Dusk	15.05.2018	20:44	22:47	10	8	1	8/8	None	0	0	0	0	0	0	0	6	0	6	0	12
3	Dusk	18.06.2018	21:22	23:24	21	17	4	7/8	None	0	0	0	0	0	0	0	10	0	1	1	12
4	Dusk	19.07.2018	21:13	23:14	20	16	1	3/8	None	0	0	0	0	1	0	0	13	1	1	0	16
5	Dusk	21.08.2018	20:08	22:09	21	18	1	5/8	None	0	0	0	0	0	0	0	19	0	11	0	30
6	Dusk	25.09.2018	18:47	20:47	16	16	1	1/8	None	0	0	0	0	3	0	0	7	7	6	0	23
7	Dawn	26.09.2018	04:48	06:49	10	8	2	4/8	None	0	0	0	0	0	0	0	1	0	0	0	1
8	Dusk	15.10.2018	18:07	20:09	14	13	2	8/8	Light drizzle	0	0	0	1	3	0	0	12	4	7	0	27

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE ⁶
1	Dusk	13.04.2018	0	0	0	0	0	1	0	26	8	0	9	44	1020
2	Dusk	15.05.2018	1	0	0	0	0	0	0	17	0	4	9	31	823
3	Dusk	18.06.2018	0	0	0	0	1	0	0	21	6	5	9	42	1266
4	Dusk	19.07.2018	0	0	1	0	2	0	0	16	21	0	3	43	764
5	Dusk	21.08.2018	0	1	6	1	10	4	0	18	7	2	19	68	1176
6	Dusk	25.09.2018	0	0	0	1	4	0	0	14	30	5	7	61	1039
7	Dawn	26.09.2018	0	0	0	0	0	0	0	0	0	0	0	0	821
8	Dusk	15.10.2018	0	0	3	0	15	0	0	14	29	1	24	86	834

⁴ All bats not identified to species level.

⁵ 'Total bats' refers to the total number of confirmed bat passes.

⁶ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA07.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	1	0	2	2	16	10	0	681	169	12	240	1133	1294
21.05.2018	0	0	0	2	5	3	5	1458	368	51	155	2047	1466
25.06.2018	4	1	0	1	1	0	0	329	101	9	74	520	1923
25.07.2018	0	1	4	6	3	0	0	1037	65	113	151	1380	1983
27.08.2018	3	2	6	7	11	7	0	83	48	1	65	233	1932
02.10.2018	4	0	1	7	5	7	2	278	62	8	66	440	3069
22.10.2018	1	0	1	7	4	3	0	319	116	8	69	528	1300
Grand Total	13	4	14	32	45	30	7	4185	929	202	820	6281	12967

Table 7: Static data from BA point BA08.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	0	0	6	0	48	0	1	3247	530	199	1233	5264	8748
21.05.2018	0	1	5	0	5	0	0	116	220	10	101	458	3271
25.06.2018	0	0	1	0	4	0	3	355	31	11	203	608	1706
25.07.2018	0	0	2	4	10	0	2	361	124	2	159	664	2352
27.08.2018	0	2	5	1	42	0	2	669	14	36	434	1205	4048
02.10.2018	0	0	2	6	15	0	3	266	35	2	224	553	4652
22.10.2018	1	0	11	3	729	6	3	581	1167	35	1317	3853	10779
Grand Total	1	3	32	14	853	6	14	5595	2121	295	3671	12605	35556

Table 8: Static data from BA point BA09.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	0	0	1	0	2	0	0	5	8	0	19	35	783
21.05.2018	0	0	0	12	1	0	1	158	51	23	25	271	688
25.06.2018	0	0	0	0	1	0	0	119	8	3	41	172	1058
25.07.2018	0	1	0	1	1	0	0	1311	137	11	221	1683	3229
27.08.2018	0	1	1	0	3	0	0	18	8	1	32	64	3395
02.10.2018	0	0	0	1	1	0	1	96	67	1	73	240	4705
22.10.2018	1	0	0	0	0	0	0	119	9	4	75	208	1011
Grand Total	1	2	2	14	9	0	2	1826	288	43	486	2673	14869

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

DateSpecies	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
13.04.2018	0	0	0	0	5	6	0	14	4	0	28	57	375
14.04.2018	1	0	0	0	4	0	0	53	7	2	38	105	550
15.04.2018	0	0	0	0	0	0	0	197	27	72	162	458	1123
16.04.2018	0	0	2	0	11	1	1	476	41	21	150	703	1250
17.04.2018	0	0	1	0	28	0	0	1862	270	75	434	2670	3133
18.04.2018	0	0	6	1	18	3	0	1165	312	37	660	2202	4138
19.04.2018	0	0	0	1	0	0	0	166	46	4	20	237	256
15.05.2018	0	0	1	3	3	0	1	196	106	9	71	390	2732
16.05.2018	0	0	0	5	2	1	0	197	29	9	25	268	772
17.05.2018	0	0	0	4	1	0	4	663	33	15	52	772	701
18.05.2018	0	0	0	2	0	0	0	156	62	7	13	240	198
19.05.2018	0	0	1	0	3	1	1	380	239	35	72	732	673
20.05.2018	0	1	3	0	2	1	0	131	168	9	47	362	339
21.05.2018	0	0	0	0	0	0	0	9	2	0	1	12	10
18.06.2018	0	0	0	0	1	0	0	2	1	1	9	14	1017
19.06.2018	1	0	0	0	3	0	1	72	19	5	57	158	926
20.06.2018	0	1	0	0	0	0	2	228	37	5	68	341	765
21.06.2018	0	0	1	0	0	0	0	252	40	8	75	376	1033
22.06.2018	0	0	0	0	0	0	0	101	22	1	31	155	271
23.06.2018	1	0	0	0	1	0	0	78	4	2	20	106	220
24.06.2018	2	0	0	1	0	0	0	36	4	0	29	72	290
25.06.2018	0	0	0	0	1	0	0	34	13	1	29	78	165
19.07.2018	0	0	0	0	0	0	0	279	24	5	48	356	769

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPIYG	PIPSPP	NoID	Total bats	NOISE
20.07.2018	0	0	1	1	2	0	0	354	81	45	86	570	842
21.07.2018	0	0	1	4	4	0	0	443	27	14	80	573	1031
22.07.2018	0	2	0	1	3	0	1	446	64	15	94	626	1235
23.07.2018	0	0	2	4	5	0	0	395	23	13	88	530	1555
24.07.2018	0	0	1	1	0	0	0	413	52	12	88	567	1522
25.07.2018	0	0	1	0	0	0	1	379	55	22	47	505	610
21.08.2018	0	3	5	4	10	3	0	47	17	2	69	160	1042
22.08.2018	1	0	4	2	25	2	2	337	17	18	220	628	2091
23.08.2018	1	0	1	0	9	2	0	243	23	6	118	403	2327
24.08.2018	1	0	0	1	4	0	0	13	4	1	12	36	406
25.08.2018	0	0	0	1	0	0	0	5	0	0	16	22	840
26.08.2018	0	2	1	0	7	0	0	100	5	9	71	195	1248
27.08.2018	0	0	1	0	1	0	0	25	4	2	25	58	1421
26.09.2018	1	0	0	4	9	2	2	421	44	6	150	639	1978
27.09.2018	3	0	1	2	2	3	2	140	62	0	96	311	2664
28.09.2018	0	0	1	2	4	1	0	18	15	0	34	75	2074
29.09.2018	0	0	1	2	5	0	0	4	3	1	34	50	701
30.09.2018	0	0	0	1	1	1	2	23	22	1	28	79	1131
01.10.2018	0	0	0	2	0	0	0	32	17	3	18	72	2122
02.10.2018	0	0	0	1	0	0	0	2	1	0	3	7	1756
15.10.2018	0	0	2	0	149	3	0	108	320	1	310	893	2551
16.10.2018	1	0	3	3	232	1	0	222	164	16	459	1101	4101
17.10.2018	1	0	2	1	106	1	0	64	376	6	213	770	1566
18.10.2018	1	0	1	1	5	1	0	4	26	0	29	68	378
19.10.2018	0	0	0	0	3	0	0	61	35	0	38	137	362
20.10.2018	0	0	2	3	101	2	0	173	115	0	179	575	1620

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
21.10.2018	0	0	2	2	137	1	3	387	224	24	225	1005	1732
22.10.2018	0	0	0	0	0	0	0	0	32	0	8	40	780
Grand Total	15	9	48	60	907	36	23	11606	3338	540	4977	21559	63392

4.5. Map showing key bat activity

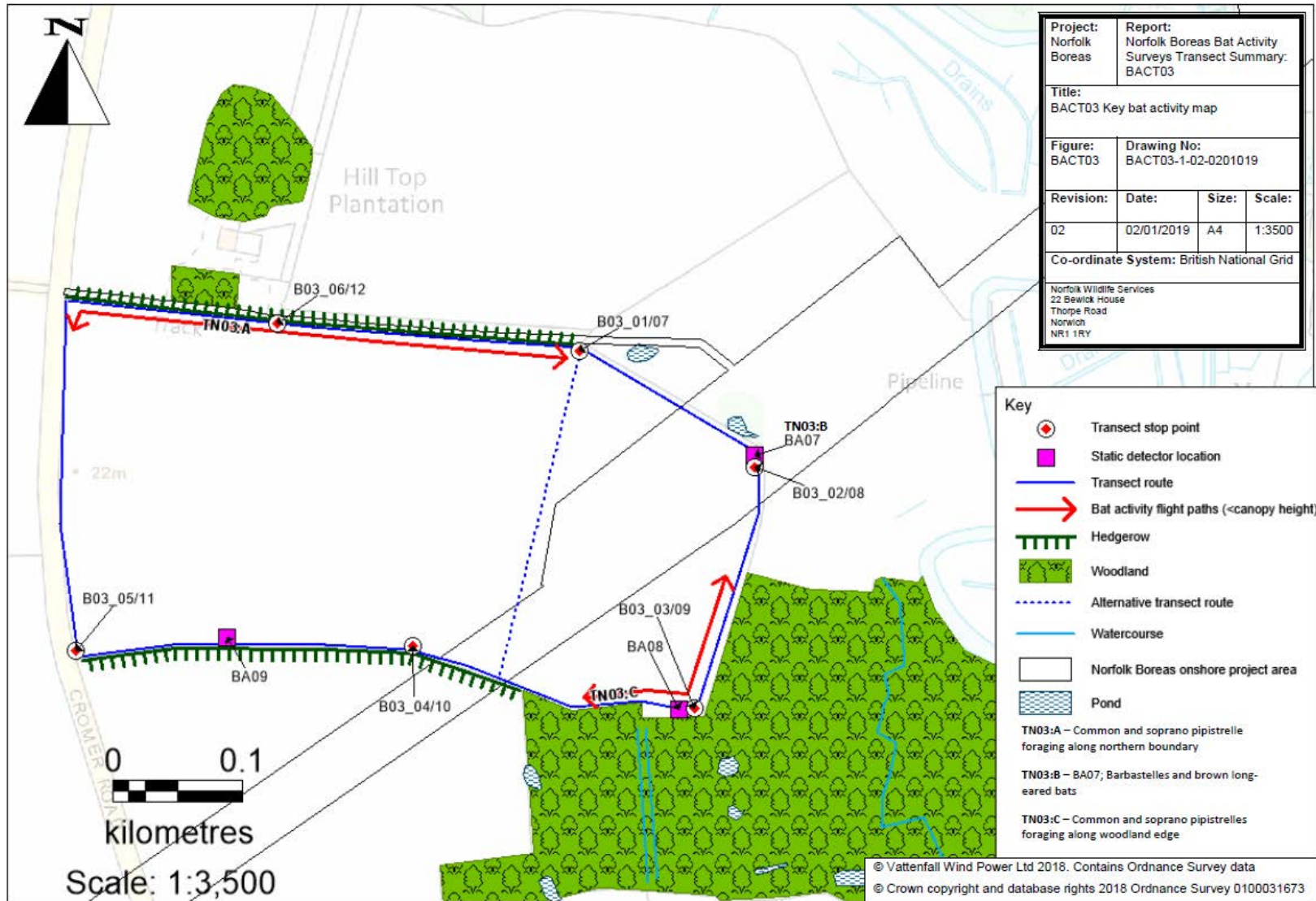


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3. Transect stop point associated code (e.g. B03_01/07) is reference to transect number (B01) and the transect stop numbers (01 and 07).



Norfolk Boreas Bat Activity Surveys Transect Summary: BACT04

Survey scope:	Bat activity surveys: Transect Summary
Prepared on behalf of:	Royal HaskoningDHV
Report reference:	2017/147.2: BACT04
Date of surveys:	April – October 2018

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Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).*

Report prepared by :	Checked by :	Approved by :	Status :
Sally McColl Date : 15.11.2018	Ben Moore 15.11.2018	Chris Smith 15.11.2018	V1 - DRAFT FOR CLIENT COMMENT
Ben Moore Date : 17.12.2018	Sally McColl 17.12.2018	Sally McColl 17.12.2018	V2 – SECOND DRAFT FOR CLIENT COMMENT
Ben Moore Date : 07.01.2019	Sally McColl 07.01.2019	Sally McColl 07.01.2019	V3 - FINAL

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1. Transect summary: BACT04, Bure South: Aylsham

- 1.1. Grid reference: TG188279.
- 1.2. Transect habitat suitability assessment: High quality.
- 1.3. Static detectors: BA10, BA11, BA12.

2. Description of transect

Land use at transect

- 2.1. The transect route was situated around the edge of two arable fields and one grazing meadow. The transect was set within an arable landscape with arable fields to the north and south and a continuation of the southern grazing meadow along the western boundary. The eastern boundary was bordered by woodland and parkland with scattered oak standards.
- 2.2. There were two copses of woodland situated along the transect route. Along the northern boundary a small (0.4ha) copse of semi-mature deciduous woodland was located. Towards the south east of the transect a larger (5ha) deciduous wet woodland was located.
- 2.3. There was a pond in the south eastern corner of the transect route. Although full in spring, the pond had dried up by the summer. The larger woodland also contained a series of drainage ditches and a large pond.
- 2.4. The transect route was bordered by established native species hedgerows with oak *Quercus rober* standards (excluding areas where the transect route followed the woodland edge).

Key commuting and foraging features

- 2.5. Woodland edges were noted as key foraging areas for both common and soprano pipistrelles.
- 2.6. The hedgerow along the southern boundary of the grazing meadow was a key foraging route for pipistrelle bats.
- 2.7. Common and soprano pipistrelles were commonly observed and recorded foraging under mature oak standards along the western boundary of the transect.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of three static detectors over five consecutive nights.

3.2. The transect was walked eight times from April to October.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA10	1	13.04.2018	19.04.2018	6
BA10	2	22.05.2018	29.05.2018	7
BA10	3	18.06.2018	25.06.2018	7
BA10	4	18.07.2018	25.07.2018	7
BA10	5	27.08.2018	04.09.2018	8
BA10	6	17.09.2018	24.09.2018	7
BA10	7	17.10.2018	24.10.2018	7
BA11	1	13.04.2018	19.04.2018	6
BA11	2	22.05.2018	29.05.2018	7
BA11	3	18.06.2018	25.06.2018	7
BA11	4	18.07.2018	25.07.2018	7
BA11	5	27.08.2018	04.09.2018	8
BA11	6	17.09.2018	24.09.2018	7
BA11	7	15.10.2018	22.10.2018	7
BA12	1	13.04.2018	19.04.2018	6
BA12	2	22.05.2018	29.05.2018	7
BA12	3	18.06.2018	25.06.2018	7
BA12	4	18.07.2018	25.07.2018	7
BA12	5	27.08.2018	04.09.2018	8
BA12	6	17.09.2018	24.09.2018	7
BA12	7	15.10.2018	22.10.2018	7

Transect dates

Table 2: Transect dates summary.

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, SF	13.04.2018	19:49	22:05
2	Dusk	BM, SF	22.05.2018	20:54	22:54
3	Dusk	BM, NT	18.06.2018	21:20	23:23
4	Dusk	BM, JH	18.07.2018	21:05	23:05
5	Dusk	SM, BC	23.08.2018	20:04	22:04
6	Dusk	BM, SM	17.09.2018	19:06	21:07
7	Dawn	BM, JH	18.09.2018	04:33	06:33
8	Dusk	BM, JH	15.10.2018	18:00	20:00

¹ Surveyor initials are referenced with full names in Appendix 4 in the overarching Norfolk Boreas Bat Activity Surveys Report 2017.147.2 (November 2018).

4. Bat observations

4.1. Bat activity by species

4.1.1. A summary of the bat activity on the transect, based on the transect and static data from all visits is given in Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species	Code	Presence Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	x	✓ ²	Isolated records on static detectors BA10 and BA11.	Recorded towards midnight in May and September.	N/A
Serotine	EPTSER	x	✓ ³²	Recorded to the north of the transect on static detector BA12 only.	Most of records were in early spring, with one in July.	N/A
Large bat species	LGESPP	✓ ³²	✓	Recorded mostly around the northern woodland area.	Calls recorded throughout the season.	N/A
Myotis spp.	MYOSPP	x	✓	Recorded on all static detectors but the majority of the calls were at BA11.	Spring and autumn only.	N/A
Noctule	NYCNOC	✓	✓	Observed foraging to the west of the transect.	Calls recorded throughout the season.	N/A
Brown long-eared	PLEAUR	✓ ²	✓ ²	Recorded on all static detectors.	Calls recorded in Spring and Autumn in early evening.	N/A
Nathusius' pipistrelle	PIP NAT	✓ ²	✓	Recorded on all static detectors but predominately to the north of the transect.	Calls recorded throughout the season.	N/A
Common pipistrelle	PIPIPI	✓	✓	Observed foraging around the woodland areas and also along the northern and southern hedgerows.	Calls recorded throughout the season but the majority of calls recorded in May and September.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Observed foraging around the woodland areas and also along the northern and southern hedgerows.	Similar pattern to common pipistrelle but significantly fewer calls.	N/A
Pipistrelle spp.	PIPSPP	✓	✓	Observed foraging around the woodland areas and also along the northern and southern hedgerows.	A few records spread throughout the season.	N/A

² Limited recordings collected by static detectors (less than 10 records).

³ Only found to be present through analysis of transect acoustic recordings (Table 5, compiled acoustic data).

4.2. Transect survey data

Table 4: Summary from transect data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp (°C)	End Temp (°C)	Wind (Beaufort Scale)	Cloud (/8)	Precipitation	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID ⁴	Total bats ⁵
1	Dusk	13.04.2018	19:49	22:05	10	12	0	8/8	None	0	0	0	0	0	0	0	12	2	4	0	18
2	Dusk	22.05.2018	20:54	22:54	11	9	3	8/8	None	0	0	0	0	0	0	0	10	0	2	0	12
3	Dusk	18.06.2018	21:20	23:23	19	18	3	7/8	None	0	0	0	0	0	0	0	11	0	1	0	12
4	Dusk	18.07.2018	21:05	23:05	18	17	0	4/8	None	0	0	0	0	0	0	0	11	0	0	0	11
5	Dusk	23.08.2018	20:04	22:04	19	19	2	8/8	None	0	0	0	0	1	0	0	13	11	0	0	25
6	Dusk	17.09.2018	19:06	21:07	20	14	2	3/8	None	0	0	0	0	1	0	0	11	0	8	0	20
7	Dawn	18.09.2018	04:33	06:33	17	17	2	0/8	None	0	0	0	0	0	0	0	20	4	5	0	29
8	Dusk	15.10.2018	18:00	20:00	13	12	2	8/8	Light drizzle	0	0	0	0	0	0	0	14	0	0	0	14

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID	Total bats	NOISE ⁶
1	Dusk	13.04.2018	0	0	0	0	7	0	0	30	8	0	18	63	969
2	Dusk	22.05.2018	0	0	0	0	2	0	1	228	26	5	17	279	2165
3	Dusk	18.06.2018	0	0	0	0	0	0	1	53	11	3	5	73	654
4	Dusk	18.07.2018	0	0	0	0	3	0	0	27	2	0	16	48	1550
5	Dusk	23.08.2018	0	0	2	0	3	3	0	118	37	1	5	169	1
6	Dusk	17.09.2018	0	0	0	0	1	0	0	23	0	0	4	28	234
7	Dawn	18.09.2018	0	0	0	0	0	0	0	35	24	1	10	70	102
8	Dusk	15.10.2018	0	0	1	0	10	0	0	12	16	0	18	57	1070

⁴ All bats not identified to species level.

⁵ 'Total bats' refers to the total number of confirmed bat passes.

⁶ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA10.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
13.04.2018	0	0	0	0	0	0	0	31	0	0	1	32	1
22.05.2018	0	0	0	0	1	0	2	83	12	0	2	100	27
18.06.2018	0	0	0	0	1	0	3	172	38	0	3	217	40
18.07.2018	0	0	0	0	0	0	0	5	1	0	1	7	8
23.08.2018	0	0	0	0	0	0	2	409	39	0	1	451	9
17.09.2018	1	0	2	12	20	1	9	14191	2375	0	75	16686	692
15.10.2018	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1	0	2	12	22	1	16	14891	2465	0	83	17493	777

Table 7: Static data from BA point BA11.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
13.04.2018	0	0	1	0	3	0	0	152	13	0	8	177	36
22.05.2018	2	0	0	0	1	1	47	2240	74	0	29	2394	268
18.06.2018	0	0	1	0	1	0	2	133	4	0	8	149	38
18.07.2018	0	0	0	0	3	0	1	211	51	0	6	272	29
23.08.2018	0	0	0	0	0	0	0	0	0	0	0	0	0
17.09.2018	0	0	0	2	1	0	1	336	21	0	26	387	81
15.10.2018	0	0	0	1229	0	0	0	184	258	0	126	1797	8119
Grand Total	2	0	2	1231	9	1	51	3256	421	0	203	5176	8571

Table 8: Static data from BA point BA12.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
13.04.2018	0	1	1	1	1	0	0	38	89	0	2	133	40
22.05.2018	0	6	4	18	8	1	41	12425	2778	1	32	15314	771
18.06.2018	0	0	0	0	0	0	0	838	421	0	22	1281	162
18.07.2018	0	1	1	0	2	0	0	19	4	0	0	27	3
23.08.2018	0	0	0	0	1	0	1	404	17	0	30	453	49
17.09.2018	0	0	0	0	1	0	0	851	180	0	0	1032	9
15.10.2018	0	0	3	1	113	3	2	765	1497	0	70	2454	320
Grand Total	0	8	9	20	126	4	44	15340	4986	1	156	20694	1354

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID	Total bats	NOISE
13.04.2018	0	0	0	0	0	0	0	20	5	0	0	25	0
14.04.2018	0	0	0	0	0	0	0	20	24	0	5	49	27
15.04.2018	0	0	0	0	1	0	0	8	10	0	4	23	22
16.04.2018	0	0	0	0	0	0	0	44	24	0	1	69	10
17.04.2018	0	1	2	0	0	0	0	31	9	0	1	44	9
18.04.2018	0	0	0	0	3	0	0	78	22	0	0	103	7
19.04.2018	0	0	0	1	0	0	0	20	8	0	0	29	2
22.05.2018	1	0	0	0	1	1	2	3217	261	1	3	3487	219
23.05.2018	0	0	1	0	2	0	4	3082	207	0	1	3297	181
24.05.2018	1	0	0	0	0	0	24	2358	389	0	11	2783	238
25.05.2018	0	0	0	0	1	0	17	1469	749	0	7	2243	94
26.05.2018	0	0	0	2	3	0	19	1435	435	0	8	1902	80
27.05.2018	0	1	1	0	1	1	10	1273	142	0	22	1451	152
28.05.2018	0	5	2	9	1	0	7	1189	327	0	7	1547	50
29.05.2018	0	0	0	7	1	0	7	725	354	0	4	1098	52
18.06.2018	0	0	0	0	0	0	1	9	0	0	0	10	3
19.06.2018	0	0	0	0	0	0	0	42	6	0	1	49	13
20.06.2018	0	0	0	0	0	0	0	93	15	0	7	115	50
21.06.2018	0	0	1	0	1	0	1	442	235	0	8	688	54
22.06.2018	0	0	0	0	0	0	2	289	116	0	3	410	51
23.06.2018	0	0	0	0	1	0	1	143	43	0	5	193	20
24.06.2018	0	0	0	0	0	0	0	80	38	0	6	124	32
25.06.2018	0	0	0	0	0	0	0	45	10	0	3	58	17

DateSpecies	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
18.07.2018	0	1	1	0	2	0	0	37	5	0	0	46	6
19.07.2018	0	0	0	0	2	0	0	38	4	0	2	46	4
20.07.2018	0	0	0	0	1	0	0	24	1	0	0	26	9
21.07.2018	0	0	0	0	0	0	0	23	1	0	1	25	5
22.07.2018	0	0	0	0	0	0	0	24	0	0	1	25	5
23.07.2018	0	0	0	0	0	0	0	16	2	0	0	18	1
24.07.2018	0	0	0	0	0	0	0	20	3	0	0	23	2
25.07.2018	0	0	0	0	0	0	1	53	40	0	3	97	8
27.08.2018	0	0	0	0	0	0	2	436	40	0	5	483	16
28.08.2018	0	0	0	0	0	0	0	67	3	0	7	77	6
29.08.2018	0	0	0	0	0	0	0	58	1	0	1	60	2
30.08.2018	0	0	0	0	0	0	0	4	0	0	6	10	9
31.08.2018	0	0	0	0	0	0	0	3	3	0	1	7	3
01.09.2018	0	0	0	0	1	0	0	113	4	0	7	125	2
02.09.2018	0	0	0	0	0	0	0	64	1	0	1	66	8
03.09.2018	0	0	0	0	0	0	1	35	2	0	2	40	11
04.09.2018	0	0	0	0	0	0	0	33	2	0	1	36	1
17.09.2018	0	0	0	2	3	0	4	812	78	0	5	904	36
18.09.2018	0	0	1	1	4	0	6	2211	355	0	10	2588	91
19.09.2018	0	0	1	1	5	0	0	2917	241	0	23	3188	117
20.09.2018	0	0	0	0	3	0	0	2592	327	0	7	2929	111
21.09.2018	1	0	0	0	0	0	0	1621	583	0	9	2214	142
22.09.2018	0	0	0	0	0	0	0	1046	382	0	10	1438	50
23.09.2018	0	0	0	3	2	0	0	254	150	0	17	426	58
24.09.2018	0	0	0	3	0	0	0	50	39	0	0	92	33

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
25.09.2018	0	0	0	4	0	1	0	1944	47	0	8	2004	35
26.09.2018	0	0	0	0	5	0	0	1435	240	0	10	1690	92
27.09.2018	0	0	0	0	0	0	0	496	134	0	2	632	17
15.10.2018	0	0	0	1	1	1	0	138	148	0	11	300	37
16.10.2018	0	0	0	0	4	0	0	21	5	0	1	31	11
17.10.2018	0	0	0	0	1	1	0	144	64	0	5	215	22
18.10.2018	0	0	1	0	3	0	0	11	72	0	4	91	37
19.10.2018	0	0	0	1202	0	0	0	14	79	0	44	1339	2700
20.10.2018	0	0	0	27	3	0	0	145	83	0	19	277	4268
21.10.2018	0	0	2	0	101	1	2	424	1022	0	110	1662	1356
22.10.2018	0	0	0	0	0	0	0	52	282	0	2	336	8
Grand total	3	8	13	1263	157	6	111	33487	7872	1	442	43363	10702

4.5. Map showing key bat activity

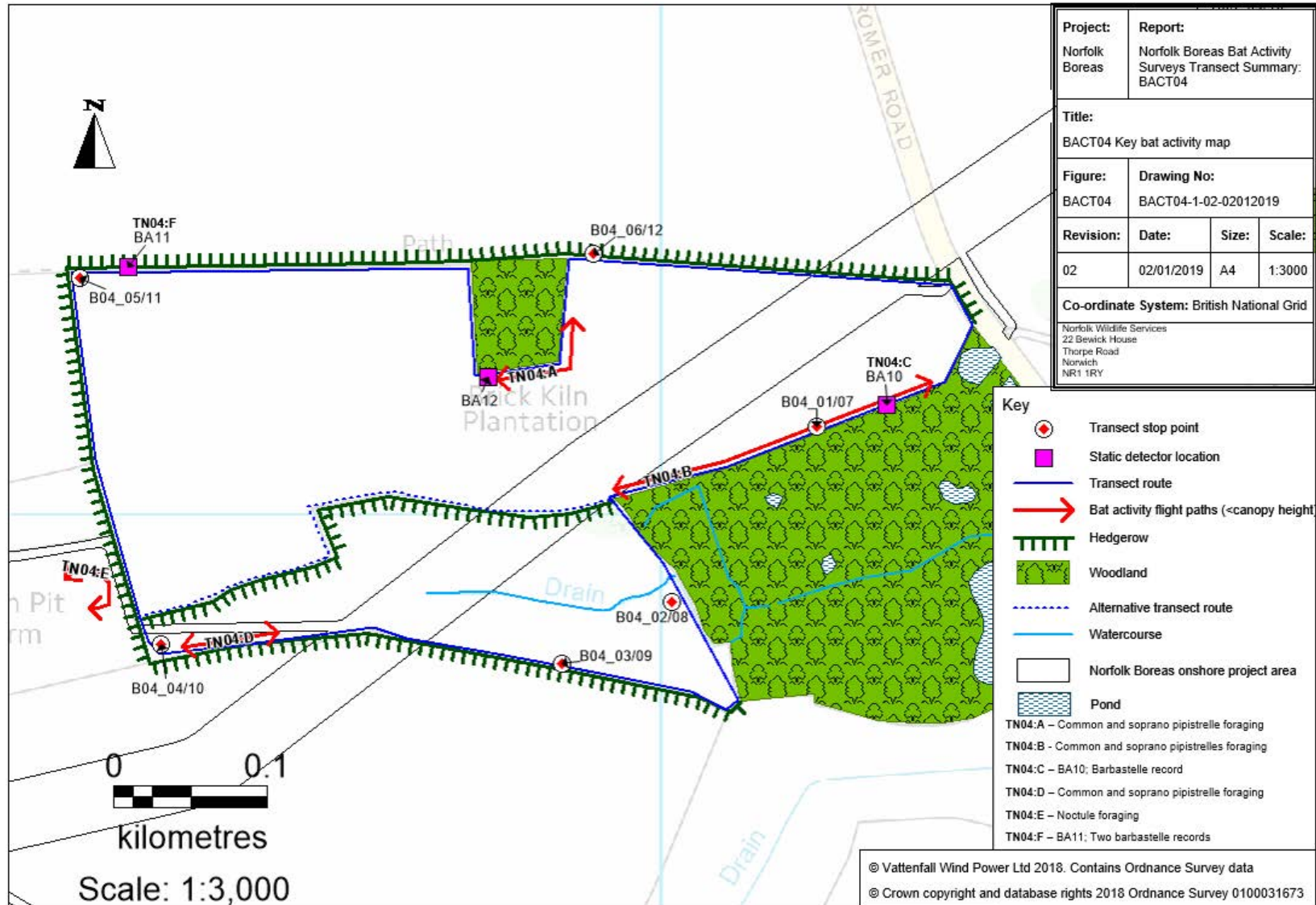


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3. Transect stop point associated code (e.g. B04_01/07) is reference to transect number (B04) and the transect stop numbers (01 and 07).



Norfolk Boreas Bat Activity Surveys Transect Summary: BACT05

Survey scope:	Bat activity surveys: Transect Summary
Prepared on behalf of:	Royal HaskoningDHV
Report reference:	2017/147.2: BACT05
Date of surveys:	April – October 2018

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Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).*

Report prepared by :	Checked by :	Approved by :	Status :
Ben Christie Date : 15.11.2018	Sally McColl 15.11.2018	Chris Smith 15.11.2018	V1 - DRAFT FOR CLIENT COMMENT
Ben Moore Date : 17.12.2018	Sally McColl 17.12.2018	Sally McColl 17.12.2018	V2 – SECOND DRAFT FOR CLIENT COMMENT
Ben Moore Date : 07.01.2019	Sally McColl 07.01.2019	Sally McColl 07.01.2019	V3 - FINAL

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1. Transect summary: BACT05, Salle

- 1.1. Grid reference: TG128244.
1.2. Transect habitat suitability assessment: High quality.
1.3. Static detectors: BA13, BA14, BA15.

2. Description of transect

Land use at transect

2.1. The transect route ran along the field margins of two large arable fields. There was a small area of rough grassland to the south. Hedgerows with trees were present along the majority of the field boundaries and a small wooded depression was present to the southeast of the transect.

2.2. Further afield, the landscape was a mixture of arable and parkland, with the village of Cawston to the east and the town of Reepham to the southwest. There was an extensive area of woodland and a disused railway (part of the Marriott's Way) to the south. Located to the west of the transect was the Reepham Stream, a tributary of the River Wensum with riparian woodland along the banks.

Key commuting and foraging features

2.3. Boundary hedgerows with trees were the key features used by bats for foraging and commuting, particularly the western boundary as this is functionally linked with surrounding habitat including the Reepham Stream, woodland and the disused railway to the south.

2.4. The transect route was designed to cover the habitat to the north-west of the transect area but due to access restrictions only the eastern edge of this habitat was surveyed.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of three static detectors over five consecutive nights.

3.2. The transect was walked eight times from April to October.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA13	1	19.04.2018	26.04.2018	7
BA13	2	09.05.2018	15.05.2018	6
BA13	3	21.06.2018	27.06.2018	6
BA13	4	19.07.2018	30.07.2018	11
BA13	5	16.08.2018	23.08.2018	7
BA13	6	26.09.2018	02.10.2018	6
BA13	7	18.10.2018	24.10.2018	6
BA14	1	19.04.2018	26.04.2018	7
BA14	2	09.05.2018	15.05.2018	6
BA14	3	21.06.2018	27.06.2018	6
BA14	4	19.07.2018	30.07.2018	11
BA14	5	16.08.2018	23.08.2018	7
BA14	6	26.09.2018	02.10.2018	6
BA14	7	18.10.2018	24.10.2018	6
BA15	1	19.04.2018	26.04.2018	7
BA15	2	09.05.2018	15.05.2018	6
BA15	3	21.06.2018	27.06.2018	6
BA15	4	19.07.2018	30.07.2018	11
BA15	5	16.08.2018	23.08.2018	7
BA15	6	26.09.2018	02.10.2018	6
BA15	7	18.10.2018	24.10.2018	6

Transect dates

Table 2: Transect dates summary.

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BC, JH	19.04.2018	20:00	22:00
2	Dusk	JA, SF	09.05.2018	20:35	22:40
3	Dusk	SM, POE	27.06.2018	21:23	23:26
4	Dusk	JA, NT	19.07.2018	21:02	23:02
5	Dusk	JA, JH	16.08.2018	20:23	22:23
6	Dusk	JA, AH	26.09.2018	18:45	20:45
7	Dawn	BC, AH	27.09.2018	04:50	06:55
8	Dusk	BC, JM	18.10.2018	17:53	20:06

¹ Surveyor initials are referenced with full names in Appendix 4 in the overarching Norfolk Boreas Bat Activity Surveys Report 2017.147.2 (November 2018).

4. Bat observations

4.1. Bat activity by species

4.1.1. A summary of the bat activity on the transect, based on the transect and static data from all visits is given in Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species	Code	Presence Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓ ^{2,3}	✓ ³	Isolated passes recorded from all three static detectors.	Recorded throughout the survey period.	N/A
Serotine	EPTSER	✓	✓ ⁴	Two isolated records during August from the transect and static data.	Isolated recordings during August.	N/A
Large bat species	LGEBAT	✓ ^{2,3}	✓	Isolated passes recorded from all three static detectors.	Several isolated recordings between April and August.	N/A
Myotis spp.	MYOSPP	x	✓	Static detectors, particularly along the west and north of the transect recorded infrequent passes.	Recorded throughout the survey period.	N/A
Noctule	NYCNOC	✓	✓	Records of three individuals commuting together high above the canopy observed near the western boundary hedgerow on the first visit.	Recorded throughout the survey period.	N/A
Brown long-eared	PLEAUR	x	✓	Isolated passes recorded from all three static detectors.	Recorded throughout the survey period.	N/A
Nathusius' pipistrelle	PIP NAT	✓ ³	✓	Concentration of activity in July on static BA14.	Recorded throughout the survey period.	N/A
Common pipistrelle	PIPPIP	✓	✓	Consistently recorded along the transect, and by all static detectors. Foraging and commuting routes present along hedgerows.	Recorded throughout the survey period.	N/A
Soprano pipistrelle	PIPPYG	✓ ³	✓	Consistently recorded along the transect, and by all static detectors but less frequent than common pipistrelle.	Recorded throughout the survey period.	N/A
Pipistrelle spp.	PIPSPP	✓	✓	Consistently recorded along the transect, and by all static detectors. Foraging and commuting routes present along hedgerows.	Recorded throughout the survey period.	N/A

² Only found to be present through analysis of transect acoustic recordings (Table 5, compiled acoustic data)

³ Limited recordings collected by static detectors (less than 10 records)

4.2. Transect survey data

Table 4: Summary from transect data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp (°C)	End Temp (°C)	Wind (Beaufort Scale)	Cloud (8ths)	Precipitation	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID ⁴	Total bats ⁵
1	Dusk	19.04.2018	20:00	22:00	21	17	1	2/8	None	0	0	0	0	3	0	0	22	6	6	0	37
2	Dusk	09.05.2018	20:35	22:40	15	13	1	7/8	None	0	0	0	0	1	0	0	5	1	4	0	11
3	Dusk	27.06.2018	21:23	23:26	15	12	2	7/8	None	0	0	0	0	0	0	1	17	5	1	0	24
4	Dusk	19.07.2018	21:02	23:02	21	20	1	1/8	None	0	0	0	0	0	0	0	0	0	6	0	6
5	Dusk	16.08.2018	20:23	22:23	16	16	2	2/8	None	0	1	0	0	0	0	0	2	0	4	0	7
6	Dusk	26.09.2018	18:45	20:45	17	17	1	0/8	None	0	0	0	0	0	0	0	9	0	7	0	16
7	Dawn	27.09.2018	04:50	06:55	13	10	1	1/8	None	0	0	0	0	0	0	0	1	2	0	0	3
8	Dusk	18.10.2018	17:53	20:06	13	11	1	7/8	None	0	0	0	0	1	0	0	6	13	1	0	21

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID	Total bats	NOISE ⁶
1	Dusk	19.04.2018	0	0	0	0	1	0	0	35	4	0	37	77	1389
2	Dusk	09.05.2018	0	0	0	0	22	0	0	19	5	0	41	87	1552
3	Dusk	27.06.2018	0	0	0	0	1	0	5	85	5	4	25	125	1573
4	Dusk	19.07.2018	0	0	1	0	0	0	0	10	1	1	16	29	2105
5	Dusk	16.08.2018	0	0	0	0	0	0	0	4	0	0	6	10	1028
6	Dusk	26.09.2018	1	0	3	0	7	0	0	65	11	3	74	164	1138
7	Dawn	27.09.2018	0	0	0	0	0	0	0	3	0	1	17	21	1207
8	Dusk	18.10.2018	0	0	0	0	0	0	0	9	6	0	4	19	1593

⁴ All bats not identified to species level.

⁵ 'Total bats' refers to the total number of confirmed bat passes.

⁶ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA13.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	1	0	1	5	102	0	0	1486	63	11	414	2083	5176
09.05.2018	4	0	0	7	35	2	0	223	44	3	56	374	728
21.06.2018	0	0	0	5	95	1	1	213	71	8	77	471	1212
19.07.2018	0	0	1	1	40	0	0	92	25	3	57	219	93716
26.09.2018	0	0	0	0	0	0	0	0	0	0	0	0	4024
18.10.2018	0	0	0	0	45	0	0	240	55	2	79	421	5558
Grand Total	5	0	2	18	317	3	1	2254	258	27	683	3568	110414

Table 7: Static data from BA point BA14.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	0	0	0	2	63	0	0	279	21	3	43	411	1435
09.05.2018	0	0	1	3	27	2	1	590	137	66	212	1039	2442
21.06.2018	0	0	0	0	12	0	13	472	11	44	100	652	1064
19.07.2018	1	0	2	14	12	6	68	2411	53	163	570	3300	34885
16.08.2018	0	0	0	0	3	0	0	5	5	5	11	29	12361
26.09.2018	0	0	0	2	22	2	0	296	26	9	70	427	2067
18.10.2018	0	0	0	0	3	0	0	301	17	2	53	376	2138
Grand Total	1	0	3	21	142	10	82	4354	270	292	1059	6234	56392

Table 8: Static data from BA point BA15.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	0	0	0	0	1	0	2	26	10	0	3	42	1552
09.05.2018	0	0	0	0	4	0	0	130	5	1	22	162	513
21.06.2018	0	0	0	0	0	0	0	0	0	0	0	0	1
19.07.2018	0	0	0	0	0	0	0	0	0	0	0	0	0
16.08.2018	1	2	5	3	61	4	1	354	39	19	136	625	24498
26.09.2018	0	0	0	0	0	0	0	0	1	0	1	2	1418
18.10.2018	0	0	0	1	9	1	0	17	10	0	18	56	6543
Grand Total	1	2	5	4	75	5	3	527	65	20	180	887	34525

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

DateSpecies	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	0	0	0	2	7	0	0	399	20	2	52	482	472
20.04.2018	0	0	0	2	69	0	2	87	11	1	39	211	221
21.04.2018	0	0	0	0	15	0	0	516	0	7	129	667	960
22.04.2018	1	0	1	1	61	0	0	522	37	4	88	715	1291
23.04.2018	0	0	0	1	10	0	0	140	20	0	70	241	3216
24.04.2018	0	0	0	0	4	0	0	115	1	0	79	199	1755
25.04.2018	0	0	0	1	0	0	0	12	5	0	0	18	245
26.04.2018	0	0	0	0	0	0	0	0	0	0	0	0	3
09.05.2018	0	0	1	2	2	0	0	80	15	0	20	120	274
10.05.2018	0	0	0	0	33	0	0	353	70	13	129	598	952
11.05.2018	1	0	0	3	3	1	0	146	28	34	53	269	452
12.05.2018	2	0	0	4	3	3	0	159	28	13	55	267	1104
13.05.2018	1	0	0	0	23	0	0	136	31	10	26	227	282
14.05.2018	0	0	0	1	2	0	1	67	13	0	10	94	398
15.05.2018	0	0	0	0	0	0	0	2	1	0	2	5	221
21.06.2018	0	0	0	1	12	1	1	294	17	9	34	369	575
22.06.2018	0	0	0	1	34	0	3	55	17	4	28	142	258
23.06.2018	0	0	0	1	9	0	9	194	13	29	44	299	330
24.06.2018	0	0	0	0	18	0	0	76	15	8	38	155	279
25.06.2018	0	0	0	1	13	0	0	40	11	1	18	84	179
26.06.2018	0	0	0	1	9	0	1	22	9	1	7	50	388
27.06.2018	0	0	0	0	12	0	0	4	0	0	8	24	268
19.07.2018	0	0	0	2	6	0	0	276	3	3	53	343	8267

DateSpecies	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
20.07.2018	0	0	0	3	6	1	3	384	4	7	91	499	16508
21.07.2018	0	0	0	2	17	3	10	367	17	18	195	629	28839
22.07.2018	0	0	0	3	5	0	18	281	23	9	55	394	21419
23.07.2018	1	0	1	3	11	2	29	782	16	67	101	1013	22346
24.07.2018	0	0	2	2	2	0	8	309	10	61	39	433	13567
25.07.2018	0	0	0	0	5	0	0	104	5	1	93	208	17380
26.07.2018	0	0	0	0	0	0	0	0	0	0	0	0	93
27.07.2018	0	0	0	0	0	0	0	0	0	0	0	0	39
28.07.2018	0	0	0	0	0	0	0	0	0	0	0	0	143
16.08.2018	0	0	0	0	0	1	0	7	0	0	5	13	4264
17.08.2018	0	0	0	0	3	1	0	40	1	0	6	51	10301
18.08.2018	0	1	0	0	19	0	0	31	4	2	15	72	6287
19.08.2018	0	0	1	1	13	0	0	78	6	4	17	120	4030
20.08.2018	1	0	2	1	9	0	1	58	14	6	30	122	1081
21.08.2018	0	0	1	1	12	1	0	96	17	7	37	172	6981
22.08.2018	0	1	1	0	8	0	0	40	2	2	21	75	1437
23.08.2018	0	0	0	0	0	1	0	9	0	3	16	29	2478
26.09.2018	0	0	0	0	5	0	0	16	0	0	13	34	4531
27.09.2018	0	0	0	2	4	0	0	255	20	9	46	336	2003
28.09.2018	0	0	0	0	5	2	0	20	1	0	9	37	238
29.09.2018	0	0	0	0	0	0	0	0	0	0	0	0	135
30.09.2018	0	0	0	0	8	0	0	1	4	0	3	16	235
01.10.2018	0	0	0	0	0	0	0	4	2	0	2	8	353
02.10.2018	0	0	0	0	0	0	0	0	0	0	0	0	14
18.10.2018	0	0	0	0	3	0	0	72	13	1	10	99	2632

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.10.2018	0	0	0	0	9	0	0	0	0	0	6	15	896
20.10.2018	0	0	0	1	18	1	0	325	33	0	64	442	1949
21.10.2018	0	0	0	0	26	0	0	99	21	3	53	202	3772
22.10.2018	0	0	0	0	1	0	0	7	4	0	4	16	2554
23.10.2018	0	0	0	0	0	0	0	13	8	0	10	31	1886
24.10.2018	0	0	0	0	0	0	0	42	3	0	4	49	550
Grand total	7	2	10	43	534	18	86	7135	593	339	1927	10694	201331

4.5. Map showing key bat activity

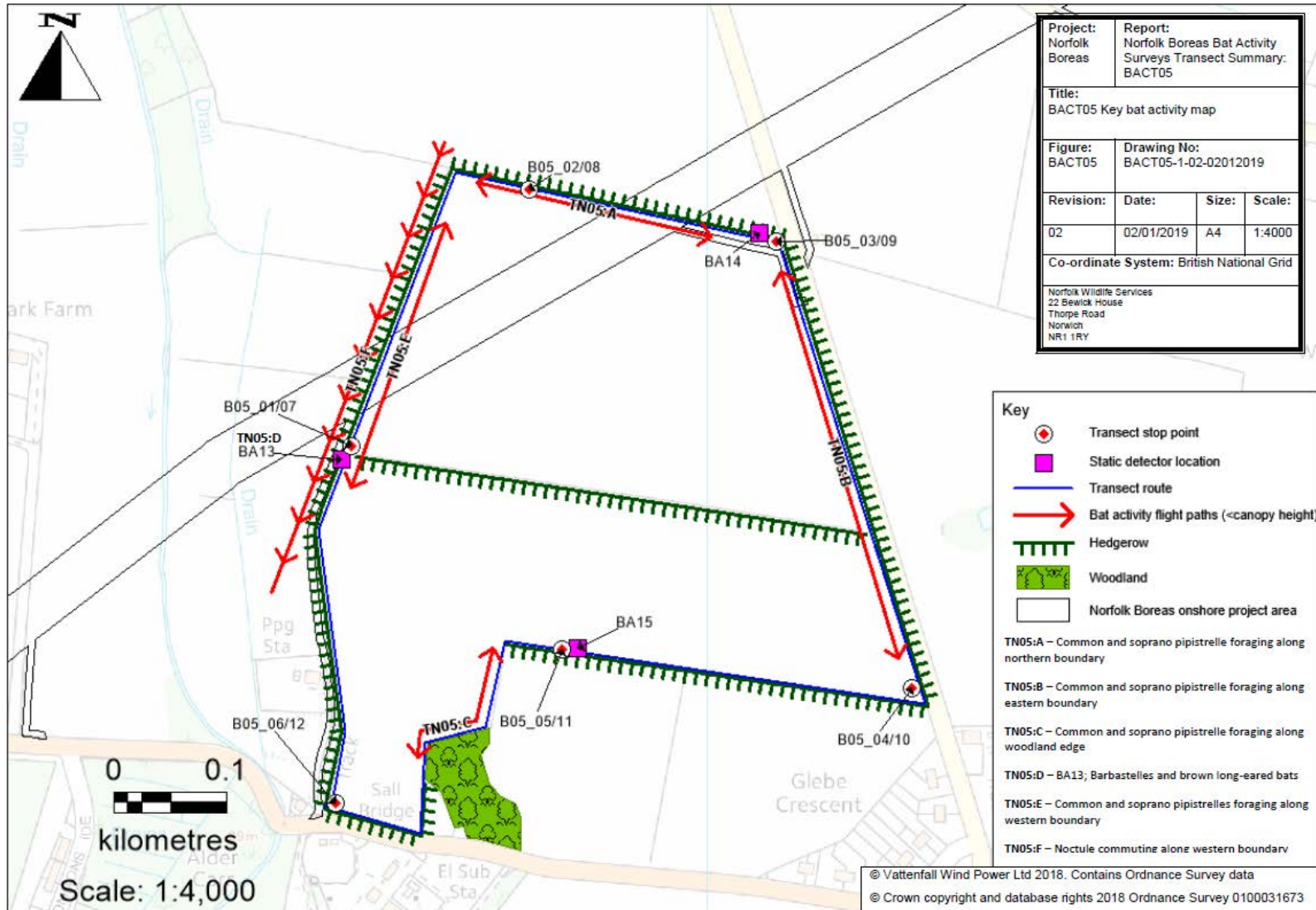


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3. Transect stop point associated code (e.g. B05_01/07) is reference to transect number (B05) and the transect stop numbers (01 and 07).



Norfolk Boreas Bat Activity Surveys Transect Summary: BACT06

Survey scope:	Bat activity surveys: Transect Summary
Prepared on behalf of:	Royal HaskoningDHV
Report reference:	2017/147.2: BACT06
Date of surveys:	April – October 2018

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Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).

Report prepared by :	Checked by :	Approved by :	Status :
Ben Moore Date : 15.11.2018	Sally McColl 15.11.2018	Chris Smith 15.11.2018	V1 - DRAFT FOR CLIENT COMMENT
Ben Moore Date : 17.12.2018	Sally McColl 17.12.2018	Sally McColl 17.12.2018	V2 – SECOND DRAFT FOR CLIENT COMMENT
Ben Moore Date : 07.01.2019	Sally McColl 07.01.2019	Sally McColl 07.01.2019	V3 - FINAL

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1. Transect summary: BACT06, Reepham

- 1.1. Grid reference: TG097240.
1.2. Transect habitat suitability assessment: High quality.
1.3. Static detectors: BA16, BA17, BA18.

2. Description of transect

Land use at transect

- 2.1. The transect route was situated around the edge of an area of wet grassland used for grazing by cattle. This wet grassland was situated within an arable landscape and its elevation was lower than the surrounding land. Due to this, it was used as a drain for run-off from surrounding arable fields.
- 2.2. A drain ran north to south through the centre of the transect which had a dense gorse hedge on either side of it.
- 2.3. An established native species hedgerow with mature oak *Quercus rober* standards was situated along the eastern boundary and semi-mature native tree line ran along the length of the western boundary.
- 2.4. There was a small (1ha) copse of deciduous woodland situated adjacent to the eastern boundary of the transect.

Key commuting and foraging features

- 2.5. Common and soprano pipistrelles were commonly recorded foraging along the western and northern boundaries.
- 2.6. The canopy of trees surrounding stop points 06 and 12 were popular foraging habitats for common and soprano pipistrelles, where the Marriott's Way footpath runs east to west just outside of the transect. Similarly, Pipistrelles were frequently recorded foraging along the woodland edge on the eastern boundary at stop points 04 and 10 (See *Figure 1*)

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of three static detectors over five consecutive nights.

3.2. The transect was walked eight times from April to October.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA16	1	16.04.2018	23.04.2018	7
BA16	2	01.05.2018	06.05.2018	5
BA16	3	05.06.2018	11.06.2018	6
BA16	4	03.07.2018	10.07.2018	7
BA16	5	16.08.2018	22.08.2018	6
BA16	6	04.09.2018	18.09.2018	14
BA16	7	02.10.2018	09.10.2018	7
BA17	1	16.04.2018	23.04.2018	7
BA17	2	01.05.2018	08.05.2018	7
BA17	3	05.06.2018	11.06.2018	6
BA17	4	-	-	0
BA17	5	16.08.2018	22.08.2018	6
BA17	6	04.09.2018	18.09.2018	14
BA17	7	03.10.2018	09.10.2018	6
BA18	1	16.04.2018	23.04.2018	7
BA18	2	01.05.2018	06.05.2018	5
BA18	3	05.06.2018	11.06.2018	6
BA18	4	03.07.2018	10.07.2018	7
BA18	5	16.08.2018	22.08.2018	6
BA18	6	04.09.2018	18.09.2018	14
BA18	7	02.10.2018	09.10.2018	7

Transect dates

Table 2: Transect dates summary.

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, MP	16.04.2018	19:54	21:56
2	Dusk	BM, SF	01.05.2018	20:20	22:21
3	Dusk	BM, SF	05.06.2018	21:13	23:30
4	Dusk	BM, SF	03.07.2018	21:19	21:41
5	Dusk	BM, POE	16.08.2018	20:22	22:24
6	Dusk	BM, POE	04.09.2018	19:37	21:37
7	Dusk	BM, AH	02.10.2018	18:30	20:30
8	Dawn	BM, AH	03.10.2018	04:59	05:59

¹ Surveyor initials are referenced with full names in Appendix 4 in the overarching Norfolk Boreas Bat Activity Surveys Report 2017.147 (November 2018).

4. Bat observations

4.1. Bat activity by species

4.1.1. A summary of the bat activity on the transect, based on the transect and static data from all visits is given in Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species	Code	Presence Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓ ^{2,3}	✓ ³	Few passes recorded towards the northern end of the transect (BA16).	Recorded during the spring and autumn during the early evening and throughout the morning.	N/A
Serotine	EPTSER	x	✓ ³	Isolated records towards the northern end of the transect (BA16).	Recorded during the late evening during spring and early summer.	N/A
Large bat species	LGESPP	✓ ³	✓	Commonly recorded across the transect on each static.	Recorded throughout the season, primarily recorded throughout the evening with some passes during the early morning.	N/A
Myotis spp	MYOSPP	✓ ^{2,3}	✓	Most commonly recorded towards the northern end of the transect (BA16). Also, several passes were recorded on the other statics.	Commonly recorded throughout the night during the spring and autumn.	N/A
Noctule	NYCNOC	✓ ^{2,3}	✓	Recorded throughout the transect, especially towards the northern and southern ends (BA16 and BA18).	Recorded throughout the night, the majority of calls were recorded during the evening.	N/A
Brown long-eared	PLEAUR	✓ ^{2,3}	✓	Most commonly recorded towards the northern end of the transect (BA16). Several passes were recorded on the other statics.	Commonly recorded throughout the night during the spring and autumn.	N/A
Nathusius' pipistrelle	PIP NAT	x	✓	Commonly recorded at the northern end of the transect (BA16). Also, several passes were recorded at BA18.	Recorded throughout the night during the spring and autumn.	N/A
Common pipistrelle	PIPIPI	✓	✓	Common across the transect, frequently observed foraging and commuting during the walked transect.	Recorded throughout the night, during the course of the survey period.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Common across the transect, frequently observed foraging and commuting during the walked transect.	Recorded throughout the night, during the course of the survey period.	N/A
Pipistrelle spp	PIPSPP	✓	✓	Common across the transect, frequently observed foraging and commuting during the walked transect.	Recorded throughout the night, during the course of the survey period.	N/A

² Only found to be present through analysis of transect acoustic recordings (Table 5, compiled acoustic data).

³ Indicates limited records (less than 10 records).

4.2. Transect survey data

Table 4: Summary from transect data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp (°C)	End Temp (°C)	Wind (Beaufort Scale)	Cloud (/8)	Precipitation	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID ⁴	Total bats ⁵
1	Dusk	16.04.2018	19:54	21:56	11	9	0	1/8	None	0	0	0	0	0	0	0	12	1	8	0	21
2	Dusk	01.05.2018	20:20	22:21	12	9	2	1/8	None	0	0	0	0	0	0	0	9	1	3	0	13
3	Dusk	05.06.2018	21:13	23:30	11	9	2	7/8	None	0	0	0	0	0	0	0	30	7	1	0	38
4	Dusk	03.07.2018	21:19	21:41	15	15	2	2/8	None	0	0	0	0	0	0	0	0	0	0	0	0
5	Dusk	16.08.2018	20:22	22:24	16	16	0	0/8	None	0	0	0	0	0	0	0	9	3	2	0	14
6	Dusk	04.09.2018	19:37	21:37	15	13	2	7/8	None	0	0	0	0	0	0	0	22	1	1	0	24
7	Dusk	02.10.2018	18:30	20:30	16	14	2	7/8	None	0	0	0	0	0	0	0	28	1	1	0	30
8	Dawn	03.10.2018	04:59	05:59	10	8	0	0/8	None	0	0	0	0	0	0	0	10	5	1	0	16

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE ⁶
1	Dusk	16.04.2018	0	0	1	0	0	3	0	23	9	0	6	42	815
2	Dusk	01.05.2018	0	0	0	1	1	0	0	19	24	0	10	55	1229
3	Dusk	05.06.2018	0	0	0	0	0	0	0	131	12	7	21	171	1378
4	Dusk	03.07.2018	0	0	0	0	0	0	0	18	1	0	2	21	660
5	Dusk	16.08.2018	1	0	0	0	0	1	0	35	2	0	2	41	270
6	Dusk	04.09.2018	0	0	0	0	0	1	0	119	20	1	19	160	503
7	Dusk	02.10.2018	0	0	0	0	3	0	0	0	0	0	2	5	1007
8	Dawn	03.10.2018	0	0	0	0	0	0	0	2	1	0	4	7	630

⁴ All bats not identified to species level.

⁵ 'Total bats' refers to the total number of confirmed bat passes.

⁶ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA16.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
16.04.2018	3	1	4	7	17	5	2	359	26	9	131	564	1298
01.05.2018	0	0	0	3	6	2	2	180	22	7	116	338	1024
05.06.2018	0	1	0	1	4	3	38	461	11	288	100	907	952
03.07.2018	0	0	1	0	0	0	3	308	34	8	70	424	759
18.08.2018	0	0	0	0	0	0	0	0	1	0	0	1	86
04.09.2018	0	0	0	0	0	0	0	0	0	0	0	0	58
02.10.2018	5	0	4	6	93	20	0	741	150	8	154	1081	8922
Grand Total	8	2	9	17	120	30	45	2049	244	320	571	3415	13099

Table 7: Static data from BA point BA17.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
16.04.2018	0	0	0	0	7	2	0	2347	5	24	414	2799	3669
01.05.2018	0	0	1	1	1	0	0	274	3	2	73	355	1078
06.06.2018	0	0	0	0	0	0	0	3	0	0	1	4	20
16.08.2018	0	0	0	0	0	0	0	9	0	0	24	33	2423
04.09.2018	0	0	0	0	1	0	0	23	0	0	46	70	1930
03.10.2018	0	0	0	0	0	0	0	0	0	0	0	0	12
Grand Total	0	0	1	1	9	2	0	2656	8	26	558	3261	9132

Table 8: Static data from BA point BA18.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
16.04.2018	0	0	6	6	156	9	1	898	1543	18	711	3348	2368
01.05.2018	0	0	0	0	0	0	0	0	0	0	0	0	36
05.06.2018	0	0	2	0	0	0	0	0	0	0	31	33	1392
04.07.2018	0	0	0	0	0	0	0	3	0	0	4	4	7
16.08.2018	0	0	0	0	0	0	0	498	36	57	124	715	20660
04.08.2018	0	0	0	0	1	0	1	370	39	18	123	552	14919
02.10.2018	0	0	0	0	1	0	0	308	16	11	106	442	1611
Grand Total	0	0	8	6	158	9	2	2077	1634	104	1099	5097	40993

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

DateSpecies	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
16.04.2018	0	0	1	1	4	1	0	25	6	0	8	46	206
17.04.2018	1	0	2	2	3	2	0	25	7	2	21	65	336
18.04.2018	1	0	3	1	135	4	1	1299	445	24	412	2325	1704
19.04.2018	1	0	1	5	16	1	0	675	773	8	343	1823	1756
20.04.2018	0	0	2	0	16	1	0	150	177	4	132	482	597
21.04.2018	0	1	1	2	1	2	0	867	127	3	133	1137	975
22.04.2018	0	0	0	2	5	5	1	529	37	10	176	765	1410
23.04.2018	0	0	0	0	0	0	1	34	2	0	31	68	351
01.05.2018	0	0	0	1	0	0	0	40	6	0	13	60	197
02.05.2018	0	0	1	1	0	0	0	15	0	0	4	21	81
03.05.2018	0	0	0	1	4	0	0	145	5	2	50	207	508
04.05.2018	0	0	0	0	2	2	2	117	13	7	44	187	475
05.05.2018	0	0	0	0	0	0	0	51	1	0	30	82	294
06.05.2018	0	0	0	1	1	0	0	36	0	0	31	69	332
07.05.2018	0	0	0	0	0	0	0	48	0	0	15	63	167
08.05.2018	0	0	0	0	0	0	0	2	0	0	2	4	84
05.06.2018	0	1	1	0	1	1	0	23	0	0	3	30	63
06.06.2018	0	0	1	0	0	0	2	27	1	3	23	57	235
07.06.2018	0	0	0	0	1	2	23	199	5	187	29	446	291
08.06.2018	0	0	0	1	0	0	10	71	2	29	23	136	249
09.06.2018	0	0	0	0	1	0	1	44	3	10	14	73	1052
10.06.2018	0	0	0	0	1	0	2	94	0	59	31	187	294
11.06.2018	0	0	0	0	0	0	0	6	0	0	9	15	180

DateSpecies	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPIYG	PIPSPP	NoID	Total bats	NOISE
03.07.2018	0	0	0	0	0	0	1	22	1	0	5	29	91
04.07.2018	0	0	0	0	0	0	0	22	1	0	9	32	69
05.07.2018	0	0	0	0	0	0	2	25	2	1	15	45	178
06.07.2018	0	0	0	0	0	0	0	66	4	2	8	80	68
07.07.2018	0	0	1	0	0	0	0	82	6	4	16	109	125
08.07.2018	0	0	0	0	0	0	0	31	0	0	12	43	106
09.07.2018	0	0	0	0	0	0	0	57	20	1	8	86	80
10.07.2018	0	0	0	0	0	0	0	6	0	0	1	7	49
16.08.2018	0	0	0	0	0	0	0	49	12	6	16	83	694
17.08.2018	0	0	0	0	0	0	0	50	3	3	16	72	2318
18.08.2018	0	0	0	0	0	0	0	8	1	3	3	15	2001
19.08.2018	0	0	0	0	0	0	0	48	1	9	20	78	2069
20.08.2018	0	0	0	0	0	0	0	5	1	0	4	10	3190
21.08.2018	0	0	0	0	0	0	0	23	3	1	19	46	2400
22.08.2018	0	0	0	0	0	0	0	17	0	0	8	25	2327
23.08.2018	0	0	0	0	0	0	0	146	10	21	32	209	3430
24.08.2018	0	0	0	0	0	0	0	45	2	0	5	52	355
25.08.2018	0	0	0	0	0	0	0	15	1	0	2	18	1003
26.08.2018	0	0	0	0	0	0	0	24	0	3	9	36	330
27.08.2018	0	0	0	0	0	0	0	77	3	11	14	105	3052
04.09.2018	0	0	0	0	1	0	0	28	6	4	21	60	4335
05.09.2018	0	0	0	0	0	0	1	171	14	2	63	251	5918
06.09.2018	0	0	0	0	0	0	0	110	3	2	20	135	2973
07.09.2018	0	0	0	0	0	0	0	63	16	10	27	116	2317
08.09.2018	0	0	0	0	0	0	0	7	0	0	3	10	61
09.09.2018	0	0	0	0	0	0	0	0	0	0	5	5	164

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
10.09.2018	0	0	0	0	0	0	0	2	0	0	6	8	135
11.09.2018	0	0	0	0	1	0	0	0	0	0	7	8	258
12.09.2018	0	0	0	0	0	0	0	0	0	0	0	0	37
13.09.2018	0	0	0	0	0	0	0	1	0	0	1	2	51
14.09.2018	0	0	0	0	0	0	0	2	0	0	2	4	117
15.09.2018	0	0	0	0	0	0	0	1	0	0	1	2	102
16.09.2018	0	0	0	0	0	0	0	1	0	0	3	4	259
17.09.2018	0	0	0	0	0	0	0	7	0	0	8	15	126
18.09.2018	0	0	0	0	0	0	0	0	0	0	2	2	54
02.10.2018	1	0	1	1	24	6	0	247	17	2	41	340	3038
03.10.2018	0	0	1	0	27	6	0	171	48	1	59	313	3627
04.10.2018	1	0	1	1	14	4	0	183	17	1	41	263	1865
05.10.2018	3	0	1	1	29	4	0	355	42	15	93	543	1382
06.10.2018	0	0	0	2	0	0	0	33	17	0	11	63	302
07.10.2018	0	0	0	1	0	0	0	15	24	0	4	44	211
08.10.2018	0	0	0	0	0	0	0	32	1	0	6	39	81
09.10.2018	0	0	0	0	0	0	0	13	0	0	5	18	39
Grand Total	8	2	18	24	287	41	47	6782	1886	450	2228	11773	63224

4.5. Map showing key bat activity

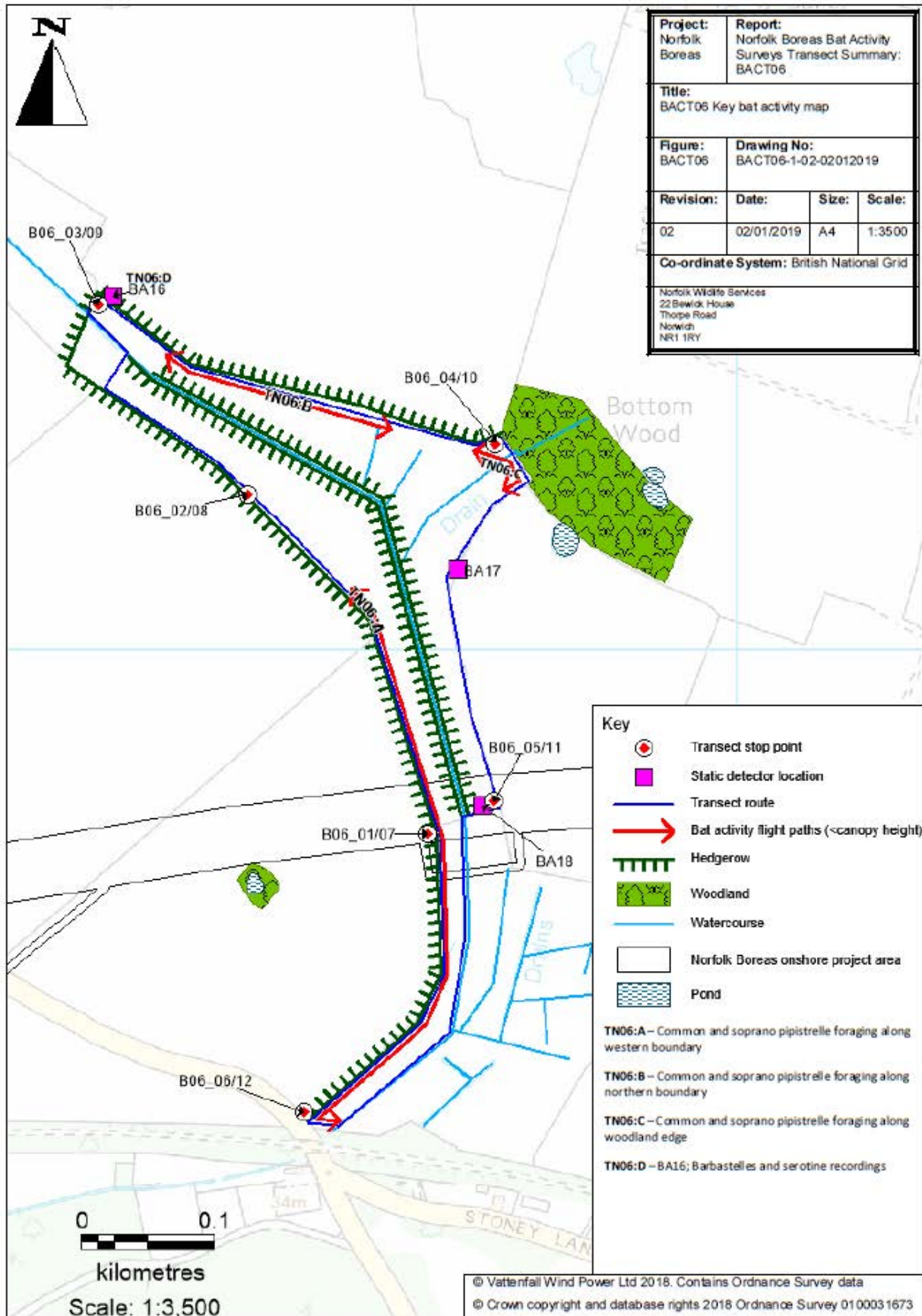


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3. Transect stop point associated code (e.g. B06_01/07) is reference to transect number (B06) and the transect stop numbers (01 and 07).



Norfolk Boreas Bat Activity Surveys Transect Summary: BACT07

Survey scope:	Bat activity surveys: Transect Summary
Prepared on behalf of:	Royal HaskoningDHV
Report reference:	2017/147.2: BACT07
Date of surveys:	April – October 2018

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Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).*

Report prepared by :	Checked by :	Approved by :	Status :
Sally McColl Date : 15.11.2018	Ben Moore 15.11.2018	Chris Smith 15.11.2018	V1 - DRAFT FOR CLIENT COMMENT
Ben Moore Date : 17.12.2018	Sally McColl 17.12.2018	Sally McColl 17.12.2018	V2 – SECOND DRAFT FOR CLIENT COMMENT
Ben Moore Date : 07.01.2019	Sally McColl 07.01.2019	Sally McColl 07.01.2019	V3 - FINAL

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1. Transect summary: BACT07, Sparham

- 1.1. Grid reference: TG068205.
1.2. Transect habitat suitability assessment: High quality.
1.3. Static detectors: BA19, BA20, BA21.

2. Description of transect

Land use at transect

2.1. The transect route was situated around the edge of a large arable field cropped with oilseed rape. The transect was set within an arable landscape with adjacent arable fields, hedgerows and occasional small copses.

2.2. The transect was bordered by established hedgerows on the northern and eastern boundary, and by mixed native semi-natural woodland on the western boundary. A pond was situated on the northern boundary, which was surrounded by vegetation.

2.3. A small stream ran the length of the southern boundary and a line of mature trees approximately 8m wide ran three quarters of the length of the boundary adjacent to the stream.

2.4. An area of rough grass also ran the length of the southern boundary, which was approximately 30m wide in places. This area was prone to being very wet and was cut once a year by flail.

Key commuting and foraging features

2.5. The northern boundary was used by common and soprano pipistrelles as a commuting route.

2.6. The eastern boundary and south eastern corner had mainly common pipistrelle foraging on the edge habitat.

2.7. The western boundary along the woodland edge had occasional pipistrelle foraging and commuting.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of three static detectors over five consecutive nights.

3.2. The transect was walked eight times from April to October.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA19	1	19.04.2018	26.04.2018	7
BA19	2	03.05.2018	10.05.2018	7
BA19	3	21.06.2018	29.06.2018	8
BA19	4	05.07.2018	10.07.2018	5
BA19	5	02.08.2018	08.08.2018	6
BA19	6	06.09.2018	19.09.2018	13
BA19	7	03.10.2018	17.10.2018	14
BA20	1	19.04.2018	26.04.2018	7
BA20	2	03.05.2018	10.05.2018	7
BA20	3	21.06.2018	29.06.2018	8
BA20	4	05.07.2018	10.07.2018	5
BA20	5	02.08.2018	08.08.2018	6
BA20	6	06.09.2018	19.09.2018	13
BA20	7	03.10.2018	17.10.2018	14
BA21	1	19.04.2018	26.04.2018	7
BA21	2	03.05.2018	10.05.2018	7
BA21	3	21.06.2018	29.06.2018	8
BA21	4	05.07.2018	10.07.2018	5
BA21	5	02.08.2018	08.08.2018	6
BA21	6	06.09.2018	19.09.2018	13
BA21	7	03.10.2018	17.10.2018	14

Transect dates

Table 2: Transect dates summary.

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	JA, SF	19.04.18	20:00	21:56
2	Dusk	JA, JH	03.05.18	20:24	22:24
3	Dusk	JA, NT	21.06.18	21:22	23:26
4	Dusk	JA, JH	05.07.18	21:16	23:16
5	Dusk	BM, JH	02.08.18	20:48	22:49
6	Dawn	JA, JH	06.09.18	04:13	06:13
7	Dusk	JA, JH	06.09.18	19:33	21:33
8	Dusk	JA, JM	03.10.18	18:27	20:27

¹ Surveyor initials are referenced with full names in Appendix 4 in the overarching Norfolk Boreas Bat Activity Surveys Report 2017.147.2 (November 2018).

4. Bat observations

4.1. Bat activity by species

4.1.1. A summary of the bat activity on the transect, based on the transect and static data from all visits is given in Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species	Code	Presence confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	x	✓	Static detectors recorded infrequent passes.	Recorded throughout April to July.	N/A
Serotine	EPTSER	x	✓	Static detectors recorded infrequent passes.	Recorded throughout April to August.	N/A
Large bat species	LGEBAT	x	✓	Static detectors recorded infrequent passes from large bats.	Recorded throughout the survey period.	N/A
Myotis spp.	MYOSPP	✓ ³	✓	A single pass observed on the first transect visit. Static detectors recorded infrequent passes.	Recorded throughout the survey period.	N/A
Noctule	NYCNOC	✓ ²	✓	Static detector recorded calls on the final transect visit.	Recorded throughout the survey period.	N/A
Brown long-eared	PLEAUR	x	✓	Infrequent passes recorded at BA19 and BA20.	Recorded throughout the survey period.	N/A
Nathusius' pipistrelle	PIP NAT	x	✓ ²	Isolated records on all three static detectors.	Recorded from April to July.	N/A
Common pipistrelle	PIPPIP	✓	✓	Recorded in low numbers along northern, western and eastern areas of the transect during the transect visits.	Recorded throughout the survey period.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Recorded in low numbers along northern, western and eastern areas of the transect during the transect visits.	Recorded throughout the survey period.	N/A
Pipistrelle spp.	PIPSPP	✓	✓	Recorded in low numbers along northern, western and eastern areas of the transect during the transect visits.	Recorded throughout the survey period.	N/A

² Limited recordings collected by static detectors (less than 10 records)

4.2. Transect survey data

Table 4: Summary from transect data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp (°C)	End Temp (°C)	Wind (Beaufort Scale)	Cloud (/8)	Precipitation	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID ³	Total bats ⁴
1	Dusk	19.04.18	20:00	21:56	19	15	1	0/8	None	0	0	0	1	0	0	0	4	1	10	0	16
2	Dusk	03.05.18	20:24	22:24	13	11	1	6/8	None	0	0	0	0	0	0	0	12	2	6	0	20
3	Dusk	21.06.18	21:22	23:26	16	13	1	4/8	None	0	0	0	0	0	0	0	0	0	8	0	8
4	Dusk	05.07.18	21:16	23:16	17	17	1	1/8	None	0	0	0	0	0	0	0	18	1	0	0	19
5	Dusk	02.08.18	20:48	22:49	25	21	0	0/8	None	0	0	0	0	0	0	0	3	0	2	0	5
6	Dawn	06.09.18	04:13	06:13	14	14	2	4/8	Light rain, low cloud	0	0	0	0	0	0	0	4	1	0	0	5
7	Dusk	06.09.18	19:33	21:33	17	13	3	8/8	None	0	0	0	0	0	0	0	0	0	2	0	2
8	Dusk	03.10.18	18:27	20:27	16	13	2	7/8	None	0	0	0	0	0	0	0	7	6	0	0	13

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID	Total bats	NOISE ⁵
1	Dusk	19.04.18	0	0	0	4	0	0	0	22	6	1	6	41	1030
2	Dusk	03.05.18	0	0	0	0	0	0	0	4	8	0	8	21	1244
3	Dusk	21.06.18	0	0	0	0	0	0	0	0	0	0	0	0	489
4	Dusk	05.07.18	0	0	0	0	0	0	0	0	0	0	10	10	468
5	Dusk	02.08.18	0	0	0	0	0	0	0	16	1	1	17	39	1671
6	Dawn	06.09.18	0	0	0	0	0	0	0	1	1	0	5	8	796
7	Dusk	06.09.18	0	0	0	0	0	0	0	9	20	0	2	31	860
8	Dusk	03.10.18	0	0	0	0	17	0	0	21	30	2	21	95	1076

³ All bats not identified to species level.

⁴ 'Total bats' refers to the total number of confirmed bat passes.

⁵ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA19.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	1	0	6	19	25	6	2	1693	55	26	472	2305	5419
03.05.2018	1	1	1	3	4	3	1	119	19	1	80	233	1160
21.06.2018	0	0	0	0	0	0	0	0	0	0	0	0	61
05.07.2018	0	1	4	1	1	0	0	30	47	2	48	134	271
02.08.2018	0	4	0	0	1	0	0	7	15	0	9	36	18928
06.09.2018	0	0	0	0	0	0	0	0	0	0	0	0	9810
03.10.2018	0	0	1	6	19	2	0	115	279	4	152	578	6300
Grand Total	2	6	12	29	50	11	3	1964	415	33	761	3286	41949

Table 7: Static data from BA point BA20.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	7	1	9	10	28	0	0	1490	379	8	447	2379	2822
03.05.2018	1	0	4	7	21	1	1	762	242	5	257	1301	1158
21.06.2018	0	3	1	12	0	2	1	112	87	8	52	278	766
05.07.2018	0	0	0	0	1	0	0	50	15	1	25	92	19336
02.08.2018	0	0	3	6	69	8	0	81	26	1	98	292	46775
06.09.2018	0	0	0	0	1	0	0	348	3	10	269	631	10244
03.10.2018	0	0	0	0	0	0	0	31	22	2	2	57	751
Grand Total	8	4	17	35	120	11	2	2874	774	35	1150	5030	81852

Table 8: Static data from BA point BA21.

Deployment\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	0	1	3	2	3	0	0	1243	1889	34	872	4047	7348
03.05.2018	0	0	0	0	0	0	0	0	0	0	0	0	27676
21.06.2018	0	2	3	2	2	1	1	2922	180	14	809	3936	3160
05.07.2018	1	1	5	13	4	0	0	1060	533	14	293	1924	2222
02.08.2018	0	0	1	0	3	1	0	47	2	2	48	104	34262
06.09.2018	0	0	7	0	48	0	0	32	19	2	174	282	44773
03.10.2018	0	0	1	0	0	0	0	1	0	0	0	2	96
Grand Total	1	4	16	17	60	2	1	5305	2623	66	2196	10295	119537

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPPIP	PIPPYG	PIPSPP	NoID	Total bats	NOISE
19.04.2018	0	0	5	1	14	1	2	542	63	15	177	820	5896
20.04.2018	0	0	1	1	1	1	0	456	61	4	178	703	947
21.04.2018	1	2	7	2	25	1	0	1353	1023	22	634	3070	2634
22.04.2018	5	0	1	5	4	3	0	1027	1152	16	522	2735	2275
23.04.2018	1	0	2	15	10	0	0	999	18	11	223	1279	1207
24.04.2018	1	0	1	5	2	0	0	41	6	0	25	81	1536
25.04.2018	0	0	0	2	0	0	0	8	0	0	13	23	803
26.04.2018	0	0	1	0	0	0	0	0	0	0	19	20	291
03.05.2018	0	0	1	2	8	0	0	410	82	2	109	614	494
04.05.2018	0	0	1	2	1	0	0	177	34	1	56	272	5388
05.05.2018	0	0	1	1	2	0	1	17	4	0	13	39	5946
06.05.2018	0	0	0	1	3	0	0	42	7	0	25	78	5608
07.05.2018	1	0	1	1	10	0	0	39	63	1	61	177	4999
08.05.2018	1	0	1	2	0	3	1	49	11	0	32	100	4555
09.05.2018	0	0	0	1	0	1	0	132	55	2	32	223	2402
10.05.2018	0	1	0	0	1	0	0	15	5	0	9	31	602
21.06.2018	0	1	0	0	0	0	0	369	19	1	86	476	416
22.06.2018	0	0	1	0	0	0	0	365	6	0	100	472	338
23.06.2018	0	0	0	0	0	0	0	374	3	3	127	507	493
24.06.2018	0	0	0	3	0	0	0	76	8	1	16	104	184
25.06.2018	0	0	0	3	0	0	1	104	6	1	32	147	212
26.06.2018	0	2	3	0	0	0	0	335	38	3	74	455	478
27.06.2018	0	1	0	1	0	2	0	582	57	2	120	765	606

DateSpecies	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
28.06.2018	0	0	0	1	2	1	0	622	38	5	235	904	735
29.06.2018	0	0	0	2	0	0	0	155	36	0	48	241	304
30.06.2018	0	0	0	1	0	0	0	17	16	2	11	47	123
01.07.2018	0	0	0	2	0	0	1	24	32	4	8	71	56
02.07.2018	0	1	0	1	0	0	0	11	8	0	4	25	42
05.07.2018	0	1	3	2	2	0	0	99	29	3	54	193	476
06.07.2018	0	0	0	4	2	0	0	158	148	2	67	381	4359
07.07.2018	1	0	1	2	1	0	0	337	126	5	108	581	5496
08.07.2018	0	0	1	5	0	0	0	160	31	2	32	231	3630
09.07.2018	0	1	2	1	1	0	0	283	176	3	80	547	5969
10.07.2018	0	0	2	0	0	0	0	103	85	2	25	217	1899
02.08.2018	0	0	0	5	30	1	0	26	9	0	28	99	15615
03.08.2018	0	0	3	1	40	7	0	39	27	0	58	175	28898
04.08.2018	0	4	0	0	1	0	0	66	5	0	49	125	28830
05.08.2018	0	0	1	0	2	0	0	2	0	0	8	13	19471
06.08.2018	0	0	0	0	0	1	0	2	2	3	12	20	7151
06.09.2018	0	0	0	0	0	0	0	10	3	0	33	46	11560
07.09.2018	0	0	0	0	0	0	0	67	0	3	81	151	15380
08.09.2018	0	0	6	0	43	0	0	43	14	2	161	269	20678
09.09.2018	0	0	1	0	5	0	0	11	2	0	27	46	4071
10.09.2018	0	0	0	0	0	0	0	9	0	0	8	17	437
11.09.2018	0	0	0	0	0	0	0	5	0	0	7	12	596
12.09.2018	0	0	0	0	0	0	0	5	0	0	6	11	69
13.09.2018	0	0	0	0	0	0	0	20	1	5	10	36	2316
14.09.2018	0	0	0	0	0	0	0	12	1	0	17	30	482

DateSpecies	BARBAR	EPTSER	LGEBAT	MYOSPP	NYCNOC	PLEAUR	PIP NAT	PIPIPI	PIPPYG	PIPSPP	NoID	Total bats	NOISE
15.09.2018	0	0	0	0	0	0	0	28	1	2	15	46	568
16.09.2018	0	0	0	0	1	0	0	67	0	0	32	100	594
17.09.2018	0	0	0	0	0	0	0	103	0	0	46	149	3996
18.09.2018	0	0	0	0	0	0	0	0	0	0	0	0	4080
03.10.2018	0	0	1	0	0	1	0	39	27	2	5	75	1057
04.10.2018	0	0	0	2	8	1	0	6	92	1	17	127	457
05.10.2018	0	0	0	1	2	0	0	14	13	0	12	42	610
06.10.2018	0	0	0	0	0	0	0	7	3	0	7	17	190
07.10.2018	0	0	0	1	0	0	0	0	8	0	8	17	89
08.10.2018	0	0	0	0	4	0	0	15	22	0	17	58	221
09.10.2018	0	0	0	1	4	0	0	7	33	0	20	65	145
10.10.2018	0	0	0	1	1	0	0	13	22	1	15	53	126
11.10.2018	0	0	0	0	0	0	0	4	21	0	6	31	405
12.10.2018	0	0	0	0	0	0	0	1	1	0	8	10	464
13.10.2018	0	0	0	0	0	0	0	1	2	0	7	10	946
14.10.2018	0	0	0	0	0	0	0	25	26	1	19	71	1205
15.10.2018	0	0	1	0	0	0	0	1	9	0	1	12	732
16.10.2018	0	0	0	0	0	0	0	13	13	1	8	35	270
17.10.2018	0	0	0	0	0	0	0	1	9	0	4	14	122
18.10.2018	0	0	0	0	0	0	0	0	0	0	0	0	108
Grand total	11	14	49	81	230	24	6	10143	3812	134	4107	18611	243338

4.5. Map showing key bat activity

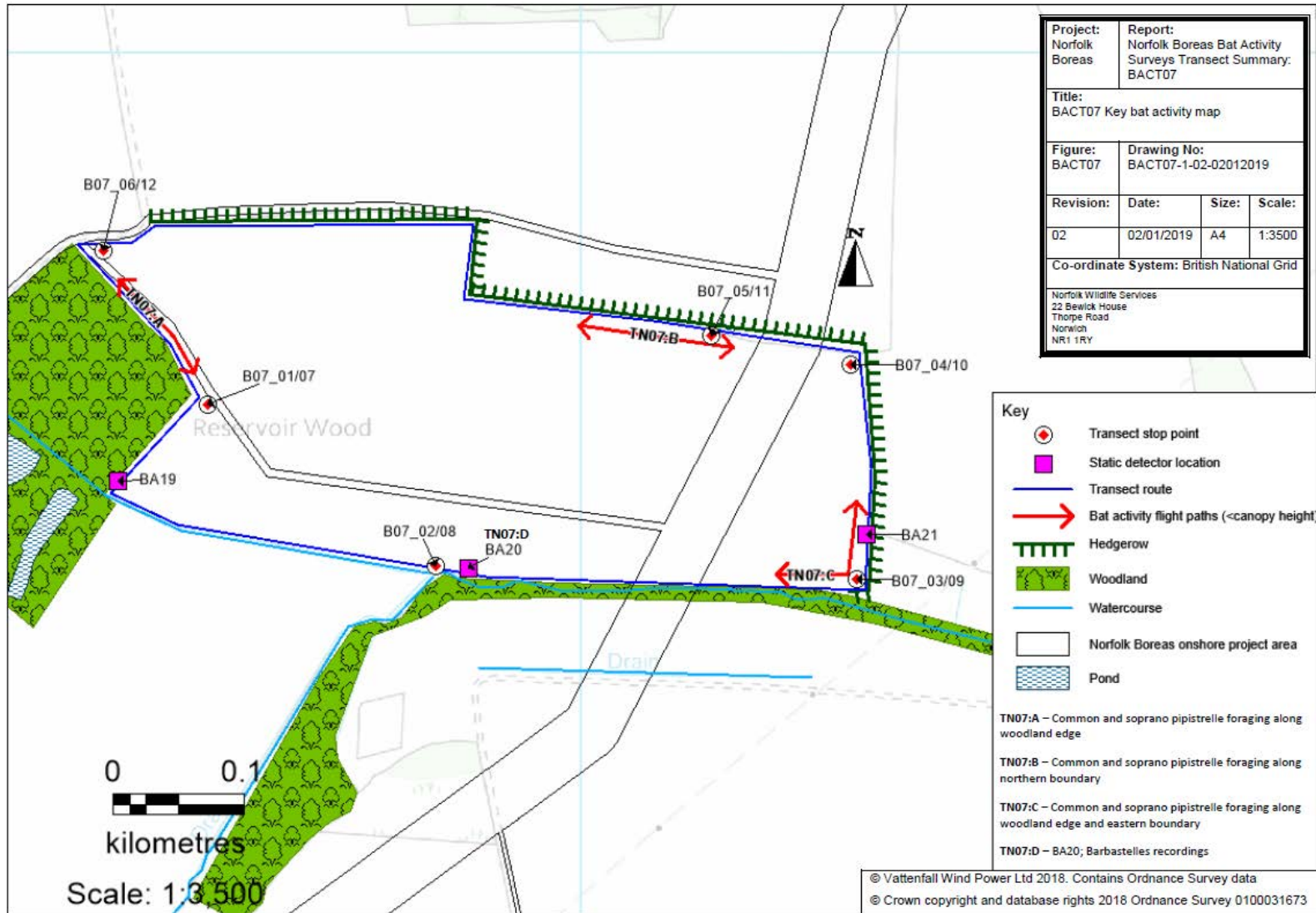


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3. Transect stop point associated code (e.g. B07_01/07) is reference to transect number (B07) and the transect stop numbers (01 and 07).

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Norfolk Vanguard Bat activity surveys

Report prepared by Norfolk Wildlife Services Ltd.
on behalf of Royal HaskoningDHV
February 2018

Reference: 2016/131.3

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2. Executive Summary

2.1. The Norfolk Vanguard Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2017a) identified 167 linear features as providing “moderate” or “high” suitability to support commuting or foraging bats. Following a review of the linear features data, groupings of these features were made which identified 59 survey locations. For practical purposes of data collection and proportionality, these 59 survey locations were proposed to be surveyed using 25 separate transects.

2.2. The purpose of the surveys was to ascertain, based on transect and static detector surveys, whether bats are commuting or foraging along linear features identified by the Extended Phase 1 Habitat Survey as providing “moderate” or “high” suitability for supporting commuting or foraging bats, and if so, which species and in what numbers.

2.3. The following guidance document was used to inform development of the survey methodology: Bat surveys for professional ecologists: good practice guidelines. Bat Conservation Trust. (Collins (Ed), 2016). A specific protocol is set out in this document and any divergences in practice from this protocol during delivery are noted to allow an assessment of constraints.

2.4. Between May and October 2017, a total of 1839 complete nights of static detection at 68 locations and 184 transects at 27 transect locations were carried out. Recordings were subject to analysis using Kaleidoscope acoustic analysis software, and the results subsequently quality assured¹.

2.5. Bats were recorded on all transects. Evidence of the following species were found within the study area:

Barbastelle	<i>Barbastella barbastellus</i>
Serotine	<i>Eptesicus serotinus</i>
Myotis aggregate	<i>Myotis spp</i>
Daubenton’s	<i>Myotis daubentonii</i>
Noctule	<i>Nyctalus noctula</i>
Leisler’s bat	<i>Nyctalus leisleri</i>
Nathusius’ pipistrelle	<i>Pipistrellus nathusii</i>
Common pipistrelle	<i>Pipistrellus pipistrellus</i>
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>
Brown long-eared	<i>Plecotus auritus</i>

2.6. Of the 27 transects surveyed, evidence of barbastelles was recorded at 22, including transects BACT 4, 5, 8, 9, 10, 13, 14, 16, 17, 18, 19, 20, 21, 22, 24, 26, 28, 30, 31, 32, 33, and 34.

2.7. Summary results, including number of bat passes along key transects for each species, are presented for each locality and additional details are given in a short separate report for each location. Full field survey results and associated static and transect recordings are available.

2.8. No surveys were able to be carried out on any transects in April 2017. Some limited data was available from statics in early May from this spring 2017 period. There is therefore

¹ Quality assurance is ongoing at the time of writing.

a general limitation with lack of survey information during the early spring period for a number of transects surveyed. Nevertheless, these transects are considered to provide valuable data for understanding bat activity levels along the linear features covered by these transects.

2.9. No surveys were carried out on the following transects due to access issues: BACT 1, 2, 6, 7, 11, 12, 23 and 25. Only one survey was carried out at BACT 15 and 35 before access was rescinded. This was considered a significant limitation to being able to assess the suitability of the linear features for supporting commuting or foraging bats on these two transects.

3. Introduction

3.1. Project background

3.1.1. Norfolk Vanguard is a proposed offshore wind farm being developed by Norfolk Vanguard Limited (or an affiliate company), with a capacity of 1800MW, enough to power 1.3 million UK households. The offshore wind farm comprises two distinct areas, Norfolk Vanguard East (NV East) and Norfolk Vanguard West (NV West) and will be connected to the shore by offshore export cables installed within the provisional offshore cable corridor. The project will also require onshore infrastructure in order to connect the offshore wind farm to the National Grid at the existing National Grid substation at Necton, which in summary will comprise the following:

- Landfall;
- Cable relay station (if required);
- Underground cables;
- Onshore substation; and
- Extension to the existing Necton National Grid substation.

3.1.2. The location of the onshore electrical infrastructure is shown on Figure 1, Appendix A: of the Extended Phase 1 Habitat Survey Report (Royal HaskoningDHV, 2017a). Collectively the onshore electrical infrastructure is herein referred to as the 'onshore project area'.

3.1.3. During the development of the project, the onshore Scoping Area that was initially defined has been refined, to include three landfall options, associated cable relay search zones, as well as an onshore substation search zone in proximity to the Necton National Grid substation. A 200m wide cable corridor has been identified within which the buried cable will be located, and Horizontal Directional Drilling (HDD) zones and mobilisation zones have been identified along the cable corridor.

3.1.4. The surveys described within this report were designed and based on the onshore project area which was in use when the project Extended Phase 1 Habitat Survey was undertaken (February 2017). As the project design is further refined, these search zones will decrease in size, and the final options for the siting of infrastructure (i.e. one cable relay station, one landfall, one onshore substation) will be taken forward for the final Development Consent Order (DCO) application in June 2018.

3.2. Aim of report

3.2.1. As Norfolk Vanguard is a Nationally Significant Infrastructure Project (NSIP) an Environmental Impact Assessment (EIA) is required as part of a DCO application under the Planning Act 2008.

3.2.2. Norfolk Wildlife Services were appointed in late April 2017 to undertake additional ecological surveys to support this application as set out within the Survey Scope (Royal HaskoningDHV, 2017b).

3.3. Survey objective

3.3.1. To ascertain, based on transect and static detector surveys, whether bats are commuting or foraging along linear features identified by the Extended Phase 1 Habitat Survey as providing "moderate" or "high" suitability for supporting commuting or foraging bats, which species and in what numbers.

3.4. Survey scope

3.4.1. Development of survey scope

3.4.1.1. An Extended Phase 1 Habitat Survey of the project area was undertaken during February 2017, and reported in Norfolk Vanguard Offshore Wind Farm Extended Phase 1 Habitat Survey Report (Document ref: PB4476-003-040)).

3.4.1.2. The Extended Phase 1 Habitat Survey identified the potential for legally protected species located within the project area plus a 50m buffer surrounding the project area, and provided recommendations for further surveys required to characterise the ecological baseline for the project area.

3.4.1.3. Potential habitat features were identified and evaluated as to their suitability for foraging or commuting bats in the Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2017a). All those with “medium” or “high” potential were recommended by Royal HaskoningDHV (2017b) for additional surveys.

3.4.1.4. Norfolk Wildlife Services were appointed in late April 2017 to undertake additional ecological surveys to support this application as set out within the Survey Scope (Royal HaskoningDHV 2017b).

3.4.2. Scoping of survey locations

Transects

3.4.2.1. The Extended Phase 1 Habitat Survey (Royal HaskoningDHV, 2017a) identified 167 linear features as providing moderate or high suitability to support commuting or foraging bats. Following a review of the linear features data, groupings of these features were made which identified 59 survey locations.

3.4.2.2. In practice, survey access was not possible for all areas of each survey location. Therefore, for the purposes of data collection the 59 survey locations were proposed to be surveyed as 25 transects, each indexed by a number (BACT1, BACT2, etc.), encompassing as far as possible the groupings of identified linear features and in particular 59 survey locations (Royal HaskoningDHV 2017b).

Statics

3.4.2.3. 59 provisional static detector locations were set out within the Survey Scope (Royal HaskoningDHV, 2017b). These original locations identified potential representative points for groups of linear features and are shown within the maps for the Survey Scope.

3.4.2.4. The 59 identified survey locations were subsequently amended so that static detectors were grouped into the 25 transects areas (BACT1, BACT2) as far as possible, and each static detector location indexed by a number (BA1, BA2, etc.). Three detectors have been used on linear feature networks with at most “high suitability” to support commuting and foraging bats, and two detectors have been used on linear feature networks with at most “moderate suitability” to support commuting and foraging bats.

3.4.2.5. There was a maximum survey effort of 60 static locations proposed, one greater than the 59 static sampling points identified by the Extended Phase 1 Habitat survey.

4. Methodology

4.1. Section 4.1 sets out the proposed survey protocol as agreed between Royal HaskoningDHV and Norfolk Wildlife Services prior to any field work commencing, and Section 4.2 sets out how the surveys were delivered in practice in relation to the protocol and identifies any deviations or modifications that took place during the delivery phase.

4.1. Survey protocol

4.1.1. This Section details the proposed survey protocol as agreed between Royal HaskoningDHV and Norfolk Wildlife Services prior to any field work commencing.

Relevant guidance

4.1.2. The following guidance document was used to inform development of the survey methodology:

Collins, J. (Ed.). (2016). Bat surveys for professional ecologists: good practice guidelines. Third edition. Bat Conservation Trust.

Survey locations

4.1.3. Subsequent to the commencement of contract, a further area located along the Dilham Canal (BACT21) was identified as an additional site which may support commuting and foraging bats and included within the scope of works.

4.1.4. Survey locations are described in the table in Appendix 1: Transect details and descriptions Appendix 2: Static locations descriptions and are presented on maps in Appendix 5: Maps.

Survey methodology

4.1.5. A full technical protocol for the collection of data using SM4s and subsequent analysis is given in Annex 1: Process for auto identification.

Transects

4.1.6. Proposed transect routes will be designed in 25 locations, encompassing as many previously identified static points as possible.

4.1.7. For all habitats scoped into the assessment, bat activity transect surveys will be undertaken.

4.1.8. Transect surveys will involve walking at a constant speed along each linear bat habitat (or the one edge of the two-dimensional bat habitat) recording observations such as number of bats, flight direction, flight height, behaviour, appearance and relative speed. Weather conditions including temperature, wind speed and precipitation, will be recorded at the start and end of each survey visit.

4.1.9. Field observation will be relied upon as the primary method for species identification. Bat detectors will be used to listen to bats during surveys. An SM4 ZC unit with an attached GPS will be used to make a permanent record of the transect.

4.1.10. A field recording set will be retained in the compressed Zero Crossing Analysis (ZCA) format. Laboratory sound-analysis will subsequently be used to identify the calls of any bat species picked up using the bat detectors.

Statics

4.1.11. For all transects identified in the previous section, static detector surveys will be set up in parallel.

4.1.12. These will involve placement of a static detector at locations identified as suitable through judgement of the surveying ecologist whilst on site. SM4 ZC recorders will be

deployed in suitable locations separated from stock and other potential hazards. Where an SM4 ZC fails during deployment, the survey will be repeated.

4.1.13. Data from these surveys will be recorded and subject to sound-analysis to identify species and pass numbers following the survey.

Survey timing and weather conditions

Transects

4.1.14. For transects of “moderate” suitability for commuting or foraging bats scoped into the survey, these will be subject to one transect survey visit per month from April to October 2017(eight visits), including one dusk and pre-dawn survey within a 24-hour period.

4.1.15. For localities of “high” suitability for commuting or foraging bats, these will be subject to two survey visits per month from April to October (16 visits), including one dusk and pre-dawn survey within a 24-hour period.

4.1.16. The transect surveys will commence at sunset, and cease a minimum of 2 hours after sunset. Sunset and sunrise times will be standardised using the time and date website: <https://www.timeanddate.com/sun/uk/norwich>.

4.1.17. Surveys will not be carried out when the temperature is below 10°C at sunset/sunrise, or during heavy rain or strong wind unless justified by the surveying ecologist.

Statics

4.1.18. The surveys will use SM4 ZC static detectors. Deployment of SM4 ZC recorders will follow the user guide¹.

4.1.19. For transects identified as being of moderate habitat for commuting or foraging bats, static bat detector surveys will take place at two locations on five consecutive nights per month between April and October.

4.1.20. For transects identified as being of high suitability for commuting or foraging bats, static bat detector surveys will take place at three locations on five consecutive nights per month between April and October.

4.1.21. Static detector surveys will be programmed to commence 30 minutes before sunset, and cease 30 minutes after sunrise.

4.1.22. Periods of prolonged bad weather will be noted for static detectors.

Equipment

4.1.23. Whilst walking the transect, surveyors will use SM4 ZCA units with an attached GPS as well as their personal bat detectors to listen to any echolocation calls. The make of bat detector used by each surveyor will be recorded.

4.1.24. Wildlife Acoustics Kaleidoscope software will be used for analysis.

Personnel

4.1.25. All surveys will be undertaken by suitably experienced bat surveyors, who will either be members of CIEEM or act according to its code of conduct.

4.1.26. No lone working is permitted, each transect will be undertaken by a single surveyor. An additional safety worker will be present, but will only assist the surveyor (e.g. by note taking).

4.2. Survey delivery

4.2.1. The following section details how the work was delivered in relation to the protocol and identifies any deviations or modifications that took place during the delivery phase. The protocol was followed for the emergence surveys as far as possible or reasonable. Variations from this are noted in 4.2.2. Limitations.

4.2.1. Survey methodology as delivered

Survey access

4.2.1.1. Surveys were delivered on a total of 27 transects and 64 static detectors. A further four static detectors were also deployed outside of any established transect, due to changes in transect location (BA05, BA39, BA57 and BA61X).

4.2.1.2. Access to survey sites was on a voluntary basis by landowners and some proposed² transect routes could not be surveyed. Furthermore, some landowners withdrew access during the project. Details of access for each transect and any resultant alterations are given in Table 2.

Table 1 : Summary of areas where activity surveys carried out

Transect Habitat Suitability	Number
High	10
Medium	17
TOTAL	27

Table 2 : Transects surveys – details of access

Transects #	Habitat Suitability Assessment	Related statics	Details of access	Changes to transect
BACT01	Medium	None	Access not achieved	Replaced with BACT27
BACT02	Low	BA07, BA08	Access not achieved	Withdrawn
BACT03	Medium	BA06, BA69X	Access granted	-
BACT04	High	BA70X, BA71X	Access permission withdrawn by landowner on 24.08.17	No further surveys after that date
BACT05	High	BA10, BA11, BA95X	Access granted	-
BACT06	Medium	BA14, BA15, BA16	Access not achieved	Replaced with BACT28
BACT07	Medium	BA17, BA18, BA19	Access not achieved	Withdrawn
BACT08	Medium	BA20, BA21	Access granted	-
BACT09	High	BA23, BA92X, BA97X	Access granted	-
BACT10	High	BA24, BA72X, BA98X	Access granted	-
BACT11	Medium	BA27, BA28	Access not achieved	Replaced with BACT29
BACT12	Medium	BA29	Access not achieved	Replaced with BACT30
BACT13	Medium	BA73X, BA74X	Access granted	-
BACT14	High	BA63X, BA66X, BA100X	Access granted	-
BACT15	Medium	BA32, BA33	Access permission withdrawn by landowner on 12.06.17	Replaced with BACT31
BACT16	Medium	BA35, BA75	Access granted	-
BACT17	Medium	BA91X, BA37	Access granted	-

² Transects proposed within the Royal HaskoningDHV Survey Scope (Royal HaskoningDHV, 2017b)

Transects #	Habitat Suitability Assessment	Related statics	Details of access	Changes to transect
BACT18	Medium	BA43, BA44	Access granted	-
BACT19	Medium	BA55, BA56	Access granted	-
BACT20	High	BA02, BA03, BA04	Access permission withdrawn by landowner on 30.08.17	No further surveys after that date
BACT21	High	BA62X, BA76X, BA106X	Access granted	-
BACT22	High	BA48, BA60X, BA107X	Access granted	-
BACT23	Medium	None	Access not achieved	Withdrawn
BACT24	Medium	BA65X, BA108X	Access permission withdrawn by landowner on 24.08.17	Replaced by BACT34; no further surveys after that date
BACT25	Medium	BA77X, BA78X	Access not achieved	Replaced with BACT28
BACT26	Medium	BA79X, BA08X	Access granted	-
BACT27	Medium	BA81X, BA82X	Access granted	-
BACT28	Medium	BA13, BA111X	Access granted	-
BACT29	Medium	BA25, BA26	Access granted	-
BACT30	Medium	BA64X, BA87X,	Access granted	-
BACT31	High	BA67X, BA68X, BA114X	Access granted	-
BACT32	Medium	BA88X, BA89X	Access granted	-
BACT33	Medium	BA40, BA41	Access granted	-
BACT34	Medium	BA52, BA90X	Access granted	-
BACT35	Medium	BA118X, BA119X	Access permission withdrawn by landowner on 24.08.17	No further surveys after that date

Transects survey effort

4.2.1.3. A summary of survey effort by month is given in Table 3 below.

Table 3 : Transects surveys – dates of surveys by month

Transects #	Habitat Suitability Assessment	April 2017	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017	Total number of surveys
BACT03	Medium	No survey	No survey	No survey	03/07/17; 04/07/17	03/08/17	01/09/17	26/10/17	5
BACT04	High	No survey	No survey	20/06/17; 21/06/17	03/07/17	03/08/17; 14/08/17	No survey	No survey	5
BACT05	High	No survey	25/05/17	12/06/17; 26/06/17	18/07/17	08/08/17; 22/08/17	06/09/17; 19/09/17	03/10/17; 04/10/17; 17/10/17	11
BACT08	Medium	No survey	22/05/17	02/06/17; 12/06/17	11/07/17; 14/07/17	07/08/17	04/09/17; 12/09/17	02/10/17	9
BACT09	High	No survey	10/05/17	13/06/17; 29/06/17	13/07/17; 27/07/17	29/08/17	12/09/17; 26/09/17; 27/09/17	10/10/17; 24/10/17	11
BACT10	High	No survey	10/05/17	No survey	07/07/17; 18/07/17	04/08/17; 25/08/17	22/09/17; 29/09/17	06/10/17; 20/10/17	9
BACT13	Medium	No survey	26/05/17	19/06/17; 21/06/17	No survey	18/08/17; 19/08/17	18/09/17	31/10/17	7
BACT14	High	No survey	No survey	08/06/17; 22/06/17	06/07/17; 27/07/17	10/08/17; 31/08/17	14/09/17; 15/09/17; 28/09/17	12/10/17; 26/10/17	11
BACT 15	Medium	No survey	No survey	07/06/17	No survey	No survey	No survey	No survey	1
BACT16	Medium	No survey	No survey	No survey	04/07/17	02/08/17; 15/08/17	07/09/17	05/10/17; 06/10/17	6
BACT17	Medium	No survey	30/05/17	23/06/17	24/07/17	14/08/17	11/09/17; 12/09/17	09/10/17	7
BACT18	Medium	No survey	24/05/17	01/06/17	12/07/17	16/08/17	20/09/17; 21/09/17	23/10/17	7
BACT19	Medium	No survey	No survey	09/06/17; 25/06/17	05/07/17	16/08/17	06/09/17; 07/09/17	18/10/17	7
BACT20	High	No survey	15/05/17; 30/05/17	26/06/17	12/07/17; 13/07/17; 31/07/17	21/08/17	No survey	No survey	7
BACT21	High	No survey	22/05/17; 31/05/17	19/06/17; 29/06/17	31/07/17	07/08/17; 30/08/17	04/09/17; 18/09/17; 19/09/17	03/10/17; 17/10/17	12
BACT22	High	No survey	22/05/17	15/06/17	No survey	22/08/17; 23/08/17; 29/08/17	12/09/17; 26/09/17	10/10/17; 24/10/17	9
BACT24	Medium	No survey	No survey	07/06/17	No survey	No survey	No survey	No survey	1

Transects #	Habitat Suitability Assessment	April 2017	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017	Total number of surveys
BACT26	Medium	No survey	No survey	20/06/17; 21/06/17	31/07/17	08/08/17	21/09/17	05/10/17	6
BACT27	Medium	No survey	No survey	13/06/17	03/07/17	30/08/17	08/09/17; 09/09/17	13/10/17	6
BACT28	Medium	No survey	No survey	21/06/17; 30/06/17	19/07/17	23/08/17	13/09/17; 14/09/17	11/10/17	7
BACT29	Medium	No survey	No survey	No survey	04/07/17	11/08/17; 30/08/17	04/09/17; 05/09/17	02/10/17	6
BACT30	Medium	No survey	26/05/17	28/06/17	25/07/17	22/08/17	19/09/17; 20/09/17	19/10/17	7
BACT31	High	No survey	No survey	12/06/17; 26/06/17	12/07/17; 26/07/17	23/08/17; 31/08/17	01/09/17; 15/09/17	09/10/17; 25/10/17	10
BACT32	Medium	No survey	No survey	15/06/17	12/07/17	15/08/17; 16/08/17	19/09/17	No survey	5
BACT33	Medium	No survey	No survey	14/06/17	21/07/17	24/08/17; 25/08/17	29/09/17	No survey	5
BACT34	Medium	No survey	No survey	30/06/17	05/07/17;	17/08/17	12/09/17	10/10/17; 11/10/17	6
BACT35	Medium	No survey	No survey	No survey	30/07/17	No survey	No survey	No survey	1

Statics survey effort

4.2.1.4. Full dates for static deployments are given in Appendix 4 : Details of static deployments.

Table 4 : Static surveys –total deployment nights for each transect

Transect location	Total nights deployment on transect for all statics
BACT03	37
BACT04	55
BACT05	88
BACT08	90
BACT09	95
BACT10	92
BACT13	45
BACT14	95
BACT15	10
BACT16	54
BACT17	77
BACT18	68
BACT19	54
BACT20	173
BACT21	106
BACT22	77
BACT24	6
BACT26	48
BACT27	45
BACT28	52
BACT29	52
BACT30	66
BACT31	113
BACT32	64
BACT33	55
BACT34	50
BACT35	18
Unassociated	54
Grand Total	1839

4.2.1.5. A summary of survey effort by month is given in the following table. Please note that deployments at end of months may overlap into the following month.

Table 5 : Static surveys –total nights each month deployment per static detector

Transect reference	Static point	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017
BACT03	BA06	0	0	3	4	6	5
BACT03	BA69X	0	0	3	4	6	6
BACT04	BA70X	0	6	4	6	0	0
BACT04	BA71X	0	5	0	14	0	0
BACT04	BA93X	0	2	4	14	0	0
BACT05	BA10	7	11	3	6	4	5
BACT05	BA11	7	7	0	6	7	6
BACT05	BA95X	0	4	0	5	4	6
BACT08	BA20	0	18	13	1	8	9
BACT08	BA21	0	18	6	0	8	9
BACT09	BA23	10	5	9	6	5	7
BACT09	BA92X	0	9	8	6	2	9
BACT09	BA97X	0	0	8	6	0	5
BACT10	BA24	9	0	12	6	5	5
BACT10	BA72X	0	0	11	6	5	5
BACT10	BA98X	0	0	12	6	5	5
BACT13	BA73X	0	4	0	5	7	6
BACT13	BA74X	0	4	0	6	7	6
BACT14	BA100X	0	5	5	6	5	5
BACT14	BA63X	6	5	5	5	5	5
BACT14	BA66X	0	11	10	5	6	6
BACT15	BA32	0	5	0	0	0	0
BACT15	BA33	0	5	0	0	0	0
BACT16	BA35	0	0	6	13	3	5
BACT16	BA75X	0	0	6	14	3	4
BACT17	BA36	8	0	0	0	0	0
BACT17	BA37	8	4	0	0	8	7
BACT17	BA38	8	0	4	0	0	0
BACT17	BA91X	0	4	4	7	8	7

Transect reference	Static point	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017
BACT18	BA43	8	5	5	5	4	6
BACT18	BA44	8	5	5	5	5	7
BACT19	BA55	0	9	6	0	5	5
BACT19	BA56	0	9	6	9	0	5
BACT20	BA02	16	15	5	24	0	0
BACT20	BA03	16	9	13	24	0	0
BACT20	BA04	16	14	4	17	0	0
BACT21	BA106X	0	7	7	7	9	4
BACT21	BA62X	14	7	6	7	14	5
BACT21	BA76X	0	7	0	6	0	6
BACT22	BA107X	0	0	0	3	8	6
BACT22	BA48	7	5	0	6	8	6
BACT22	BA60X	9	0	0	7	6	6
BACT24	BA65X	0	6	0	0	0	0
BACT26	BA79X	0	6	1	8	5	6
BACT26	BA80X	0	6	3	2	5	6
BACT27	BA81X	0	6	4	13	0	5
BACT27	BA82X	0	6	4	2	0	5
BACT28	BA111X	0	5	5	5	5	5
BACT28	BA13	0	6	5	6	5	5
BACT29	BA25	0	0	6	9	7	4
BACT29	BA26	0	0	1	10	8	7
BACT30	BA64X	11	6	4	5	5	5
BACT30	BA87X	0	6	6	7	6	5
BACT31	BA114X	0	4	5	8	5	5
BACT31	BA67X	0	11	5	8	6	8
BACT31	BA68X	0	11	13	6	10	8
BACT32	BA88X	0	8	5	5	6	7
BACT32	BA89X	0	8	5	6	7	7
BACT33	BA40	0	5	5	6	5	7
BACT33	BA41	0	5	5	5	5	7
BACT34	BA52	0	11	6	7	7	0
BACT34	BA90X	0	5	6	3	0	5

Transect reference	Static point	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017
BACT35	BA118X	0	0	0	9	0	0
BACT35	BA119X	0	0	0	9	0	0
External	BA05	21	0	0	0	0	0
External	BA39	8	0	0	0	0	0
External	BA57	0	5	0	0	0	0
External	BA61X	15	5	0	0	0	0

4.2.1.6. No surveys were carried out at the following static points.

Table 6 : Static surveys

Static point	Transect reference	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017
BA01	None	0	0	0	0	0	0
BA09	None	0	0	0	0	0	0
BA12	None	0	0	0	0	0	0
BA30	None	0	0	0	0	0	0
BA31	None	0	0	0	0	0	0
BA45	None	0	0	0	0	0	0
BA46	None	0	0	0	0	0	0
BA47	None	0	0	0	0	0	0
BA49	None	0	0	0	0	0	0
BA50	None	0	0	0	0	0	0
BA51	None	0	0	0	0	0	0
BA59	None	0	0	0	0	0	0

Timing and weather conditions

4.2.1.7. The weather conditions and timings during the surveys are given in the following table. An assessment of any related limitations for each survey can be found in 4.2.2. Limitations.

4.2.1.8. In general, the weather throughout the 2017 survey season was warm and dry with light wind conditions consistent as specified in Survey Protocol as suitable survey conditions, with only occasional surveys being cancelled due to bad weather. Storm Aileen impacted the UK on 12 -13 September 2017 and associated weather effects persisted for a week which impacted on static surveys during this period. Otherwise no extreme weather events were noted.

Personnel and Equipment

4.2.1.9. All surveys were undertaken by experienced bat surveyors, who are listed below in Table 7 below. Surveyors were accompanied by a safety worker on all surveys.

4.2.1.10. Bat surveys were recorded using an SM4, but surveyors also had personal equipment as shown below.

Table 7 : Surveyor experience

Team member	Experience	Memberships	Equipment used
James Allitt	14 years' experience of ecological surveying, including bats	-	Batbox Duet
Karl Charters	20 years' experience in ecological surveying, including bats. Holds a level 1 bat licence	-	Batbox Duet
Ben Christie	5 years' experience in ecological surveying, including bats. Holds a level 1 bat licence	GradCIEEM	Batbox Duet
James Goldsmith	8 years' experience in ecological surveying, including bats. Holds a level 1, 3 and 4 bat licence	-	Echo Meter Touch
Abi Gray	6 years' experience in ecological surveying, including bats. Holds a level 2 bat licence	ACIEEM	Echo Meter EM3
Ben Moore	2 years' experience of ecological surveying, including bats	GradCIEEM	Batbox Duet
Sally McColl	10 years' experience of ecological surveying, including bats	-	Batbox Duet
Carolyn Smith	4 years' experience of ecological surveying, including bats	GradCIEEM	Batbox Duet
Sue Traer	15 years' experience in ecological surveying, including bats. Holds a level 1 bat licence	MCIEEM	Echo Meter Touch
John Worthington-Hill	6 years' experience in ecological surveying, including bats.	-	Batbox Duet
Lisa Treadwell	8 years' experience of ecological surveying, including bats	-	Batbox Duet
Chris Bawler	2 years' experience of ecological surveying, including bats.	-	Batbox Duet

4.2.2. Limitations

4.2.2.1. A summary of the survey limitations encountered for all transects is set out below. Detailed limitations for each survey transect, including any notable limitations which may affect data quality, are set out in Table 9.

Survey timing

4.2.2.2. No surveys were able to be carried out on any transects in April 2017. Some limited data was available from statics in early May from this spring 2017 period. There is therefore a general issue in lack of survey information during the spring period. This may affect results in habitats where there is significant seasonal variation in food supply availability e.g. flood plains and broadleaved woodland.

4.2.2.3. For many transects the length of the proposed transect route took less than two hours to survey in full. For these transects, surveyors visited at different times within the period from 30 minutes before dusk to two hours after dusk to ensure that species which are active early or late were covered. This is not anticipated to affect the quality of the data received.

4.2.2.4. The duration of surveys is given in Appendix 3: Transect survey effort

Weather conditions

4.2.2.5. Weather was calm, dry and mild during October 2017, and early autumn coverage for bats was therefore good where access was available to carry out the surveys. Weather conditions encountered during each survey are provided within Appendix 3.

Survey approach

4.2.2.6. Transects were limited in length by landownership boundaries in relation to features of interest meaning that in general transects were quicker than a two-hour walked duration. Where a circuit substantially exceeded an hour, a second circuit of the route was not made, due to the logistics e.g. taking the total duration to well over 2 hours and the difficulties of interpreting data e.g. where there was uneven coverage between survey visits.

4.2.2.7. Consequently many transects had below two hours of transect walking for bats, although some differences are relatively small. Each transect continued to have 12 two-minute stopping points. Surveyors were generally present at the transect location for additional periods of time, where:

1. They were awaiting the start time or had to walk to the start point for the survey
2. During or after the transect surveys, whilst deploying the static detectors.

4.2.2.8. This reduced walked effort deviates from the protocol. The duration of individual surveys is given in Appendix 3: Transect survey effort. Practically the differences are not seen as substantial since:

1. The walked transects are backed by substantial static datasets over an extended period
2. The statics are "back-to-back" with the walked transects, so form a logical continuation of them
3. The behavioural observations by surveyors are most powerful at sunset and during twilight when bats are still visible and this coverage remained.

4.2.2.9. No behavioural observations were available for static detector surveys, when deployed following transect surveys, but this was not seen as significant limitation. In practice since all transect surveys continued until complete darkness, surveyors' observations would have been limited to contacts on bat detectors with bats without further details e.g. on their exact locations or direction of flight, etc. In total there were 1839

complete nights of static detection compared to 184 transects. The curtailment of transects is not therefore seen as being a significant constraint on the results, especially with respect to presence/absence of particular species.

4.2.2.10. Statics were deployed by attachment to suitable objects such as trees and could not be placed in the open due to farming operations. The microphones on the statics are affected by surrounding clutter for example trees and buildings, but also the availability of suitable deployment sites means that they cannot be placed in open wetland areas. This is not seen as a major limitation, but may alter relative numbers of tracks.

Data analysis

4.2.2.11. Detectability of bats varies by species and the intensity and loudness of their calls. A classification for this is given within Barataud (2015). In general this is not seen as presenting a limitation to the survey results, but means that numerical results between species are not comparable.

4.2.2.12. It is likely that brown long-eared bat *Plecotus auritus*, which are exceptionally quiet in echolocating, will be significantly underrepresented within the results and may be present at sites where survey results indicate absence. This is a known issue and provide that this caveat is placed on the data, no other significant constraints are envisaged.

Limitations by transect

4.2.2.13. The table below (Table 8) compares the number of survey visits achieved for each transect throughout the year against the recommended number of visits set out in the survey protocol.

4.2.2.14. Table 9 summarises for each transect: Access limitations, including any visibility issues, weather and survey effort limitations for transects and static. It makes a categorical assessment as to whether these limitations significantly affect the quality of the data. Transects highlighted in orange have significant limitations.

Table 8 : Details of specified transect visit effort versus actual survey effort

Transects #	Habitat Suitability Assessment	SPRING			SUMMER		AUTUMN		Total number of surveys	Programmed number	Variation
		April 2017	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017			
BACT03	Medium	No survey	No survey	No survey	2	1	1	1	5	8	3
BACT04	High	No survey	No survey	2	1	2	No survey	No survey	5	15	10
BACT05	High	No survey	1	2	1	2	2	3	11	15	4
BACT08	Medium	No survey	1	2	2	1	2	1	9	8	-1
BACT09	High	No survey	1	2	2	1	3	2	11	15	4
BACT10	High	No survey	1	No survey	2	2	2	2	9	15	6
BACT13	Medium	No survey	1	2	No survey	2	1	1	7	8	1
BACT14	High	No survey	No survey	2	2	2	3	2	11	15	4
BACT 15	Medium	No survey	No survey	1	No survey	No survey	No survey	No survey	1	8	7
BACT16	Medium	No survey	No survey	No survey	1	2	1	2	6	8	2
BACT17	Medium	No survey	1	1	1	1	2	1	7	8	1
BACT18	Medium	No survey	1	1	1	1	2	1	7	8	1
BACT19	Medium	No survey	No survey	2	1	1	2	1	7	8	1
BACT20	High	No survey	2	1	3	1	No survey	No survey	7	15	8
BACT21	High	No survey	2	2	1	2	3	2	12	15	3
BACT22	High	No survey	1	1	No survey	3	2	2	9	15	6
BACT24	Medium	No survey	No survey	1	No survey	No survey	No survey	No survey	1	15	14
BACT26	Medium	No survey	No survey	2	1	1	1	1	6	8	2

		SPRING			SUMMER			AUTUMN				
Transects #	Habitat Suitability Assessment	April 2017	May 2017	June 2017	July 2017	August 2017	September 2017	October 2017	Total number of surveys	Programmed number	Variation	
BACT27	Medium	No survey	No survey	1	1	1	2	1	6	8	2	
BACT28	Medium	No survey	No survey	2	1	1	2	1	7	8	1	
BACT29	Medium	No survey	No survey	No survey	1	2	2	1	6	8	2	
BACT30	Medium	No survey	1	1	1	1	2	1	7	8	1	
BACT31	High	No survey	No survey	2	2	2	2	2	10	15	5	
BACT32	Medium	No survey	No survey	1	1	2	1	No survey	5	8	3	
BACT33	Medium	No survey	No survey	1	1	2	1	No survey	5	8	3	
BACT34	Medium	No survey	No survey	1	1	1	1	2	6	8	2	
BACT35	Medium	No survey	No survey	No survey	1	No survey	No survey	No survey	1	8	7	

Table 9 : Survey limitations – combined static and manual surveys

Survey Location	Habitat Suitability Assessment	Access limitations, including any visibility issues	Weather limitations	Survey effort – <u>Transect</u> Static	Limitation to survey results
BACT01		N/A	N/A	N/A	Significant impact. Unable to assess any potential bat activity.
				N/A	
BACT02		N/A	N/A	N/A	Significant impact. Unable to assess any potential bat activity.
				N/A	
BACT03	Medium	None	None	No survey in April, May or June 2017	Moderate impact. Limited data regarding bat activity early in the season.
				No survey in April, May 2017; Statics deployed for less than 10 days in July and August 2017	
BACT04	High	Access permission withdrawn by landowner on 24.08.17	03/08/17 – Wind BWS4; 14/08/17 – Rain at start	No surveys in April, May, September or October 2017; Only 1 survey in July 2017; Two surveys not carried out within 24hour period	Moderate impact. Limited data regarding bat activity early or late in the season.
				No surveys April, May, September or October 2017; Statics deployed for less than 15 days in June and July 2017	
BACT05	High	None	10/05/17 – Starting temperature less than 10°C; 08/08/17 – Heavy rain for last 30minutes of survey	No survey in April 2017; Only 1 survey in May and July 2017.	No impact. Sufficient survey data to indicate bat activity.
				No surveys in April, May 2017	
BACT06		N/A	N/A	N/A	Significant impact. Unable to assess any potential bat activity.
				N/A	
BACT07		N/A	N/A	N/A	Significant impact. Unable to assess any potential bat activity.
				N/A	

Survey Location	Habitat Suitability Assessment	Access limitations, including any visibility issues	Weather limitations	Survey effort – <u>Transect</u> <u>Static</u>	Limitation to survey results
BACT08	Medium	None	None	No survey in April 2017; Two surveys not carried out within 24hour period	No impact. Sufficient survey data to indicate bat activity.
				No survey in April or May 2017; Statics deployed for less than 10 days in August 2017	
BACT09	High	None	29/08/17 and 12/09/17 – Wind BWS4	No survey in April 2017; Only 1 survey carried out in May and August 2017	No impact. Sufficient survey data to indicate bat activity.
				No survey April 2017; Statics deployed for less than 15 days in May, June and September 2017	
BACT10	High	None	None	No survey in April or June 2017; Only 1 survey carried out in May 2017; Two surveys not carried out within 24hour period	No impact. Sufficient survey data to indicate bat activity.
				No survey in April or June 2017; Statics deployed for less than 15 days in May 2017	
BACT11		N/A	N/A	N/A	Significant impact. Unable to assess any potential bat activity.
				N/A	
BACT12		N/A	N/A	N/A	Significant impact. Unable to assess any potential bat activity.
				N/A	
BACT13	Medium	None	None	No survey in April or July 2017	No impact. Sufficient survey data to indicate bat activity.
				No survey in April, May or July 2017; Statics deployed for less than 10 days in June 2017	
BACT14	High	None	15/09/17 - Starting temperature less than 10°C; 27/07/17 – rain preceding survey; 14/09/17 – rain for last 10 minutes of survey	No survey in April or May 2017	No impact. Sufficient survey data to indicate bat activity.
				No survey in April 2017; Statics deployed for less than 15 days in May 2017	
BACT15	Medium	Access permission withdrawn by landowner on 12.06.17	N/A	N/A	Significant impact. Limited data regarding bat activity at the site.

Survey Location	Habitat Suitability Assessment	Access limitations, including any visibility issues	Weather limitations	Survey effort – <u>Transect</u> <u>Static</u>	Limitation to survey results
				No surveys in April, May or July-October 2017	
BACT16	Medium	None	07/09/17 - Rain	No surveys in April, May or June 2017	Moderate impact. Limited data regarding bat activity early in the season.
				No surveys in April-June 2017; Statics deployed for less than 10 days in September and October 2017	
BACT17	Medium	None	11/09/17 – Wind BWS4; 24/07/17 – Heavy drizzle before survey and for last hour	No survey in April 2017	No impact. Sufficient survey data to indicate bat activity.
				No survey in April 2017; Statics deployed for less than 10 days in June-August 2017	
BACT18	Medium	None	None	No survey in April 2017	No impact. Sufficient survey data to indicate bat activity.
				No survey in April 2017; Statics deployed for less than 10 days in September 2017	
BACT19	Medium	None	18/10/17 – Wind BWS4	No surveys in April or May 2017	Moderate impact. Limited data regarding bat activity early in the season.
				No surveys in April or May 2017; Statics deployed for less than 10 days in August and September 2017	
BACT20	High	Access permission withdrawn by landowner on 30.08.17	15/05/17 – Wind BWS4	No surveys in April, September or October 2017	Moderate impact. Limited data regarding bat activity late in the season.
				No surveys in April, September or October 2017	
BACT21	High	None	None	No survey in April 2017; Only 1 survey in July 2017	No impact. Sufficient survey data to indicate bat activity.
				No survey in April 2017; Statics deployed for less than 15 days in May 2017	
BACT22	High	None	None	No surveys in April or July 2017; Only 1 survey in May and June 2017	No impact. Sufficient survey data to indicate bat activity.
				No surveys in April or July 2017; Statics deployed for less than 15 days in June 2017	

Survey Location	Habitat Suitability Assessment	Access limitations, including any visibility issues	Weather limitations	Survey effort – <u>Transect</u> Static	Limitation to survey results
BACT23		N/A	N/A	N/A	Significant impact. Unable to assess any potential bat activity.
				N/A	
BACT24	Medium	Access permission withdrawn by landowner on 24.08.17	None	No surveys in April- May or July-October 2017; Two surveys not carried out within 24hour period	Moderate impact. Limited data regarding bat activity mid and late in the season.
				No survey in April, May or July-October 2017; Statics deployed for less than 15 days in June 2017	
BACT25		N/A	N/A	N/A	Significant impact. Unable to assess any potential bat activity.
				N/A	
BACT26	Medium	None	08/08/17 – Rain for last hour of survey; 05/10/17 – Rain showers	No surveys in April or May 2017	Moderate impact. Limited data regarding bat activity early in the season.
				No surveys in April or May 2017; Statics deployed for less than 10 days in July 2017	
BACT27	Medium	None	None	No surveys in April or May 2017	Moderate impact. Limited data regarding bat activity mid and late in the season.
				No surveys in April, May or September 2017; Statics deployed for less than 10 days in July 2017	
BACT28	Medium	None	14/09/17 - Starting temperature less than 10°C	No surveys in April or May 2017	Moderate impact. Limited data regarding bat activity early in the season.
				No surveys in April or May 2017	
BACT29	Medium	None	02/10/17 – Wind BWS4	No surveys in April or May 2017	Moderate impact. Limited data regarding bat activity early in the season.
				No surveys in April or May 2017; Statics deployed for less than 10 days in July 2017	
BACT30	Medium	None	20/09/17 - Starting temperature less than 10°C	No survey in April 2017	No impact. Sufficient survey data to indicate bat activity.

Survey Location	Habitat Suitability Assessment	Access limitations, including any visibility issues	Weather limitations	Survey effort – <u>Transect</u> <u>Static</u>	Limitation to survey results
				No survey in April 2017	
BACT31	High	None	None	No surveys in April or May 2017; Two surveys not carried out within 24hour period	Moderate impact. Limited data regarding bat activity early in the season.
				No surveys in April or May 2017	
BACT32	Medium	None	None	No surveys in April, May or October 2017	Moderate impact. Limited data regarding bat activity early in the season.
				No surveys in April or May 2017	
BACT33	Medium	None	None	No surveys in April, May or October 2017	Moderate impact. Limited data regarding bat activity early in the season.
				No surveys in April or May 2017	
BACT34	Medium	None	30/06/07 and 10/10/17 – Wind BWS4; 12/09/17 – Rain mid survey for 5 minutes	No surveys in April or May 2017	Moderate impact. Limited data regarding bat activity early in the season.
				No surveys in April or May 2017; Statics deployed for less than 10 days in September and October 2017	
BACT35	Medium	Access permission withdrawn by landowner on 24.08.17	None	No surveys in April-June or August-October 2017; Two surveys not carried out within 24hour period	Significant impact. Limited data regarding bat activity at the site.
				No surveys in April-June or August-October 2017	
BA05	N/A	None	None	21 days in May 2017 only	Significant impact. Limited data regarding bat activity at the site but may be of value.
BA39	N/A	None	None	8 days in May 2017 only	Significant impact. Limited data regarding bat activity at the site but may be of value.
BA57	N/A	None	None	5 days in June 2017 only	Significant impact. Limited data regarding bat activity at the site but may be of value.

Survey Location	Habitat Suitability Assessment	Access limitations, including any visibility issues	Weather limitations	Survey effort – <u>Transect</u> Static	Limitation to survey results
BA61X	N/A	None	None	15 days in May 2017; 5 days June 2017	Significant impact. Limited data regarding bat activity at the site but may be of value.

5. Results

5.1. A description of each site can be found in Appendix 1: Transect details and descriptions.

5.2. Summary results for each transect are given in Table 11 : Summary of results for each transect below.

5.3. Full results are provided in the standalone ‘Transect Summary’ documents provided alongside this report.

Table 10 : Explanation of species, status and categories in results

Species	Latin	Code	Notes ³	UK status ⁴
Barbastelle	<i>Barbastella barbastellus</i>	BARBAR	Sec 41; Annx II; IUCN NT	Rare
Serotine	<i>Eptesicus serotinus</i>	EPTSER	IUCN LT	Uncommon, largely restricted to south
Large bat	<i>Not applicable</i>	LARGEBAT	Bat calls with FME<30kHz, but not identifiable further	Not applicable
Myotis aggregate	<i>Myotis spp</i>	MYOSPP	Aggregated; sometimes identifiable in field	Various
Daubenton's	<i>Myotis daubentonii</i>	MYODAU	IUCN LT; Identifiable by behavior when foraging over water bodies	Common
Noise	<i>Not applicable</i>	NOISE	Noise includes non-bat sounds, ambient sounds and any track <3 pulses	Not applicable
Noctule	<i>Nyctalus noctula</i>	NYCNOC	Sec 41; IUCN LT;	Uncommon
Leisler's bat	<i>Nyctalus leisleri</i>	NYCLEI	IUCN LT; confirmed potential calls from statics	Uncommon in GB although may be under recorded, common in Ireland
Other	<i>Not applicable</i>	OTHER	All bats not identifiable to another level; any non-identifiable potential social calls	Not applicable
Nathusius' pipistrelle	<i>Pipistrellus nathusii</i>	PIP NAT	IUCN LT;	Uncommon but widespread, may be under recorded
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	PIPPIP	IUCN LT;	Common
Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	PIPPYG	Sec 41'; IUCN LT;	Common
Brown long-eared	<i>Plecotus auritus</i>	PLEAUR	Sec 41; IUCN LT; low detectability	Common

Abbreviations

*IUCN categories: LC is Least Concern, NT is Near Threatened, DD is Data deficient; see www.iucnredlist.org for more details.

Sec 41 : Section 41 species of principal importance; often referred to as BAP species.

Annx II : Annex II of European Habitats Directive; all bats are protected under Annex IV.

³ Source : Bat Conservation Trust (2016) Table of legal and conservation status of UK bat species. www.bats.org.uk/publications.../Table_of_legal_and_conserv_status_of_UK_bats.pdf

⁴ Source : Bat Conservation Trust (2014) The state of the UK's bats 2014 National Bat Monitoring Programme Population Trends <http://www.bats.org.uk/pages/nbmp.html>

Table 11 : Summary of results for each transect

Transect	Habitat suitability assessment	Associated species	Species present		Key habitats and features for bats	Additional notes on bat activity
			Identified by transects	Identified by statics		
BACT01	N/A	N/A	✘	✘	N/A	N/A
BACT02	N/A	N/A	✘	✘	N/A	N/A
BACT03	Medium	NYCNOC*, PIP NAT*, PIPPIP, PIPPYG, PIPSPP*, PLEAUR*	✓	✓	The tree line around the lodge in the centre north of the transect was a good commuting route for bats. The hedgerow along the southern boundary with the road provided good commuting links. The eastern boundary of the transect was good foraging habitat.	N/A
BACT04	High	BARBAR*, EPTSER*, LARGEBATSPP*, MYOSPP*, NYCNOC*, PIP NAT*, PIPPIP, PIPPYG, PIPSPP PLEAUR*	✓	✓	The tree belt was an excellent commuting and foraging route. The pond was used by foraging bats. Common and soprano pipistrelles were only recorded between walk 5 and stop 12. Even on the dawn where the transect was reversed and started at stop 12 bats were only recorded up until walk 5.	Occasional barbastelles recorded to the north of the transect at BA70X.
BACT05	High	BARBAR*, EPTSER*, LARGEBATSPP*, MYOSPP*, NYCLEI*, NYCNOC*, PIP NAT*, PIPPIP, PIPPYG, PIPSPP PLEAUR*	✓	✓	Key commuting features were hedgerows along field boundaries and the minor road. There were no major breaks in commutable habitat throughout the transect route, with largely intact hedgerows between woodlands. Key foraging habitat was evident within the western section between Walk 1 and Stop 5 and between Walk 8 and Stop 10 in the eastern section.	Barbastelles recorded by statics at the eastern and western areas on the transect at BA11 and BA95X.
BACT06	N/A	N/A	✘	✘	N/A	N/A
BACT07	N/A	N/A	✘	✘	N/A	N/A

Transect	Habitat suitability assessment	Associated species	Species present		Key habitats and features for bats	Additional notes on bat activity
			Identified by transects	Identified by statics		
BACT08	Medium	BARBAR*, EPTSER*, MYOSPP, NYCNOC, PIPPIP, PIPPYG, PLEAUR*	✓	✓	The hedgerows provide good commuting routes with the woodlands providing good connecting habitat. The area of wet grassland to the north provides good foraging habitat	Barbastelles recorded by static detector along the eastern boundary of the transect.
BACT09	High	BARBAR*, MYOSPP, NYCLEI*, NYCNOC, PIPNAT*, PIPPIP, PIPPYG	✓	✓	Along the north small tree lined stream runs E-W and adjoins the nearby river Wensum. This stream and tree line also connects to the west of the transect where there is a strip of deciduous woodland. The woodland running along the western edge of the transect provides a good foraging route.	Barbastelles foraging along the northern edge of the transect above tree lined stream.
BACT10	High	BARBAR*, EPTSER*, MYOSPP, NYCNOC, PIPNAT*, PIPPIP, PIPPYG	✓	✓	River Wensum provides a high quality commuting and foraging route, most notably Daubentons. Hedgerow through the centre of the site also follows drainage ditches and along its length includes large oak standards. A cut channel runs parallel to the river is wider and more open than the other drainage ditches, a key corridor feature for pipistrelles.	Barbastelles recorded along the north-western corner along native species rich hedgerow.
BACT11	N/A	N/A	✗	✗	N/A	N/A
BACT12	N/A	N/A	✗	✗	N/A	N/A
BACT13	Medium	BARBAR*, LARGEBATSPP NYNOC, MYOSPP*, PIPPIP, PIPPYG, PIPSPP	✓	✓	The Marriott's way is an excellent commuting route connecting woodlands to the east at Reepham to wet grassland areas in the west.	Single barbastelle pass recorded by transect detector.

Transect	Habitat suitability assessment	Associated species	Species present		Key habitats and features for bats	Additional notes on bat activity
			Identified by transects	Identified by statics		
BACT14	High	BARBAR*, EPTSER*, NYNOC, MYOSPP*, PIPPIP, PIPPYG, PLEAUR*	✓	✓	Northern section parallel to the road, less favourable to bats with only commuting Noctules registering. Mixed native species along the southern boundary - good linking habitat from East (deciduous woodland) to the West boundary (wet deciduous woodland). Marriott's way (runs east to West to the south of the site) excellent commuting route, which connects other nearby patches of woodland.	Barbastelles frequently recorded along the south and western edges of the transect.
BACT15	Medium	EPTSER*, NYCNOC*, PIP NAT*, PIPPIP, PIPPYG, PLEAUR*	✓	✓	The woodland strip has good connectivity with the wider landscape through adjoining hedgerows which further link to other nearby woodland patches. The woodland and wet grassland to the SW of the transect provide excellent foraging and commuting habitat for bats.	N/A
BACT16	Medium	BARBAR*, EPTSER*, LARGE BATSPP, MYOSPP*, NYCLEI, NYCNOC, PIP NAT*, PIPPIP, PIPPYG, PIPSPP, PLEAUR*	✓	✓	The hedgerows along the western edge of the transect provided a commuting and foraging route for both common and soprano pipistrelles.	Occasional barbastelles records across the transect being recorded at both statics.

Transect	Habitat suitability assessment	Associated species	Species present		Key habitats and features for bats	Additional notes on bat activity
			Identified by transects	Identified by statics		
BACT17	Medium	BARBAR*, EPTSER*, LARGEATSPP, MYOSPP*, NYCLEI*, NYCNOC, PIPNAT*, PIPPIP, PIPPYG, PIPSPP*, PLEAUR	✓	✓	Colby Road was a good commuting route. The hedgerow which runs south from stop point three was another commuting route with bats recorded commuting south into the transect area. The south-western field margins were key foraging areas for common and soprano pipistrelles.	Occasional barbastelles records across the transect being recorded at both statics.
BACT18	Medium	BARBAR*, EPTSER*, LARGEATSPP, MYOSPP*, NYCNOC, PIPNAT*, PIPPIP, PIPPYG, PLEAUR*	✓	✓	The pond was a key foraging area for common pipistrelles. Lyngate Road (along the southern boundary of the transect) was noted as a key foraging route, as was the northern boundary for common and soprano pipistrelle.	Within 10km of Paston SAC. Barbastelle activity recorded by BA43 along Lyngate Road to the west of the transect.
BACT19	Medium	BARBAR*, EPTSER*, LARGEATSPP, MYOSPP*, NYCNOC, PIPNAT, PIPPIP, PIPPYG, PIPSPP	✓	✓	Key foraging area for bats, road and hedgerow to the west of the transect	Within 10km of Paston SAC. Scarce records on BA55, north-west area
BACT20	High	BARBAR*, EPTSER*, LARGEATSPP*, MYOSPP*, NYCNOC, PIPNAT*, PIPPIP, PIPPYG, PIPSPP*, PLEAUR*	✓	✓	Features for commuting and foraging bats were largely restricted to arable hedgerows with field margins. There were two small areas of woodland suitable for foraging bats.	Active on the transect, recorded on static detectors BA03 and BA04.

Transect	Habitat suitability assessment	Associated species	Species present		Key habitats and features for bats	Additional notes on bat activity
			Identified by transects	Identified by statics		
BACT21	High	BARBAR*, LARGEBATSPP, MYOSPP*, NYCNOC, PIP NAT, PIPPIP, PIPPYG	✓	✓	Noctules were often seen commuting from the south-west of the transect from an area of wet grassland with scattered standards. Common and soprano pipistrelles were frequently seen foraging above Hall Lane. Species of <i>Myotis</i> bats were recorded foraging along the North Walsham and Dilham Canal. Common and soprano pipistrelles were frequently seen and recorded foraging along the northern most edge of the arable field.	Within 10km of Paston SAC. Recorded between June and August, adjacent to the water treatment plant.
BACT22	High	BARBAR, EPTSER, LARGEBATSPP, MYOSPP, NYCNOC, PIP NAT, PIPPIP, PIPPYG	✓	✓	Excellent woodland habitat connecting to foraging areas within Witton Heath and beyond to the North Walsham and Dilham Canal. The western edge adjacent to the woodland was a key foraging and commuting route for bats. The road along the southern edge was a good foraging route for common pipistrelles	Within 10km of Paston SAC. Across the transect at all static detector locations. Foraging along the north-western and western woodland edges.
BACT23	N/A	N/A	✗	✗	N/A	N/A
BACT24	Medium	BARBAR*, EPTSER*, LARGEBATSPP, NYCNOC, PIP NAT*, PIPPIP, PIPPYG*	✓	✓	Munn's Track foraging corridor for pipistrelle bats. Common pipistrelles foraged above alder lined drainages ditches within the grassland to the north.	Within 10km of Paston SAC. Limited data. Single barbastelle pass at BA65X on western edge by wood.
BACT25	N/A	N/A	✗	✗	N/A	N/A

Transect	Habitat suitability assessment	Associated species	Species present		Key habitats and features for bats	Additional notes on bat activity
			Identified by transects	Identified by statics		
BACT26	Medium	BARBAR*, EPTSER*, LARGEATSPP*, MYOSPP*, NYCLEI*, NYCNOC*, PIPNAT*, PIPPIP, PIPPYG, PIPSPP*, PLEAUR*	✓	✓	Pipistrelle foraging activity is high to the south of the transect at stop ten where the road joins the field. The western hedgerow is an important foraging and commuting route for bats.	One barbastelle recording on static detector BA80X.
BACT27	Medium	LARGEATSPP*, MYOSPP*, NYCLEI*, NYCNOC*, PIPNAT*, PIPPIP, PIPPYG, PIPSPP*, PLEAUR*	✓	✓	Hedgerows to the south and west of the site provided important foraging and commuting habitat for bats, including the woodland areas to the north east and south east. The oak tree near to stop 7 was an important foraging area for bats.	N/A
BACT28	Medium	BARBAR*, EPTSER*, LARGEATSPP*, MYOSPP*, NYCNOC*, PIPNAT*, PIPPIP, PIPPYG, PIPSPP*, PLEAUR*	✓	✓	The eastern and western hedgerows provided good commuting and foraging habitat for bats. The southern edge also provided opportunities for bats to forage along.	Solitary barbastelle calls across the summer
BACT29	Medium	EPTSER*, LARGEATSPP*, MYOSPP*, NYCLEI*, NYCNOC*, PIPNAT*, PIPPIP, PIPPYG, PIPSPP*, PLEAUR*	✓	✓	The western hedgerow has good connectivity within the wider landscape with other linear features and patches of deciduous woodland. The stream which runs along the north also has good links to other nearby linear features and joins to a large patch of woodland to the NW of the transect.	N/A

Transect	Habitat suitability assessment	Associated species	Species present		Key habitats and features for bats	Additional notes on bat activity
			Identified by transects	Identified by statics		
BACT30	Medium	BARBAR*, EPTSER, NYCLEI*, MYOSPP, NYCNOC, PIP NAT, PIPPIP, PIPPYG, PIPSPP, PLEAUR*	✓	✓	Along the northern section of the transect is an optimal commuting and foraging habitat for bats. Due to the nature of its design, the old tree lined railway embankments provide cover from the weather for bats. The south-western and western lengths of the transect also provide good foraging habitat for bats.	Occasional barbastelle records on both static detectors.
BACT31	High	BARBAR*, EPTSER*, LARGEBATSPP*, MYOSPP*, NYCNOC*, PIP NAT*, PIPPIP, PIPPYG, PIPSPP, PLEAUR*	✓	✓	The River Bure which borders the transect from the north border all the way around to the eastern border provides an excellent foraging and commuting route for bats due to its linear characteristics and bankside tree line. The river is of particular interest for foraging Daubenton's which appear to forage most in areas where the river is widest due to cattle poaching. The short section along the south-western edge bordering the small patch of mature deciduous woodland proved excellent foraging ground for Pipistrelles. The low lying wet grassland contained abundant scattered dead (and living) trees with plenty of roost features for bats, although none were spotted entering or leaving. Centrally, an established, native, species-rich hedge bordered the arable field, and was favored by bats as both a commuting and foraging route.	Solitary barbastelle calls across the summer

Transect	Habitat suitability assessment	Associated species	Species present		Key habitats and features for bats	Additional notes on bat activity
			Identified by transects	Identified by statics		
BACT32	Medium	BARBAR*, EPTSER*, LARGEBATSPP*, MYOSPP*, NYCLEI, NYCNOC*, PIP NAT*, PIPPIP, PIPSPP, PIPPYG,	✓	✓	The tree belt along the north and western boundary provides a linear feature and shelters from winds from the south to the north east. The road through the tree belt at the north of the transect creates a tunnel effect and a high proportion of activity was recorded. The site has good connectivity with the extended landscape.	Barbastelle activity across the transect, recorded on all statics and during transect visits.
BACT33	Medium	BARBAR*, EPTSER, LARGEBATSPP*, MYOSPP*, NYCLEI, NYCNOC*, PIP NAT, PIPPIP, PIPPYG, PIPSPP	✓	✓	The section of road along the north west of the transect (between stop eight and nine) was well sheltered by mature poplar trees and was a particularly popular foraging route. The hedgerows surrounding the transect provided foraging routes for pipistrelles. From the east of the site (continuing from walk three) a mature tree line extends southwards and adjoins a woodland which has further linear features running into the wider landscape. BACT33 is situated within 10km of Paston Great Barn.	Recorded across the transect but only a single pass on each static detector.
BACT34	Medium	BARBAR*, EPTSER*, LARGEBATSPP, MYOSPP*, NYCNOC, PIP NAT, PIPPIP, PIPPYG, PIPSPP, PLEAUR*	✓	✓	The key area for commuting and foraging bats was the western track with hedgerows either side. Intense use by common pipistrelles during some static deployments	Barbastelles recorded in the northwestern corner of the transect.

Transect	Habitat suitability assessment	Associated species	Species present		Key habitats and features for bats	Additional notes on bat activity
			Identified by transects	Identified by statics		
BACT35	Medium	LARGBATSP* , NYCNOC* , PIPPIP* , PIPPYG* , PIPSPP*	✓	✓	Hedgerows are good connecting features between the two woodlands at either end of the transect and foraging areas beyond. The north-western woodland has a ditch running along the eastern boundary and a small pond at the north-western end.	N/A

* - indicates limited or only possible records

6. References

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Appendix 1: Transect details and descriptions

Transect reference	OS grid references	Habitat Suitability Assessment	Description of transect context
BACT03	TF944124	Medium	Arable with minor road, Dale Road, splitting the eastern and western areas.
BACT04	TF916108	High	Arable with blocks of mixed woodland; small stream.
BACT05	TF970148	High	Mosaic of agricultural land, lowland deciduous woodland and lowland fen. Minor river valley at Dillington
BACT08	TG033166	Medium	Within river valley . Mixture of grassland and arable fields, bordered by hedgerows on all sides.
BACT09	TG038172	High	Within river valley. Arable at south; northern end wet grassland used for grazing by cattle.
BACT10	TG038176	High	Within river valley and the eastern and north-eastern bordered by the River Wensum.
BACT13	TG079236	Medium	A linear transect along the Marriots Way which is decommissioned railway line with grassland, tree and scrub mosaic and adjacent arable land.
BACT14	TG119240	High	Forestry plantation for Christmas trees of varied age with acid grassland patches and adjacent woodland and nearby minor river valley and Marriots Way
BACT15	TG203288	Medium	Arable land with bordering hedgerows and a small strip of woodland within the centre of the transect.
BACT16	TG212293	Medium	Arable land bordered by roads on the southern and northern edge with a main road, the A140 to the west.
BACT17	TG223304	Medium	Arable land, excluding the Western most field which was used for cattle grazing
BACT18	TG273317	Medium	Mainly arable land
BACT19	TG369304	Medium	Mainly arable land
BACT20	TF904104	High	Dominated by arable fields with hedgerows; links between large blocks of adjacent woodland
BACT21	TG295316	High	Adjacent land includes deciduous woodland and rough grassland; adjacent to Dilham Canal and river valley; Pigneys Wood nearby
BACT22	TG323313	High	Following field boundaries on two arable fields. Extensive woodlands of Witton Hall and Bacton Woods surround transect
BACT24	TG356303	Medium	Mainly arable land, with a track and double hedgerow running along the eastern section of the transect
BACT26	TF947132	Medium	Mainly arable land; small stream on parts
BACT27	TF955144	Medium	Network of arable fields with tall mixed native hedgerows with tree standards
BACT28	TF986154	Medium	Single arable field with continuous hedgerows along most boundaries.
BACT29	TG062203	Medium	Mainly arable land as was surrounding areas
BACT30	TG074228	Medium	Mainly arable land as was surrounding areas

Transect reference	OS grid references	Habitat Suitability Assessment	Description of transect context
BACT31	TG196288	High	At south-west along two lengths of an arable field ; adjacent patch of mature deciduous woodland to the west. River bure, Blickling estate
BACT32	TG167269	Medium	Mainly arable fields with pockets of planted woodland.
BACT33	TG237304	Medium	Mainly arable land as was surrounding areas
BACT34	TG360302	Medium	Mainly arable land, with a track and double hedgerow running along the western section of the transect; small stream
BACT35	TF917102	Medium	Mixture of arable land, adjacent blocks of broadleaved woodland and conifer plantation.

Appendix 2: Static locations descriptions

Transect	BA point	Grid reference	Static position
BACT03	BA06	TF 94050 12417	Mature Ash Tree at the end of hedgerow.
BACT03	BA69X	TF 94800 12503	Mature Oak standard, between two arable fields.
BACT04	BA70X	TF 91624 10974	Holly tree within thin deciduous woodland strip.
BACT04	BA71X	TF 91425 10548	End of established hedgerow.
BACT04	BA93X	TF 91241 10801	Medium Oak tree at S corner of deciduous woodland.
BACT05	BA10	TF 97059 14824	Mature Oak along established tree line long road.
BACT05	BA11	TF 97289 15030	Mature Ash at end of established hedgerow.
BACT05	BA95X	TF 96742 14985	Mature Oak along established tree line long road.
BACT08	BA20	TG 03408 16490	Fence post next to mature Oak tree along established hedgerow.
BACT08	BA21	TG 03550 16531	Fence post parallel to fence <i>Salix</i> tree line.
BACT09	BA23	TG 04025 17321	Fence post below line of mature Poplar trees.
BACT09	BA92X	TG 03800 17304	Mature oak outside NE corner of strip of woodland.
BACT09	BA97X	TG 03962 17027	Fence post within gap of established hedgerow.
BACT10	BA24	TG 03958 17632	Mature oak along mature tree line through grazing pasture.
BACT10	BA72X	TG 03803 17569	Large Hawthorn at end of hedgerow at arable field entrance.
BACT10	BA98X	TG 04109 17738	Mature Willow tree standard along the bank of the river Wensum.
BACT13	BA73X	TG 07910 23729	Ivy covered Holly tree, amongst small copse of trees.
BACT13	BA74X	TG 08896 23590	Mature Ash tree on top of disused railway embankment, other nearby trees.
BACT14	BA100X	TG 11897 23791	Fencepost with deer fencing surrounding Christmas tree plantation.
BACT14	BA63X	TG 11616 24210	Medium Beech tree along mixed woodland edge.
BACT14	BA66X	TG 12104 24228	Within established Hawthorn hedgerow within Christmas tree plantation.
BACT15	BA32	TG 20280 29069	Mature Oak on corner of woodland.

Transect	BA point	Grid reference	Static position
BACT15	BA33	TG 20446 28851	<i>End of hedgerow.</i>
BACT16	BA35	TG 21203 29278	Young oak tree along open arable field edge.
BACT16	BA75X	TG 20936 29023	Mature Oak tree standard, surrounded by open arable land.
BACT17	BA36	TG 21826 30308	<i>Mature Oak, field side along road.</i>
BACT17	BA37	TG 21936 30206	Holly tree along well established hedgerow.
BACT17	BA91X	TG 22730 30573	Holly tree on edge of woodland strip.
BACT18	BA43	TG 27047 31731	Young oak tree along open arable field edge.
BACT18	BA44	TG 27367 31887	Mature Ash tree along well established hedgerow.
BACT19	BA55	TG 37014 30872	Large Hawthorn tree surrounded by open arable fields.
BACT19	BA56	TG 36703 30570	Mature tree along short, mature tree line.
BACT20	BA02	TF 89638 10399	Young Horse Chestnut alongside pond edge and established hedgerow.
BACT20	BA03	TF 90225 10470	Young Ash tree along patchy hedgerow.
BACT20	BA04	TF 90595 10221	Medium Oak tree within established hedgerow.
BACT21	BA106X	TG 29645 31559	Mature Willow tree within small copse of willow trees adjacent to Dilham Canal.
BACT21	BA62X	TG 29559 31866	Medium Oak tree within woodland.
BACT21	BA76X	TG 29763 31562	Young Oak within patchy hedgerow.
BACT22	BA107X	TG 32305 31646	Medium tree alongside woodland edge and arable field.
BACT22	BA48	TG 32748 31347	Small gap within established hedgerow.
BACT22	BA60X	TG 31932 31475	Medium tree along woodland edge, adjacent to reservoir and arable field.
BACT24	BA65X	TG 35600 30300	<i>Medium Oak on NE corner of mixed woodland.</i>
BACT26	BA79X	TF 94666 13130	Mature Ash tree, surrounded by open meadow.
BACT26	BA80X	TF 94888 13497	Young Oak tree along hedgerow.
BACT27	BA81X	TF 95794 14308	Mature Oak tree along established hedgerow.

Transect	BA point	Grid reference	Static position
BACT27	BA82X	TF 95726 14763	Mature Oak tree along established hedgerow.
BACT28	BA111X	TF 98582 15988	Trunk of dead tree at end of short tree line.
BACT28	BA13	TF 98418 15408	On trunk of dense Field Maple along well established hedgerow
BACT29	BA25	TG 06192 20259	Mature tree within established Blackthorn hedgerow.
BACT29	BA26	TG 06353 20317	In opening along established Blackthorn hedgerow.
BACT30	BA64X	TG 07785 22996	Crab apple tree amongst scrub along arable field edge.
BACT30	BA87X	TG 07302 23130	Large Hazel coppice within small copse of trees at base of disused railway embankment.
BACT31	BA114X	TG 19628 28557	Dead tree on arable field edge.
BACT31	BA67X	TG 19822 28632	Fence post adjacent to river Bure.
BACT31	BA68X	TG 19313 28758	Medium Hawthorn adjacent to small patch of woodland.
BACT32	BA88X	TG 16539 27154	Mature Sweet Chestnut tree within deciduous woodland.
BACT32	BA89X	TG 16395 26653	Mature Oak tree within established hedgerow.
BACT33	BA40	TG 23607 30424	Medium Oak tree within established Hawthorn hedgerow.
BACT33	BA41	TG 23911 30428	Ivy covered tree at gap in hedgerow.
BACT34	BA52	TG 35947 30027	Mature Ash tree at end of established hedgerow, surrounded by arable fields.
BACT34	BA90X	TG 35894 30426	Mature Oak Tree within established hedgerow and tree line.
BACT35	BA118X	TF 91252 10081	Outside corner of deciduous woodland plantation.
BACT35	BA119X	TF 90017 10766	Outside corner of deciduous woodland plantation.
<i>Non-transect</i>	<i>BA05</i>	<i>TF 93733 11836</i>	<i>Coppice Hazel along hedgerow.</i>
<i>Non-transect</i>	<i>BA38</i>	<i>TG 22219 30417</i>	<i>Medium Ash tree within established hedgerow.</i>
<i>Non-transect</i>	<i>BA39</i>	<i>TG 22467 30444</i>	<i>Within established hedgerow.</i>
<i>Non-transect</i>	<i>BA57</i>	<i>TG 37245 30441</i>	<i>Within established hedgerow.</i>
<i>Non-transect</i>	<i>BA61</i>	<i>TF 91128 09618</i>	<i>Mature Oak along woodland edge.</i>

Appendix 3: Transect survey effort

Transect	Surveyor	Date	Sunrise/Sunset	Start	End	Start	End	Wind	Cloud cover	Precipitation
						Temp	Temp			
BACT03	JG , JH	03/07/17	21:20	21:20	23:22	16°C	15°C	BWS1	2/8	None
BACT03	JG , JH	04/07/17	04:38	02:30	04:39	10°C	13°C	BWS1	1/8	None
BACT03	JWH, JH	03/08/17	20:43	20:54	21:58	19.5°C	18°C	BWS2	6/8	None
BACT03	KC, JH	01/09/17	19:42	19:45	20:47	13°C	14°C	BWS0	3/8	None
BACT04	BC, CB	20/06/17	21:22	21:28	23:25	18°C	14°C	BWS2	8/8	None
BACT04	BC, CB	21/06/17	21:22	02:30	04:33	16°C	14°C	BWS2	4/8	None
BACT04	BM, KC	03/07/17	21:20	21:20	23:04	16°C	15°C	BWS0	1/8	None
BACT04	JA, CB	03/07/17	21:20	20:28	22:45	16°C	18°C	BWS4	6/8	None
BACT04	KC, JA	14/08/17	20:22	20:16	21:42	17°C	18°C	BWS2	8/8	Rain at start
BACT05	BC, AB	25/05/17	20:59	20:58	21:41	15°C	13°C	BWS1	1/8	None
BACT05	BC, AV	12/06/17	21:18	21:22	23:16	15°C	15°C	BWS1	7/8	None
BACT05	KC, BM	26/06/17	21:22	21:20	22:57	12°C	14°C	BWS0	1/8	None
BACT05	AG, JH	18/07/17	21:07	21:18	22:49	17°C	17°C	BWS0	5/8	None
BACT05	AG, JH	08/08/17	05:25	20:39	21:58	15°C	14°C	BWS2	8/8	Heavy rain 21:24>
BACT05	AG, JH	22/08/17	05:48	20:07	21:28	19°C	17°C	BWS2	6/8	None
BACT05	JH, AG	06/09/17	06:14	19:45	21:17	18°C	15°C	BWS0	5/8	light rain at start
BACT05	JWH, JH	19/09/17	19:00	19:06	20:24	13°C	15°C	BWS0	2/8	None
BACT05	JWH, JH	03/10/17	18:26	18:25	20:17	14°C	12°C	BWS1	8/8	None
BACT05	BC, BM	04/10/17	07:01	05:02	07:07	10°C	10°C	BWS2	7/8	None
BACT05	JWH, JH	17/10/17	17:55	17:58	19:38	15°C	11°C	BWS0	8/8	None
BACT08	KC, LT	22/05/17	20:55	20:30	23:00	18°C	15°C	BWS0	6/8	None

Transect	Surveyor	Date	Sunrise/Sunset	Start	End	Start	End	Wind	Cloud cover	Precipitation
						Temp	Temp			
BACT08	KC, BH	02/06/17	21:09	21:15	23:44	17.5°C	14°C	BWS0	8/8	None
BACT08	LT, JA	12/06/17	21:18	21:24	23:04	16°C	15°C	BWS2	7/8	None
BACT08	KC, JH	11/07/17	04:44	02:40	04:11	14°C	14°C	BWS0	5/8	None
BACT08	BM, AV	14/07/17	04:48	21:13	23:00	15°C	15°C	BWS0	4/8	None
BACT08	KC, LT	07/08/17	20:36	20:42	22:22	18.9°C	17°C	BWS0	7/8	None
BACT08	KC, JH	04/09/17	19:35	19:36	21:03	18°C	18°C	BWS0	3/8	None
BACT08	KC, JH	12/09/17	06:24	19:12	20:28	15°C	15°C	BWS3	4/8	Light rain
BACT08	LT, KC	02/10/17	06:57	18:36	20:08	15°C	14°C	BWS3	5/8	None
BACT09	BM, JA	10/05/17	20:37	20:30	22:20	8°C	5°C	BWS2	1/8	None
BACT09	RM	13/06/17	21:19	21:20	23:22	17°C	15°C	BWS0	5/8	None
BACT09	JA, PK-W	29/06/17	21:21	21:08	23:22	16°C	13°C	BWS1	6/8	None
BACT09	AG, BM	13/07/17	21:13	21:17	22:42	15°C	15°C	BWS0	8/8	Rain/drizzle - 21:50 - 22:02
BACT09	BM, JWH	27/07/17	20:55	20:56	23:05	15°C	13°C	BWS0	4/8	Dry, misty at northern end
BACT09	AG, JH	29/08/17	19:49	19:52	21:08	16°C	16°C	BWS4	8/8	None
BACT09	AG, JH	12/09/17	19:16	19:17	20:25	12°C	12°C	BWS4	8/8	Light rain 19:40-19:58
BACT09	AG, JH	26/09/17	18:43	18:45	20:03	17°C	14°C	BWS1	1/8	None
BACT09	AG, BB	27/09/17	06:49	05:24	06:40	11°C	9°C	BWS0	8/8 - Fog	None
BACT09	AG, JH	10/10/17	18:10	18:13	19:55	14°C	14°C	BWS1	6/8	None
BACT09	BM, JH	24/10/17	17:40	17:41	19:16	17°C	18°C	BWS2	8/8	None
BACT 10	BC	10/05/17	20:37	20:45	22:15	12°C	6°C	BWS1	0/8	None
BACT10	BM, JH	07/07/17	21:18	21:18	22:45	19°C	18°C	BWS0	7/8	None
BACT10	KC, JH	17/07/17	21:08	21:10	22:54	17°C	15°C	BWS0	1/8	None

Transect	Surveyor	Date	Sunrise/Sunset	Start	End	Start	End	Wind	Cloud cover	Precipitation
						Temp	Temp			
BACT10	KC, JH	18/07/17	04:53	02:45	04:15	13°C	12°C	BWS0	1/8	None - mist
BACT10	KC, AV	04/08/17	20:41	20:45	22:04	19°C	17°C	BWS1	4/8	None
BACT10	KC, AV	25/08/17	19:58	20:06	21:18	19°C	17°C	BWS0	2/8	None
BACT10	KC, JH	22/09/17	18:53	19	19:52	15°C	14°C	BWS0	2/8	02-Aug
BACT10	BM, CB	27/09/17	18:41	18:40	20:02	15°C	16°C	BWS2	4/8	None
BACT10	KC, BM	06/10/17	07:04	18:19	20:09	11°C	9°C	BWS1	5/8	05-Aug
BACT10	KC, BM	20/10/17	17:48	17:49	19:24	14°C	13°C	BWS2	8/8	08-Aug
BACT13	SM, RE	26/05/17	21:08	21:08	22:52	21°C	15°C	BWS1	0/8	None
BACT13	JG, BM	19/06/17	21:18	21:49	23:50	22.9°C	20°C	BWS1	2/8	None
BACT04	BC, CB	21/06/17	21:22	02:30	04:33	16°C	14°C	BWS2	4/8	None
BACT13	KC, JH	18/08/17	20:13	20:45	22:13	17°C	14°C	BWS2	0/8	None
BACT13	KC, JH	19/08/17	05:43	04:15	05:38	10°C	10°C	BWS2	0/8	None
BACT13	LT, KC	18/09/17	19:02	19:02	20:36	14°C	11°C	BWS0	2/8	None
BACT13	BM, CB	31/10/17	16:26	16:25	18:21	12°C	12°C	BWS3	3/8	None
BACT14	AG, BM	08/06/17	21:15	21:15	23:03	18°C	15°C	BWS0	7/8	None
BACT14	AG, BM	22/06/2017	21:22	21:21	22:51	17°C	17°C	BWS0	3/8	None
BACT14	AG, JH	06/07/2017	21:18	21:20	22:55	20°C	18°C	BWS1	3/8	None
BACT14	AG, AV	27/07/17	20:55	20:58	22:34	15°C	14°C	BWS2	5/8	Rain prior
BACT14	AG, JH	10/08/17	20:30	20:31	21:55	14°C	12°C	BWS1	2/8	None
BACT14	AG, JH	31/08/17	06:04	19:43	21:10	14°C	13°C	BWS2	6/8	None
BACT14	AG, BM	14/09/17	19:12	19:17	20:35	12°C	11°C	BWS0	6/8	Rain 20:24>
BACT14	AG, BM	15/09/17	06:29	04:35	05:54	8°C	6°C	BWS0	0/8	None

Transect	Surveyor	Date	Sunrise/Sunset	Start	End	Start	End	Wind	Cloud cover	Precipitation
						Temp	Temp			
BACT14	AC, BM	28/09/17	18:38	18:37	19:59	18°C	15°C	BWS0	3/8	None
BACT14	AB, BM	12/10/17	18:06	18:08	20:15	15°C	11°C	BWS1	4/8	None
BACT14	BM, CB	26/10/17	17:36	17:39	19:25	14°C	12°C	BWS0	5/8	None
BACT 15	BC, JH	07/06/17	21:14	21:10	22:47	16°C	13°C	BWS2	7/8	Light rain from 22:15
BACT16	AG, AV	04/07/17	21:20	21:21	22:46	19°C	18°C	BWS1	6/8	None
BACT16	JWH, AV	02/08/17	20:45	20:45	22:08	17°C	18°C	BWS2	8/8	Slight drizzle
BACT16	AG, JH	15/08/17	05:37	20:23	21:47	18°C	16°C	BWS1	2/8	None
BACT16	AG, JH	07/09/17	19:28	19:32	20:30	16°C	15°C	BWS3	8/8	Rain
BACT16	JG, JH	06/10/17	07:04	05:04	07	10°C	8°C	BWS3	4/8	None
BACT16	AG, JH	05/10/17	07:03	18:24	20:20	14°C	12°C	BWS2	3/8	None
BACT17	BB, BM	30/05/17	21:06	20:57	23:12	15°C	14°C	BWS1	1/8	None
BACT17	KC, JH	23/06/17	21:22	21:23	23:30	19°C	18°C	BWS2	6/8	None
BACT17	JWH, BM	24/07/17	20:59	21	22:29	15°C	15°C	BWS2	8/8	Heavy drizzle before survey and from 21:30
BACT17	JG, BM	14/08/17	20:22	20:22	22	17°C	15°C	BWS3	4/8	None
BACT17	JG, BM	11/09/17	06:22	19:23	21	15°C	13°C	BWS4	7/8	None
BACT17	JG, BM	12/09/17	06:24	04:20	06:36	10°C	10°C	BWS2	1/8	None
BACT17	JG, BM	09/10/17	18:13	18:20	20:30	12°C	12°C	BWS0	8/8	None
BACT18	BM, GH	24/05/17	20:58	20:58	23:21	18°C	15°C	BWS0	0/8	None
BACT18	AG, BM	01/06/17	21:08	21:08	23:10	15°C	15°C	BWS0	4/8	None
BACT18	GH, JH	12/07/17	21:15	21:14	22:53	14°C	11°C	BWS0	0/8	None
BACT18	RM	16/08/17	20:18	20:20	21:20	18°C	18°C	BWS2	3/8	None
BACT18	GH, JH	20/09/17	18:57	19:00	20:03	17°C	16°C	BWS0	8/8	None

Transect	Surveyor	Date	Sunrise/Sunset	Start	End	Start	End	Wind	Cloud cover	Precipitation
						Temp	Temp			
BACT18	BM, JWH	21/09/17	18:55	04:30	06:44	13°C	14°C	BWS2	7/8	None
BACT18	JWH, BM	23/10/17	17:42	17:40	19:30	14°C	13°C	BWS0	8/8	None
BACT19	BM, JH	09/06/17	21:16	21:15	22:50	15°C	14°C	BWS0	4/8	None
BACT19	GH, JH	25/06/17	21:22	21:20	22:55	16.5°C	16°C	BWS1	7/8	None
BACT19	GH, BM	05/07/17	21:19	21:19	23:01	17°C	15°C	BWS0	0/8	Misty
BACT19	GH, MP	16/08/17	20:18	20:20	21:34	18°C	18°C	BWS3	0/8	None
BACT19	GH, BM	06/09/17	06:14	19:31	20:51	16°C	15°C	BWS3	7/8	None
BACT19	JWH, CB	07/09/17	06:15	04:15	05:40	14°C	11°C	BWS1	6/8	None
BACT19	GH, MP	18/10/17	17:52	18:20	20:05	14°C	14°C	BWS4	8/8	Drizzle (start and end)
BACT 20	JG, BC	15/05/17	20:45	20:46	23:29	15°C	12°C	BWS4	8/8	Drizzle at start
BACT20	JA, JH	30/05/17	21:06	21:15	23:20	19°C	15°C	BWS2	8/8	None
BACT20	JG, BM	26/06/17	21:22	21:25	23:45	14.5°C	12.6°C	BWS3	8/8	None
BACT20	BC, LT	12/07/17	21:15	21:14	23	15°C	12°C	BWS0	1/8	None
BACT20	BC, LT	13/07/17	04:47	02:56	03:52	10°C	8.7°C	BWS0	1/8	None
BACT20	JG, BM	31/07/17	20:48	20:30	23:30	17°C	16°C	BWS1	8/8	Drizzle at start
BACT20	JG, LT	21/08/17	05:45	20:08	22:15	17°C	16°C	BWS1	8/8	None
BACT21	JG, JH	22/05/17	20:55	20:50	23:09	16°C	15°C	BWS2	2/8	None
BACT21	BM, JH	31/05/17	21:07	21:07	23	13°C	12°C	BWS0	0/8	None
BACT21	RM, JH	19/06/17	21:18	22:44	23:27	27°C	20°C	BWS2	5/8	None
BACT21	AG, JH	29/06/17	21:21	21:21	23:11	17°C	13°C	BWS1	7/8	None
BACT21	JWH, JH	31/07/17	20:48	20:50	22:35	19°C	17°C	BWS0	6/8	Light rain at end
BACT21	JG, JH	07/08/17	20:36	20:47	23:00	15°C	16°C	BWS1	8/8	None

Transect	Surveyor	Date	Sunrise/Sunset	Start	End	Start	End	Wind	Cloud cover	Precipitation
						Temp	Temp			
BACT21	JWH, AV	30/08/17	19:47	19:50	20:47	18°C	12°C	BWS0	8/8	Drizzle
BACT21	JG, BM	04/09/17	19:35	19:36	22	17°C	15°C	BWS0	0/8	None
BACT21	JG, JH	18/09/17	19:02	19:06	21:05	13°C	11°C	BWS3	6/8	None
BACT21	JG, JWH	19/09/17	06:35	04:49	06:35	10°C	11°C	BWS3	8/8	AT Start. Called off until 05.19
BACT21	BM, CB	03/10/17	18:26	18:21	20:24	12°C	12°C	BWS0	8/8	None
BACT21	BM, CB	17/10/17	17:55	17:54	19:53	14°C	13°C	BWS1	8/8	Light rain, 18:17 for 10 minutes
BACT22	BM, CS	22/05/17	20:55	21:19	23:06	16°C	15°C	BWS1	1/8	None
BACT22	AG , BM	15/06/17	21:20	21:20	22:52	18°C	17°C	BWS1	3/8	None
BACT22	JWH, CB	22/08/17	05:48	20:05	21:45	19°C	16°C	BWS1	8/8	None
BACT22	JWH, CB	23/08/17	05:50	03:54	05:40	19°C	17°C	BWS2	8/8	None
BACT22	JWH, CB	29/08/17	19:49	19:49	21:29	16°C	16°C	BWS2	8/8	None
BACT22	JWH, CB	12/09/17	06:24	19:17	20:41	19°C	15°C	BWS1	7/8	None
BACT22	JWH , CB	26/09/17	18:43	18:42	20:12	15°C	13°C	BWS0	0/8	None
BACT22	JWH, CB	10/10/17	18:10	18:12	20:11	16°C	15°C	BWS3	2/8	None
BACT22	JWH, BB	24/10/17	17:40	17:50	19:35	18°C	17°C	BWS2	7/8	None
BACT26	BM, JH	20/06/17	21:22	21:20	23:31	15°C	14°C	BWS3	1/8	None
BACT26	BM, JH	21/06/17	21:22	02:30	04:11	14°C	14°C	BWS1	0/8	None
BACT26	KC, AV	31/07/17	20:48	20:55	22:17	18°C	17°C	BWS0	4/8	Drizzle first 10 minutes
BACT26	BM, AV	08/08/17	05:25	20:34	21:48	16°C	14°C	BWS3	6/8	Rain started at 21:36
BACT26	BM, JWH	21/09/17	18:55	19:05	20:04	16°C	16°C	BWS3	8/8	Light rain
BACT26	BM, CB	05/10/17	07:03	18:22	19:35	13°C	10°C	BWS2	5/8	Rain showers - getting heavier/longer
BACT27	BC, JH	13/06/17	21:19	21:19	23:25	17°C	15°C	BWS0	3/8	None

Transect	Surveyor	Date	Sunrise/Sunset	Start	End	Start	End	Wind	Cloud cover	Precipitation
						Temp	Temp			
BACT27	SM, RE	03/07/17	21:20	21:23	23:11	14°C	15°C	BWS0	6/8	None
BACT27	GH, MP	30/08/17	19:47	20:04	21:10	18°C	12°C	BWS0	4/8	Heavy rain prior
BACT27	JWH, JH	08/09/17	19:26	19:30	20:38	19°C	12°C	BWS0	1/8	Rain prior
BACT27	JWH, JH	09/09/17	06:19	05:00	06:00	10°C	9°C	BWS0	8/8	None
BACT27	JWH, JH	13/10/17	18:04	18:04	19:49	19°C	17°C	BWS3	1/8	None
BACT28	JA, NT	21/06/17	21:22	21:18	23:20	22°C	21°C	BWS2	6/8	None
BACT28	BC, CB	29/06/17	21:21	21:20	23:25	15°C	13°C	BWS1	3/8	None
BACT28	GH, MP	19/07/17	04:45	21:06	22:37	21°C	21°C	BWS2	8/8	None
BACT28	JG, MP	23/08/17	20:03	20:18	21:58	19°C	18°C	BWS1	6/8	None
BACT28	GH, JH	13/09/17	19:14	19:21	20:31	11°C	10°C	BWS2	7/8	None
BACT28	JWH, GH	14/09/17	06:27	05:08	06:20	8°C	9°C	BWS1	0/8	None
BACT28	GH, JH	11/10/17	18:08	18:30	19:52	16.5°C	15.5°C	BWS2	7/8	V. light Speckles
BACT29	BM, BB	04/07/17	21:20	21:20	23:11	18oC	18oC	BWS0	7/8	None
BACT29	KC, BM	11/08/17	05:30	20:23	21:25	16oC	17oC	BWS0	7/8	None
BACT29	BM, AV	04/09/17	19:35	19:36	21:30	13oc	18oc	BWS0	5/8	None
BACT29	BM, AV	05/09/17	06:12	04:15	06:03	15OC	17OC	BWS0	8/8	None
BACT29	JG, CB	02/10/17	06:57	18:31	20:34	14OC	13OC	BWS4	8/8	None
BACT29	JG, CB	30/08/17	19:47	19:48	21:35	12OC	11OC	BWS1	1/8	Drizzle at start
BACT30	BM, KC	26/05/17	21:06	21:04	22:59	17oC	15oC	BWS2	0/8	None
BACT30	SM, MP	29/06/17	21:21	21:24	23:31	13°C	13°C	BWS3	8/8	Drizzle for first 10 minutes then dry.
BACT30	CB, AV	25/07/17	20:58	20:58	22:40	16oC	13oC	BWS0	0/8	None
BACT30	BM, AV	22/08/17	05:48	20:05	22:01	17OC	16OC	BWS1	6/8	None

Transect	Surveyor	Date	Sunrise/Sunset	Start	End	Start	End	Wind	Cloud cover	Precipitation
						Temp	Temp			
BACT30	BM, CB	19/09/17	19:00	19:12	20:25	16OC	10OC	BWS0	0/8	None
BACT30	BM, CB	20/09/17	06:37	03:52	06:02	6OC	6OC	BWS0	0/8	None
BACT30	BM, CB	19/10/17	17:50	17:49	18:51	16OC	15OC	BWS3	8/8	None
BACT31	KC, BM	12/06/17	21:18	21:18	23:18	16.1°C	13°C	BWS1	7/8	None
BACT31	RM, AV	26/06/17	21:22	21:24	22:28	13°C	11°C	BWS1	3/8	None
BACT31	BM, AV	12/07/17	21:15	21:15	23:18	12°C	12°C	BWS0	1/8	Misty
BACT31	BM, AV	26/07/17	20:56	20:56	22:58	18°C	17°C	BWS3	6/8	None
BACT31	BM, AV	23/08/17	20:03	20:03	21:54	17°C	18°C	BWS0	8/8	None
BACT31	JWH, BM	31/08/17	06:04	20:52	21:56	13°C	13°C	BWS0	2/8	None
BACT31	JWH, BM	01/09/17	06:05	04:02	05:45	11°C	8°C	BWS0	0/8	None
BACT31	KC, JH	15/09/17	19:09	19:41	20:37	13°C	12°C	BWS0	2/8	None
BACT31	KC, CB	09/10/17	18:13	18:12	20:19	13°C	12°C	BWS3	4/8	None
BACT31	BM, ML	25/10/17	17:38	17:32	19:35	15°C	14°C	BWS1	7/8	None
BACT32	BC, JH	15/06/17	21:20	21:24	23:07	18°C	17°C	BWS1	4/8	None
BACT32	JA, CB	12/07/17	21:15	21:06	23:03	24°C	11°C	BWS1	1/8	None
BACT32	RM, CB	15/08/17	05:37	20:23	22:39	15°C	14°C	BWS0	1/8	None
BACT32	JWH, BM	16/08/17	05:38	03:47	05:55	12°C	10°C	BWS0	0/8	None
BACT32	JWH, BB	19/09/17	19:00	19:02	20:13	12°C	10°C	BWS2	2/8	None
BACT33	JA, CB	14/06/17	21:19	21:12	23:05	17°C	15°C	BWS1	1/8	None
BACT33	KC, BM	21/07/17	21:03	21:03	22:30	18°C	18°C	BWS1	2/8	None
BACT33	AG, BM	24/08/17	20:07	20:14	21:34	17°C	15°C	BWS1	2/8	None
BACT33	AG, BM	25/08/17	19:58	03:50	05:15	10°C	10°C	BWS0	1/8	None

Transect	Surveyor	Date	Sunrise/Sunset	Start	End	Start	End	Wind	Cloud cover	Precipitation
						Temp	Temp			
BACT33	KC, BM	29/09/17	18:36	18:35	19:54	16°C	15°C	BWS0	7/8	None
BACT34	BC, AV	30/06/17	21:21	21:25	21:59	12°C	15°C	BWS4	8/8	None
BACT34	RB, JH	05/07/17	21:19	21:35	23:01	17°C	15°C	BWS0	0/8	None
BACT34	CB, JWH	17/08/17	05:30	20:16	21:50	18°C	17°C	BWS2	0/8	None
BACT34	BB, JA	12/09/17	06:24	19:40	20:33	13°C	13°C	BWS2	0/8	Rain at 20:00, 5 minutes
BACT34	JG, BM	10/10/17	18:19	18:10	20:25	13°C	13°C	BWS4	2/8	None
BACT34	JG, BM	11/10/17	07:13	05:04	07:06	15°C	15°C	BWS1	8/8	None
BACT35	JWH	30/07/17	21:20	21	22:36	14°C	13°C	BWS1	7/8	None

Appendix 4 : Details of static deployments

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA02	BACT20	09/05/2017	25/05/2017	16
BA02	BACT20	30/05/2017	05/06/2017	6
BA02	BACT20	26/06/2017	05/07/2017	9
BA02	BACT20	12/07/2017	17/07/2017	5
BA02	BACT20	31/07/2017	17/08/2017	17
BA02	BACT20	21/08/2017	28/08/2017	7
BA03	BACT20	09/05/2017	25/05/2017	16
BA03	BACT20	26/06/2017	05/07/2017	9
BA03	BACT20	04/07/2017	17/07/2017	13
BA03	BACT20	31/07/2017	17/08/2017	17
BA03	BACT20	21/08/2017	28/08/2017	7
BA04	BACT20	09/05/2017	25/05/2017	16
BA04	BACT20	26/06/2017	10/07/2017	14
BA04	BACT20	13/07/2017	17/07/2017	4
BA04	BACT20	31/07/2017	17/08/2017	17
BA05	External	28/04/2017	19/05/2017	21
BA06	BACT03	04/07/2017	07/07/2017	3
BA06	BACT03	03/08/2017	07/08/2017	4
BA06	BACT03	01/09/2017	07/09/2017	6
BA06	BACT03	26/10/2017	31/10/2017	5
BA10	BACT05	25/05/2017	01/06/2017	7
BA10	BACT05	12/06/2017	19/06/2017	7

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA10	BACT05	26/06/2017	30/06/2017	4
BA10	BACT05	18/07/2017	21/07/2017	3
BA10	BACT05	08/08/2017	14/08/2017	6
BA10	BACT05	31/08/2017	04/09/2017	4
BA10	BACT05	03/10/2017	08/10/2017	5
BA100X	BACT14	22/06/2017	27/06/2017	5
BA100X	BACT14	27/07/2017	01/08/2017	5
BA100X	BACT14	31/08/2017	06/09/2017	6
BA100X	BACT14	28/09/2017	03/10/2017	5
BA100X	BACT14	12/10/2017	17/10/2017	5
BA106X	BACT21	19/06/2017	26/06/2017	7
BA106X	BACT21	31/07/2017	07/08/2017	7
BA106X	BACT21	07/08/2017	14/08/2017	7
BA106X	BACT21	04/09/2017	13/09/2017	9
BA106X	BACT21	17/10/2017	21/10/2017	4
BA107X	BACT22	22/08/2017	25/08/2017	3
BA107X	BACT22	12/09/2017	20/09/2017	8
BA107X	BACT22	24/10/2017	30/10/2017	6
BA11	BACT05	25/05/2017	01/06/2017	7
BA11	BACT05	12/06/2017	19/06/2017	7
BA11	BACT05	22/08/2017	28/08/2017	6
BA11	BACT05	19/09/2017	26/09/2017	7
BA11	BACT05	17/10/2017	23/10/2017	6

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA111X	BACT28	22/06/2017	23/06/2017	1
BA111X	BACT28	29/06/2017	03/07/2017	4
BA111X	BACT28	19/07/2017	24/07/2017	5
BA111X	BACT28	23/08/2017	28/08/2017	5
BA111X	BACT28	13/09/2017	18/09/2017	5
BA111X	BACT28	11/10/2017	16/10/2017	5
BA114X	BACT31	26/06/2017	30/06/2017	4
BA114X	BACT31	12/07/2017	17/07/2017	5
BA114X	BACT31	26/07/2017	03/08/2017	8
BA114X	BACT31	01/09/2017	06/09/2017	5
BA114X	BACT31	25/10/2017	30/10/2017	5
BA118X	BACT35	30/07/2017	08/08/2017	9
BA119X	BACT35	30/07/2017	08/08/2017	9
BA13	BACT28	21/06/2017	27/06/2017	6
BA13	BACT28	19/07/2017	24/07/2017	5
BA13	BACT28	22/08/2017	28/08/2017	6
BA13	BACT28	14/09/2017	19/09/2017	5
BA13	BACT28	11/10/2017	16/10/2017	5
BA20	BACT08	02/06/2017	12/06/2017	10
BA20	BACT08	12/06/2017	20/06/2017	8
BA20	BACT08	14/07/2017	27/07/2017	13
BA20	BACT08	07/08/2017	08/08/2017	1
BA20	BACT08	04/09/2017	12/09/2017	8

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA20	BACT08	02/10/2017	11/10/2017	9
BA21	BACT08	02/06/2017	12/06/2017	10
BA21	BACT08	12/06/2017	20/06/2017	8
BA21	BACT08	11/07/2017	17/07/2017	6
BA21	BACT08	04/09/2017	12/09/2017	8
BA21	BACT08	02/10/2017	11/10/2017	9
BA23	BACT09	09/05/2017	19/05/2017	10
BA23	BACT09	14/06/2017	19/06/2017	5
BA23	BACT09	13/07/2017	18/07/2017	5
BA23	BACT09	27/07/2017	31/07/2017	4
BA23	BACT09	29/08/2017	04/09/2017	6
BA23	BACT09	27/09/2017	02/10/2017	5
BA23	BACT09	24/10/2017	31/10/2017	7
BA24	BACT10	10/05/2017	19/05/2017	9
BA24	BACT10	07/07/2017	12/07/2017	5
BA24	BACT10	17/07/2017	24/07/2017	7
BA24	BACT10	25/08/2017	31/08/2017	6
BA24	BACT10	27/09/2017	02/10/2017	5
BA24	BACT10	06/10/2017	11/10/2017	5
BA25	BACT29	04/07/2017	10/07/2017	6
BA25	BACT29	11/08/2017	15/08/2017	4
BA25	BACT29	30/08/2017	04/09/2017	5
BA25	BACT29	05/09/2017	12/09/2017	7

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA25	BACT29	02/10/2017	06/10/2017	4
BA26	BACT29	04/07/2017	05/07/2017	1
BA26	BACT29	11/08/2017	16/08/2017	5
BA26	BACT29	30/08/2017	04/09/2017	5
BA26	BACT29	04/09/2017	12/09/2017	8
BA26	BACT29	02/10/2017	09/10/2017	7
BA32	BACT15	07/06/2017	12/06/2017	5
BA33	BACT15	07/06/2017	12/06/2017	5
BA35	BACT16	04/07/2017	10/07/2017	6
BA35	BACT16	02/08/2017	08/08/2017	6
BA35	BACT16	15/08/2017	22/08/2017	7
BA35	BACT16	08/09/2017	11/09/2017	3
BA35	BACT16	05/10/2017	10/10/2017	5
BA36	BACT17	22/05/2017	30/05/2017	8
BA37	BACT17	22/05/2017	30/05/2017	8
BA37	BACT17	23/06/2017	27/06/2017	4
BA37	BACT17	14/08/2017	14/08/2017	0
BA37	BACT17	11/09/2017	19/09/2017	8
BA37	BACT17	09/10/2017	16/10/2017	7
BA38	BACT17	24/07/2017	28/07/2017	4
BA38	BACT17	22/05/2017	30/05/2017	8
BA39	External	22/05/2017	30/05/2017	8
BA40	BACT33	14/06/2017	19/06/2017	5

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA40	BACT33	21/07/2017	26/07/2017	5
BA40	BACT33	24/08/2017	30/08/2017	6
BA40	BACT33	29/09/2017	04/10/2017	5
BA40	BACT33	23/10/2017	30/10/2017	7
BA41	BACT33	14/06/2017	19/06/2017	5
BA41	BACT33	21/07/2017	26/07/2017	5
BA41	BACT33	25/08/2017	30/08/2017	5
BA41	BACT33	29/09/2017	04/10/2017	5
BA41	BACT33	23/10/2017	30/10/2017	7
BA43	BACT18	22/05/2017	30/05/2017	8
BA43	BACT18	01/06/2017	06/06/2017	5
BA43	BACT18	12/07/2017	17/07/2017	5
BA43	BACT18	16/08/2017	21/08/2017	5
BA43	BACT18	21/09/2017	25/09/2017	4
BA43	BACT18	23/10/2017	29/10/2017	6
BA44	BACT18	22/05/2017	30/05/2017	8
BA44	BACT18	01/06/2017	06/06/2017	5
BA44	BACT18	12/07/2017	17/07/2017	5
BA44	BACT18	16/08/2017	21/08/2017	5
BA44	BACT18	21/09/2017	26/09/2017	5
BA44	BACT18	23/10/2017	30/10/2017	7
BA48	BACT22	30/05/2017	06/06/2017	7
BA48	BACT22	15/06/2017	20/06/2017	5

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA48	BACT22	23/08/2017	29/08/2017	6
BA48	BACT22	12/09/2017	20/09/2017	8
BA48	BACT22	24/10/2017	30/10/2017	6
BA52	BACT34	07/06/2017	13/06/2017	6
BA52	BACT34	30/06/2017	05/07/2017	5
BA52	BACT34	05/07/2017	11/07/2017	6
BA52	BACT34	17/08/2017	24/08/2017	7
BA52	BACT34	18/09/2017	25/09/2017	7
BA52	BACT34	10/10/2017	10/10/2017	0
BA55	BACT19	09/06/2017	14/06/2017	5
BA55	BACT19	25/06/2017	29/06/2017	4
BA55	BACT19	05/07/2017	11/07/2017	6
BA55	BACT19	07/09/2017	12/09/2017	5
BA55	BACT19	18/10/2017	23/10/2017	5
BA56	BACT19	09/06/2017	14/06/2017	5
BA56	BACT19	25/06/2017	29/06/2017	4
BA56	BACT19	05/07/2017	11/07/2017	6
BA56	BACT19	21/08/2017	30/08/2017	9
BA56	BACT19	18/10/2017	23/10/2017	5
BA57	External	09/06/2017	14/06/2017	5
BA60X	BACT22	16/05/2017	25/05/2017	9
BA60X	BACT22	29/08/2017	05/09/2017	7
BA60X	BACT22	26/09/2017	02/10/2017	6

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA60X	BACT22	10/10/2017	16/10/2017	6
BA61X	External	22/05/2017	06/06/2017	15
BA61X	External	15/06/2017	20/06/2017	5
BA62X	BACT21	22/05/2017	30/05/2017	8
BA62X	BACT21	31/05/2017	06/06/2017	6
BA62X	BACT21	19/06/2017	26/06/2017	7
BA62X	BACT21	29/06/2017	05/07/2017	6
BA62X	BACT21	31/07/2017	07/08/2017	7
BA62X	BACT21	30/08/2017	04/09/2017	5
BA62X	BACT21	04/09/2017	13/09/2017	9
BA62X	BACT21	03/10/2017	08/10/2017	5
BA63X	BACT14	24/05/2017	30/05/2017	6
BA63X	BACT14	08/06/2017	13/06/2017	5
BA63X	BACT14	27/07/2017	01/08/2017	5
BA63X	BACT14	10/08/2017	15/08/2017	5
BA63X	BACT14	15/09/2017	20/09/2017	5
BA63X	BACT14	26/10/2017	31/10/2017	5
BA64X	BACT30	26/05/2017	06/06/2017	11
BA64X	BACT30	28/06/2017	04/07/2017	6
BA64X	BACT30	27/07/2017	31/07/2017	4
BA64X	BACT30	25/08/2017	30/08/2017	5
BA64X	BACT30	20/09/2017	25/09/2017	5
BA64X	BACT30	19/10/2017	24/10/2017	5

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA65X	BACT24	07/06/2017	13/06/2017	6
BA66X	BACT14	08/06/2017	13/06/2017	5
BA66X	BACT14	22/06/2017	28/06/2017	6
BA66X	BACT14	06/07/2017	11/07/2017	5
BA66X	BACT14	27/07/2017	01/08/2017	5
BA66X	BACT14	10/08/2017	15/08/2017	5
BA66X	BACT14	14/09/2017	20/09/2017	6
BA66X	BACT14	12/10/2017	18/10/2017	6
BA67X	BACT31	12/06/2017	19/06/2017	7
BA67X	BACT31	26/06/2017	30/06/2017	4
BA67X	BACT31	12/07/2017	17/07/2017	5
BA67X	BACT31	26/07/2017	03/08/2017	8
BA67X	BACT31	31/08/2017	06/09/2017	6
BA67X	BACT31	09/10/2017	17/10/2017	8
BA68X	BACT31	12/06/2017	19/06/2017	7
BA68X	BACT31	26/06/2017	30/06/2017	4
BA68X	BACT31	12/07/2017	17/07/2017	5
BA68X	BACT31	26/07/2017	03/08/2017	8
BA68X	BACT31	23/08/2017	29/08/2017	6
BA68X	BACT31	15/09/2017	25/09/2017	10
BA68X	BACT31	09/10/2017	17/10/2017	8
BA69X	BACT03	04/07/2017	07/07/2017	3
BA69X	BACT03	03/08/2017	07/08/2017	4

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA69X	BACT03	01/09/2017	07/09/2017	6
BA69X	BACT03	18/10/2017	24/10/2017	6
BA70X	BACT04	20/06/2017	26/06/2017	6
BA70X	BACT04	03/07/2017	07/07/2017	4
BA70X	BACT04	03/08/2017	09/08/2017	6
BA71X	BACT04	21/06/2017	26/06/2017	5
BA71X	BACT04	03/08/2017	09/08/2017	6
BA71X	BACT04	14/08/2017	22/08/2017	8
BA72X	BACT10	07/07/2017	12/07/2017	5
BA72X	BACT10	18/07/2017	24/07/2017	6
BA72X	BACT10	25/08/2017	31/08/2017	6
BA72X	BACT10	27/09/2017	02/10/2017	5
BA72X	BACT10	06/10/2017	11/10/2017	5
BA73X	BACT13	19/06/2017	23/06/2017	4
BA73X	BACT13	19/08/2017	24/08/2017	5
BA73X	BACT13	18/09/2017	25/09/2017	7
BA73X	BACT13	24/10/2017	30/10/2017	6
BA74X	BACT13	19/06/2017	23/06/2017	4
BA74X	BACT13	29/08/2017	04/09/2017	6
BA74X	BACT13	18/09/2017	25/09/2017	7
BA74X	BACT13	24/10/2017	30/10/2017	6
BA75X	BACT16	04/07/2017	10/07/2017	6
BA75X	BACT16	02/08/2017	08/08/2017	6

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA75X	BACT16	07/08/2017	15/08/2017	8
BA75X	BACT16	08/09/2017	11/09/2017	3
BA75X	BACT16	06/10/2017	10/10/2017	4
BA76X	BACT21	19/06/2017	26/06/2017	7
BA76X	BACT21	07/08/2017	13/08/2017	6
BA76X	BACT21	17/10/2017	23/10/2017	6
BA79X	BACT26	20/06/2017	26/06/2017	6
BA79X	BACT26	31/07/2017	01/08/2017	1
BA79X	BACT26	08/08/2017	16/08/2017	8
BA79X	BACT26	21/09/2017	26/09/2017	5
BA79X	BACT26	05/10/2017	11/10/2017	6
BA80X	BACT26	20/06/2017	26/06/2017	6
BA80X	BACT26	31/07/2017	03/08/2017	3
BA80X	BACT26	08/08/2017	10/08/2017	2
BA80X	BACT26	21/09/2017	26/09/2017	5
BA80X	BACT26	05/10/2017	11/10/2017	6
BA81X	BACT27	13/06/2017	19/06/2017	6
BA81X	BACT27	03/07/2017	07/07/2017	4
BA81X	BACT27	30/08/2017	12/09/2017	13
BA81X	BACT27	13/10/2017	18/10/2017	5
BA82X	BACT27	13/06/2017	19/06/2017	6
BA82X	BACT27	03/07/2017	07/07/2017	4
BA82X	BACT27	30/08/2017	01/09/2017	2

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA82X	BACT27	13/10/2017	18/10/2017	5
BA87X	BACT30	28/06/2017	04/07/2017	6
BA87X	BACT30	25/07/2017	31/07/2017	6
BA87X	BACT30	22/08/2017	29/08/2017	7
BA87X	BACT30	19/09/2017	25/09/2017	6
BA87X	BACT30	19/10/2017	24/10/2017	5
BA88X	BACT32	15/06/2017	23/06/2017	8
BA88X	BACT32	12/07/2017	17/07/2017	5
BA88X	BACT32	16/08/2017	21/08/2017	5
BA88X	BACT32	19/09/2017	25/09/2017	6
BA88X	BACT32	16/10/2017	23/10/2017	7
BA89X	BACT32	15/06/2017	23/06/2017	8
BA89X	BACT32	12/07/2017	17/07/2017	5
BA89X	BACT32	15/08/2017	21/08/2017	6
BA89X	BACT32	19/09/2017	26/09/2017	7
BA89X	BACT32	16/10/2017	23/10/2017	7
BA90X	BACT34	30/06/2017	05/07/2017	5
BA90X	BACT34	05/07/2017	11/07/2017	6
BA90X	BACT34	21/08/2017	24/08/2017	3
BA90X	BACT34	12/09/2017	12/09/2017	0
BA90X	BACT34	11/10/2017	16/10/2017	5
BA91X	BACT17	23/06/2017	27/06/2017	4
BA91X	BACT17	24/07/2017	28/07/2017	4

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA91X	BACT17	14/08/2017	21/08/2017	7
BA91X	BACT17	11/09/2017	19/09/2017	8
BA91X	BACT17	09/10/2017	16/10/2017	7
BA92X	BACT09	14/06/2017	19/06/2017	5
BA92X	BACT09	29/06/2017	03/07/2017	4
BA92X	BACT09	13/07/2017	17/07/2017	4
BA92X	BACT09	27/07/2017	31/07/2017	4
BA92X	BACT09	29/08/2017	04/09/2017	6
BA92X	BACT09	27/09/2017	29/09/2017	2
BA92X	BACT09	10/10/2017	19/10/2017	9
BA93X	BACT04	21/06/2017	23/06/2017	2
BA93X	BACT04	03/07/2017	07/07/2017	4
BA93X	BACT04	03/08/2017	09/08/2017	6
BA93X	BACT04	14/08/2017	22/08/2017	8
BA95X	BACT05	26/06/2017	30/06/2017	4
BA95X	BACT05	08/08/2017	13/08/2017	5
BA95X	BACT05	19/09/2017	23/09/2017	4
BA95X	BACT05	17/10/2017	23/10/2017	6
BA97X	BACT09	13/07/2017	17/07/2017	4
BA97X	BACT09	27/07/2017	31/07/2017	4
BA97X	BACT09	29/08/2017	04/09/2017	6
BA97X	BACT09	24/10/2017	29/10/2017	5
BA98X	BACT10	07/07/2017	12/07/2017	5

Static point	Transect reference	Deployment start date	Deployment end date	No. nights deployed
BA98X	BACT10	17/07/2017	24/07/2017	7
BA98X	BACT10	25/08/2017	31/08/2017	6
BA98X	BACT10	27/09/2017	02/10/2017	5
BA98X	BACT10	06/10/2017	11/10/2017	5

Appendix 5: Maps

Four overview maps are provided below showing the locations of the following transects.

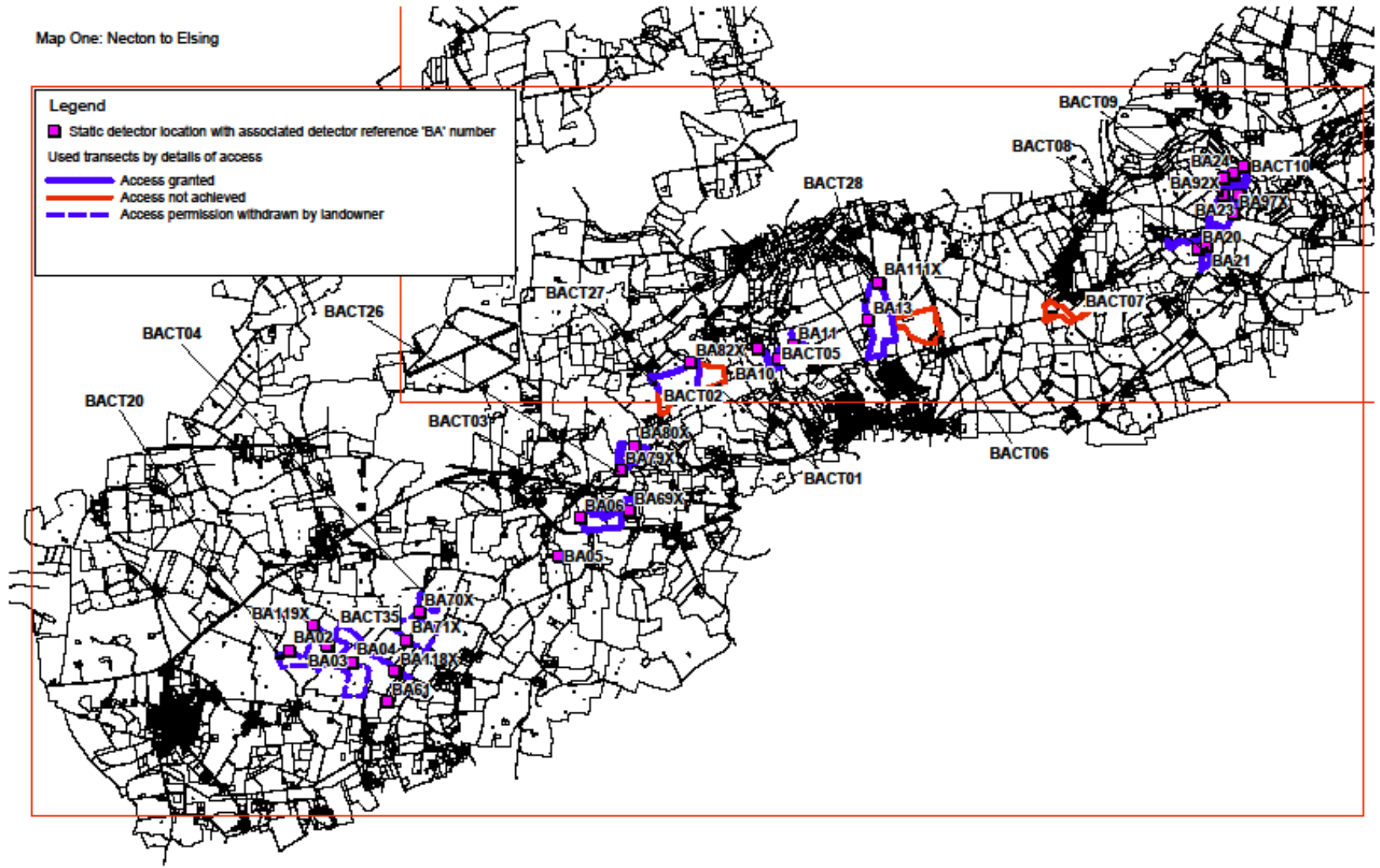
Transects #

BACT01	BACT19
BACT02	BACT20
BACT03	BACT21
BACT04	BACT22
BACT05	BACT23
BACT06	BACT24
BACT07	BACT25
BACT08	BACT26
BACT09	BACT27
BACT10	BACT28
BACT11	BACT29
BACT12	BACT30
BACT13	BACT31
BACT14	BACT32
BACT15	BACT33
BACT16	BACT34
BACT17	BACT35
BACT18	

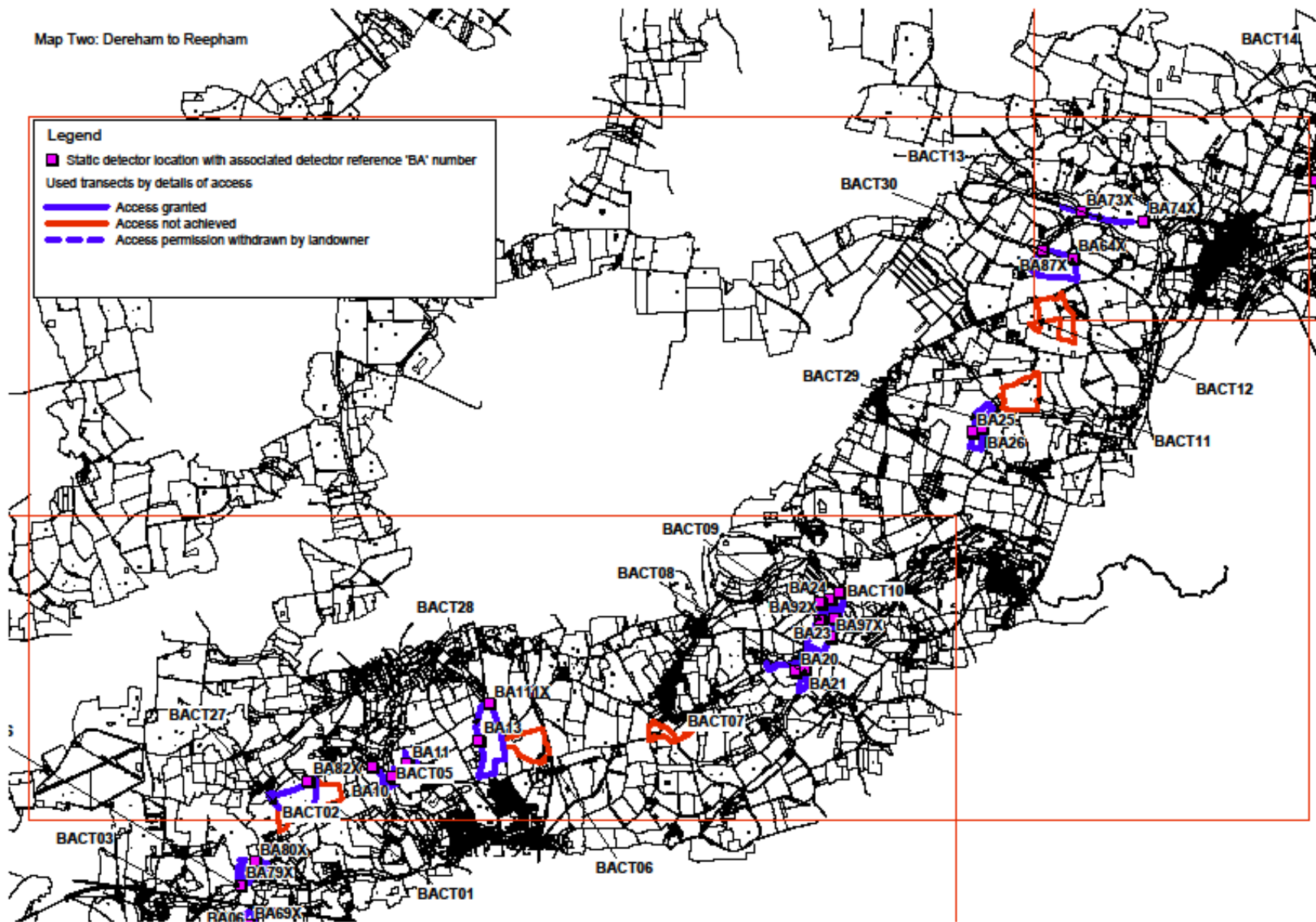
Map One: Necton to Elsing

Legend

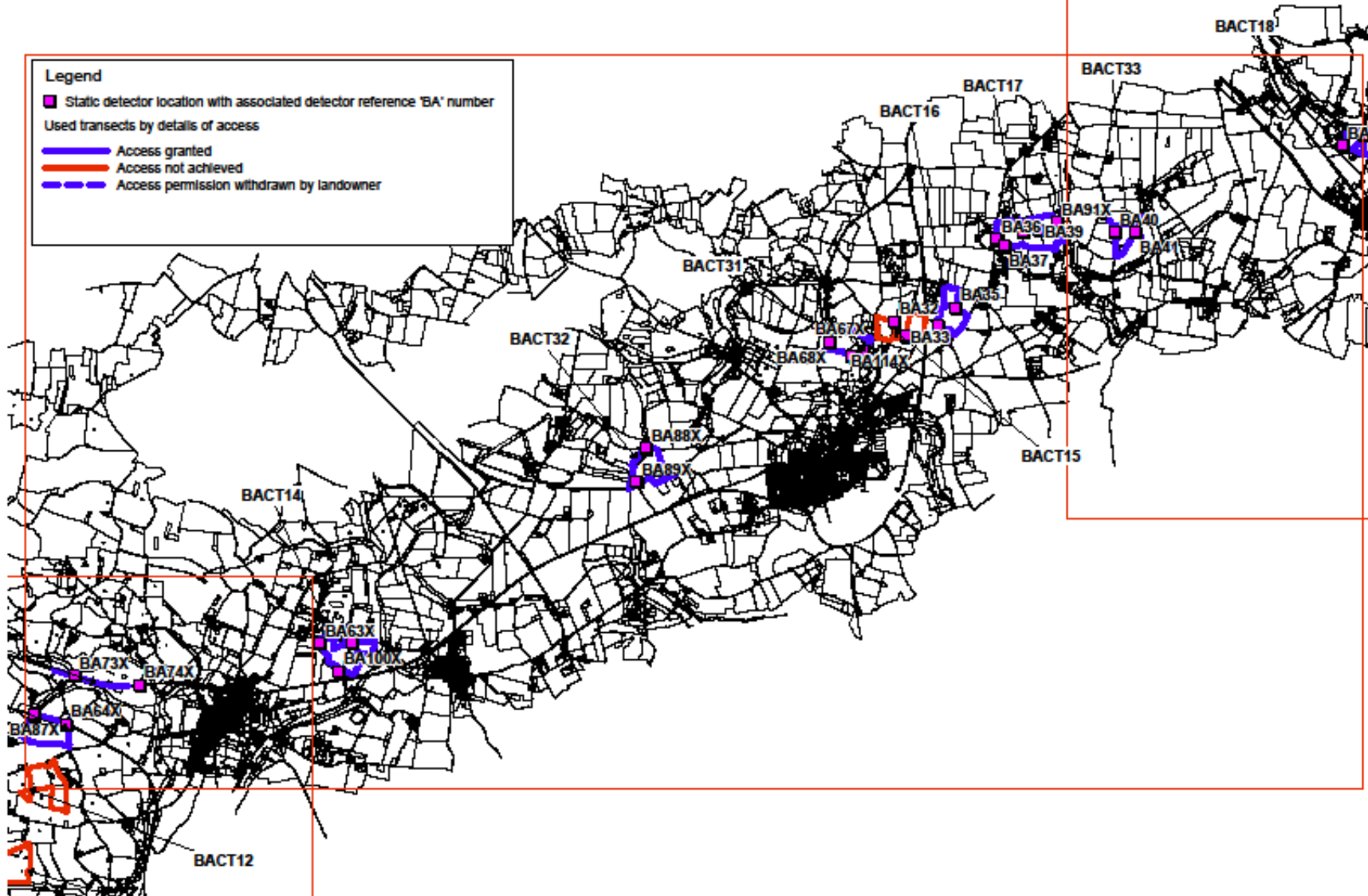
- Static detector location with associated detector reference 'BA' number
- Used transects by details of access
 - Access granted
 - Access not achieved
 - - - Access permission withdrawn by landowner



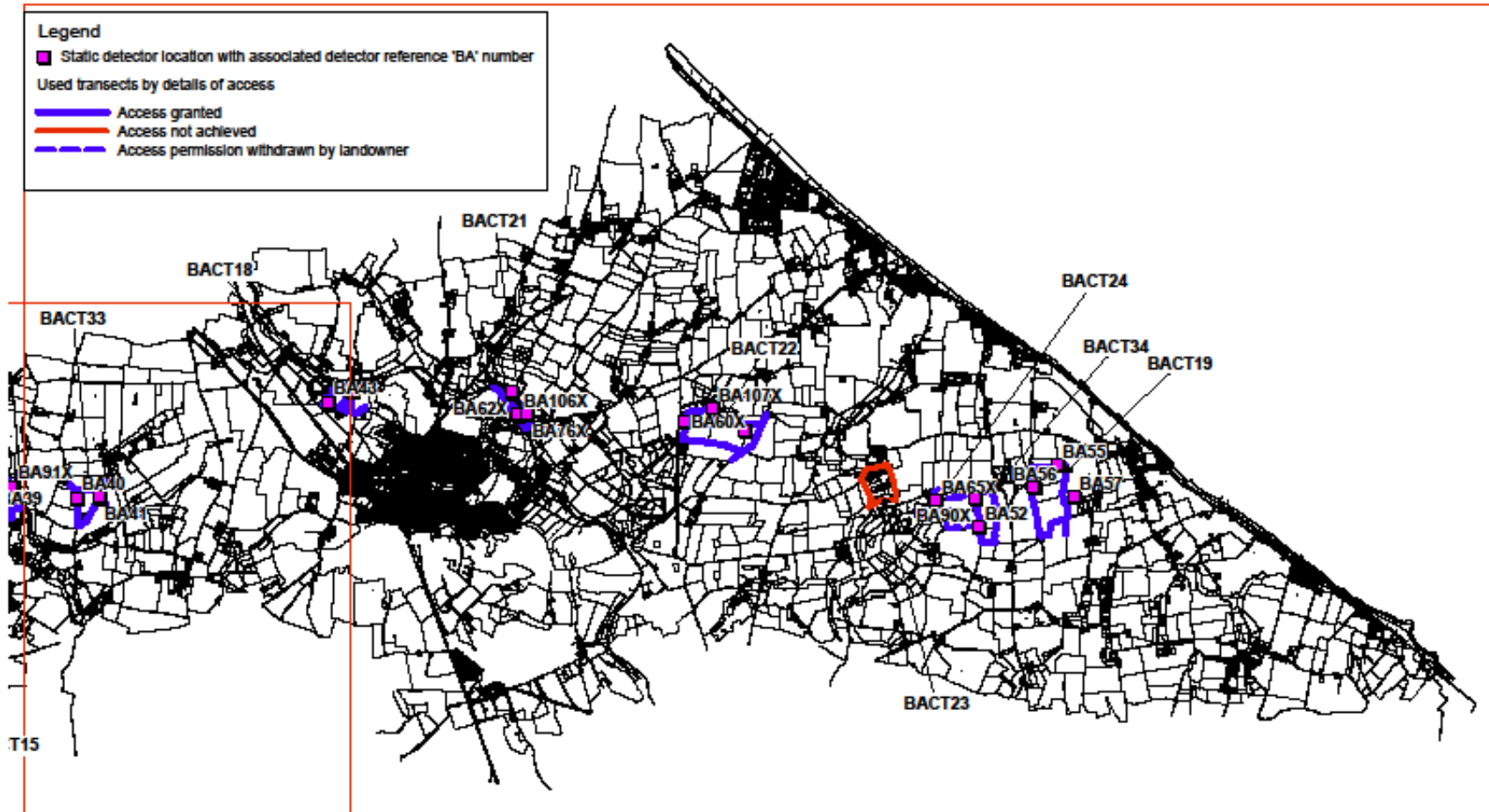
Map Two: Dereham to Reepham



Map Three: Reepham to Felmingham



Map Four: Felmingham to Walcott





Transect Summary: BACT03, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT03
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	18/12/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT03, Scarning

- 1.1. Grid reference: TF944124.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA06 and BA69X.

2. Description of transect

Land use at transect

- 2.1. Within the transect route the land is arable with Dale Road splitting the eastern and western areas.
- 2.2. To the north of the transect the surrounding habitat consists of arable land, small areas of woodland and hedgerow.
- 2.3. The A47 runs east to west to the north of the transect, whilst Dereham Road borders the south.
- 2.4. The western and eastern boundaries have connecting habitat to further arable fields and hedgerows.

Key commuting and foraging features

- 2.5. The tree line around the lodge in the centre north of the transect was a good commuting route for bats.
- 2.6. The hedgerow along the southern boundary with the road provided good commuting links.
- 2.7. The eastern boundary of the transect was good foraging habitat.

3. Survey effort

- 3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.
- 3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.
- 3.3. The transect was walked four times from July to September. An October visit was abandoned due to bad weather. The static at BA06 was deployed four times for a total of 18 nights and at BA69X four times for a total of 19 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA06	Visit 1 - 04.07.2017	04/07/2017	07/07/2017	3
	Visit 2 - 03.08.2017	03/08/2017	07/08/2017	4
	Visit 3 - 01.09.2017	01/09/2017	07/09/2017	6
	Visit 4 - 26.10.2017	26/10/2017	31/10/2017	5
BA69X	Visit 1 - 04.07.2017	04/07/2017	07/07/2017	3
	Visit 2 - 03.08.2017	03/08/2017	07/08/2017	4
	Visit 3 - 01.09.2017	01/09/2017	07/09/2017	6
	Visit 4 - 18.10.2017	18/10/2017	24/10/2017	6

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	JG, JH	03.07.17	21:20	23:22
2	Dawn	JG, JH	04.07.17	02:30	04:39
3	Dusk	JWH, JH	03.08.17	20:54	21:58
4	Dusk	KC, JH	01.09.17	19:45	20:47

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from transect data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Noctule	NYCNO	✓*	✓	Recorded throughout transect.	Throughout survey period.	N/A
Nathusius' pipistrelle	PIP NAT	✗	✓*	Isolated records at BA06.	July and October only.	N/A
Common pipistrelle	PIPPIP	✓	✓	Frequent passes throughout the transect.	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequent passes throughout the transect.	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Pipistrelle spp.	PIPSPP	✓*	✓	Frequent passes throughout the transect.	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Brown long eared	PLEAUR	✗	✓*	Isolated records at BA06.	October only.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	MYOSPP	NYCLEI	NYCNOG	PIPIPI	PYPPIG	PIPSPP	OTHER ²	Total all bats
1	Dusk	03.07.17	21:20	23:22	16 ^o C	15 ^o C	BWS1	2/8	None	0	0	0	0	6	5	0	0	11
2	Dawn	04.07.17	02:30	04:39	10 ^o C	13 ^o C	BWS1	1/8	None	0	0	0	0	12	14	0	0	26
3	Dusk	03.08.17	20:54	21:58	19.5 ^o C	18 ^o C	BWS2	6/8	None	0	0	0	0	0	0	0	0	0
4	Dusk	01.09.17	19:45	20:47	13 ^o C	14 ^o C	BWS0	3/8	None	0	0	0	0	6	9	1	0	1

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	NYCLEI	NYCNOG	PIPIPI	PYPPIG	OTHER	Total all bats	NOISE ³
1	Dusk	03.07.17	0	1	1	0	0	2	1151
2	Dawn	04.07.17	1	0	3	20	0	24	866
3	Dusk	03.08.17	0	0	0	0	0	0	745
4	Dusk	01.09.17	0	0	4	1	0	5	734

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA06.

Deployment\Species	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 04.07.2017	8	1	12	261	3	0	0	285	351
Visit 2 - 03.08.2017	6	0	596	18	8	0	1	629	47300
Visit 3 - 01.09.2017	59	0	185	482	12	0	2	740	6311
Visit 4 - 26.10.2017	1	2	87	5	0	1	8	104	1540
Grand Total	74	3	880	766	23	1	11	1758	55502

Table 7: Static data from BA point BA69X.

Deployment\Species	NYCNOC	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 04.07.2017	13	239	531	13	0	796	382
Visit 2 - 03.08.2017	0	2	10	2	0	14	61638
Visit 3 - 01.09.2017	0	0	0	0	0	0	1512
Visit 4 - 26.10.2017	0	16	1	0	1	18	7927
Grand Total	13	257	542	15	1	828	71459

4.4. Bat activity by date

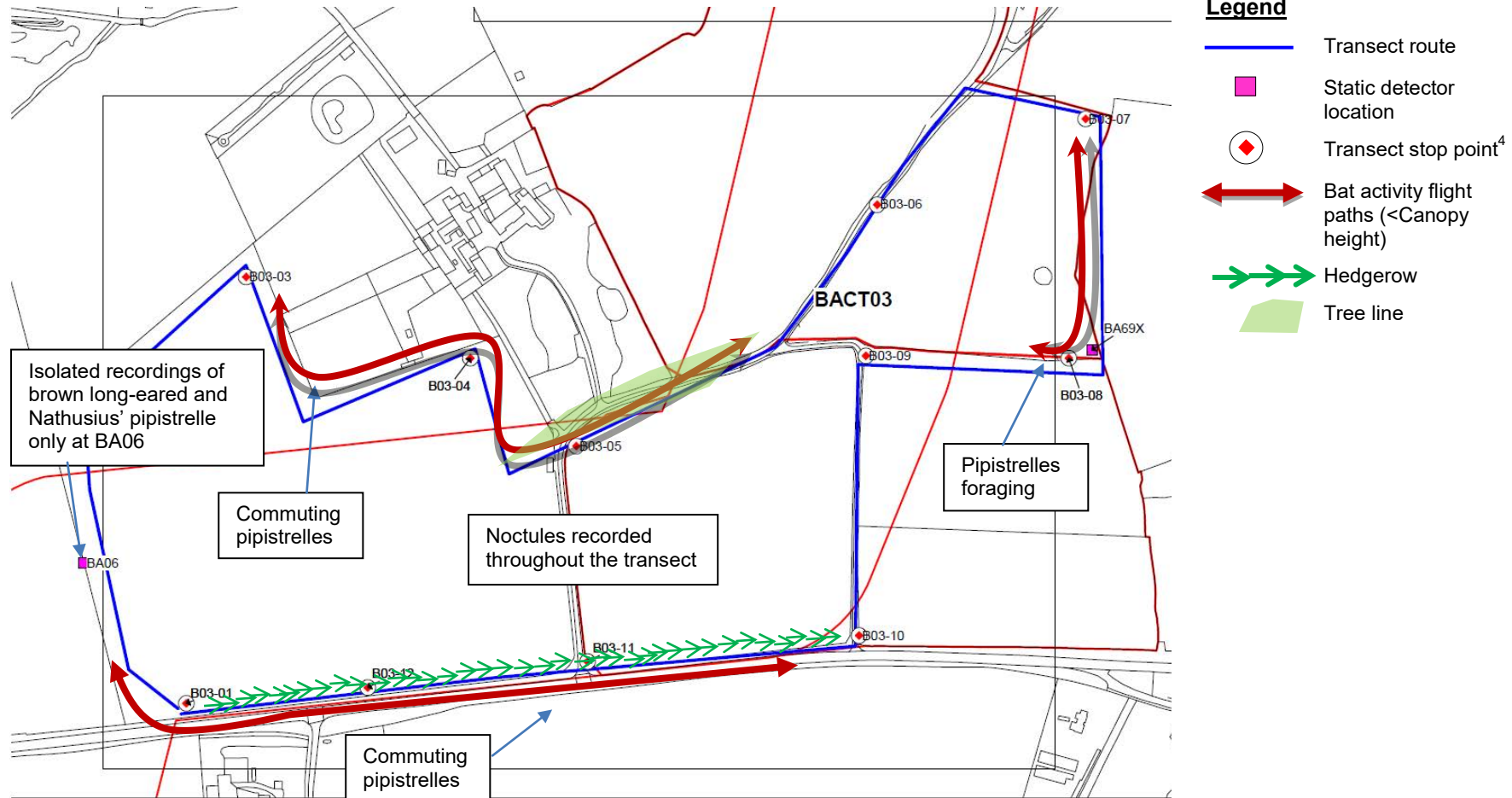
Table 8: Number of registrations of species recorded each night of deployment across all statics.

Date\Species	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
04/07/2017	1	0	94	116	4	0	0	215	154
05/07/2017	17	0	53	278	6	0	0	354	131
06/07/2017	3	0	21	136	4	0	0	164	267
07/07/2017	0	1	83	262	2	0	0	348	181
03/08/2017	0	0	197	1	1	0	0	199	7122
04/08/2017	6	0	332	10	4	0	1	353	25645
05/08/2017	0	0	27	10	0	0	0	37	36243
06/08/2017	0	0	4	5	4	0	0	13	23036
07/08/2017	0	0	38	2	1	0	0	41	16892
01/09/2017	2	0	7	21	1	0	0	31	2473
02/09/2017	1	0	0	2	0	0	0	3	337
03/09/2017	4	0	1	2	1	0	0	8	140
04/09/2017	1	0	6	44	2	0	2	55	2296
05/09/2017	6	0	93	224	2	0	0	325	1447
06/09/2017	24	0	78	189	6	0	0	297	1038
07/09/2017	21	0	0	0	0	0	0	21	92
18/10/2017	0	0	4	0	0	0	0	4	62
19/10/2017	0	0	0	0	0	0	0	0	1296
20/10/2017	0	0	6	0	0	0	0	6	1380
21/10/2017	0	0	0	0	0	0	0	0	2509
22/10/2017	0	0	0	0	0	0	0	0	2328
23/10/2017	0	0	5	1	0	0	1	7	169
24/10/2017	0	0	1	0	0	0	0	1	183
26/10/2017	0	0	83	3	0	0	0	86	47

Date\Species	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
27/10/2017	1	0	0	2	0	1	8	12	113
28/10/2017	0	0	0	0	0	0	0	0	667
29/10/2017	0	2	4	0	0	0	0	6	649
30/10/2017	0	0	0	0	0	0	0	0	36
31/10/2017	0	0	0	0	0	0	0	0	28
Grand Total	87	3	1137	1308	38	1	12	2586	126961

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B03_01) is reference to Transect number and the transect stop number.



Transect Summary: BACT04, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT04
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	03/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT04, Bradenham

- 1.1. Grid reference : TF916108.
- 1.2. Transect designation : High quality.
- 1.3. Static detectors : BA70X, BA71X & BA93X.

2. Description of transect

Land use at transect

- 2.1. The land at BACT04 consists of arable agriculture with few small fragments of mixed woodland, the largest of which is situated to the south of the transect.
- 2.2. These fragments of woodland are linked together by mature hedgerows.
- 2.3. There is a thin band of trees and an established species rich hedgerow running north through the transect. This band of trees also has a small stream running along its length, which links well with other streams, ponds and drainage ditches in the wider landscape.
- 2.4. At the north-east corner of the transect is a small pond situated adjacent to a well-established native species rich hedgerow.

Key commuting and foraging features

- 2.5. The tree belt was an excellent commuting and foraging route.
- 2.6. The pond was used by foraging bats.
- 2.7. Common and soprano pipistrelles were only recorded between walk 5 and stop 12. Even on the dawn where the transect was reversed and started at stop 12 bats were only recorded up until walk 5.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked five times from June to August. The static at BA70X was deployed three times for a total of 16 nights, at BA71X three times for a total of 19 nights and at BA93X four times for a total of 20 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA70X	Visit 1 - 20.06.2017	20/06/2017	26/06/2017	6
	Visit 2 - 03.07.2017	03/07/2017	07/07/2017	4
	Visit 3 - 03.08.2017	03/08/2017	09/08/2017	6
BA71X	Visit 1 - 21.06.2017	21/06/2017	26/06/2017	5
	Visit 2 - 03.08.2017	03/08/2017	09/08/2017	6
	Visit 3 - 14.08.2017	14/08/2017	22/08/2017	8
BA93X	Visit 1 - 21.06.2017	21/06/2017	23/06/2017	2
	Visit 2 - 03.07.2017	03/07/2017	07/07/2017	4
	Visit 3 - 03.08.2017	03/08/2017	09/08/2017	6
	Visit 4 - 14.08.2017	14/08/2017	22/08/2017	8

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BC, CB	20/06/17	21:28	23:25
2	Dawn	BC, CB	21/06/17	02:30	04:33
3	Dusk	BM, KC	03/07/17	21:20	23:04
4	Dusk	JA, CB	03/08/17	20:28	22:45
5	Dusk	KC, JA	14/08/17	20:16	21:42

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	✓*	Recorded on static BA70X only.	Recorded during the early morning only.	N/A
Serotine	EPTSER	X	✓*	Recorded on statics BA70X and BA71X.	Recorded by statics during the early evening only.	N/A
Myotis spp.	MYOSPP	X	✓*	Occasional records across the transect on all static detectors.	Recorded by statics throughout the night.	N/A
Large bat spp	LARGEBATSP	✓*	✓	Recorded across the transect on all static detectors with occasional recordings from transect data.	Recorded throughout the season.	N/A
Noctule	NYCNOC	✓*	✓	Recorded throughout the transect.	Recorded throughout the season.	N/A
Nathusius' pipistrelle	PIP NAT	✓*	✓	Recorded across the transect on all static detectors with several records from transect data.	Recorded throughout the evening from sunset and the early morning only.	N/A
Common pipistrelle	PIPIPI	✓	✓	Foraging along belt of trees which intersect the transect between stops 7 and 5. Also pipistrelle foraging activity along the hedge from walk 5 to stop 7.	Heard on transect visits from 30 minutes from sunrise and for the remaining duration of the survey.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Foraging along belt of trees which intersect the transect between stops 7 and 5. Also pipistrelle foraging activity along the hedge from walk 5 to stop 7.	Heard on transect visits from 30 minutes from sunrise and for the remaining duration of the survey.	N/A
Pipistrelle spp.	PIPSPP	✓	✓	Recorded throughout the transect.	Recorded throughout the season.	N/A
Brown long-eared	PLEAUR	✓	✓*	1 record on transect and on static BA93X only.	August only.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOC	PIPIP	PIPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	20/06/17	21:28	23:25	18°C	14°C	BS2	8/8	None	0	0	0	1	5	0	2	4	12
2	Dawn	21/06/17	02:30	04:33	16°C	14°C	BS2	4/8	None	0	0	0	1	36	0	4	5	46
3	Dusk	03/07/17	21:20	23:04	16°C	15°C	BS0	1/8	None	0	0	0	0	6	2	2	0	10
4	Dusk	03/08/17	20:28	22:45	16°C	18°C	BS4	6/8	None	0	0	0	0	0	0	6	0	6
5	Dusk	14/08/17	20:16	21:42	17°C	18°C	BS2	8/8	Rain at start	0	0	0	0	10	4	3	0	17

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	NYCLEI	NYCNOC	PIP NAT	PIPIP	PIPYG	PLEAUR	Other	Total all bats	NOISE ³
1	Dusk	20/06/17	0	0	1	57	2	2	4	66	1357
2	Dawn	21/06/17	0	0	2	57	8	0	6	73	862
3	Dusk	03/07/17	1	3	1	10	3	0	1	19	740
4	Dusk	03/08/17	0	3	0	39	20	0	3	65	1651
5	Dusk	14/08/17	0	0	0	9	10	0	12	31	918

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA70X.

Deployment\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNO	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 20.06.2017	0	0	3	0	28	72	2529	412	71	1	3116	2729
Visit 2 - 03.07.2017	0	0	1	0	10	0	247	37	6	0	301	335
Visit 3 - 03.08.2017	2	1	51	3	26	3	1446	184	18	0	1734	118484

Table 7: Static data from BA point BA71X.

Deployment\Species	EPTSER	LARGEBATSP	MYOSPP	NYCNO	PIP NAT	PIPIPI	PIPPYG	PIPSPP	Total all bats	NOISE
Visit 1 - 21.06.2017	0	3	5	9	68	1189	258	164	1696	2729
Visit 2 - 03.08.2017	0	25	1	66	0	336	46	6	480	335
Visit 3 - 14.08.2017	1	16	0	78	0	4019	46	38	4198	118484

Table 8: Static data from BA point BA93X.

Deployment\Species	LARGEBATSP	MYOSPP	NYCNO	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	Total all bats	NOISE
Visit 1 - 21.06.2017	4	0	22	10	42	3	11	0	92	501
Visit 2 - 03.07.2017	0	0	13	1	222	6	4	0	246	3124
Visit 3 - 03.08.2017	9	0	21	0	189	42	2	0	263	58280
Visit 4 - 14.08.2017	48	1	92	0	690	230	399	1	1461	76382

4.4. Bat activity by date

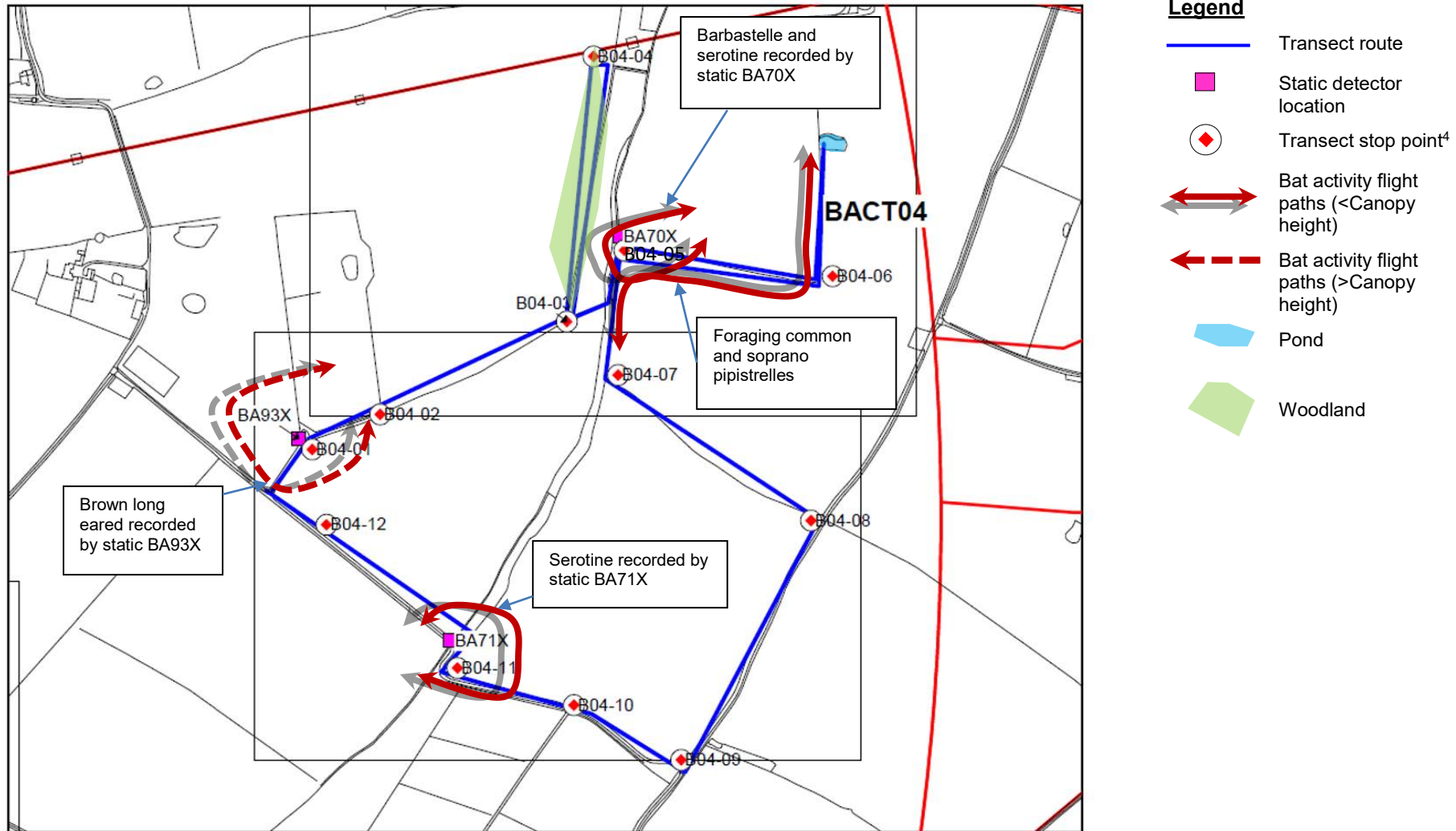
Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
20/06/2017	0	0	0	0	0	0	2	0	0	0	0	2	86
21/06/2017	0	0	4	1	11	41	180	18	39	0	0	294	735
22/06/2017	0	0	1	1	7	33	745	139	35	0	0	961	901
23/06/2017	0	0	1	0	21	23	803	110	52	0	0	1010	1054
24/06/2017	0	0	3	0	10	30	793	88	74	0	1	999	1069
25/06/2017	0	0	1	2	2	22	829	231	37	0	0	1124	608
26/06/2017	0	0	0	1	8	1	408	87	9	0	0	514	211
03/07/2017	0	0	1	0	1	0	97	2	3	0	0	104	2783
04/07/2017	0	0	0	0	2	1	112	12	1	0	0	128	167
05/07/2017	0	0	0	0	3	0	138	20	3	0	0	164	181
06/07/2017	0	0	0	0	4	0	72	4	3	0	0	83	209
07/07/2017	0	0	0	0	13	0	50	5	0	0	0	68	119
03/08/2017	0	0	45	1	14	1	554	78	12	0	0	705	10960
04/08/2017	1	0	2	2	8	2	673	88	7	0	0	783	41431
05/08/2017	0	0	1	1	12	0	203	27	0	0	0	244	49608
06/08/2017	1	0	2	0	9	0	115	20	2	0	0	149	36347
07/08/2017	0	0	13	0	22	0	154	34	3	0	0	226	37054
08/08/2017	0	1	14	0	25	0	174	21	1	0	0	236	48827
09/08/2017	0	0	8	0	23	0	98	4	1	0	0	134	19766
14/08/2017	0	0	1	0	0	0	98	12	2	0	0	113	13473
15/08/2017	0	0	6	1	7	0	169	24	7	0	0	214	20322
16/08/2017	0	0	1	0	8	0	125	21	11	0	0	166	34374
17/08/2017	0	0	0	0	4	0	262	5	2	0	0	273	23912
18/08/2017	0	0	1	0	10	0	701	9	7	0	0	728	21798

Date\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
19/08/2017	0	0	4	0	4	0	1328	6	2	0	0	1344	8425
20/08/2017	0	0	4	0	4	0	1499	49	24	0	0	1580	18714
21/08/2017	0	1	33	0	79	0	348	129	358	1	0	949	24922
22/08/2017	0	0	14	0	54	0	179	21	24	0	0	292	9175
Grand Total	2	2	160	10	365	154	10909	1264	719	1	1	13587	427231

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B04_01) is reference to transect number and the transect stop number.



Transect Summary: BACT05, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT05
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	02/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).

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1. Transect summary: BACT05, Dillington

- 1.1. Grid reference : TF970148.
- 1.2. Transect designation : High quality.
- 1.3. Static detectors : BA10, BA11 & BA95X.

2. Description of transect

Land use at transect

- 2.1. Land use within the transect route was a combination of agricultural land, lowland deciduous woodland and lowland fen.
- 2.2. Agricultural land was split between low-density pastoral in the west to high intensity arable in the east.
- 2.3. The south-western corner of the transect consisted of various ponds adjacent to a small river running north to south. These ponds were also situated in grassland with mature standards.
- 2.4. A minor road cuts through the transect running north-west to south-east. This road and the surrounding fields are bordered by mature hedgerows.
- 2.5. Outside the transect area to the north and south lie large areas of wet deciduous woodland.

Key commuting and foraging features

- 2.6. Key commuting features were hedgerows along field boundaries and the minor road.
- 2.7. There were no major breaks in commutable habitat throughout the transect route, with largely intact hedgerows between woodlands.
- 2.8. Key foraging habitat was evident within the western section between Stop 1 and Stop 5 and between Stop 8 and Stop 10 in the eastern section.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked 10 times from May to October. The static at BA10 was deployed seven times for a total of 35 nights, BA11 five times for a total of 33 nights and BA95X four times for a total of 19 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA10	Visit 1 - 25.05.2017	25/05/2017	01/06/2017	7
	Visit 2 - 12.06.2017	12/06/2017	18/06/2017	6
	Visit 3 - 26.06.2017	26/06/2017	30/06/2017	4
	Visit 4 - 18.07.2017	18/07/2017	21/07/2017	3
	Visit 5 - 08.08.2017	08/08/2017	14/08/2017	6
	Visit 6 - 31.08.2017	31/08/2017	04/09/2017	4
	Visit 7 - 03.10.2017	03/10/2017	08/10/2017	5
BA11	Visit 1 - 25.05.2017	25/05/2017	01/06/2017	7
	Visit 2 - 12.06.2017	12/06/2017	19/06/2017	7
	Visit 3 - 22.08.2017	22/08/2017	28/08/2017	6
	Visit 4 - 19.09.2017	19/09/2017	26/09/2017	7
	Visit 5 - 17.10.2017	17/10/2017	23/10/2017	6
BA95X	Visit 1 - 26.06.2017	26/06/2017	30/06/2017	4
	Visit 2 - 08.08.2017	08/08/2017	13/08/2017	5
	Visit 3 - 19.09.2017	19/09/2017	23/09/2017	4
	Visit 4 - 17.10.2017	17/10/2017	23/10/2017	6

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BC, AB	25.05.17	20:58	21:41
2	Dusk	BC, AV	12.06.17	21:22	23:16
3	Dusk	KC, BM	26.06.17	21:20	22:57
4	Dusk	AG, JH	18.07.17	21:18	22:49
5	Dusk	AG, JH	08.08.17	20:39	21:58
6	Dusk	AG, JH	22.08.17	20:07	21:28
7	Dusk	JH, AG	06.09.17	19:45	21:17
8	Dusk	JWH, JH	19.09.17	19:06	20:24
9	Dusk	JWH, JH	03.10.17	18:25	20:17
10	Dawn	BC, BM	04.10.17	05:02	07:07
11	Dusk	JWH, JH	17.10.17	17:58	19:38

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✓*	Recorded by static detector points BA11 and BA95X.	Recorded by statics throughout the survey period, generally in the early evening and early morning.	N/A
Serotine	EPTSER	✗	✓*	Occasional commuting near Stop 8 – adjacent woodland.	Recorded by surveyors after 1.5 hours post sunset, most commonly detected by statics in August. Static detectors recorded throughout the night.	N/A
Large bat spp.	LARGEBATSP	✓*	✓	Recorded across the entire transect with recordings on each of the three static detectors.	Recorded by statics throughout survey period.	N/A
Leislars	NYCLEI	✗	✓*	Recorded across the entire transect with recordings on each of the three static detectors.	Static detectors recorded throughout the night.	N/A
Myotis sp.	MYOSPP	✓*	✓	Foraging above the river in the SW of the transect.	Picked up by surveyors about 20 minutes into the survey (approximate time for surveyors to reach the river). Static detectors recorded throughout the night.	N/A
Noctule	NYCNOC	✓*	✓	Occasional commuting near Stop 8 – adjacent woodland.	Usually heard from an hour after sunset. Static detectors recorded throughout the night.	N/A
Nathusius' pipistrelle	PIP NAT	✗	✓*	Recorded across the entire transect with recordings on each of the three static detectors.	Static detectors recorded throughout the night.	N/A
Common pipistrelle	PIPPIP	✓	✓	Continual foraging between Stop 3 and 5, and between Stop 8 and 10.	Constant activity from start to finish during walked transects.	Frequent social calling
Soprano pipistrelle	PIPPYG	✓	✓	Continual foraging between Stop 3 and 5.	Constant activity from start to finish during walked transects.	Frequent social calling
Pipistrelle spp.	PIPSPP	✓	✓	Throughout the transect.	Throughout the survey period.	N/A
Brown long-eared	PLEAUR	✗	✓*	Single pass at BA95X to the west of the transect.	Heard in the early morning.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOC	PIPPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	25.05.17	20:58	21:41	15 ^o C	13 ^o C	BS1	1/8	None	0	3	0	0	41	24	0	0	68
2	Dusk	12.06.17	21:22	23:16	15 ^o C	15 ^o C	BS1	7/8	None	0	0	0	1	12	31	23	1	68
3	Dusk	26.06.17	21:20	22:57	12 ^o C	14 ^o C	BS0	1/8	None	0	1	0	0	12	14	2	0	29
4	Dusk	18.07.17	21:18	22:49	17 ^o C	17 ^o C	BS0	5/8	None	0	0	0	0	10	32	0	1	43
5	Dusk	08.08.17	20:39	21:58	15 ^o C	14 ^o C	BS2	8/8	Heavy rain 21:24>	0	0	4	0	26	32	2	0	60
6	Dusk	22.08.17	20:07	21:28	19 ^o C	17 ^o C	BS2	6/8	None	0	1	0	0	17	19	2	4	43
7	Dusk	06.09.17	19:45	21:17	18 ^o C	15 ^o C	BS0	5/8	light rain at start	0	0	0	0	17	2	5	0	24
8	Dusk	19.09.17	19:06	20:24	13 ^o C	15 ^o C	BS0	2/8	None	0	0	0	2	5	19	0	1	27
9	Dusk	03.10.17	18:25	20:17	14 ^o C	12 ^o C	BS1	8/8	None	0	0	0	0	0	0	7	2	9
10	Dawn	04.10.17	05:02	07:07	10 ^o C	10 ^o C	BS2	7/8	None	0	0	0	0	1	7	18	0	26
11	Dusk	17.10.17	17:58	19:38	15 ^o C	11 ^o C	BS0	8/8	None	0	0	1	0	3	11	0	0	15

² All bats not identified to species level.

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	LARGEBATSP	MYOSPP	NYCNOC	OTHER	PIPIPI	PIPPYG	Total all bats	NOISE ³
1	Dusk	25.05.17	1	0	0	1	4	28	40	74	372
2	Dusk	12.06.17	0	1	0	2	0	14	21	38	1055
3	Dusk	26.06.17	0	2	1	4	3	14	42	66	1193
4	Dusk	18.07.17	1	0	0	2	1	2	46	52	469
5	Dusk	08.08.17	0	0	0	0	1	0	22	25	533
6	Dusk	22.08.17	0	0	0	0	3	0	7	13	1050
7	Dusk	06.09.17	0	0	0	0	0	0	0	0	0
8	Dusk	19.09.17	0	0	0	0	0	0	0	0	0
9	Dusk	03.10.17	0	0	0	1	0	1	2	5	351
10	Dawn	04.10.17	0	1	0	0	0	1	35	36	862
11	Dusk	17.10.17	0	0	0	0	1	15	4	20	1009

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA10.

Deployment\Species	EPTSER	LARGEBATSP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 25.05.2017	0	16	0	0	51	4	912	19	5	24	1031	6581
Visit 2 - 12.06.2017	0	39	2	0	98	1	408	224	9	3	784	2880
Visit 3 - 26.06.2017	0	43	3	0	189	0	54	144	11	1	445	886
Visit 4 - 18.07.2017	1	3	4	0	11	0	351	577	31	2	980	3355
Visit 5 - 08.08.2017	0	0	0	0	0	0	7	5	0	0	12	1824
Visit 6 - 31.08.2017	0	15	0	1	17	0	13	192	7	3	248	66264
Visit 7 - 03.10.2017	0	0	0	0	2	1	5	0	0	0	8	4573
Grand Total	1	116	9	1	368	6	1750	1161	63	33	3608	86363

Table 7: Static data from BA point BA11.

Deployment\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 25.05.2017	0	0	10	1	0	22	0	231	857	63	2	1186	3310
Visit 2 - 12.06.2017	0	0	18	1	0	100	0	215	798	42	2	1176	2236
Visit 3 - 22.08.2017	3	0	14	12	3	40	0	56	345	11	0	484	128308
Visit 4 - 19.09.2017	2	5	202	58	0	637	3	5118	953	4094	53	11125	13306
Visit 5 - 17.10.2017	0	0	1	0	0	4	0	13	155	1	0	174	3176
Grand Total	5	5	245	72	3	803	3	5633	3108	4211	57	14145	150336

Table 8: Static data from BA point BA95X.

Deployment\Species	BARBAR	LARGEBATSP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 26.06.2017	0	2	8	0	8	0	54	118	10	0	0	200	2169
Visit 2 - 08.08.2017	0	37	3	1	60	0	1017	1537	82	0	0	2737	6022
Visit 3 - 19.09.2017	1	25	5	0	144	1	12	23	6	1	0	218	55293
Visit 4 - 17.10.2017	2	25	11	0	29	0	1237	1328	127	0	4	2763	6125
Grand Total	3	89	27	1	241	1	2320	3006	225	1	4	5918	69609

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

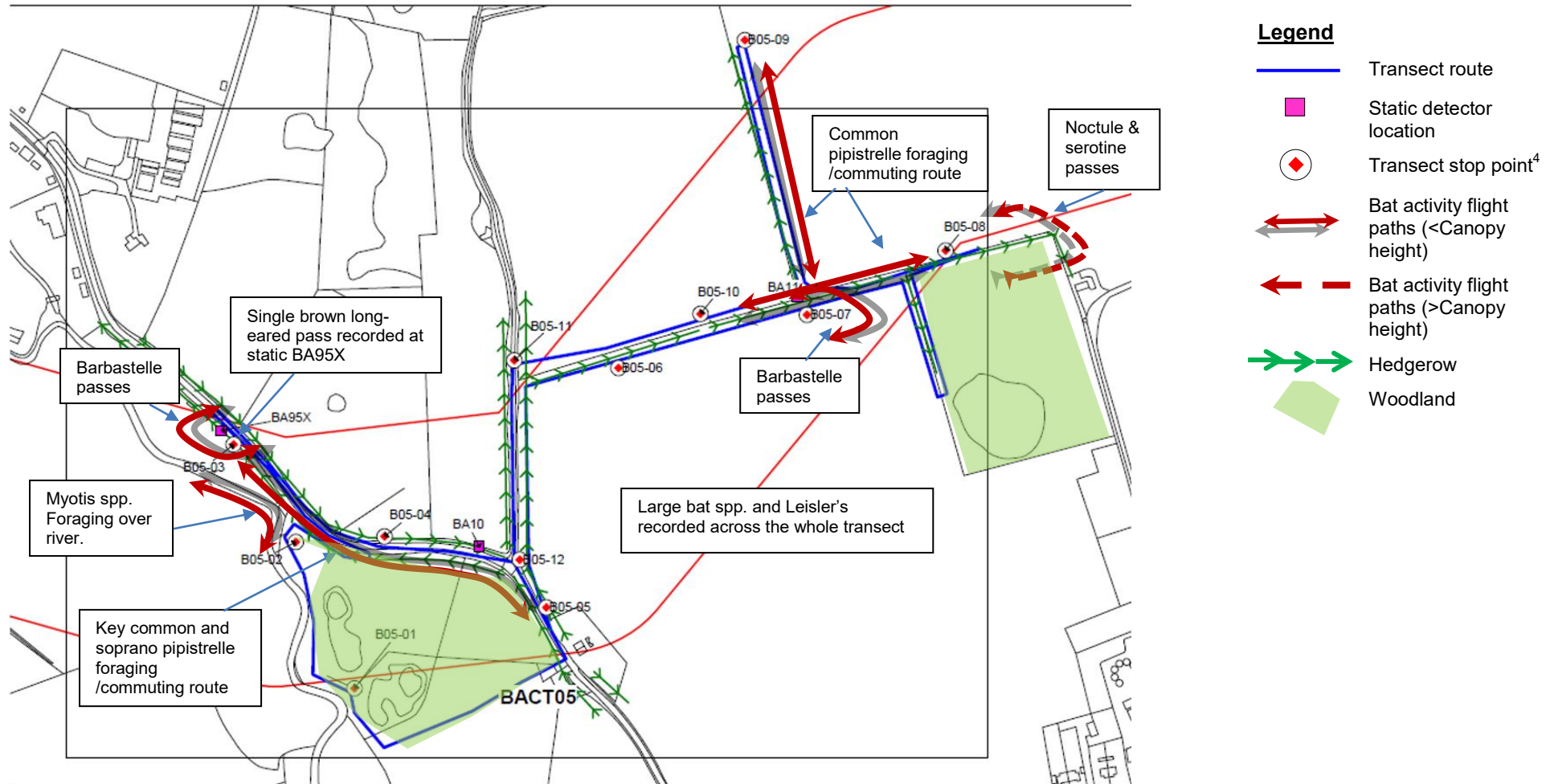
Date\Species	BARBAR	EPTSER	LARGE ATSP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
25/05/2017	c	0	0	0	0	3	0	13	15	0	0	0	31	250
26/05/2017	0	0	1	0	0	16	1	126	168	23	0	0	335	1000
27/05/2017	0	0	6	0	0	12	0	184	149	5	0	4	360	1977
28/05/2017	0	0	7	0	0	9	1	340	125	13	0	12	507	1526
29/05/2017	0	0	6	1	0	8	1	182	126	16	0	6	346	1825
30/05/2017	0	0	3	0	0	17	0	135	119	6	0	4	284	1168
31/05/2017	0	0	3	0	0	6	1	105	164	5	0	0	284	1569
01/06/2017	0	0	0	0	0	2	0	58	10	0	0	0	70	576
12/06/2017	0	0	1	0	0	1	1	44	78	6	0	0	131	304
13/06/2017	0	0	4	0	0	10	0	201	141	12	0	0	368	930
14/06/2017	0	0	15	0	0	128	0	68	73	10	0	2	296	756
15/06/2017	0	0	3	0	0	5	0	129	389	12	0	1	539	1214
16/06/2017	0	0	15	0	0	13	0	110	224	7	0	2	371	1088
17/06/2017	0	0	5	3	0	8	0	25	49	0	0	0	90	401
18/06/2017	0	0	8	0	0	20	0	32	36	4	0	0	100	355
19/06/2017	0	0	6	0	0	13	0	14	32	0	0	0	65	68
26/06/2017	0	0	0	2	0	0	0	31	79	3	0	1	116	289
27/06/2017	0	0	16	2	0	186	0	62	152	10	0	0	428	847
28/06/2017	0	0	0	1	0	0	0	2	6	0	0	0	9	1572
29/06/2017	0	0	2	6	0	8	0	10	17	3	0	0	46	257
30/06/2017	0	0	27	0	0	3	0	3	8	5	0	0	46	90
18/07/2017	0	0	1	0	0	3	0	4	89	2	0	0	99	325
19/07/2017	0	0	0	2	0	2	0	117	155	10	0	0	286	1186
20/07/2017	0	1	2	1	0	6	0	200	288	16	0	2	516	1586

Date\Species	BARBAR	EPTSER	LARGEB ATSP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
21/07/2017	0	0	0	1	0	0	0	30	45	3	0	0	79	258
08/08/2017	0	0	0	0	0	0	0	14	22	1	0	0	37	305
09/08/2017	0	0	0	1	0	0	0	45	68	1	0	0	115	542
10/08/2017	0	0	6	1	0	12	0	67	60	1	0	0	147	953
11/08/2017	0	0	13	0	0	29	0	450	478	47	0	0	1017	1823
12/08/2017	0	0	6	1	1	7	0	439	743	29	0	0	1226	2768
13/08/2017	0	0	12	0	0	12	0	9	171	3	0	0	207	1327
14/08/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	128
22/08/2017	0	0	4	0	0	7	0	13	22	4	0	0	50	10699
23/08/2017	1	0	3	0	0	8	0	17	77	0	0	0	106	30891
24/08/2017	0	0	0	0	0	1	0	9	65	0	0	0	75	19568
25/08/2017	1	0	1	3	3	5	0	9	51	4	0	0	77	16640
26/08/2017	0	0	2	4	0	16	0	5	65	0	0	0	92	22367
27/08/2017	0	0	4	5	0	3	0	3	59	3	0	0	77	19971
28/08/2017	1	0	0	0	0	0	0	0	6	0	0	0	7	8172
31/08/2017	0	0	0	0	0	0	0	2	1	0	0	0	3	6314
01/09/2017	0	0	1	0	0	10	0	10	126	3	0	0	150	15660
02/09/2017	0	0	14	0	0	4	0	0	17	0	0	3	38	18664
03/09/2017	0	0	0	0	1	3	0	1	48	4	0	0	57	20914
04/09/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	4712
19/09/2017	0	0	10	1	0	58	0	3	17	0	0	0	89	9939
20/09/2017	0	0	3	1	0	18	1	5	10	2	0	0	40	16004
21/09/2017	0	0	34	6	0	104	0	796	211	770	0	13	1934	21711
22/09/2017	1	2	9	14	0	66	1	202	90	55	1	0	441	7501
23/09/2017	1	1	52	10	0	94	1	1802	113	561	0	17	2652	6613
24/09/2017	0	1	96	9	0	347	0	1529	216	2019	0	19	4236	4166

Date\Species	BARBAR	EPTSER	LARGB ATSP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPIYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
25/09/2017	1	1	19	18	0	78	1	464	271	592	0	1	1446	2074
26/09/2017	0	0	4	4	0	16	0	329	48	101	0	3	505	591
03/10/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	203
04/10/2017	0	0	0	0	0	2	0	1	0	0	0	0	3	857
05/10/2017	0	0	0	0	0	0	1	3	0	0	0	0	4	934
06/10/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	2418
07/10/2017	0	0	0	0	0	0	0	1	0	0	0	0	1	148
08/10/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	13
17/10/2017	0	0	1	0	0	1	0	67	29	7	0	0	105	479
18/10/2017	2	0	1	2	0	1	0	89	210	16	0	1	322	1529
19/10/2017	0	0	9	4	0	9	0	796	274	46	0	1	1139	1711
20/10/2017	0	0	7	1	0	11	0	213	394	46	0	1	673	1916
21/10/2017	0	0	5	0	0	1	0	16	205	3	0	1	231	2201
22/10/2017	0	0	3	2	0	9	0	66	236	7	0	0	323	1202
23/10/2017	0	0	0	2	0	1	0	3	135	3	0	0	144	263
Grand Total	8	6	450	108	5	1412	10	9703	7275	4499	1	91	23568	306308

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B05_01) is reference to transect number and the transect stop number.



Transect Summary: BACT08, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT08
Date of report :	30/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	12/12/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT08: Elsing

- 1.1. Grid reference: TG033166.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA20 and BA21.

2. Description of transect

Land use at transect

- 2.1. Set within grassland and arable fields, the transect is bordered by hedgerows on all sides.
- 2.2. To the north is an area of floodplain grazing marsh and beyond that an area of semi-improved grassland.
- 2.3. To the north-east and south-west are areas of deciduous woodland.
- 2.4. Connecting ditches run along the eastern, northern and southern boundaries of the transect.
- 2.5. The wider environment is predominantly arable and grazing

Key commuting and foraging features

- 2.6. The hedgerows in the area provide good commuting routes for common species with the woodlands providing good connecting habitat.
- 2.7. The area of wet grassland to the north provides good foraging habitat for pipistrelles.
- 2.8. Barbastelles were only noted occasionally on the transect.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked nine times from June to October. The static at BA20 was deployed six times for a total of 49 nights and the static at BA21 was deployed five times for a total of 41 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA20	Visit 1 - 02.06.2017	02/06/2017	12/06/2017	10
	Visit 2 - 12.06.2017	12/06/2017	20/06/2017	8
	Visit 3 - 14.07.2017	14/07/2017	27/07/2017	13
	Visit 4 - 07.08.2017	07/08/2017	08/08/2017	1
	Visit 5 - 04.09.2017	04/09/2017	12/09/2017	8
	Visit 6 - 02.10.2017	02/10/2017	11/10/2017	9
BA21	Visit 1 - 02.06.2017	02/06/2017	12/06/2017	10
	Visit 2 - 12.06.2017	12/06/2017	20/06/2017	8
	Visit 3 - 11.07.2017	11/07/2017	17/07/2017	6
	Visit 4 - 04.09.2017	04/09/2017	12/09/2017	8
	Visit 5 - 02.10.2017	02/10/2017	11/10/2017	9

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	KC, LT	22.05.17	20:30	23:00
2	Dusk	KC, BH	02.06.17	21:15	23:44
3	Dusk	LT, JA	12.06.17	21:20	23:04
4	Dusk	KC, JH	11.07.17	02:40	04:11
5	Dusk	BM, AV	14.07.17	21:13	23:00
6	Dusk	KC, LT	07.08.17	20:42	22:22
7	Dusk	KC, JH	04.09.17	19:36	21:03
8	Dusk	KC, JH	12.09.17	19:12	20:28
9	Dusk	LT, KC	02.10.17	18:36	20:08

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✓*	Occasional pass	September only	N/A
Serotine	EPTSER	✓*	✗	Occasional records along NW of transect	N/A	N/A
Myotis spp	MYOSPP	✓	✓	Occasional records along NW of transect	N/A	N/A
Noctule	NYCNOC	✓	✓	Occasional pass; consistently present	September only	N/A
Leislars	NYCLEI	✗	✗	No confirmed records; possibles on AutoID not consistent	N/A	N/A
Common pipistrelle	PIPIPI	✓	✓	Frequent passes throughout the transect	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequent passes throughout the transect	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Brown long-eared	PLEAUR	✓	✗	Infrequent passes	Only recorded at the beginning and end of survey season	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOG	PIPIPI	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	22.05.17	20:30	23:00	18 ^o C	15 ^o C	BS0	6/8	None	0	0	1	0	28	11	7	2	49
2	Dusk	02.06.17	21:15	23:44	17.5 ^o C	14 ^o C	BS0	8/8	None	0	0	1	0	24	8	0	1	34
3	Dusk	12.06.17	21:20	23:04	16 ^o C	15 ^o C	BS2	7/8	None	0	0	0	0	6	0	0	1	7
4	Dusk	11.07.17	02:40	04:11	14 ^o C	14 ^o C	BS0	5/8	None	0	1	0	0	12	1	0	0	14
5	Dusk	14.07.17	21:13	23:00	15 ^o C	15 ^o C	BS0	4/8	None	0	1	1	0	2	12	3	0	19
6	Dusk	07.08.17	20:42	22:22	18.9 ^o C	17 ^o C	BS0	7/8	None	0	0	0	0	16	6	2	8	32
7	Dusk	04.09.17	19:36	21:03	18 ^o C	18 ^o C	BS0	3/8	None	0	0	0	0	10	5	1	2	18
8 ³	Dusk	12.09.17	19:12	20:28	15 ^o C	15 ^o C	BS3	4/8	Light rain	9	0	0	3	27	35	1	0	66
9	Dusk	02.10.17	18:36	20:08	15 ^o C	14 ^o C	BS3	5/8	None	0	0	0	0	13	10	0	1	24

² All bats not identified to specie level.

³ Italicised entries have been filled using transect acoustic data and weather data (timeanddate.com) due to missing survey form.

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPTSER	MYOSPP	LARGEBATSP	PLEAUR	PIP NAT	PIPIPI	PIPPYG	OTHER ⁴	Total all bats	NOISE ⁵
1	Dusk	22.05.17	0	0	0	0	0	0	0	0	1	1	79
2	Dusk	02.06.17	0	0	0	2	2	0	47	20	6	77	318
3	Dusk	12.06.17	0	0	2	1	1	0	30	23	6	63	932
4	Dusk	11.07.17	0	0	0	0	0	0	3	11	0	14	41
5	Dusk	14.07.17	0	1	0	0	0	0	9	23	1	35	513
6	Dusk	07.08.17	0	0	0	7	0	0	12	17	1	37	1364
7	Dusk	04.09.17	0	0	0	3	0	0	16	12	3	34	774
8	Dusk	12.09.17	1	0	0	3	0	1	27	35	9	111	904
9	Dusk	02.10.17	1	0	1	5	2	0	24	23	6	971	909

⁴ All bats not identified to species or genus level.

⁵ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA20.

Deployment/Species	BARBAR	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 02.06.2017	0	1	64	97	841	1108	2	11	2124	13213
Visit 2 - 12.06.2017	0	0	27	5	806	447	3	13	1301	2380
Visit 3 - 14.07.2017	1	0	45	3	1280	685	0	11	2025	14413
Visit 4 - 07.08.2017	0	0	0	0	2	3	0	0	5	16378
Visit 5 - 04.09.2017	0	0	8	0	23	35	0	2	68	44365
Visit 6 - 02.10.2017	0	0	18	1	3940	1328	0	2	5289	18119
Grand Total	1	1	162	106	6892	3606	5	39	10812	108868

Table 7: Static data from BA point BA21.

Deployment/Species	BARBAR	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 02.06.2017	0	8	29	1	25	20	0	6	89	674
Visit 2 - 12.06.2017	0	23	76	6	91	161	1	37	395	3556
Visit 3 - 11.07.2017	0	0	10	1	142	87	0	4	244	517
Visit 4 - 04.09.2017	0	0	0	0	5	12	0	1	18	7530
Visit 5 - 02.10.2017	0	0	14	0	167	330	0	7	518	5912
Grand Total	0	31	129	8	430	610	1	55	1264	18189

4.4. Bat activity by date

Table 8: Number of registrations of species recorded each night of deployment across all statics.

Date/Species	BARBAR	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
02/06/2017	0	3	16	1	13	24	0	1	58	218
03/06/2017	0	3	11	2	123	28	0	2	169	764
04/06/2017	0	2	13	1	68	123	0	6	213	1005
05/06/2017	0	0	21	0	10	74	0	0	105	2017
06/06/2017	0	0	0	0	0	2	0	0	2	345
07/06/2017	0	0	0	0	8	25	0	1	34	2950
08/06/2017	0	0	4	45	75	109	0	0	233	1186
09/06/2017	0	0	0	7	88	141	0	1	237	948
10/06/2017	0	0	14	11	26	328	0	1	380	2671
11/06/2017	0	1	14	31	455	274	2	4	781	1784
12/06/2017	0	0	13	5	237	308	1	2	566	3859
13/06/2017	0	3	9	0	80	27	0	1	120	179
14/06/2017	0	4	14	0	15	22	0	3	58	113
15/06/2017	0	0	1	1	483	163	3	0	651	914
16/06/2017	0	1	13	4	47	57	0	7	129	373
17/06/2017	0	4	17	0	10	9	0	10	50	188
18/06/2017	0	5	24	0	14	12	0	8	63	152
19/06/2017	0	6	12	1	11	10	0	13	53	164
10/07/2017	0	0	0	0	0	0	0	0	0	85
13/07/2017	0	0	6	0	2	10	0	2	20	38
14/07/2017	0	0	9	0	16	91	0	2	118	707
15/07/2017	1	0	18	0	720	182	0	5	926	1625
16/07/2017	0	0	6	1	18	13	0	2	40	292
17/07/2017	0	0	1	0	3	2	0	0	6	45
18/07/2017	0	0	0	0	0	1	0	0	1	1427
19/07/2017	0	0	6	1	19	2	0	3	31	155

Date/Species	BARBAR	MYOSPP	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
20/07/2017	0	0	1	0	0	2	0	0	3	38
21/07/2017	0	0	0	0	2	1	0	0	3	211
22/07/2017	0	0	1	0	5	2	0	1	9	49
23/07/2017	0	0	4	0	73	28	0	0	105	535
24/07/2017	0	0	0	0	0	0	0	0	0	421
25/07/2017	0	0	2	0	1	11	0	0	14	84
26/07/2017	0	0	1	2	557	423	0	0	983	3861
27/07/2017	0	0	0	0	6	4	0	0	10	5357
07/08/2017	0	0	0	0	2	3	0	0	5	16378
04/09/2017	0	0	0	0	3	12	0	1	16	12472
05/09/2017	0	0	4	0	12	26	0	2	44	14128
06/09/2017	0	0	1	0	6	5	0	0	12	8010
07/09/2017	0	0	1	0	1	0	0	0	2	3924
08/09/2017	0	0	0	0	3	4	0	0	7	471
09/09/2017	0	0	2	0	1	1	0	0	4	1026
10/09/2017	0	0	0	0	1	0	0	0	1	6183
11/09/2017	0	0	0	0	1	1	0	0	2	5682
02/10/2017	0	0	1	0	100	105	0	0	206	1739
03/10/2017	0	0	2	0	139	418	0	2	561	3126
04/10/2017	0	0	0	0	70	144	0	1	215	3709
05/10/2017	0	0	2	0	297	97	0	0	396	1790
06/10/2017	0	0	0	0	46	98	0	0	144	1594
07/10/2017	0	0	9	1	1006	97	0	0	1113	5254
08/10/2017	0	0	4	0	73	19	0	2	98	504
09/10/2017	0	0	10	0	591	254	0	2	857	1934
10/10/2017	0	0	4	0	1785	604	0	1	2394	4382
Grand Total	1	32	291	114	7322	4396	6	86	12248	127066

4.5. Map showing key bat activity

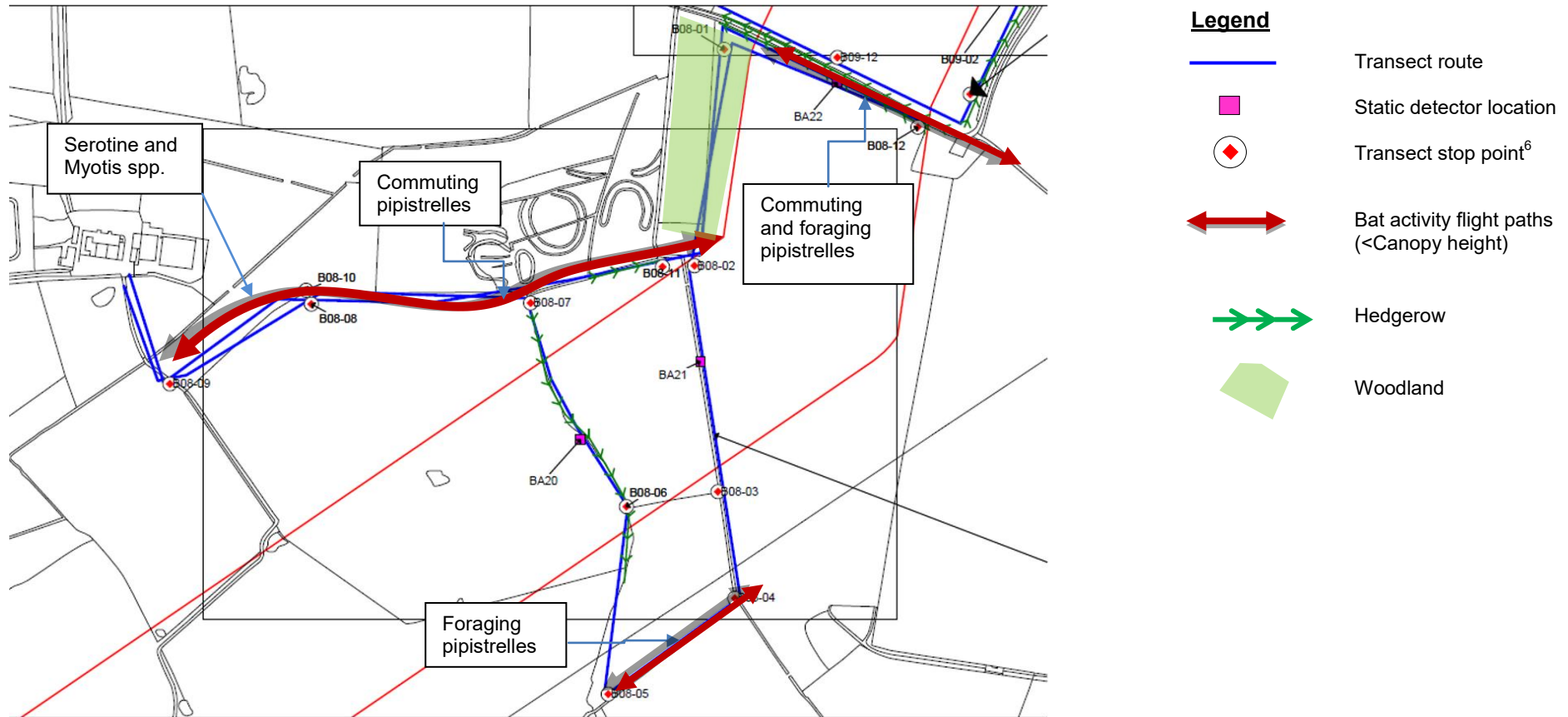


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.

⁶ Associated code (e.g. B08_01) is reference to transect number and the transect stop number.



Transect Summary: BACT09, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT09
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	12/12/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary; BACT09: Elsing

- 1.1. Grid reference : TG038172.
- 1.2. Transect designation : High quality.
- 1.3. Static detectors : BA23, BA92x & BA97X.

2. Description of transect

Land use at transect

- 2.1. Within the transect route, the southern half is arable land whereas towards the north the land is low lying wet grassland used for grazing by cattle.
- 2.2. Along the north of the transect, a small tree lined stream runs E-W and adjoins the nearby river Wensum. This stream and tree line also connects to the west
- 2.3. At the west of the transect, there is a strip of deciduous woodland.

Key commuting and foraging features

- 2.4. The woodland running along the western edge of the transect provides a good foraging route.
- 2.5. The stream running along the north of the transect was noted as a key route used by both myotis spp. and barbastelles.
- 2.6. Bat activity point BA92X recorded a pattern of noctule activity each morning for the duration of visit one between the hours of 3-4am, approximately 1.5 hours before sunrise.
- 2.7. The eastern length (over stop 3) was a common foraging route for pipistrelle bats.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked 11 times from May to October. The static at BA23 was deployed seven times for a total of 37 nights, the static at BA92X was deployed seven times for a total of 34 nights and the static at BA97X was deployed four times for a total of 19 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA23	Visit 1 - 08.05.2017	09/05/2017	14/05/2017	5
	Visit 2 - 14.06.2017	14/06/2017	19/06/2017	5
	Visit 3 - 13.07.2017	13/07/2017	18/07/2017	5
	Visit 4 - 27.07.2017	27/07/2017	31/07/2017	4
	Visit 5 - 29.08.2017	29/08/2017	04/09/2017	6
	Visit 6 - 27.09.2017	27/09/2017	02/10/2017	5
	Visit 7 - 24.10.2017	24/10/2017	31/10/2017	7
BA92X	Visit 1 - 14.06.2017	14/06/2017	19/06/2017	5
	Visit 2 - 03.07.2017	29/06/2017	03/07/2017	4
	Visit 3 - 13.07.2017	13/07/2017	17/07/2017	4
	Visit 4 - 27.07.2017	27/07/2017	31/07/2017	4
	Visit 5 - 29.08.2017	29/08/2017	04/09/2017	6
	Visit 6 - 27.09.2017	27/09/2017	29/09/2017	2
	Visit 7 - 10.10.2017	10/10/2017	19/10/2017	9
BA97X	Visit 1 - 13.07.2017	13/07/2017	17/07/2017	4
	Visit 2 - 27.07.2017	27/07/2017	31/07/2017	4
	Visit 3 - 29.08.2017	29/08/2017	04/09/2017	6
	Visit 4 - 24.10.2017	24/10/2017	29/10/2017	5

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, JA	10.05.17	20:30	22:20
2	Dusk	RM, JH	13.06.17	21:20	23:22
3	Dusk	JA, PK-W	29.06.17	21:08	23:22
4	Dusk	AG, BM	13.07.17	21:17	22:42
5	Dusk	BM, JWH	27.07.17	20:56	23:05
6	Dusk	AG, JH	29.08.17	19:52	21:08
7	Dusk	AG, JH	12.09.17	19:17	00:00
8	Dusk	AG, JH	26.09.17	18:45	20:03
9	Dawn	AG, BB	27.09.17	05:24	06:40
10	Dusk	AG, JH	10.10.17	18:13	22:20
11	Dusk	BM, JH	24.10.17	17:41	19:16

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓	✓	Heard along the Northern edge of the Transect.	Generally heard in the early morning by statics.	N/A
Myotis spp.	MYOSPP	✗	✓	Foraged around the Northern length of transect along the stream.	Heard about 30 minutes into the survey and then again about an hour later when returned to same area.	Generally lack of activity along the southern edge.
Leisler's	NYCLEI	✗	✓	Occasional records	Static detector recorded one pass in morning.	N/A
Noctule	NYCNOC	✓	✓	Foraging over wet grassland over the north of the transect.	Usually heard approximately half an hour into survey.	For the duration of one static deployment (Visit 1, BA92X). A peak in Noctule recordings is obvious between 3-4am each morning. This was approximately 1.5 hours prior to sunrise.
Nathusius' pipistrelle	PIP NAT	✓	✓	Occasional records	Static detectors recorded throughout the night.	N/A
Common pipistrelle	PIPIPI	✓	✓	Commute and forage along woodland edge (West). Forage in N-E corner.	Usually heard from 15-20 minutes into survey once arrived at stop three. Then throughout survey.	Generally lack of activity along the southern edge.
Soprano pipistrelle	PIPPYG	✓	✓	Commute and forage along woodland edge (West). Forage in N-E corner.	Usually heard from 15-20 minutes into survey once arrived at stop three. Then throughout survey.	Generally lack of activity along the southern edge.

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	MYOSPP	NYCNOG	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats
1	Dusk	10.05.17	20:30	22:20	8°C	5°C	BS2	1/8	None	1	1	0	6	1	0	0	9
2	Dusk	13.06.17	21:20	23:22	17°C	15°C	BS0	5/8	None	0	3	0	17	13	9	0	33
3	Dusk	29.06.17	21:08	23:22	16°C	13°C	BS1	6/8	None	0	0	0	6	2	1	0	9
4	Dusk	13.07.17	21:17	22:42	15°C	15°C	BS0	8/8	Rain/drizzle 21:50-22:02	1	1	1	27	2	5	0	37
5	Dusk	27.07.17	20:56	23:05	15°C	13°C	BS0	4/8	Dry, misty at northern end	5	3	1	3	3	0	0	12
6	Dusk	29.08.17	19:52	21:08	16°C	16°C	BS4	8/8	None	0	3	0	21	7	0	0	31
7	Dusk	12.09.17	19:17	00:00	12°C	12°C	BS4	8/8	Light rain 19:40-19:58	2	1	2	19	14	1	0	39
8	Dusk	26.09.17	18:45	20:03	17°C	14°C	BS1	1/8	None	0	0	1	45	7	2	0	55
9	Dawn	27.09.17	05:24	06:40	11°C	9°C	BS0	Fog	None	0	0	0	0	2	0	0	2
10	Dusk	10.10.17	18:13	22:20	14°C	14°C	BS1	6/8	None	1	0	0	35	11	2	0	48
11	Dusk	24.10.17	17:41	19:16	17°C	18°C	BS2	8/8	None	0	0	0	3	5	5	0	13

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	MYOSPP	NYCNOC	PIP NAT	PIPPPIP	PIPPYG	PLEAUR	OTHER ²	Total all bats	NOISE ³
1	Dusk	10.05.17	0	0	0	2	2	0	1	5	0
2	Dusk	13.06.17	1	0	2	33	31	0	8	75	1300
3	Dusk	29.06.17	1	8	0	25	16	0	20	70	1129
4	Dusk	13.07.17	0	1	0	5	11	0	5	22	218
5	Dusk	27.07.17	1	5	0	3	9	0	5	23	619
6	Dusk	29.08.17	2	10	2	12	15	0	7	48	851
7	Dusk	12.09.17	1	4	0	32	25	0	4	66	0
8	Dusk	26.09.17	0	2	0	53	1	0	1	57	902
9	Dawn	27.09.17	0	0	0	0	4	0	0	4	0
10	Dusk	10.10.17	1	6	0	78	24	4	12	125	424
11	Dusk	24.10.17	0	2	0	16	14	0	2	34	604

² All bats not identified to specie level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA23.

Deployment/Species	BARBAR	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 08.05.2017	0	6	0	12	0	397	278	12	9	714	1435
Visit 2 - 14.06.2017	0	16	0	973	40	220	323	1	90	1663	2521
Visit 3 - 13.07.2017	0	0	0	10	0	1	1	0	2	14	438
Visit 4 - 27.07.2017	0	0	0	9	1	21	32	0	4	67	2418
Visit 5 - 29.08.2017	0	1	0	22	9	127	179	1	14	353	1702
Visit 6 - 27.09.2017	0	1	0	3	0	567	408	0	0	979	4169
Visit 7 - 24.10.2017	2	40	0	255	0	249	182	0	0	728	4452
Grand Total	2	64	0	1284	50	1582	1403	14	119	4518	17135

Table 7: Static data from BA point BA92X.

Deployment/Species	BARBAR	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 14.06.2017	2	13	1	1837	25	118	198	1	128	2323	3471
Visit 2 - 03.07.2017	0	1	0	150	29	185	302	2	21	690	1670
Visit 3 - 13.07.2017	0	11	0	47	53	37	380	1	29	558	10787
Visit 4 - 27.07.2017	0	0	0	4	1	4	8	0	3	20	59239
Visit 5 - 29.08.2017	0	6	0	11	0	85	67	0	83	252	6934
Visit 6 - 27.09.2017	0	0	0	10	0	13	3	0	0	26	7163
Visit 7 - 10.10.2017	0	0	0	29	0	12	35	0	0	76	7436
Grand Total	2	31	1	2088	108	454	993	4	264	3945	96700

Table 8: Static data from BA point BA97X.

Deployment/Species	BARBAR	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 13.07.2017	0	5	0	23	5	41	110	6	30	220	34924
Visit 2 - 27.07.2017	0	1	0	2	1	50	68	2	3	127	2868
Visit 3 - 29.08.2017	0	0	0	10	1	53	48	2	5	119	6145
Visit 4 - 24.10.2017	0	0	0	0	0	161	199	0	0	360	4854
Grand Total	0	6	0	35	7	305	425	10	38	826	48791

4.4. Bat activity by date

Table 9: Quantity of species recorded each night of deployment across all statics.

Species	BARBAR	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
09/05/2017	0	0	0	2	0	10	23	0	0	35	162
10/05/2017	0	2	0	2	0	24	18	1	3	50	227
11/05/2017	0	0	0	5	0	171	83	2	5	266	531
12/05/2017	0	2	0	0	0	95	64	0	1	162	260
13/05/2017	0	1	0	3	0	59	68	8	0	139	149
14/05/2017	0	1	0	0	0	38	22	1	0	62	106
14/06/2017	0	5	0	664	2	87	143	1	32	934	1103
15/06/2017	0	6	1	318	5	44	46	1	25	446	909
16/06/2017	2	4	0	708	20	69	90	0	58	951	1055
17/06/2017	0	7	0	485	9	68	109	0	56	734	1504
18/06/2017	0	7	0	635	29	70	133	0	47	921	1401
19/06/2017	0	0	0	0	0	0	0	0	0	0	20
29/06/2017	0	0	0	2	0	0	40	0	0	42	198
30/06/2017	0	0	0	85	15	149	110	0	10	369	784
01/07/2017	0	0	0	57	3	26	57	0	10	153	395
02/07/2017	0	1	0	6	11	10	95	2	1	126	293

Species	BARBAR	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
13/07/2017	0	5	0	3	2	21	144	1	12	188	4018
14/07/2017	0	4	0	7	1	21	155	0	19	207	1767
15/07/2017	0	2	0	7	41	10	25	1	10	96	13459
16/07/2017	0	5	0	24	14	26	167	5	17	258	26780
17/07/2017	0	0	0	39	0	1	0	0	3	43	125
27/07/2017	0	0	0	1	0	3	5	0	0	9	19638
28/07/2017	0	0	0	2	0	6	8	0	1	17	20730
29/07/2017	0	1	0	0	2	33	26	2	1	65	7978
30/07/2017	0	0	0	8	1	18	37	0	5	69	15140
31/07/2017	0	0	0	4	0	15	32	0	3	54	1039
29/08/2017	0	0	0	16	9	121	147	1	46	340	3913
30/08/2017	0	0	0	2	0	10	19	0	7	38	1342
31/08/2017	0	3	0	1	0	16	29	1	4	54	2076
01/09/2017	0	3	0	9	0	24	15	0	37	88	2199
02/09/2017	0	1	0	12	1	39	29	0	5	87	3014
03/09/2017	0	0	0	3	0	55	55	1	3	117	2237
26/09/2017	0	0	0	4	0	0	00	0	0	4	105
27/09/2017	0	0	0	4	0	341	368	0	0	713	5681
28/09/2017	0	0	0	2	0	99	21	0	0	122	2432
29/09/2017	0	0	0	2	0	74	9	0	0	85	1291
30/09/2017	0	1	0	0	0	63	9	0	0	73	206
01/10/2017	0	0	0	1	0	3	4	0	0	8	1617
10/10/2017	0	0	0	2	0	0	0	0	0	2	1848
11/10/2017	0	0	0	1	0	1	2	0	0	4	597
12/10/2017	0	0	0	1	0	1	2	0	0	4	452
13/10/2017	0	0	0	0	0	0	0	0	0	0	1318
14/10/2017	0	0	0	15	0	2	3	0	0	20	1097
15/10/2017	0	0	0	7	0	5	1	0	0	13	768
16/10/2017	0	0	0	0	0	0	0	0	0	0	455

Species	BARBAR	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
17/10/2017	0	0	0	0	0	3	20	0	0	23	358
18/10/2017	0	0	0	3	0	0	7	0	0	10	543
24/10/2017	0	0	0	1	0	24	21	0	0	46	2638
25/10/2017	1	26	0	1	0	171	122	0	0	321	1692
26/10/2017	1	13	0	5	0	199	234	0	0	452	1898
27/10/2017	0	1	0	0	0	4	4	0	0	9	302
28/10/2017	0	0	0	0	0	12	0	0	0	12	2617
29/10/2017	0	0	0	82	0	0	0	0	0	82	97
30/10/2017	0	0	0	166	0	0	0	0	0	166	62
Grand Total	4	101	1	3407	165	2341	2821	28	421	9289	162626

4.5. Map showing key bat activity

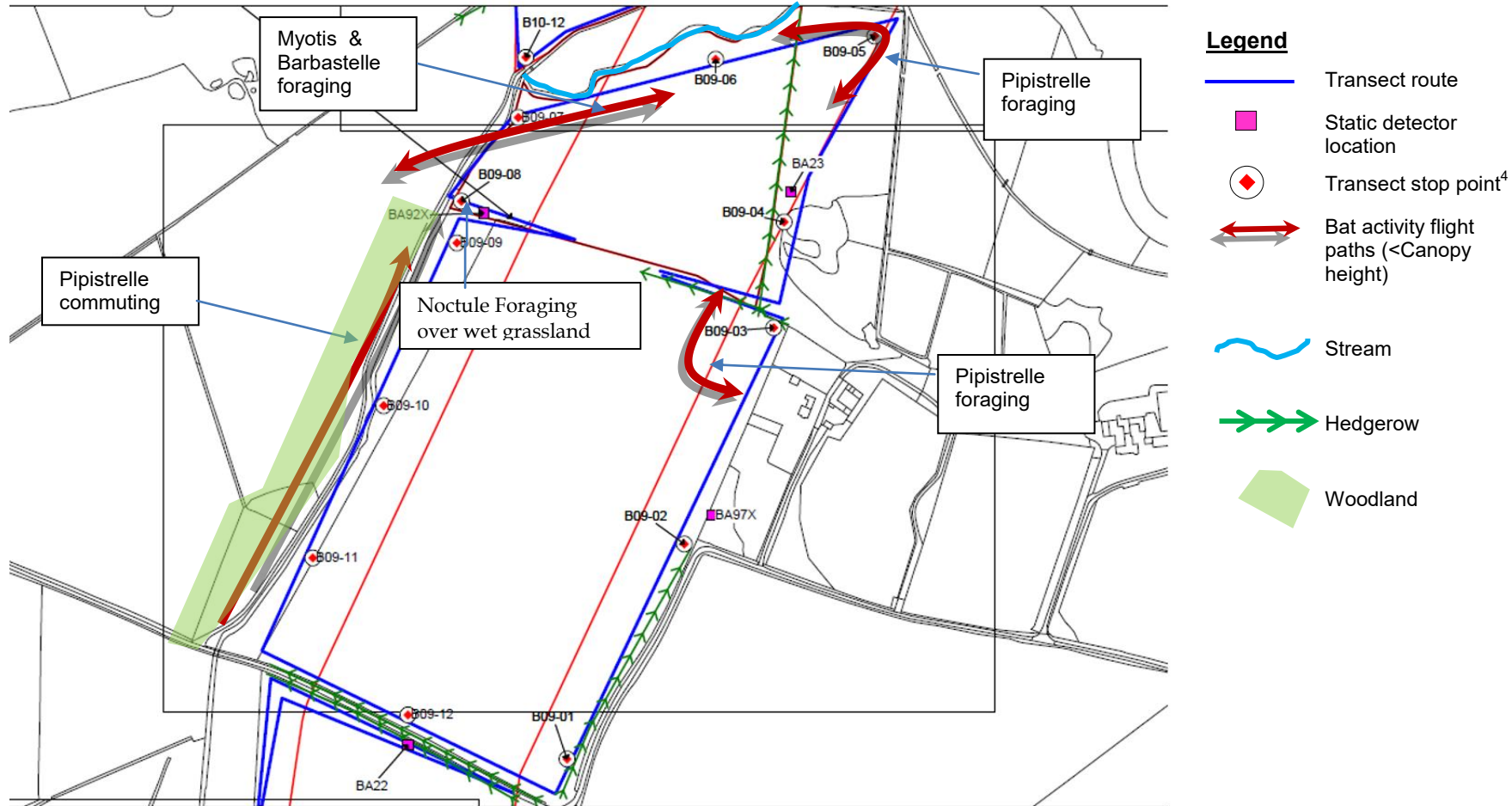


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.

⁴ Associated code (e.g. B09_01) is reference to transect number and the transect stop number.



Transect Summary: BACT10, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT10
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	12/12/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary; BACT10: Elsing

- 1.1. Grid reference: TG038176
- 1.2. Transect designation: High quality
- 1.3. Static detectors: BA24, BA72X and BA98X.

2. Description of transect

Land use at transect

- 2.1. The eastern and north-eastern lengths of the transect are bordered by the river Wensum.
- 2.2. Within the transect consists of wet grassland which is used by cattle for grazing.
- 2.3. The Southern length of the transect follows Penny Spot Beck, a small stream running into the river Wensum.
- 2.4. Drainage ditches cut through the transect, some of which are bordered by established native species hedgerows. This hedgerow joins to a strip of woodland south of the transect which (in the wider landscape) is subsequently joined to other hedgerows linking other patches of woodland.
- 2.5. Outside the transect to the West the land use consists of arable farmland.

Key commuting and foraging features

- 2.6. The river Wensum provides a great commuting and foraging route for bats, most notably Daubentons.
- 2.7. The cut channel was a key corridor feature for pipistrelles species and in particular these species were frequently noted foraging by the channel at stop point 4.
- 2.8. A cut channel runs parallel to the river Wensum which is wider and more open than the other drainage ditches, this was a key corridor feature for pipistrelles and often had pipistrelles foraging where the transect crosses this channel at stop point four.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked ten times from May to October. The static at BA24 was deployed seven times for a total of 37 nights, the static at BA72X was deployed five times for a total of 27 nights and BA98X was deployed five times for a total of 28 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA24	Visit 1 - 10.05.2017	10/05/2017	13/05/2017	3
	Visit 2 - 07.07.2017	07/07/2017	12/07/2017	5
	Visit 3 - 17.07.2017	17/07/2017	24/07/2017	7
	Visit 4 - 25.08.2017	25/08/2017	31/08/2017	6
	Visit 5 - 29.08.2017	29/08/2017	04/09/2017	6
	Visit 6 - 27.09.2017	27/09/2017	02/10/2017	5
	Visit 7 - 06.10.2017	06/10/2017	11/10/2017	5
BA72X	Visit 1 - 07.07.2017	07/07/2017	12/07/2017	5
	Visit 2 - 18.07.2017	18/07/2017	24/07/2017	6
	Visit 3 - 25.08.2017	25/08/2017	31/08/2017	6
	Visit 4 - 27.09.2017	27/09/2017	02/10/2017	5
	Visit 5 - 06.10.2017	06/10/2017	11/10/2017	5
BA98X	Visit 1 - 07.07.2017	07/07/2017	12/07/2017	5
	Visit 2 - 17.07.2017	17/07/2017	24/07/2017	7
	Visit 3 - 25.08.2017	25/08/2017	31/08/2017	6
	Visit 4 - 27.09.2017	27/09/2017	02/10/2017	5
	Visit 5 - 06.10.2017	06/10/2017	11/10/2017	5

Transect dates

Table 2: Transect dates summary

Visit	Surveyor ¹	Date	Start	End
1	BC	10.05.17	20:45	22:15
2	BM, JH	07.07.17	21:18	22:45
3	KC, JH	17.07.17	21:10	22:54
4	KC, JH	18.07.17	02:45	04:15
5	KC, AV	04.08.17	20:45	22:04
6	KC, AV	25.08.17	20:06	21:18
7	KC, JH	22.09.17	19:00	19:52
8	BM, CB	27.09.17	18:40	20:02
9	KC, BM	06.10.17	18:19	20:09
10	KC, BM	20.10.17	17:49	19:24

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from transect data

4.1.1. A summary of the bat activity on the transect, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓	✓	Occasional records	N/A	N/A
Serotine	EPTSER	✗	✓	Occasional records	N/A	N/A
Daubentons	MYOSPP	✓	✗	Recorded foraging along the river Wensum from walk six up until stop eight. Sometimes would be heard along Penny Spot Beck up until stop ten.	Heard on both walks of the transect in the same areas, suggests they stay foraging over transect for the duration of the survey.	N/A
Myotis spp	MYOSPP	✓	✓	Occasional records	N/A	N/A
Noctule	NYCNOC	✓	✓	Foraging and commuting behaviour over the land between the river Wensum and the drainage channel.	Registered from 30 minutes into the survey.	N/A
Nathusius' pipistrelle	PIP NAT	✓	✓	Occasional records	N/A	N/A
Common pipistrelle	PIPIPI	✓	✓	Commonly seen foraging along the hedgerow which runs from stop one round to stop three. Also favours the river Wensum as a foraging and commuting route. At stop five pips usually seen commuting from the South heading North.	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Commonly seen foraging along the hedgerow which runs from stop one round to stop three. Also favours the river Wensum as a foraging and commuting route. At stop five pips usually seen commuting from the South heading North.	Heard approximately from 20 minutes after sunset for the duration of the survey.	Foraging high at tree height along trees on opposite side of river Wensum at stop point seven.

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	MYOSPP	NYCLEI	NYCNOG	PIPPIP	PYPYGY	PIPSPP	OTHER	Total all bats
1	Dusk	10.05.17	20:45	22:15	12°C	6°C	BS1	0/8	None	0	2	0	0	0	14	2	0	18
2	Dusk	07.07.17	21:18	22:45	19°C	18°C	BS0	7/8	None	3	0	0	0	0	0	1	0	4
3	Dusk	17.07.17	21:10	22:54	17°C	15°C	BS0	0.125	None	0	3	0	1	10	20	2	0	36
4	Dawn	18.07.17	02:45	04:15	13°C	12°C	BS0	0.125	None-misty	0	0	0	0	3	3	0	0	6
5	Dusk	04.08.17	20:45	22:04	19°C	17°C	BS1	4/8	None	0	0	0	4	3	10	1	0	15
6	Dusk	25.08.17	20:06	21:18	19°C	17°C	BS0	2/8	None	5	4	0	0	3	5	3	0	20
7	Dusk	22.09.17	19:00	19:52	15°C	14°C	BS0	BS0	2/8	0	1	0	0	3	12	0	0	16
8	Dusk	27.09.17	18:40	20:02	15°C	16°C	BS2	4/8	None	2	0	0	0	19	0	4	0	25
9	Dusk	06.10.17	18:19	20:09	11°C	9°C	BS1	BS1	5/8	0	4	1	0	8	12	1	0	26
10	Dusk	20.10.17	17:49	19:24	14°C	13°C	BS2	BS2	8/8	0	1	0	0	3	4	0	0	8

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	MYOSPP	NYCNOC	NYCLEI	PIP NAT	PIPIPI	PIPPYG	OTHER ²	Total all bats	NOISE ³
1	Dusk	10.05.17	0	0	2	1	72	64	17	156	996
2	Dusk	07.07.17	0	0	0	0	0	0	1	1	786
3	Dusk	17.07.17	0	3	0	0	15	62	11	91	785
4	Dawn	18.07.17	1	0	0	0	0	0	0	1	362
5	Dusk	04.08.17	0	0	0	0	0	0	0	0	26
6	Dusk	25.08.17	0	2	0	0	0	1	1	4	444
7	Dusk	22.09.17	0	0	0	0	12	3	4	19	755
8	Dusk	27.09.17	0	1	0	0	57	38	17	113	653
9	Dusk	06.10.17	1	0	0	0	2	1	1	5	180
10	Dusk	20.10.17	2	0	0	0	4	4	0	10	478

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA24.

Deployment/Species	BARBAR	EPTSER	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 10.05.2017	0	0	4	21	5	2304	1718	15	152	4219	7456
Visit 2 - 07.07.2017	0	0	3	29	1	100	78	3	14	228	1104
Visit 3 - 17.07.2017	2	11	12	13	1	887	244	5	52	1214	10424
Visit 4 - 25.08.2017	24	59	0	109	0	906	638	1	637	2291	11353
Visit 5 - 29.08.2017	0	4	0	56	0	939	119	4	67	1185	9441
Visit 6 - 27.09.2017	0	3	1	23	9	134	169	6	19	361	1694
Visit 7 - 06.10.2017	0	2	0	66	0	109	28	2	47	252	6868
Grand Total	26	79	20	317	16	5379	2994	36	988	9750	48340

Table 7: Static data from BA point BA72X

Deployment/Species	BARBAR	EPTSER	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 07.07.2017	0	0	0	3	0	105	240	0	10	358	2250
Visit 2 - 18.07.2017	0	0	3	29	28	884	452	0	28	1424	4210
Visit 3 - 25.08.2017	5	8	1	32	1	889	172	1	19	1115	2357
Visit 4 - 27.09.2017	5	1	2	23	4	2329	418	0	1	2777	3254
Visit 5 - 06.10.2017	0	1	0	7	0	429	53	1	58	548	1188
Grand Total	10	10	6	94	33	4636	1335	2	10	6116	13259

Table 8: Static data from BA point BA98X

Deployment/Species	BARBAR	EPTSER	MYOSPP	NYCNOC	PIPIIP	PIPPYG	OTHER	Total all bats	NOISE
Visit 1 - 07.07.2017	0	0	1	4	34	20	14	73	1973
Visit 2 - 17.07.2017	1	0	1	206	32	81	52	373	3330
Visit 3 - 25.08.2017	0	0	0	32	19	2	25	78	30912
Visit 4 - 27.09.2017	0	0	0	51	31	113	41	236	1550
Visit 5 - 06.10.2017	0	2	0	60	16	43	69	190	1112
Grand Total	1	2	2	353	132	259	201	950	38877

4.4. Bat activity by date

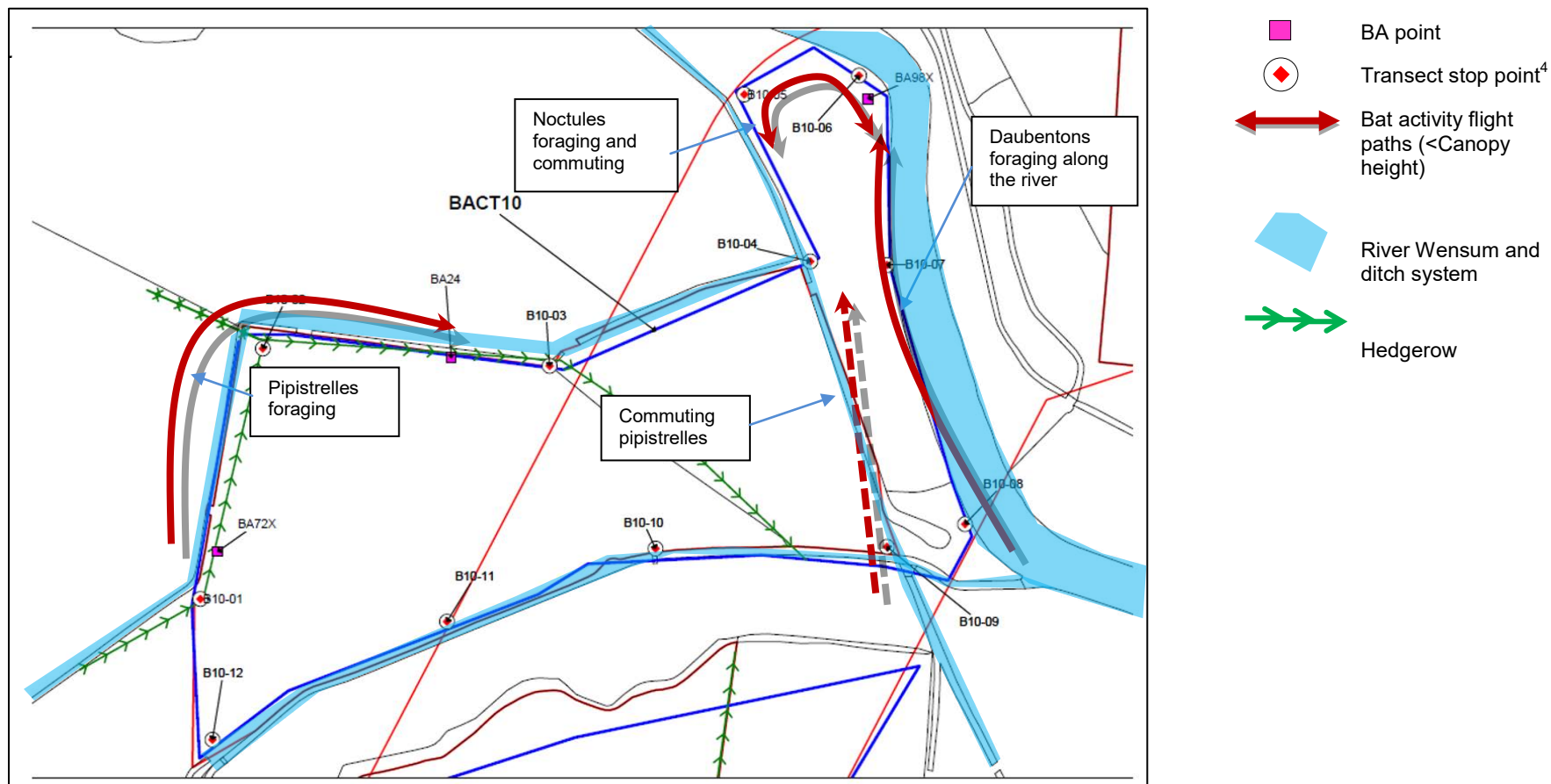
Table 9: Quantity of species recorded each night of deployment across all statics.

Species	BARBAR	EPTSER	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
10/05/2017	0	0	0	1	0	59	325	0	4	389	350
11/05/2017	0	0	3	16	4	1056	1342	14	100	2535	2124
12/05/2017	0	0	0	3	0	981	39	1	42	1066	4218
13/05/2017	0	0	1	1	1	208	12	0	6	229	764
07/07/2017	0	0	1	23	1	93	51	1	12	182	955
08/07/2017	0	0	3	1	0	42	26	0	1	73	131
09/07/2017	0	0	0	6	0	21	41	1	8	77	1321
10/07/2017	0	0	0	6	0	79	190	1	9	285	1567
11/07/2017	0	0	0	0	0	4	30	0	1	35	1350
17/07/2017	1	0	6	5	0	102	117	1	12	244	422
18/07/2017	1	0	1	12	1	707	174	4	8	908	3870
19/07/2017	0	1	2	18	2	218	116	0	11	367	1794
20/07/2017	0	0	1	52	0	63	10	0	13	139	1522
21/07/2017	0	0	4	2	25	458	281	0	14	784	4975
22/07/2017	1	8	0	61	0	96	45	0	37	240	2166
23/07/2017	0	2	2	98	1	159	34	0	22	316	3212
25/08/2017	1	2	1	65	0	253	145	0	106	571	3141
26/08/2017	0	9	0	44	0	60	35	1	34	174	1091
27/08/2017	3	30	0	27	1	71	80	0	90	272	2078
28/08/2017	1	8	0	3	0	582	200	0	156	942	17163
29/08/2017	2	17	0	34	9	820	425	3	287	1580	20296
30/08/2017	22	4	0	10	0	87	32	0	66	217	1155
31/08/2017	0	0	0	0	0	9	12	0	1	22	114
01/09/2017	0	0	1	4	0	17	9	2	1	34	693
02/09/2017	0	0	0	9	0	22	17	0	7	55	358

Species	BARBAR	EPTSER	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSP	OTHER	Total all bats	NOISE
03/09/2017	0	0	0	0	0	27	26	2	1	56	187
27/09/2017	0	0	0	5	1	991	129	1	46	1173	4398
28/09/2017	0	3	0	42	2	316	104	0	55	519	1677
29/09/2017	4	1	0	65	1	464	169	0	35	738	2749
30/09/2017	0	0	2	17	0	987	176	3	25	1210	2372
01/10/2017	1	1	0	1	0	541	72	0	14	629	3001
06/10/2017	0	0	0	0	0	20	10	0	4	34	1287
07/10/2017	0	0	0	7	0	4	7	0	2	20	947
08/10/2017	0	3	0	43	0	139	39	2	53	276	1192
09/10/2017	0	1	0	77	0	278	34	1	45	435	2695
10/10/2017	0	1	0	6	0	113	34	0	18	171	3042
Grand Total	37	91	28	764	49	10147	4588	38	1346	16997	100377

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B10_01) is reference to Transect number and the transect stop number.



Transect Summary: BACT13, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT13
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
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2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT13, Reepham

- 1.1. Grid reference: TG079236.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA73X and BA74X.

2. Description of transect

Land use at transect

- 2.1. A linear transect along the Marriott's Way, a track following the bed of a decommissioned railway line.
- 2.2. The transect is surrounded by arable land with trees along the boundary.
- 2.3. Larger areas of broadleaved woodland can be found towards the eastern end of the transect.

Key commuting and foraging features

- 2.4. The Marriott's way is an excellent commuting route connecting woodlands to the east at Reepham to wet grassland areas in the west.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked six times from June to October. The static detectors at BA73X and BA74X were deployed four times for a total of 25.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA73X	Visit 1 - 19/06/2017	19/06/2017	23/06/2017	5
	Visit 2 - 19/08/2017	19/08/2017	24/08/2017	6
	Visit 3 - 18/09/2017	18/09/2017	25/09/2017	7
	Visit 4 - 24/10/2017	24/10/2017	30/10/2017	7
BA74X	Visit 1 - 19/06/2017	19/06/2017	23/06/2017	5
	Visit 2 - 19/08/2017	19/08/2017	24/08/2017	6
	Visit 3 - 18/09/2017	18/09/2017	25/09/2017	7
	Visit 4 - 24/10/2017	24/10/2017	30/10/2017	7

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	SM, RE	26.05.17	21:08	22:52
2	Dusk	JG, BM	19.06.17	21:49	23:50
3	Dusk	KC, JH	18.08.17	20:45	22:13
4	Dawn	KC, JH	19.08.17	04:15	05:38
5	Dusk	LT, KC	18.09.17	19:02	20:36
6	Dusk	BM, CB	31.10.17	16:25	18:21

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✗	One pass recorded on transect only.	August only.	N/A
Large bat spp.	LARGEBATSP	✓*	✗	Two passes recorded on transect only.	August and October only.	N/A
Myotis spp	MYOSPP	✓*	✗	One pass recorded on transect only.	August only.	N/A
Noctule	NYCNOC	✓*	✓	Frequent passes	Recorded throughout with greatest number of recordings in May and June.	N/A
Common pipistrelle	PIPPIP	✓	✓	Frequent passes; consistently present. Very high numbers in October.	Heard approximately from 20 minutes after sunset for the duration of the survey	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequent passes; consistently present; less frequently recorded than PIPPIP	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Pipistrelle spp.	PIPSPP	✗	✓	Occasional records.	Throughout survey period.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOG	PIPIPI	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	26.05.17	21:08	22:52	21°C	15°C	BS1	0/8	None	0	0	0	0	32	5	7	1	45
2	Dusk	19.06.17	21:49	23:50	22.9°C	20°C	BS1	2/8	None	0	0	0	0	27	10	0	0	37
3	Dusk	18.08.17	20:45	22:13	17°C	14°C	BS2	0/8	None	0	0	0	0	60	3	0	0	63
4	Dawn	19.08.17	04:15	05:38	10°C	10°C	BS2	0/8	None	0	0	1	0	7	6	0	0	14
5	Dusk	18.09.17	19:02	20:36	14°C	11°C	BS0	2/8	None	0	0	1	0	37	10	0	0	48
6	Dusk	31.10.17	16:25	18:21	12°C	12°C	BS3	3/8	None	0	0	1	0	0	0	10	0	11

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	LARGEBATSP	MYOSPP	NYCNOG	PIPIPI	PIPPYG	OTHER	Total all bats	NOISE ³
1	Dusk	26.05.17	0	0	0	3	69	14	5	91	613
2	Dusk	19.06.17	0	0	0	0	17	9	0	26	221
3	Dusk	18.08.17	1	1	1	0	178	6	14	201	1280
4	Dawn	19.08.17	0	0	0	0	11	14	0	25	493
5	Dusk	18.09.17	0	0	0	0	78	25	9	112	127
6	Dusk	31.10.17	0	1	0	0	3	5	2	11	1275

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA73X.

Deployment\Species	NYCNOC	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 19.06.2017	243	67	0	1	45	356	1268
Visit 2 - 19.08.2017	24	42	0	1	138	205	18256
Visit 3 - 18.09.2017	17	390	4	3	46	460	1939
Visit 4 - 24.10.2017	37	1839	15	5	110	2006	6622
Grand Total	321	2338	19	10	339	3027	28085

Table 7: Static data from BA point BA74X.

Deployment\Species	NYCNOC	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 19.06.2017	64	545	26	7	14	656	1542
Visit 2 - 29.08.2017	0	0	0	0	0	0	24
Visit 3 - 18.09.2017	0	6	0	0	0	6	1411
Visit 4 - 24.10.2017	0	130	32	3	6	171	4392
Grand Total	64	681	58	10	20	833	7369

4.4. Bat activity by date

Table 8: Quantity of species recorded each night of deployment across all statics.

Date/Species	NYCNOC	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
19/06/2017	0	14	0	0	1	15	230
20/06/2017	39	179	5	1	4	228	854
21/06/2017	139	148	10	4	25	326	521
22/06/2017	32	133	4	2	13	184	759
23/06/2017	97	138	7	1	16	259	446
19/08/2017	0	2	0	0	2	4	763
20/08/2017	0	9	0	1	6	16	1031
21/08/2017	7	6	0	0	5	18	11538
22/08/2017	2	16	0	0	4	22	2787
23/08/2017	10	9	0	0	114	133	1919
24/08/2017	5	0	0	0	7	12	218
29/08/2017	0	0	0	0	0	0	6
30/08/2017	0	0	0	0	0	0	1
31/08/2017	0	0	0	0	0	0	4
01/09/2017	0	0	0	0	0	0	4
02/09/2017	0	0	0	0	0	0	1
03/09/2017	0	0	0	0	0	0	6
04/09/2017	0	0	0	0	0	0	2
18/09/2017	6	85	3	0	12	106	730
19/09/2017	1	2	0	0	3	6	192
20/09/2017	1	4	0	0	0	5	432
21/09/2017	5	57	0	0	8	70	766
22/09/2017	3	96	1	2	15	117	313

Date\Species	NYCNOG	PIPIP	PIPYG	PIPSPP	OTHER	Total all bats	NOISE
23/09/2017	0	70	0	1	3	74	271
24/09/2017	1	80	0	0	4	85	538
25/09/2017	0	2	0	0	1	3	108
24/10/2017	8	1358	6	3	70	1445	1793
25/10/2017	3	452	2	2	33	492	1650
26/10/2017	8	32	4	0	6	50	308
27/10/2017	4	55	11	1	2	73	394
28/10/2017	13	1	1	0	1	16	1774
29/10/2017	1	68	14	2	3	88	3749
30/10/2017	0	3	9	0	1	13	1346
Grand Total	385	3019	77	20	359	3860	35454

4.5. Map showing key bat activity

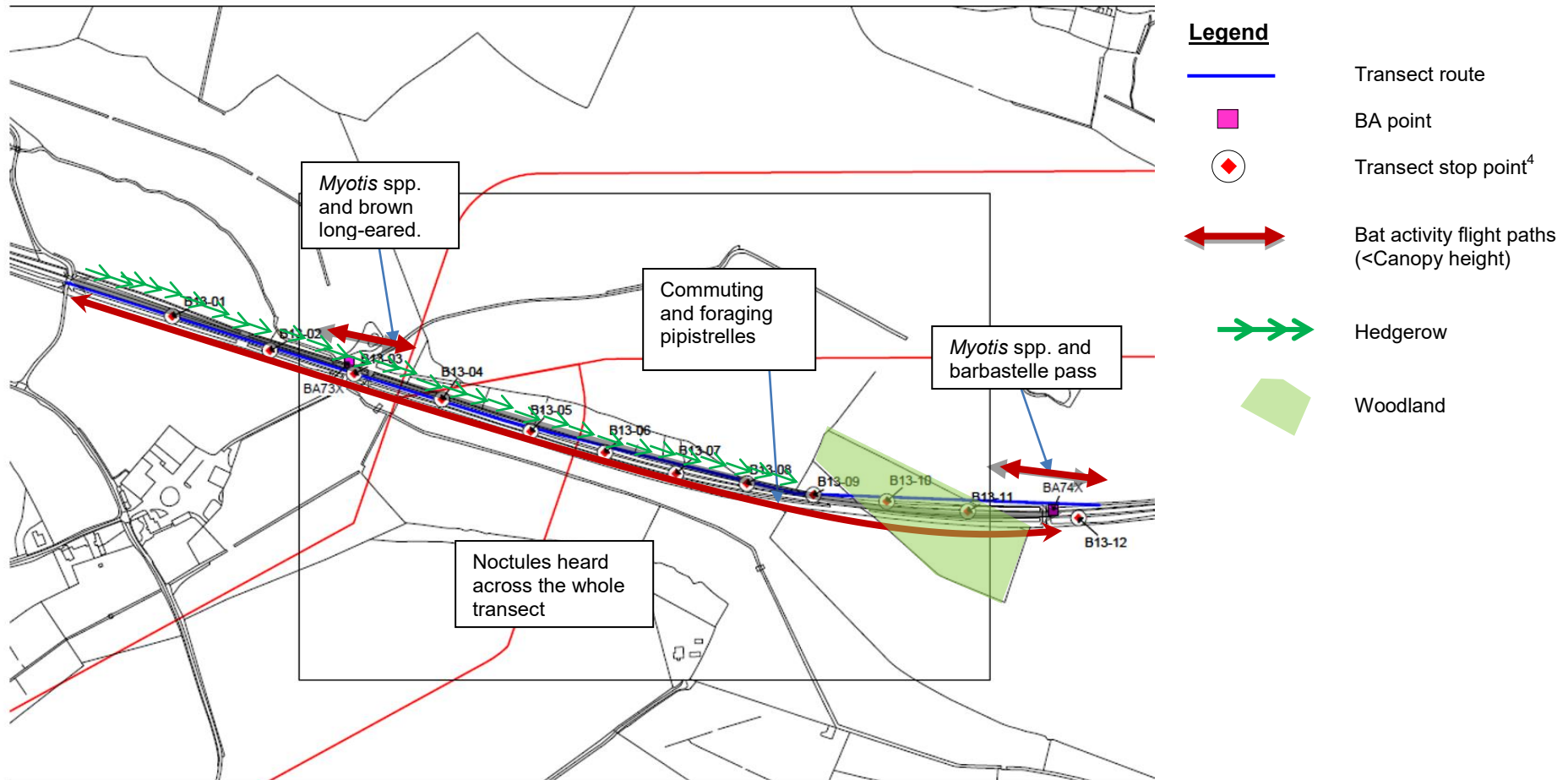


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.

⁴ Associated code (e.g. B13_01) is reference to Transect number and the transect stop number.



Transect Summary: BACT14, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT14
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	20/11/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report for client	Chris Smith

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1. Transect summary: BACT14, Cawston

- 1.1. Grid reference: TG119240.
- 1.2. Transect designation: High quality.
- 1.3. Static detectors: BA63X, BA66X & BA100X.

2. Description of transect

Land use at transect

- 2.1. Within the transect route, the land is used as a mixed Spruce and Fir tree plantation. Trees are grown in blocks of different ages in order to harvest on rotation.
- 2.2. To the north of the transect, the surrounding habitat consists of deciduous woodland and parkland with scattered standards.
- 2.3. Bordering the transect on the east is deciduous woodland.
- 2.4. Along the southern and eastern boundaries, the habitat consists of wet deciduous woodland.
- 2.5. The Marriott's way runs east to west to the south of the transect and patches of woodland along its length connect other nearby patches of woodland.

Key commuting and foraging features

- 2.6. The northern section of the route which runs parallel to the road seems to be less favourable to bats with only commuting noctules registering.
- 2.7. Along the southern boundary a mixture of native tree species forms good linking habitat from the east (wet deciduous woodland) to the west boundary (deciduous woodland).
- 2.8. The Marriott's way (which runs east to west to the south of the transect) is an excellent commuting and foraging route between other nearby patches of woodland in the landscape.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked eleven times from May to October. The static at BA63 was deployed six times for a total of 34 nights, the static at BA66X was deployed seven times for a total of 35 nights and the static at BA100X was deployed five times for a total of 25 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA63X	Visit 1 - 24.05.2017	24/05/2017	30/05/2017	6
	Visit 2 - 08.06.2017	08/06/2017	13/06/2017	6
	Visit 3 - 27.07.2017	27/07/2017	01/08/2017	6
	Visit 4 - 10.08.2017	10/08/2017	15/08/2017	6
	Visit 5 - 15.09.2017	15/09/2017	20/09/2017	5
	Visit 6 - 26.10.2017	26/10/2017	31/10/2017	5
BA66X	Visit 1 - 08.06.2017	08/06/2017	13/06/2017	5
	Visit 2 - 22.06.2017	22/06/2017	27/06/2017	5
	Visit 3 - 06.07.2017	06/07/2017	11/07/2017	5
	Visit 4 - 27.07.2017	27/07/2017	01/08/2017	5
	Visit 5 - 10.08.2017	10/08/2017	15/08/2017	5
	Visit 6 - 14.09.2017	14/09/2017	20/09/2017	5
	Visit 7 - 12.10.2017	12/10/2017	18/10/2017	5
BA100X	Visit 1 - 22.06.2017	22/06/2017	27/06/2017	5
	Visit 2 - 27.07.2017	27/07/2017	01/08/2017	5
	Visit 3 - 31.08.2017	31/08/2017	06/09/2017	5
	Visit 4 - 28.09.2017	28/09/2017	03/10/2017	5
	Visit 5 - 12.10.2017	12/10/2017	17/10/2017	5

Transect dates

Table 2: Transect dates summary.

Visit	Surveyor ¹	Date	Start	End
1	AG, BM	08.06.17	21:15	23:33
2	AG, BM	22.06.17	21:21	22:51
3	AG, JH	06.07.17	21:20	22:55
4	AG, AV	27.07.17	20:58	22:34
5	AG, JH	10.08.17	20:31	21:55
6	AG, JH	31.08.17	19:43	21:10
7	AG, BM	14.09.17	19:17	20:35
8	AG, BM	15.09.17	04:35	05:54
9	AC, BM	28.09.17	18:37	19:59
10	AB, BM	12.10.17	18:08	20:15
11	BM, CB	26.10.17	17:39	19:25

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✓*	Heard between stop five and stop ten. Generally a single pass whilst commuting N-S or E-W.	Heard approximately 30-40 minutes after sunset same locations.	N/A
Serotine	EPTSER	x	✓*	Occasional records		N/A
Myotis spp	MYOSPP	✓*	✓*	Occasional records, recorded across the transect at each of the static detector locations.		N/A
Noctule	NYCNOC	✓	✓	Usually seen towards the western side of the transect early in the evening, commuting and foraging high over the Christmas tree plantation in the open. Usually seen travelling S-N.	Usually seen early on transect, not heard again from 30 minutes after sunset.	N/A
Nathusius' pipistrelle	PIP NAT	x	✓	Occasional records, recorded along the western edge of the transect at static point BA63X.		N/A
Common pipistrelle	PIPIPI	✓	✓	Heard across all parts of the transect, most common foraging activity along the southern and eastern boundaries. Not unusual to see multiple bats foraging together in the same place, this is more often the case along the western boundary.	Usually heard 15 – 20 minutes after survey start time and then throughout the evening until the end of survey.	September transect heard lots of social calling, most notably in the north-west corner of the transect between stop eight and ten.
Soprano pipistrelle	PIPPYG	✓	✓	Heard across all parts of the transect, most common foraging activity along the southern and western boundaries. Usually foraging below tree height of surrounding woodland.	Usually heard 15 – 20 minutes after survey start time and then throughout the evening until the end of survey.	September transect heard lots of social calling, most notably in the north-west corner of the transect between stop eight and ten.
Brown Long-eared	PLEAUR	✓*	x	Not commonly detected, foraging behaviour above stop six, above mature hawthorn hedgerow which runs N-S perpendicular to the transect.	Heard mid transect ~30-40 minutes into survey.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk /Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOG	PIPPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	08.06.17	21:15	23:33	18°C	15°C	BS0	7/8	None	0	0	2	2	5	6	5	2	22
2	Dusk	22.06.17	21:21	22:51	17°C	17°C	BS0	3/8	None	0	0	0	0	5	8	3	1	17
3	Dusk	06.07.17	21:20	22:55	20°C	18°C	BS1	3/8	None	0	0	0	1	20	13	2	1	37
4	Dusk	27.07.17	20:58	22:34	15°C	14°C	BS2	5/8	Rain prior	1	0	2	3	19	16	1	0	42
5	Dusk	10.08.17	20:31	21:55	14°C	12°C	BS1	2/8	None	0	0	0	0	21	7	3	0	31
6 ³	Dusk	31.08.17	19:43	21:10	14°C	13°C	BS2	6/8	None	0	0	0	3	48	7	0	8	66
7	Dusk	14.09.17	19:17	20:35	12°C	11°C	BS0	6/8	Rain 20:24>	0	0	0	0	13	11	0	2	26
8	Dawn	15.09.17	04:35	05:54	8°C	6°C	BS0	0/8	None	1	0	0	0	0	0	0	0	1
9	Dusk	28.09.17	18:37	19:59	18°C	15°C	BS0	3/8	None	0	0	0	2	9	10	4	1	26
10	Dusk	12.10.17	18:08	20:15	15°C	11°C	BS1	4/8	None	0	0	0	0	26	6	1	1	34
11	Dusk	26.10.17	17:39	19:25	14°C	12°C	BS0	5/8	None	0	0	2	0	9	6	2	1	20

² All bats not identified to species level.

³ Italicised entries have been filled using transect acoustic data and weather data (timeanddate.com) due to missing survey form.

Table 5: Compiled acoustic data from transect recordings.

Visit	Date	BARBAR	LARGEATSPP	MYOSPP	NYCNOC	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ⁴
1	08.06.17	0	1	0	1	26	2	2	3	35	372
2	22.06.17	0	1	0	6	13	9	0	1	30	1259
3	06.07.17	0	0	0	0	5	11	2	3	21	493
4	27.07.17	0	0	1	2	22	7	0	0	32	795
5	10.08.17	0	1	0	18	14	10	2	10	55	2761
6	31.08.17	0	2	0	10	3	4	0	6	25	856
7	14.09.17	0	1	0	1	4	0	0	2	8	976
8	15.09.17	0	2	0	3	49	7	5	0	66	1126
9	28.09.17	0	0	0	0	8	5	0	1	14	214
10	12.10.17	0	0	0	0	0	1	0	1	2	1014
11	26.10.17	1	1	0	5	3	18	1	17	46	1059

⁴ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA63X.

Deployment/Species	BARBAR	EPTSER	LARGE BATSP	MYOSPP	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 24.05.2017	4	0	120	1	157	2	652	5	6	0	12	959	2992
Visit 2 - 08.06.2017	3	1	111	7	673	4	3785	729	98	15	133	5559	9360
Visit 3 - 27.07.2017	1	2	22	3	3	1	715	36	47	0	25	855	1838
Visit 4 - 10.08.2017	0	0	13	1	30	0	381	17	15	0	15	472	1633
Visit 5 - 15.09.2017	0	0	4	0	31	0	30	2	3	0	7	77	3391
Visit 6 - 26.10.2017	0	0	1	0	0	0	1	31	1	0	17	51	493
Grand Total	8	3	271	12	894	7	5564	820	170	15	209	7973	19707

Table 7: Static data from BA point BA66X.

Deployment/Species	BARBAR	LARGE BATSP	MYOSPP	NYCLEI	NYCNOC	PIPIIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 08.06.2017	0	7	0	0	65	91	20	4	0	17	204	680
Visit 2 - 22.06.2017	0	14	0	0	42	38	76	8	4	15	197	435
Visit 3 - 06.07.2017	0	15	0	0	47	229	10	22	0	12	335	783
Visit 4 - 27.07.2017	0	66	0	1	156	176	52	2	6	67	526	5590
Visit 5 - 10.08.2017	2	33	2	0	122	65	37	0	16	60	337	1446
Visit 6 - 14.09.2017	1	9	0	0	28	0	36	0	1	7	82	699
Visit 7 - 12.10.2017	2	3	5	0	20	393	237	12	12	18	702	2076
Grand Total	5	147	7	1	480	992	468	48	39	196	2383	11709

Table 8: Static data from BA point BA100X.

Deployment/Species	LARBAT SPP	MYOSPP	NYCNO	PIPIP	PIPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 22.06.2017	8	0	14	55	41	0	0	13	131	273
Visit 2 - 27.07.2017	14	1	49	30	30	0	3	25	152	4128
Visit 3 - 31.08.2017	22	1	75	118	71	11	4	27	329	2503
Visit 4 - 28.09.2017	4	1	8	59	163	3	11	13	262	398
Visit 5 - 12.10.2017	3	3	21	114	126	6	10	17	300	6473
Grand Total	51	6	167	376	431	20	28	95	1174	13775

4.4. Bat activity by date

Table 9: Quantity of species recorded each night of deployment across all statics.

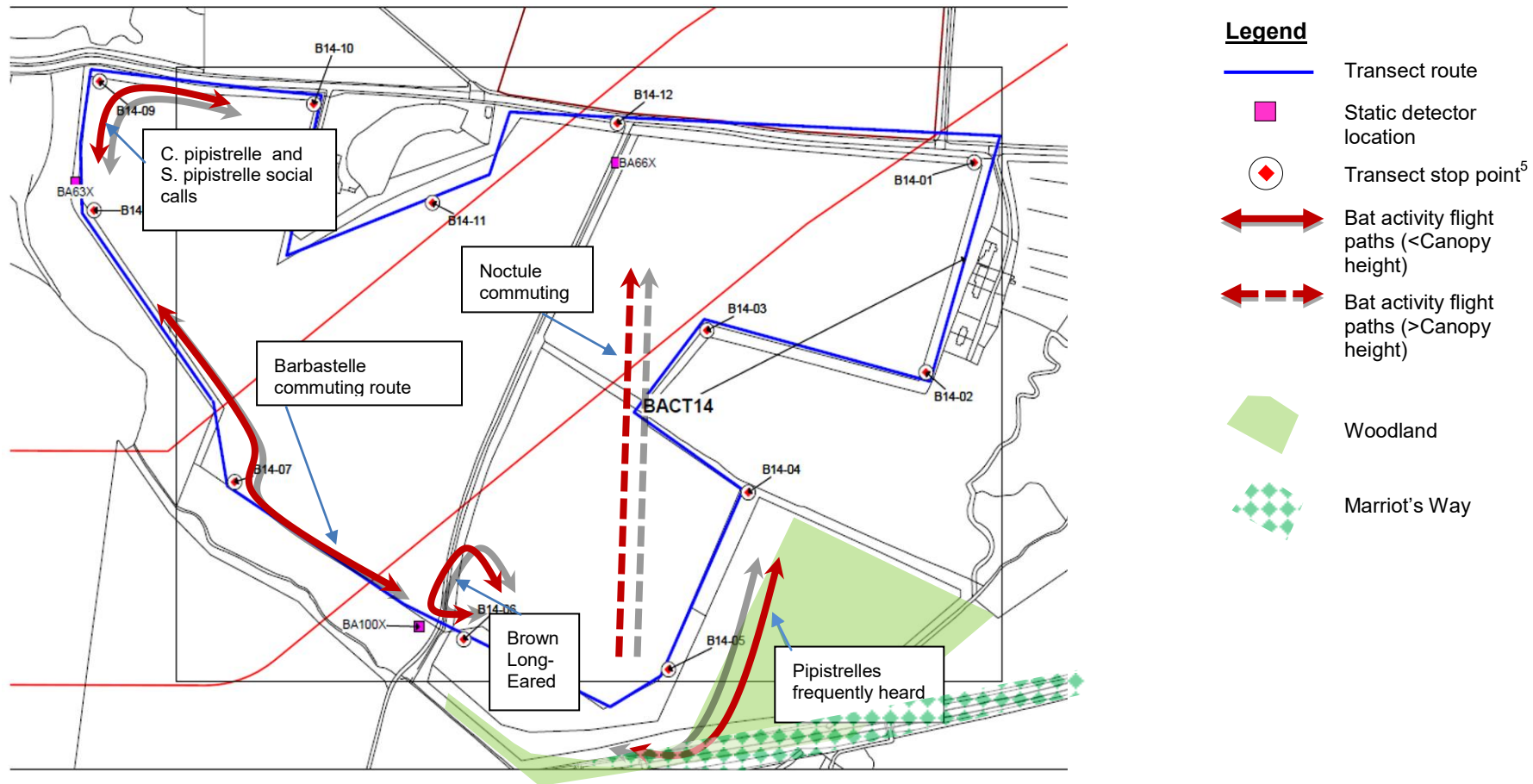
Date\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
24/05/2017	1	0	2	0	0	1	0	7	0	1	0	2	14	1287
25/05/2017	0	0	0	1	0	2	0	75	1	0	0	0	79	335
26/05/2017	2	0	40	0	0	54	2	162	2	1	0	0	263	481
27/05/2017	0	0	46	0	0	56	0	152	2	3	0	3	262	287
28/05/2017	0	0	19	0	0	33	0	18	0	1	0	6	77	199
29/05/2017	1	0	4	0	0	8	0	225	0	0	0	0	238	205
30/05/2017	0	0	9	0	0	3	0	13	0	0	0	1	26	198
08/06/2017	1	0	2	5	0	3	2	647	67	13	1	15	756	2374
09/06/2017	0	0	22	1	0	151	0	605	121	6	3	25	934	1181
10/06/2017	1	1	9	1	0	149	1	531	83	14	3	22	815	1685
11/06/2017	1	0	29	0	0	151	1	764	205	46	6	39	1242	2273
12/06/2017	0	0	24	0	0	87	0	1025	180	19	2	31	1368	1640
13/06/2017	0	0	32	0	0	197	0	304	93	4	0	18	648	887
22/06/2017	0	0	2	0	0	8	0	10	24	1	0	4	49	92
23/06/2017	0	0	9	0	0	17	0	11	12	1	2	11	63	213
24/06/2017	0	0	4	0	0	12	0	20	20	1	1	4	62	175
25/06/2017	0	0	2	0	0	10	0	36	46	3	1	2	100	100
26/06/2017	0	0	3	0	0	6	0	13	13	2	0	3	40	111
27/06/2017	0	0	2	0	0	3	0	3	2	0	0	4	14	17
06/07/2017	0	0	0	0	0	1	0	8	1	0	0		10	49
07/07/2017	0	0	6	0	0	23	0	14	2	1	0	8	54	121
08/07/2017	0	0	0	0	0	7	0	134	3	17	0	1	162	86
09/07/2017	0	0	3	0	0	7	0	6	3	0	0	3	22	71
10/07/2017	0	0	6	0	0	9	0	63	1	4	0	0	83	441
11/07/2017	0	0	0	0	0	0	0	4	0	0	0	0	4	15

Date\Species	BARBAR	EPTSER	LARGEATSPP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
27/07/2017	0	0	5	0	0	7	0	17	8	0	2	7	46	122
28/07/2017	0	0	16	1	0	40	0	291	9	13	2	11	383	1742
29/07/2017	1	2	58	1	0	88	1	367	12	32	3	60	625	4299
30/07/2017	0	0	8	0	0	29	0	8	41	0	1	12	99	4759
31/07/2017	0	0	12	1	1	39	0	228	34	4	1	25	345	500
01/08/2017	0	0	3	1	0	5	0	10	14	0	0	2	35	134
10/08/2017	0	0	0	0	0	2	0	0	0	0	0	2	4	91
11/08/2017	0	0	5	1	0	34	0	134	7	8	5	17	211	639
12/08/2017	0	0	16	0	0	39	0	268	23	7	7	17	377	1602
13/08/2017	2	0	7	1	0	25	0	13	9	0	2	16	75	226
14/08/2017	0	0	5	1	0	15	0	14	7	0	1	11	54	218
15/08/2017	0	0	13	0	0	37	0	17	8	0	1	12	88	303
31/08/2017	0	0	0	0	0	0	0	1	0	0	1	0	2	1192
01/09/2017	0	0	4	0	0	3	0	37	20	2	1	0	67	301
02/09/2017	0	0	3	0	0	23	0	9	14	0	1	5	55	73
03/09/2017	0	0	2	0	0	0	0	22	2	0	0	2	28	236
04/09/2017	0	0	1	1	0	10	0	40	27	8	0	5	92	301
05/09/2017	0	0	12	0	0	38	0	8	5	1	0	15	79	378
06/09/2017	0	0	0	0	0	1	0	1	3	0	1	0	6	22
14/09/2017	0	0	0	0	0	4	0	0	0	0	0	3	7	49
15/09/2017	0	0	2	0	0	11	0	2	0	0	0	1	16	160
16/09/2017	0	0	1	0	0	12	0	6	3	1	0	4	27	206
17/09/2017	0	0	3	0	0	8	0	0	1	0	0	2	14	932
18/09/2017	1	0	1	0	0	4	0	8	5	1	0	0	20	2169
19/09/2017	0	0	6	0	0	18	0	11	27	1	1	4	68	467
20/09/2017	0	0	0	0	0	2	0	3	2	0	0	0	7	107
28/09/2017	0	0	0	0	0	1	0	9	2	0	2	5	19	70
29/09/2017	0	0	3	1	0	4	0	26	58	0	2	4	98	157

Date\Species	BARBAR	EPTSER	LARGEATSPP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
30/09/2017	0	0	0	0	0	0	0	24	99	3	0	3	129	145
01/10/2017	0	0	1	0	0	0	0	0	1	0	4	1	7	15
02/10/2017	0	0	0	0	0	3	0	0	3	0	2	0	8	10
03/10/2017	0	0	0	0	0	0	0	0	0	0	1	0	1	1
12/10/2017	0	0	0	1	0	3	0	2	22	0	2	3	33	148
13/10/2017	1	0	0	2	0	0	0	3	2	0	7	4	19	1405
14/10/2017	0	0	2	2	0	13	0	251	110	9	1	11	399	1176
15/10/2017	1	0	2	1	0	19	0	134	79	8	7	9	260	290
16/10/2017	0	0	2	2	0	4	0	2	2	0	4	4	20	3172
17/10/2017	0	0	0	0	0	0	0	107	138	1	1	3	250	2316
18/10/2017	0	0	0	0	0	2	0	8	10	0	0	1	21	42
26/10/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	7
27/10/2017	0	0	0	0	0	0	0	0	12	1	0	7	20	118
28/10/2017	0	0	0	0	0	0	0	1	0	0	0	2	3	34
29/10/2017	0	0	1	0	0	0	0	0	4	0	0	0	5	138
30/10/2017	0	0	0	0	0	0	0	0	15	0	0	3	18	192
31/10/2017	0	0	0	0	0	0	0	0	0	0	0	5	5	4
Grand Total	13	3	469	25	1	1541	7	6932	1719	238	82	500	11530	45191

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁵ Associated code (e.g. B14_01) is reference to transect number and the transect stop number.



Transect Summary: BACT15, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT15
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	10/01/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

Norfolk Wildlife Services is a member of the Association of Wildlife Trust Consultancies (AWTC) which is also a corporate member of the Institute of Environmental Management and Assessment (IEMA).

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1. Transect summary: BACT15, Drabblegate

- 1.1. Grid reference: TG203288.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA32 and BA33.

2. Description of transect

Land use at transect

- 2.1. Within the transect area the land is used for arable agriculture, with several crop fields all bordered by native species hedgerows.
- 2.2. The transect is bordered by the A140 to the east.
- 2.3. A strip of mixed woodland is situated in the center of the transect between stops four and five.
- 2.4. The west of the transect is bordered by the same area of wet grassland and woodland which borders the northeast of neighbouring transect BACT31.

Key commuting and foraging features

- 2.5. The woodland strip has good connectivity with the wider landscape through adjoining hedgerows which further link to other nearby woodland patches.
- 2.6. The woodland and wet grassland to the south-west of the transect provide excellent foraging and commuting habitat for bats.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked once in June. The statics at BA32 and BA33 were deployed once for a total of five nights each.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA32	Visit 1 - 07/06/17	07/06/17	12/06/17	5
BA33	Visit 1 - 07/06/17	07/06/17	12/06/17	5

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BC, JH	07/06/17	21:10	22:47

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	X	N/A	N/A	N/A
Serotine	EPTSER	X	✓*	Only recorded on static detector BA33.	Recorded once in the late evening.	N/A
Large bat spp.	LARGEBATSP	X	X	N/A	N/A	N/A
Leislars	NYCLEI	X	X	N/A	N/A	N/A
Myotis sp.	MYOSPP	X	X	N/A	N/A	N/A
Noctule	NYCNOC	✓*	✓	Recorded across the transect on both static detectors.	Recorded by statics soon at dusk and dawn.	N/A
Nathusius' pipistrelle	PIP NAT	✓*	✓*	Recorded on static detector BA33. Brief passes recorded by surveyors detector on transect visit.	Static BA33 recorded PIPNAT passes throughout each night for the duration of the deployment. Heard approximately an hour into the survey on the transect visit.	N/A
Common pipistrelle	PIPPIP	✓	✓	All activity recorded on transects between stop 5 and stop 8.	Recorded throughout the night	N/A
Soprano pipistrelle	PIPPYG	✓	✓	All activity recorded on transects between stop 5 and stop 8.	Recorded throughout the night.	N/A
Brown long-eared	PLEAUR	✓	X	Heard once on transect.	N/A	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOC	PIPIIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	07/06/17	21:10	22:47	16°C	13°C	BS2	7/8	Light rain from 22:15	0	0	0	0	15	5	32	0	52

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	NYCNOC	PLEAUR	PIPIIP	PIPPYG	OTHER	Total all bats	Noise ³
1	Dusk	07/06/17	3	1	39	21	6	70	2054

4.3. Static data

Table 6: Static data from BA point BA32.

Deployment\Species	NYCNOC	Total all bats	NOISE
Visit 1 - 07.06.17	26	26	918

Table 7: Static data from BA point BA33.

Deployment\Species	EPTSER	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 07.06.17	1	39	11	957	920	73	21	2022	1726

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

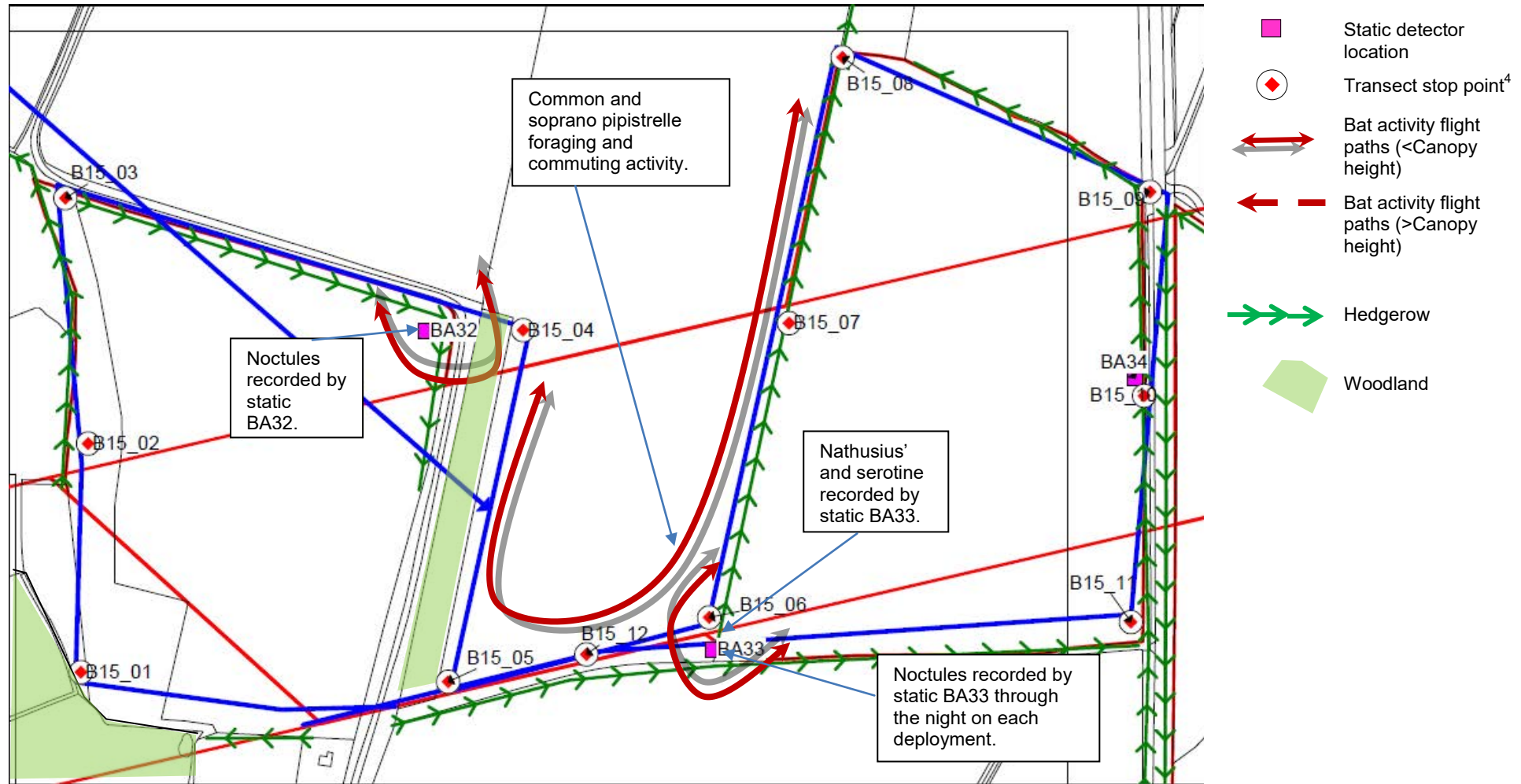
4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	EPTSER	NYCNOG	PIP NAT	PIPIPI	PIPIYG	PIPSPP	OTHER	Total all bats	NOISE
07/06/2017	0	0	0	42	5	3	1	51	265
08/06/2017	1	20	4	246	102	15	2	390	881
09/06/2017	0	1	2	249	397	19	5	673	555
10/06/2017	0	8	1	256	297	22	9	593	418
11/06/2017	0	29	3	139	89	10	4	274	413
12/06/2017	0	7	1	25	30	4	0	67	112
Grand Total	1	65	11	957	920	73	21	2048	2644

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B15_01) is reference to transect number and the transect stop number.



Transect Summary: BACT16, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT16
Date of report :	30/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	03/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT16, Banningham

- 1.1. Grid reference: TG212293.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA35 & BA75X.

2. Description of transect

Land use at transect

- 2.1. Arable land bordered by roads on the southern and northern areas with the A140 to the west.
- 2.2. The village of Banningham lies to the north-east of the transect.
- 2.3. Three farms and associated land lie to the west, south and east.
- 2.4. Small areas of woodland are to the west connected by broken hedgerow and tree lines.

Key commuting and foraging features

- 2.5. The hedgerow along the south-western edge of the transect provided a commuting and foraging route for both common and soprano pipistrelles.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked six times from July to October. The static at BA35 was deployed five times for a total of 27 nights and at BA75X five times for a total of 27 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA35	Visit 1 - 04.07.2017	04/07/2017	10/07/2017	6
	Visit 2 - 02.08.2017	02/08/2017	08/08/2017	6
	Visit 3 - 15.08.2017	15/08/2017	22/08/2017	7
	Visit 4 - 08.09.2017	08/09/2017	11/09/2017	3
	Visit 5 - 05.10.2017	05/10/2017	10/10/2017	5
BA75X	Visit 1 - 04.07.2017	04/07/2017	10/07/2017	6
	Visit 2 - 02.08.2017	02/08/2017	08/08/2017	6
	Visit 3 - 15.08.2017	07/08/2017	15/08/2017	8
	Visit 4 - 08.09.2017	08/09/2017	11/09/2017	3
	Visit 5 - 06.10.2017	06/10/2017	10/10/2017	4

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	AG, AV	04.07.17	21:21	22:46
2	Dusk	JWH, AV	02.08.17	20:45	22:08
3	Dusk	AG, JH	15.08.17	20:23	21:47
4	Dusk	AG, JH	07.09.17	19:32	20:30
5	Dusk	JG, JH	06.10.17	05:04	07:00
6	Dawn	AG, JH	05.10.17	18:24	20:20

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species. * Indicates limited records

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	✓*	Occasional records.	Static detectors picked up passes throughout the night.	N/A
Serotine	EPTSER	X	✓*	Occasional records.	Static detectors picked up passes throughout the night.	N/A
Large bat spp.	LARGEBATSP	X	✓	N/A	Statics recorded through the night.	N/A
Myotis spp.	MYOSPP	X	✓*	Occasional records.	Statics recorded Myotis spp. in the evening but no later than midnight.	N/A
Leislars	NYCLEI	✓*	X	Scare records recorded by transect detector.	Recorded in September only.	N/A
Noctule	NYCNOC	✓	✓	Recorded along the western edge of the route.	Statics commonly detected noctules during the early evening and morning.	N/A
Nathusius Pipistrelle	PIP NAT	X	✓*	Occasional records.	Single pass in the late evening on one occasion.	N/A
Common Pipistrelle	PIPIPI	✓	✓	Most commonly heard along the western and south-western lengths of the transect.	Usually heard 30-40 minutes from survey start until end of survey.	N/A
Soprano Pipistrelle	PIPPYG	✓	✓	Most commonly heard along the western and south-western lengths of the transect.	Usually heard 30-40 minutes from survey start until end of survey.	N/A
Pipistrelle spp.	PIPSPP	✓	✓	Recorded throughout.	Usually heard 30-40 minutes from survey start until end of survey.	N/A
Brown long-eared	PLEAUR	X	✓*	Occasional records from static detector BA75X only.	Only recorded in August.	N/A

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	MYOSPP	NYCNOC	PIPPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	04.07.17	21:21	22:46	19 ^o C	18 ^o C	BS1	6/8	None	0	0	0	18	10	1	0	29
2	Dusk	02.08.17	20:45	22:08	17 ^o C	18 ^o C	BS2	8/8	Slight drizzle	0	0	0	8	3	1	0	12
3	Dusk	15.08.17	20:23	21:47	18 ^o C	16 ^o C	BS1	2/8	None	0	0	0	4	7	0	0	11
4	Dusk	07.09.17	19:32	20:30	16 ^o C	15 ^o C	BS3	8/8	Rain	0	0	0	1	0	0	1	2
5	Dusk	06.10.17	05:04	07:00	10 ^o C	8 ^o C	BS3	4/8	None	0	0	0	5	6	0	0	11
6	Dawn	05.10.17	18:24	20:20	14 ^o C	12 ^o C	BS2	3/8	None	0	0	0	22	6	3	0	31

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	NYCLEI	NYCNOC	PIPPPIP	PIPPYG	OTHER	Total all bats	NOISE ³
1	Dusk	04.07.17	0	0	0	4	0	4	33
2	Dusk	02.08.17	0	0	32	4	11	47	840
3	Dusk	15.08.17	0	0	5	6	1	12	1263
4	Dusk	07.09.17	2	3	2	1	1	9	813
5	Dusk	06.10.17	0	41	27	18	3	89	1053
6	Dawn	05.10.17	0	0	4	2	3	9	1257

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consists of ambient background noise, rain, wind and other biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA35.

Deployment\Species	BARBAR	LARGEBA TSPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 04.07.2017	0	9	1	30	0	28	48	2	3	121	405
Visit 2 - 02.08.2017	0	1	0	9	0	79	41	3	1	134	31768
Visit 3 - 15.08.2017	0	10	0	6	0	1706	54	27	104	1907	49185
Visit 4 - 08.09.2017	1	4	1	8	0	2785	7	6	23	2835	5904
Visit 5 - 05.10.2017	0	1	0	6	2	567	4	4	14	598	3828
Grand Total	1	25	2	59	2	5165	154	42	145	5595	91090

Table 7: Static data from BA point BA75X.

Deployment\Species	BARBAR	EPTSER	LARGE B ATSP	MYOSPP	NYCNOC	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 04.07.2017	0	0	1	0	4	129	2041	647	0	14	2836	1947
Visit 2 - 02.08.2017	1	0	3	0	1	3859	46	56	0	31	3997	49814
Visit 3 - 15.08.2017	0	4	18	8	55	57	87	1	4	13	247	6030
Visit 4 - 08.09.2017	1	0	0	0	0	1	1	0	0	0	3	20093
Visit 5 - 06.10.2017	0	0	0	1	1	233	467	21	0	20	743	5463
Grand Total	2	4	22	9	61	4279	2642	725	4	78	91173	7826

4.4. Bat activity by date

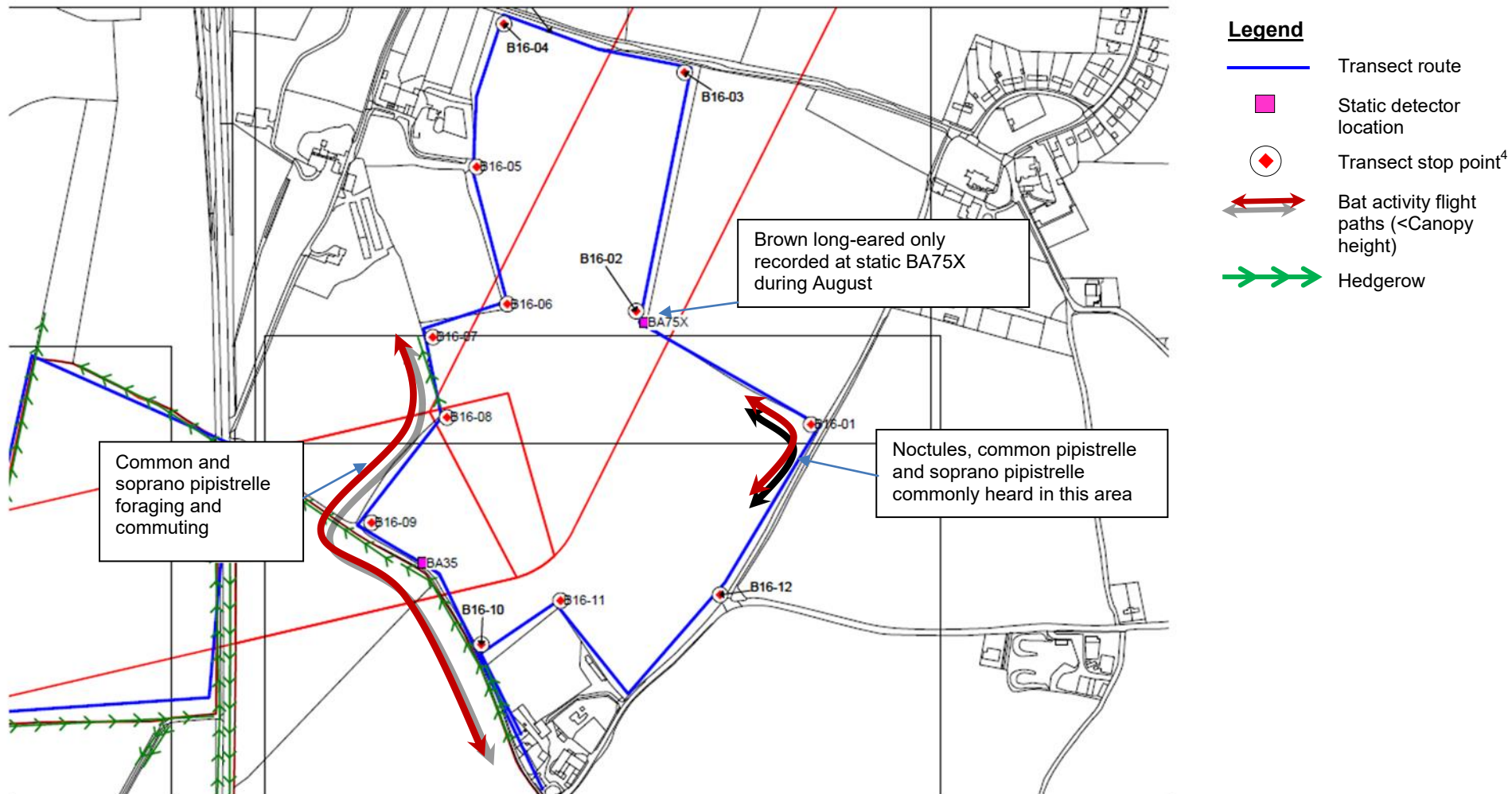
Table 8: Number of registrations of species recorded each night of deployment across all statics.

DateSpecies	BARBAR	EPTSER	LARGE B ATSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
04/07/2017	0	0	0	0	0	0	6	40	19	0	0	65	118
05/07/2017	0	0	0	0	0	0	39	465	158	0	0	662	467
06/07/2017	0	0	3	0	20	0	14	73	42	0	4	156	402
07/07/2017	0	0	6	1	9	0	51	415	132	0	5	619	488
08/07/2017	0	0	0	0	1	0	26	451	151	0	4	633	389
09/07/2017	0	0	1	0	1	0	12	163	55	0	2	234	196
10/07/2017	0	0	0	0	3	0	9	482	92	0	2	588	292
02/08/2017	0	0	0	0	2	0	634	0	13	0	8	657	5227
03/08/2017	0	0	0	0	0	0	1935	15	36	0	12	1998	7420
04/08/2017	0	0	0	0	0	0	901	16	2	0	7	926	14581
05/08/2017	0	0	1	0	0	0	36	29	0	0	2	68	12566
06/08/2017	1	0	0	0	2	0	182	8	0	0	1	194	18040
07/08/2017	0	1	7	2	7	0	262	21	7	1	2	310	18353
08/08/2017	0	0	1	0	1	0	21	10	1	1	0	35	7535
09/08/2017	0	0	2	0	2	0	4	4	0	0	0	12	537
10/08/2017	0	0	1	3	5	0	13	8	0	0	2	32	501
11/08/2017	0	0	6	0	24	0	2	43	1	1	3	80	417
12/08/2017	0	3	3	2	16	0	2	19	0	1	5	51	363
13/08/2017	0	0	1	1	6	0	1	1	0	0	3	13	6
15/08/2017	0	0	0	0	0	0	4	0	0	0	0	4	3260
16/08/2017	0	0	2	0	1	0	102	1	5	0	25	136	8018
17/08/2017	0	0	1	0	1	0	155	4	2	0	20	183	10005
18/08/2017	0	0	3	0	1	0	599	48	8	0	37	696	7255
19/08/2017	0	0	3	0	1	0	386	1	8	0	14	413	11792
20/08/2017	0	0		0	2	0	440	0	4	0	7	453	5615
21/08/2017	0	0	1	0	0	0	22	0	0	0	1	24	4847

Date/Species	BARBAR	EPTSER	LARGE ATSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
22/08/2017	0	0	0	0	0	0	0	0	0	0	0	0	459
08/09/2017	1	0	0	0	0	0	27	2	0	0	0	30	6650
09/09/2017	1	0	0	0	0	0	6	3	0	0	0	10	9360
10/09/2017	0	0	4	1	7	0	1439	2	5	0	19	1477	8065
11/09/2017	0	0	0	0	1	0	1314	1	1	0	4	1321	1922
05/10/2017	0	0	0	0	0	1	23	0	0	0	3	27	140
06/10/2017	0	0	0	0	0	0	7	7	0	0	0	14	752
07/10/2017	0	0	0	0	0	0	57	13	0	0	2	72	2845
08/10/2017	0	0	0	0	4	1	142	214	17	0	8	386	531
09/10/2017	0	0	0	1	3	0	140	237	5	0	15	401	1741
10/10/2017	0	0	1	0	0	0	431	0	3	0	6	441	3282
Grand Total	3	4	47	11	120	2	9444	2796	767	4	223	13421	174437

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B16_01) is reference to Transect number and the transect stop number.



Transect Summary: BACT17, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT17
Date of report :	30/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	18/12/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT17, Banningham

- 1.1. Grid reference: TG223304.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA91X and BA37.

2. Description of transect

Land use at transect

- 2.1. The land in and around BACT17 consists of arable agriculture, excluding the western field which is used for cattle grazing.
- 2.2. Established native species hedgerows surround the transect and three parallel hedgerows run north to south through the centre of the transect.
- 2.3. Colby Road runs north to south along the western edge.
- 2.4. A small deciduous plantation is situated along the north of the transect which is directly linked to a larger strip of woodland containing two reservoirs along the eastern edge via an established hedgerow.
- 2.5. Gunton Park is situated within 5km to the north of the transect which consists of large areas of open water, woodland and parkland with large scattered standards.

Key commuting and foraging features

- 2.6. Colby Road was a good commuting route.
- 2.7. The hedgerow which runs south from stop point three was another commuting route with bats recorded commuting south into the transect area.
- 2.8. The south-western field margins were key foraging areas for common and soprano pipistrelles.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked seven times from May to October. The static at BA91X was deployed five times for a total of 30 nights and the static at BA37 was deployed five times for a total of 27 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA91X	Visit 1 - 23.06.2017	23/06/2017	27/06/2017	4
	Visit 2 - 24.07.2017	24/07/2017	28/07/2017	4
	Visit 3 - 14.08.2017	14/08/2017	21/08/2017	7
	Visit 4 - 11.09.2017	11/09/2017	19/09/2017	8
	Visit 5 - 09.10.2017	09/10/2017	16/10/2017	7
BA37	Visit 1 - 22.05.2017	22/05/2017	30/05/2017	8
	Visit 2 - 23.06.2017	23/06/2017	27/06/2017	4
	Visit 3 - 14.08.2017	14/08/2017	14/08/2017	0
	Visit 4 - 11.09.2017	11/09/2017	19/09/2017	8
	Visit 5 - 09.10.2017	09/10/2017	16/10/2017	7

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BB, BM	30.05.17	20:57	23:12
2	Dusk	KC, JH	23.06.17	21:23	23:30
3	Dusk	JWH, BM	24.07.17	21:00	22:29
4	Dusk	JG, BM	14.08.17	20:22	22:00
5	Dusk	JG, BM	11.09.17	19:23	21:00
6	Dawn	JG, BM	12.09.17	04:20	06:36
7	Dusk	JG, BM	09.10.17	18:20	20:30

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	x	✓*	Occasional pass recorded on statics.	Recorded in early evening September only.	N/A
Serotine	EPTSER	x	✓*	Single record at static point BA91X.	May only.	N/A
Large bat spp.	LARGBATSPP	✓*	✓	Throughout the survey period, mostly recorded on statics.	Throughout the survey period.	N/A
Myotis spp	MYOSPP	✓*	✓*	Only recorded by static BA37.	Statics only recorded in the evening.	N/A
Noctule	NYCNOC	✓*	✓	Frequent recordings.	Throughout the survey period.	N/A
Leislars	NYCLEI	x	✓*	Only recorded by static BA37.	May only.	N/A
Nathusius' pipistrelle	PIP NAT	✓*	✓	Occasionally recorded by static BA37.	Recorded throughout the night. Majority of records from May.	N/A
Common pipistrelle	PIPIPI	✓	✓	Frequent passes throughout the transect.	Heard within 20 minutes after sunset for the duration of the survey.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequent passes throughout the transect; Less frequently recorded than PIPPIPI.	Heard within from 20 minutes after sunset for the duration of the survey.	N/A
Pipistrelle spp.	PIPSPP	✓*	✓	Frequent passes throughout the transect.	Throughout the survey period.	N/A
Brown Long Eared	PLEAUR	x	✓	Only recorded by static BA37.	Mostly recorded throughout the morning until dawn, few passes in the evening. Majority of records from May.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOG	PIPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	30.05.17	20:57	23:12	15°C	14°C	BS1	1/8	None	0	0	0	0	19	4	6	8	37
2	Dusk	23.06.17	21:23	23:30	19°C	18°C	BS2	6/8	None	0	0	0	0	22	4	0	0	26
3	Dusk	24.07.17	21:00	22:29	15°C	15°C	BS2	8/8	Heavy drizzle before survey and from 21:30	0	0	0	0	15	2	0	1	18
4	Dusk	14.08.17	20:22	22:00	17°C	15°C	BS3	4/8	None	0	0	0	0	21	13	0	0	34
5	Dusk	11.09.17	19:23	21:00	15°C	13°C	BS4	7/8	None	0	0	0	0	9	1	0	0	10
6	Dawn	12.09.17	04:20	06:36	10°C	10°C	BS2	1/8	None	0	0	0	0	5	0	0	0	5
7	Dusk	09.10.17	18:20	20:30	12°C	12°C	BS0	8/8	None	0	0	2	0	21	8	0	2	33

² All bats not identified to species level.

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	LARGEATSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	30.05.17	2	1		61	10	2	2	78	876
2	Dusk	23.06.17			1	37	3	1	1	43	500
3	Dusk	24.07.17				54	17	2		73	251
4	Dusk	14.08.17		6		63	4	2	4	79	277
5	Dusk	11.09.17	1		2	21	2	1	5	32	610
6	Dawn	12.09.17				11	1			12	372
7	Dusk	09.10.17		2		86	16		10	114	1092

³ Non bat files analysed by Kaleidoscope software which consists of ambient background noise, rain, wind and other biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA37.

Deployment\Species	BARBAR	EPTSER	LARGE BATSPP	MYOSP P	NYCLEI	NYNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 22.05.2017	0	1	1	4	2	8	21	783	40	82	13	1	956	1302
Visit 2 - 23.06.2017	0	0	29	0	0	140	6	279	20	6	2	0	482	611
Visit 3 - 14.08.2017	0	0	1	0	0	2	0	95	15	4	0	0	117	477
Visit 4 - 11.09.2017	2	0	13	2	0	6	0	2098	31	7	0	7	2166	9864
Visit 5 - 09.10.2017	0	0	37	1	0	34	1	108	38	8	1	8	236	9217
Grand Total	2	1	81	7	2	190	28	3363	144	107	16	16	3957	21471

Table 7: Static data from BA point BA91X.

Deployment\Species	BARBAR	LARGE BATS PP	NYNOC	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ⁴
Visit 1 - 23.06.2017	0	3	8	41	4	1	0	57	1073
Visit 2 - 24.07.2017	0	0	13	53	797	8	0	871	1546
Visit 3 - 14.08.2017	0	0	5	238	1	5	1	250	888
Visit 4 - 11.09.2017	1	12	18	685	381	13	1	1111	7923
Visit 5 - 09.10.2017	0	8	25	87	34	0	0	154	1614
Grand Total	1	23	69	1104	1217	27	2	2443	13044

⁴ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.4. Bat activity by date

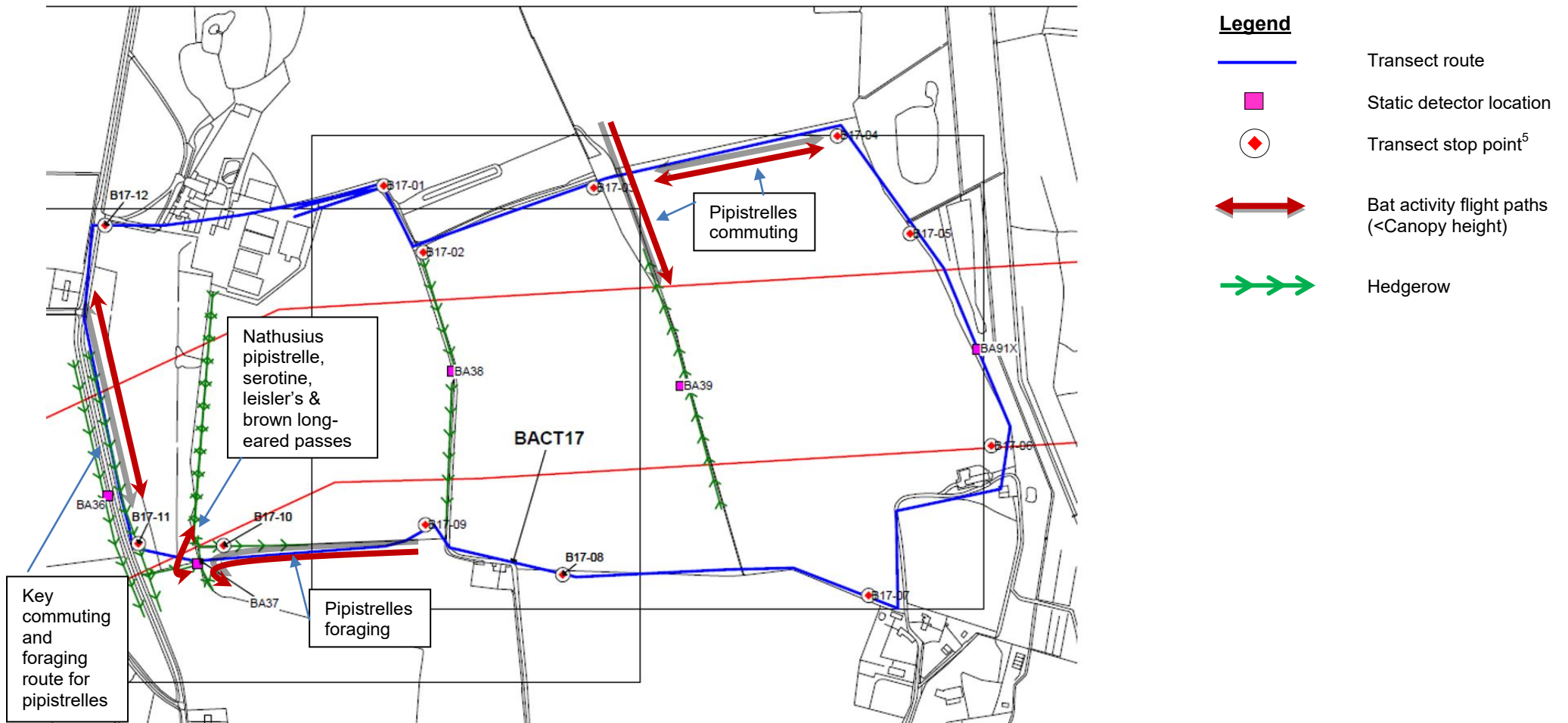
Table 8: Number of registrations of species recorded each night of deployment across all statics.

Date\Species	BARBAR	EPTSER	LARGBATSPP	MYOSPP	NYCLEI	NYNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
22/05/2017	0	0	0	0	0	2	1	83	9	0	0	0	95	82
23/05/2017	0	0	1	0	0	0	3	108	6	4	4	0	126	205
24/05/2017	0	0	0	1	0	0	2	93	4	8	1	0	109	166
25/05/2017	0	0	0	1	0	3	2	99	5	7	3	0	120	198
26/05/2017	0	0	0	1	2	0	12	142	8	47	0	1	213	177
27/05/2017	0	0	0	0	0	0	0	83	1	7	0	0	91	84
28/05/2017	0	0	0	1	0	1	1	65	4	6	2	0	80	90
29/05/2017	0	1	0	0	0	2	0	79	3	2	2	0	89	217
30/05/2017	0	0	0	0	0	0	0	31	0	1	1	0	33	83
23/06/2017	0	0	0	0	0	0	0	1	1	0	0	0	2	83
24/06/2017	0	0	12	0	0	40	1	89	8	4	0	0	154	533
25/06/2017	0	0	6	0	0	22	1	119	5	1	0	0	154	356
26/06/2017	0	0	9	0	0	26	1	77	10	0	1	0	124	496
27/06/2017	0	0	5	0	0	60	3	34	0	2	1	0	105	216
24/07/2017	0	0	0	0	0	1	0	10	138	0	0	0	149	357
25/07/2017	0	0	0	0	0	4	0	15	198	3	0	0	220	277
26/07/2017	0	0	0	0	0	7	0	3	0	0	0	0	10	29
27/07/2017	0	0	0	0	0	1	0	25	413	5	0	0	444	482
28/07/2017	0	0	0	0	0	0	0	0	48	0	0	0	48	401
14/08/2017	0	0	1	0	0	2	0	158	15	4	0	1	181	649
15/08/2017	0	0	0	0	0	0	0	51	0	2	0	0	53	200
16/08/2017	0	0	0	0	0	0	0	11	0	0	0	0	11	110
17/08/2017	0	0	0	0	0	4	0	36	1	2	0	0	43	86
18/08/2017	0	0	0	0	0	0	0	16	0	0	0	0	16	49
19/08/2017	0	0	0	0	0	1	0	13	0	1	0	0	15	115
20/08/2017	0	0	0	0	0	0	0	47	0	0	0	0	47	153

Date\Species	BARBAR	EPTSER	LARGEATSPP	MYOSPP	NYCLEI	NYNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
21/08/2017	0	0	0	0	0	0	0	1	0	0	0	0	1	3
11/09/2017	1	0	1	0	0	4	0	582	2	1	0	0	591	171
12/09/2017	0	0	1	0	0	1	0	123	24	1	0	0	150	2534
13/09/2017	0	0	0	0	0	3	0	50	58	2	0	0	113	1625
14/09/2017	1	0	3	0	0	5	0	83	13	1	0	1	107	1103
15/09/2017	0	0	9	1	0	3	0	180	31	3	0	6	233	1361
16/09/2017	0	0	1	0	0	2	0	144	50	2	0	0	199	2041
17/09/2017	0	0	1	0	0	0	0	494	38	4	0	0	537	3219
18/09/2017	1	0	9	1	0	6	0	1110	194	6	0	1	1328	4320
19/09/2017	0	0	0	0	0	0	0	17	2	0	0	0	19	1413
09/10/2017	0	0	1	0	0	2	1	58	11	0	0	0	73	769
10/10/2017	0	0	3	0	0	4	0	14	24	1	0	0	46	3197
11/10/2017	0	0	9	0	0	2	0	14	1	1	1	1	29	3157
12/10/2017	0	0	25	0	0	5	0	40	16	5	0	7	98	722
13/10/2017	0	0	1	0	0	0	0	20	4	0	0	0	25	980
14/10/2017	0	0	3	1	0	6	0	30	6	0	0	0	46	1418
15/10/2017	0	0	2	0	0	36	0	19	9	1	0	0	67	505
16/10/2017	0	0	1	0	0	4	0	0	1	0	0	0	6	83
Grand Total	3	1	104	7	2	259	28	4467	1361	134	16	18	6400	34515

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁵ Associated code (e.g. B17_01) is reference to Transect number and the transect stop number.



Transect Summary: BACT18, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT18
Date of report :	30/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	18/12/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT18, North Walsham

- 1.1. Grid reference: TG273317.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA43 and BA44.

2. Description of transect

Land use at transect

- 2.1. The centre of the transect is used as arable agricultural land as is the majority of the surrounding land in the wider landscape.
- 2.2. There is a pond in the north-west corner and outside of the transect area, here the transect borders an area of wet rough grassland. A semi-mature tree line separates the transect from this area following a drainage ditch.
- 2.3. The west of the transect follows the edge of a small area of mixed woodland (surrounding a large pond) which is linked to the wider landscape with native species hedgerows and tree belts.
- 2.4. An established hedgerow also runs down the centre of the transect along Bradfield Road.
- 2.5. A small copse of trees also borders the south-western corner of the transect.

Key commuting and foraging features

- 2.6. The pond was a key foraging area for common pipistrelles.
- 2.7. Lyngate Road (along the southern boundary of the transect) was noted as a key foraging route, as was the northern boundary for common and soprano pipistrelle.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked seven times from May to October. The static at BA43 was deployed six times (total of 32 nights) and that at BA44 six times for a total of 35 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA43	Visit 1 - 22.05.2017	22/05/2017	30/05/2017	8
	Visit 2 - 01.06.2017	01/06/2017	06/06/2017	5
	Visit 3 - 12.07.2017	12/07/2017	17/07/2017	5
	Visit 4 - 16.08.2017	16/08/2017	21/08/2017	5
	Visit 5 - 20.09.2017	21/09/2017	25/09/2017	4
	Visit 6 - 23.10.2017	23/10/2017	28/10/2017	5
BA44	Visit 1 - 22.05.2017	22/05/2017	30/05/2017	8
	Visit 2 - 01.06.2017	01/06/2017	06/06/2017	5
	Visit 3 - 12.07.2017	12/07/2017	17/07/2017	5
	Visit 4 - 16.08.2017	16/08/2017	21/08/2017	5
	Visit 5 - 21.09.2017	21/09/2017	26/09/2017	5
	Visit 6 - 23.10.2017	23/10/2017	30/10/2017	7

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, GH	24/05/17	20:58	23:21
2	Dusk	AG, BM	01/06/17	21:08	23:10
3	Dusk	GH, JH	12/07/17	21:14	22:53
4	Dusk	RM	16/08/17	20:20	21:20
5	Dusk	GH, JH	20/09/17	19:00	20:03
6	Dawn	BM, JWH	21/09/17	04:30	06:44
7	Dusk	JWH, BM	23/10/17	17:40	19:30

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the site, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	✓*	Recorded in the south-west corner of transect (BA43). Isolated passes.	Isolated tracks, recorded 40 minutes into survey.	N/A
Serotine	EPTSER	X	✓*	Isolated records on both statics	Single tracks; scattered across period	N/A
Large bat species	LARGEBATSP	✓	✓*	Recorded across the transect in each static.	Recorded throughout the night on static deployments.	N/A
Myotis sp.	MYOSPP	✓	✓*	Recorded most frequently between stops 9 and 10 in the south-east; other passes were picked up in other parts of the southern stretch of transect.	Mostly recorded about 40 minutes into the survey.	N/A
Noctule	NYCNOC	✓	✓	Commuting and foraging behaviour recorded along the northern most sections of the transect route – at tree height.	Generally heard briefly between 15 and 20 minutes after sunset. Recorded again briefly ~30 mins before sunrise.	N/A
Nathusius' pipistrelle	PIP NAT	X	✓*	Occasional isolated possible records from statics	Statics recorded PIP NAT during the night.	N/A
Common pipistrelle	PIPPIP	✓	✓	Foraging across the entire transect, especially Lyngate Road.	Most commonly heard from 30-50 minutes post sunset.	Frequent social calling
Soprano pipistrelle	PIPPYG	✓	✓	Foraging across the entire transect, especially Lyngate Road.	Usually before PIPPIP; often recorded 10-20 minutes earlier.	Frequent social calling
Brown long-eared	PLEAUR	X	✓*	Occasional static records; likely underrepresented; BA43 only	August and September	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	MYOSPP	NYCNOC	PIPIP	PIPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	24.05.17	20:58	23:21	18°C	15°C	BS0	0/8	None	0	1	0	8	3	0	2	14
2	Dusk	01.06.17	21:08	23:10	15°C	15°C	BS0	4/8	None	0	0	0	15	2	0	1	18
3	Dusk	12.07.17	21:14	22:53	14°C	11°C	BS0	0/8	None	0	0	1	14	3	0	0	18
4	Dusk	16.08.17	20:20	21:20	18°C	18°C	BS2	3/8	None	0	3	1	25	3	1	0	33
5	Dusk	20.09.17	19:00	20:03	17°C	16°C	BS0	8/8	None	0	0	0	3	3	0	0	6
6	Dawn	21.09.17	04:30	06:44	13°C	14°C	BS2	7/8	None	0	0	1	12	3	0	0	16
7	Dusk	23/10/17	17:40	19:30	14°C	13°C	BS0	8/8	None	0	2	1	5	5	0	0	13

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	LARGEBATSPP	MYOSPP	NYCNOC	PIPNAT	PIPIP	PIPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	24.05.17	0	0	0	0	17	5	1	1	24	1072
2	Dusk	01.06.17	1	0	2	1	3	0	0	0	7	1311
3	Dusk	12.07.17	2	0	33	0	54	2	1	10	102	1070
4	Dusk	16.08.17	0	0	0	0	7	0	0	0	7	690
5	Dusk	20.09.17	0	0	2	0	13	8	4	0	27	834
6	Dawn	21.09.17	0	0	0	0	35	7	2	2	46	1371
7	Dusk	23/10/17	1	2	5	0	19	8	0	4	39	1143

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA43.

Deployment\Species	BARBAR	EPTSER	LARGEB ATSP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 22.05.2017	0	0	6	0	24	0	234	47	9	0	6	326	1632
Visit 2 - 01.06.2017	0	0	2	0	2	2	748	14	3	0	8	779	1927
Visit 3 - 12.07.2017	0	1	20	0	78	1	167	12	2	0	37	318	2195
Visit 4 - 16.08.2017	2	1	10	1	30	0	837	84	93	12	194	1262	62997
Visit 5 - 20.09.2017	1	0	18	5	69	2	1256	45	12	6	44	1457	9550
Visit 6 - 23.10.2017	1	0	4	0	5	1	215	30	6	0	10	271	12177
Grand Total	4	2	60	6	208	6	3457	232	125	18	299	4413	90478

Table 7: Static data from BA point BA44.

Deployment\Species	EPTSER	LARGEBATS PP	MYOSPP	NYCNOC	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 22.05.2017	0	12	0	43	1376	20	10	13	1474	5552
Visit 2 - 01.06.2017	0	18	0	16	117	0	1	11	163	5841
Visit 3 - 12.07.2017	0	3	0	36	8	0	0	2	49	2766
Visit 4 - 16.08.2017	1	7	3	28	96	57	21	85	298	84238
Visit 5 - 21.09.2017	0	15	0	41	905	154	112	78	1305	11482
Visit 6 - 23.10.2017	0	0	0	0	1	0	0	0	1	575
Grand Total	1	55	3	164	2503	231	144	189	3290	110454

4.4. Bat activity by date

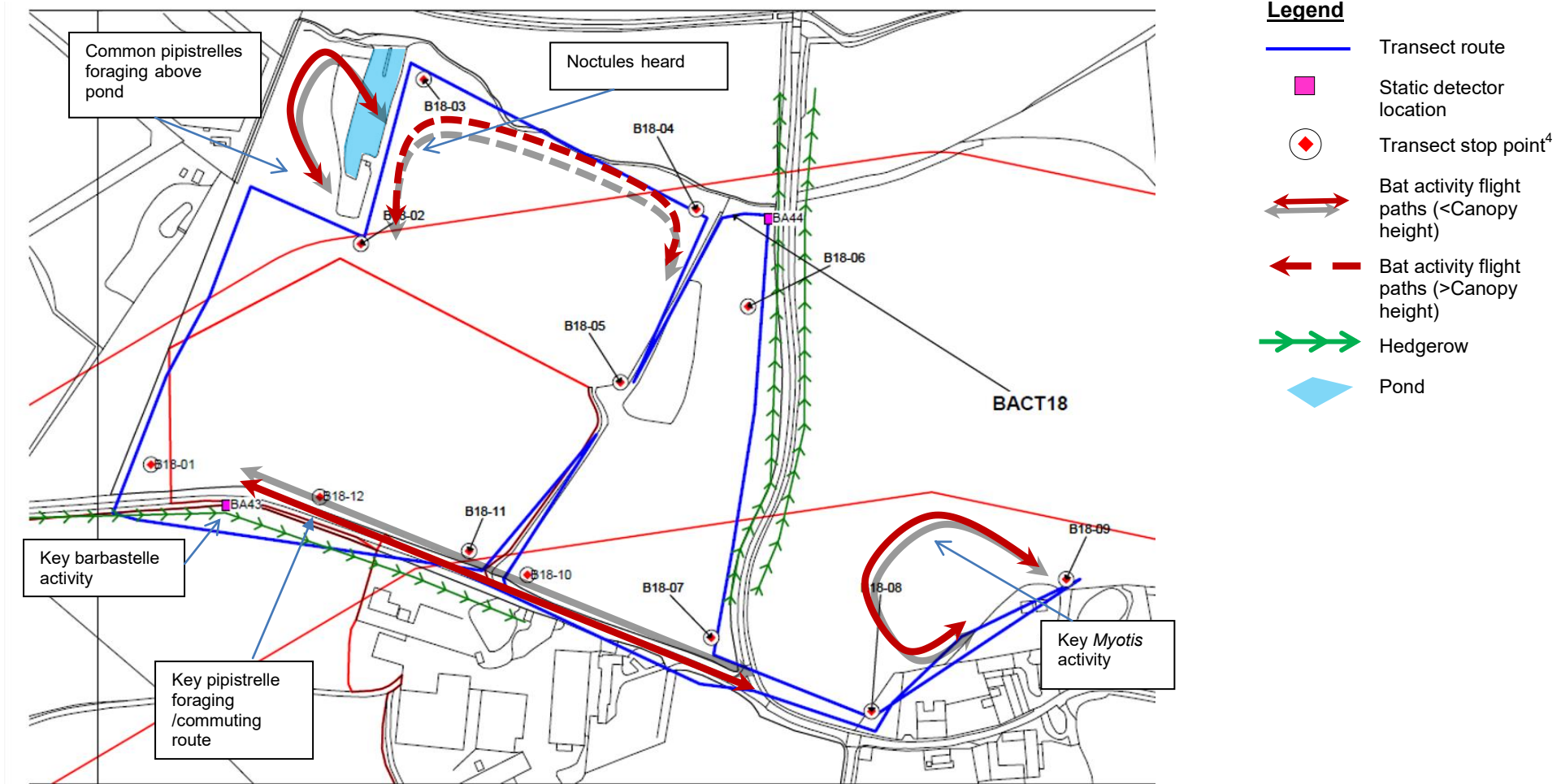
Table 8: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
22/05/2017	0	0	3	0	9	0	58	0	2	0	1	73	434
23/05/2017	0	0	0	0	6	0	273	10	5	0	3	297	712
24/05/2017	0	0	6	0	9	0	163	19	3	0	2	202	585
25/05/2017	0	0	1	0	8	0	135	3	2	0	5	154	665
26/05/2017	0	0	2	0	9	0	151	3	0	0	2	167	1208
27/05/2017	0	0	0	0	7	0	163	12	0	0	2	184	1302
28/05/2017	0	0	2	0	8	0	439	3	0	0	0	452	591
29/05/2017	0	0	2	0	5	0	91	3	5	0	1	107	1243
30/05/2017	0	0	2	0	6	0	137	14	2	0	3	164	444
01/06/2017	0	0	3	0	0	0	15	1	0	0	2	21	2669
02/06/2017	0	0	7	0	13	0	82	3	1	0	5	111	1314
03/06/2017	0	0	1	0	0	0	103	5	1	0	6	116	1034
04/06/2017	0	0	5	0	3	2	66	0	0	0	2	78	975
05/06/2017	0	0	4	0	2	0	130	3	2	0	3	144	1133
06/06/2017	0	0	0	0	0	0	469	2	0	0	1	472	643
12/07/2017	0	0	0	0	8	0	8	0	1	0	4	21	139
13/07/2017	0	0	1	0	12	0	17	0	1	0	4	35	501
14/07/2017	0	0	5	0	29	0	42	2	0	0	4	82	1509
15/07/2017	0	0	6	0	8	0	50	6	0	0	6	76	1017
16/07/2017	0	0	11	0	52	1	34	4	0	0	17	119	1588
17/07/2017	0	1	0	0	5	0	24	0	0	0	4	34	207
16/08/2017	0	0	0	1	9	0	97	13	16	1	16	153	14457
17/08/2017	0	1	5	0	21	0	239	37	22	4	68	397	35834

Date\Species	BARBAR	EPTSER	LARGEBATSPP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
18/08/2017	0	0	1	0	7	0	315	29	39	4	26	421	42406
19/08/2017	1	0	0	0	3	0	86	17	13	1	22	143	31859
20/08/2017	1	1	9	0	18	0	156	42	19	2	140	388	21200
21/08/2017	0	0	2	3	0	0	40	3	5	0	7	60	1479
21/09/2017	1	0	20	0	54	0	1194	90	35	1	36	1431	3841
22/09/2017	0	0	3	0	11	0	183	19	23	0	21	260	2009
23/09/2017	0	0	7	3	25	0	424	56	28	2	31	576	5620
24/09/2017	0	0	2	2	6	2	162	19	20	3	24	240	5552
25/09/2017	0	0	1	0	12	0	134	9	13	0	8	177	3490
26/09/2017	0	0	0	0	2	0	64	6	5	0	2	79	520
23/10/2017	0	0	1	0	0	0	83	10	1	0	1	96	1127
24/10/2017	1	0	1	0	1	0	41	11	0	0	1	56	1724
25/10/2017	0	0	0	0	1	1	73	7	5	0	5	92	4167
26/10/2017	0	0	0	0	3	0	16	2	0	0	2	23	2404
27/10/2017	0	0	2	0	0	0	2	0	0	0	1	5	1405
28/10/2017	0	0	0	0	0	0	1	0	0	0	0	1	1853
29/10/2017	0	0	0	0	0	0	0	0	0	0	0	0	19
30/10/2017	0	0	0	0	0	0	0	0	0	0	0	0	53
Grand total	4	3	115	9	372	6	5960	463	269	18	488	7707	200932

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B18_01) is reference to transect number and the transect stop number.



Transect Summary: BACT19, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT19
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	12/12/2017	ALL	ALL	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	ALL	ALL	Final report	Chris Smith

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1. Transect summary: BACT19, Walcott Green

- 1.1. Grid reference: TG369304.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA55 and BA56.

2. Description of transect

Land use at transect

- 2.1. Within and around the transect the land use is arable agriculture.
- 2.2. There are minimal hedgerows within and around the transect, although it is most established along the western boundary. There are some areas of wide field margins left as rough grassland along the eastern side of the route.
- 2.3. A small pond is situated in the north-west corner of the transect.
- 2.4. The western boundary of the transect runs parallel to a road.

Key commuting and foraging features

- 2.5. The track and hedgerow to the west of the transect is a key foraging area for bats.
- 2.6. The western edge was used by barbastelles being recorded on multiple static deployments at BA53.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked seven times from June to October. The static at BA55 was deployed five times for a total of 26 nights and that at BA56 five times for a total of 34 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA55	Visit 1 - 02.06.2017	09/06/2017	11/06/2017	3
	Visit 2 - 25.06.2017	25/06/2017	28/06/2017	4
	Visit 3 - 05.07.2017	05/07/2017	11/07/2017	7
	Visit 4 - 07.09.2017	07/09/2017	12/09/2017	6
	Visit 5 - 18.10.2017	18/10/2017	23/10/2017	6
BA56	Visit 1 - 02.06.2017	09/06/2017	14/06/2017	6
	Visit 2 - 25.06.2017	25/06/2017	29/06/2017	5
	Visit 3 - 05.07.2017	05/07/2017	11/07/2017	7
	Visit 4 - 21.08.2017	21/08/2017	30/08/2017	10
	Visit 5 - 18.10.2017	18/10/2017	23/10/2017	6

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, JH	09.06.17	21:15:00	22:50:00
2	Dusk	GH, JH	25.06.17	21:20:00	22:55:00
3	Dusk	GH, BM	05.07.17	21:19:00	23:01:00
4	Dusk	GH, MP	16.08.17	20:20:00	21:34:00
5	Dusk	GH, BM	06.09.17	19:31:00	20:51:00
6	Dawn	JWH, CB	07.09.17	04:15:00	05:40:00
7	Dusk	GH, MP	18.10.17	18:20:00	20:05:00

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	✓*	Occasional records from statics (BA55)	June, July and August only	N/A
Serotine	EPTSER	X	✓*	Occasional records on statics (BA55)	June and July only	N/A
Large bat spp	LARGEATSPP	✓	✓	Throughout the survey period, mostly recorded on statics	Throughout survey period	N/A
Myotis spp	MYOSPP	X	✓*	Aggregation of species; Occasional records from statics	June and August only	N/A
Noctule	NYCNOC	✓	✓	Noted on October transect survey and many passes recorded on statics	Throughout survey period	N/A
Nathusius' pipistrelle	NATPIP	X	✓	Occasional but regular records from statics only	Throughout survey period	N/A
Common pipistrelle	PIPPIP	✓	✓	Most common bat recorded and seen foraging throughout the transect, mostly along western boundary of transect	Generally recorded 30 minutes following sunset	Frequent social calls
Soprano pipistrelle	PIPPYG	✓	✓	Recorded throughout western part of the transect but in much reduced numbers than PIPPIP	Generally recorded 30 minutes following sunset	Frequent social calls
Pipistrelle spp.	PIPSPP	✓	✓	Occasional but regular records	Throughout survey period	N/A
Brown long-eared	PLEAUR	X	X	Possible records not confirmed	N/A	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	LARGEATSPP	EPTSER	MYOSPP	NYCNOG	PIPIIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	09.06.17	21:15	22:50	15°C	14°C	BS0	4/8	None	0	0	0	0	10	3	5	0	18
2	Dusk	25.06.17	21:20	22:55	16.5°C	16°C	BS1	7/8	None	0	0	0	0	8	0	0	0	8
3	Dusk	05.07.17	21:19	23:01	17°C	15°C	BS0	0/8	Misty	0	0	0	0	4	3	0	0	7
4	Dusk	16.08.17	20:20	21:34	18°C	18°C	BS3	0/8	None	0	0	0	0	10	0	0	0	10
5	Dusk	06.09.17	19:31	20:51	16°C	15°C	BS3	7/8	None	0	0	0	0	3	3	0	0	6
6	Dawn	07.09.17	04:15	05:40	14°C	11°C	BS1	6/8	None	0	0	0	0	1	4	2	0	7
7	Dusk	18.10.17	18:20	20:05	14°C	14°C	BS4	8/8	Drizzle (start and end)	0	0	0	1	3	2	0	0	6

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPSTER	LARGEATSPP	NYCNOG	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	09.06.17	1	0	1	0	65	3	5	4	79	345
2	Dusk	25.06.17	0	0	1	1	73	2	2	2	81	410
3	Dusk	05.07.17	0	0	1	2	11	3	0	1	18	1093
4	Dusk	16.08.17	0	1	2	5	37	3	2	3	53	569
5	Dusk	06.09.17	0	0	0	2	6	1	0	3	12	735
6	Dawn	07.09.17	0	0	0	0	0	0	0	0	0	733
7	Dusk	18.10.17	0	0	0	1	40	1	0	20	62	800

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA55.

Deployment\Species	BARBAR	EPTSER	LARGEBA TSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 09.06.2017	0	1	1	3	60	2266	39	135	36	2541	2434
Visit 2 - 25.06.2017	0	0	4	30	0	104	5	3	1	147	2116
Visit 3 - 05.07.2017	6	1	25	58	7	1864	129	93	40	2223	2394
Visit 4 - 07.09.2017	1	0	2	9	0	10	1	1	7	31	78780
Visit 5 - 18.10.2017	2	0	3	11	3	1063	79	3	31	1195	3765
Grand Total	9	2	35	111	70	5307	253	235	115	6137	89489

Table 7: Static data from BA point BA56.

Deployment\Species	LARGEBA SPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 09.06.2017	1	1	0	3	460	10	27	3	505	1878
Visit 2 - 25.06.2017	0	0	0	0	53	0	1	1	55	445
Visit 3 - 05.07.2017	4	0	34	1	474	16	18	13	560	598
Visit 4 - 21.08.2017	7	4	7	0	426	22	6	10	482	151744
Visit 5 - 18.10.2017	1	0	4	0	7	11	1	2	26	24500
Grand Total	13	5	45	4	1420	59	53	29	1628	179165

4.4. Bat activity by date

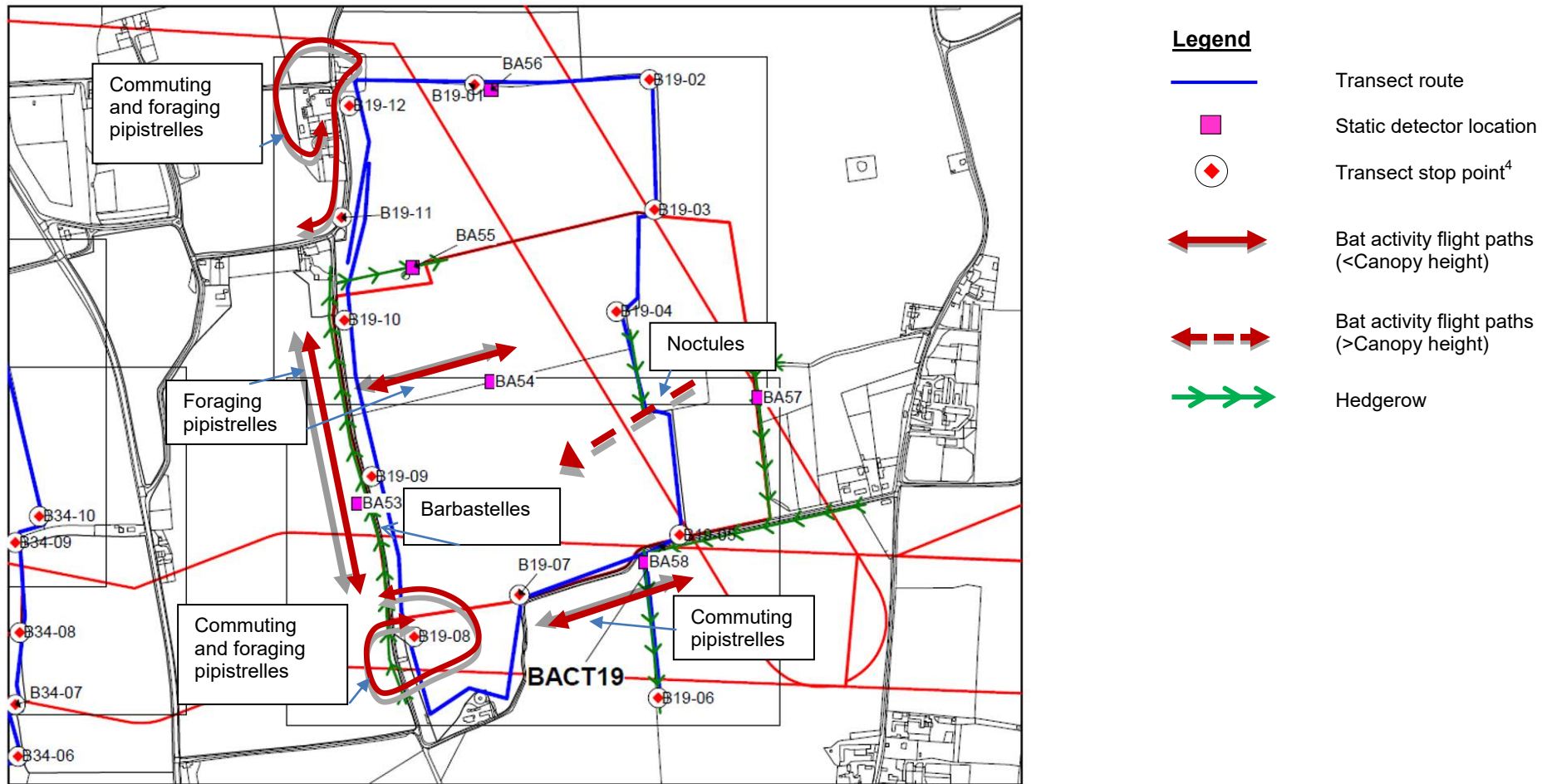
Table 8: Number of registrations recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LARGE BAT SPP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
09/06/2017	0	1	1	1	0	15	409	11	21	15	474	827
10/06/2017	0	0	1	0	3	12	1094	15	48	15	1188	1246
11/06/2017	0	0	0	0	0	35	955	15	71	8	1084	1460
12/06/2017	0	0	0	0	0	1	63	6	11	0	81	679
13/06/2017	0	0	0	0	0	0	88	1	9	1	99	71
14/06/2017	0	0	0	0	0	0	117	1	2	0	120	29
25/06/2017	0	0	0	0	1	0	22	0	1	0	24	104
26/06/2017	0	0	3	0	23	0	127	5	2	2	162	168
27/06/2017	0	0	0	0	3	0	8	0	1	0	12	675
28/06/2017	0	0	1	0	3	0	0	0	0	0	4	1610
29/06/2017	0	0	0	0	0	0	0	0	0	0	0	4
05/07/2017	0	0	1	0	0	0	82	0	0	0	83	89
06/07/2017	1	0	8	0	12	0	183	51	8	15	278	463
07/07/2017	0	0	10	0	22	1	243	41	21	12	350	444
08/07/2017	1	0	1	0	16	4	451	17	39	4	533	460
09/07/2017	3	0	2	0	6	1	384	16	12	11	435	521
10/07/2017	1	1	5	0	35	2	921	16	29	10	1020	934
11/07/2017	0	0	2	0	1	0	74	4	2	1	84	81
21/08/2017	0	0	2	1	0	0	65	2	1	2	73	12790
22/08/2017	0	0	0	0	0	0	14	2	0	0	16	10284
23/08/2017	0	0	0	0	3	0	59	7	1	2	72	9481
24/08/2017	0	0	1	0	0	0	90	4	2	1	98	15969
25/08/2017	0	0	2	1	0	0	39	1	1	1	45	17385
26/08/2017	0	0	1	2	3	0	52	1	0	0	59	27339
27/08/2017	0	0	1	0	1	0	32	1	0	1	36	22270

Date\Species	BARBAR	EPTSER	LARGEBAT SPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
28/08/2017	0	0	0	0	0	0	38	3	0	3	44	20328
29/08/2017	0	0	0	0	0	0	24	1	1	0	26	13122
30/08/2017	0	0	0	0	0	0	13	0	0	0	13	2776
07/09/2017	0	0	0	0	0	0	0	0	0	0	0	11612
08/09/2017	0	0	0	0	0	0	3	0	1	2	6	17112
09/09/2017	0	0	0	0	1	0	1	0	0	0	2	11411
10/09/2017	0	0	2	0	7	0	0	0	0	2	11	12735
11/09/2017	0	0	0	0	1	0	6	1	0	3	11	16499
12/09/2017	1	0	0	0	0	0	0	0	0	0	1	9411
18/10/2017	1	0	0	0	1	1	23	9	3	1	39	10819
19/10/2017	1	0	0	0	0	0	92	1	0	4	98	11791
20/10/2017	0	0	1	0	2	0	626	43	1	9	682	1859
21/10/2017	0	0	0	0	0	0	247	0	0	16	263	1950
22/10/2017	0	0	2	0	1	2	74	12	0	3	94	1631
23/10/2017	0	0	1	0	11	0	8	25	0	0	45	215
Grand Total	9	2	48	5	156	74	6727	312	288	144	276419	268654

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B19_01) is reference to transect number and the transect stop number.



Transect Summary: BACT20, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT20
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	02/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT20, Necton

- 1.1. Grid reference: TF904104.
- 1.2. Transect designation: High quality.
- 1.3. Static detectors: BA02, BA03 & BA04.

2. Description of transect

Land use at transect

- 2.1. Habitat within the transect was dominated by arable fields bordered by established native species rich hedgerows.
- 2.2. There were small areas of lowland deciduous woodland at Stop 12 and near Stop 6 and a larger area of deciduous woodland along the eastern edge of the transect.
- 2.3. Small ponds are situated adjacent to static detector locations BA02 and BA04.

Key commuting and foraging features

- 2.4. Features for commuting and foraging bats were largely restricted to arable hedgerows with field margins. There were two small areas of woodland suitable for foraging bats.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked seven times from May to August. The static at BA02 was deployed six times for a total of 60 nights, BA03 was deployed five times for a total of 62 nights and that BA04 was deployed four times for a total of 51 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA02	Visit 1 - 09.05.2017	09/05/2017	25/05/2017	16
	Visit 2 - 30.05.2017	30/05/2017	05/06/2017	6
	Visit 3 - 26.06.2017	26/06/2017	05/07/2017	9
	Visit 4 - 12.07.2017	12/07/2017	17/07/2017	5
	Visit 5 - 31.07.2017	31/07/2017	17/08/2017	17
	Visit 6 - 21.08.2017	21/08/2017	28/08/2017	7
BA03	Visit 1 - 09.05.2017	09/05/2017	25/05/2017	16
	Visit 2 - 26.06.2017	26/06/2017	05/07/2017	9
	Visit 3 - 04.07.2017	04/07/2017	17/07/2017	13
	Visit 4 - 31.07.2017	31/07/2017	17/08/2017	17
	Visit 5 - 21.08.2017	21/08/2017	28/08/2017	7
BA04	Visit 1 - 09.05.2017	09/05/2017	25/05/2017	16
	Visit 2 - 26.06.2017	26/06/2017	10/07/2017	14
	Visit 3 - 12.07.2017	13/07/2017	17/07/2017	4
	Visit 4 - 31.07.2017	31/07/2017	17/08/2017	17

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	JG, BC	15.05.17	20:46	23:29
2	Dusk	JA, JH	30.05.17	21:15	23:20
3	Dusk	JG, BM	26.06.17	21:25	23:45
4	Dusk	BC, LT	12.07.17	21:14	23:00
5	Dawn	BC, LT	13.07.17	02:56	03:52
6	Dusk	JG, BM	31.07.17	20:30	23:30
7	Dusk	JG, LT	21.08.17	20:08	22:15

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017)

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✓*	Active on the transect, recorded on static detectors BA03 and BA04.	Recorded late evening and early morning only.	N/A
Serotine	EPTSER	✗	✓*	Active on the transect, recorded on all static detectors.	Recorded late evening and early morning only.	N/A
Large bat spp.	LARGEBATSP	✓*	✓	Recorded across all static detectors.	Recorded throughout the night.	N/A
Myotis sp.	MYOSPP	✓*	✓	Rarely recorded on transect visits however present across the transect, recorded on all static detectors.	Recorded throughout the night.	N/A
Noctule	NYCNOC	✓	✓	Recorded across the transect.	Recorded throughout the night.	N/A
Nathusius' pipistrelle	PIP NAT	✓*	✓	Rarely recorded on transect visits however present across the transect, recorded on all static detectors.	Recorded throughout the night.	N/A
Common pipistrelle	PIPIPI	✓	✓	Foraging was quite spread out along the transect, with peak passes around Stop 5 and Stop 6, Stop 9 and between stopes 10 and 11 and 11 and 12.	Bats were heard from the start of the survey onwards.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Foraging was spread out along the transect, although most passes were between Stops 8 and 11.	Bats were heard from 15 minutes onwards.	N/A
Pipistrelle sp.	PIPSPP	✓*	✓	Recorded throughout the transect.	Recorded throughout the night.	N/A
Brown long-eared	PLEAUR	✗	✓*	Occasional records recorded at BA03.	Recorded throughout the night.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOC	PIPIPI	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	15.05.17	20:46	23:29	15°C	12°C	BS4	8/8	Drizzle at start	0	0	0	0	14	15	0	0	29
2	Dusk	30.05.17	21:15	23:20	19°C	15°C	BS2	8/8	None	0	0	0	0	2	0	8	0	10
3	Dusk	26.06.17	21:25	23:45	14.5°C	12.6°C	BS3	8/8	None	0	0	0	0	16	3	0	1	20
4	Dusk	12.07.17	21:14	23:00	15°C	12°C	BS0	1/8	None	0	0	0	0	19	23	21	0	63
4	Dawn	13.07.17	02:56	03:52	10°C	8.7°C	BS0	1/8	None	0	0	0	0	0	0	0	0	0
5	Dusk	31.07.17	20:30	23:30	17°C	16°C	BS1	8/8	Drizzle at start	0	0	0	0	51	9	0	0	60
6	Dusk	21.08.17	20:08	22:15	17°C	16°C	BS1	8/8	None	0	0	0	0	14	18	0	0	32

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	15.05.17	0	3	0	4	0	7	13	0	4	31	1457
2	Dusk	31.05.17	0	0	1	1	0	8	1	0	0	11	2615
3*	Dusk	26.06.17											
4	Dusk	12.07.17	0	2	0	1	0	5	28	2	1	39	425
4	Dawn	13.07.17	0	0	0	0	0	0	0	0	1	1	117
5	Dusk	31.07.17	7	11	0	5	2	36	1	1	33	96	1994
6	Dusk	21.08.17	0	2	0	16	1	22	15	0	12	68	1192

*Acoustic data failed during recording.

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA02.

Deployment\Species	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 09.05.2017	1	8	1	130	54	289	87	45	16	631	4813
Visit 2 - 30.05.2017	0	108	0	265	2	129	3	11	13	531	3606
Visit 3 - 12.07.2017	0	22	0	295	11	32	0	2	13	375	974
Visit 4 - 31.07.2017	2	30	0	76	86	2331	1161	71	126	3883	71757
Visit 5 - 21.08.2017	0	7	0	26	1	97	0	5	34	170	4303
Grand Total	3	175	1	792	154	2878	1251	134	202	5590	85453

Table 7: Static data from BA point BA03.

Deployment\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 09.05.2017	2	0	18	8	117	1	1552	518	13	0	31	2260	5252
Visit 2 - 26.06.2017	0	1	3	3	52	0	608	186	15	1	9	878	6481
Visit 3 - 04.07.2017	0	0	7	0	43	12	171	263	145	0	13	654	2571
Visit 4 - 31.07.2017	1	4	7	37	26	50	5295	700	127	9	100	6356	12560
Visit 5 - 21.08.2017	1	4	6	10	9	5	7861	1470	360	6	136	9868	8194
Grand Total	4	9	41	58	247	68	15487	3137	660	16	289	20016	35058

Table 8: Static data from BA point BA04.

Deployment\Species	BARBAR	EPTSER	LARGE B ATSP	MYOSPP	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 09.05.2017	4	0	13	0	8	1	185	235	41	8	495	5747
Visit 2 - 26.06.2017	0	0	7	0	44	3	1456	1401	971	29	3911	3311
Visit 3 - 12.07.2017	0	0	5	3	15	0	393	102	5	14	537	983
Visit 4 - 31.07.2017	1	1	3	14	5	3	688	2297	921	47	3980	233683
Grand Total	5	1	28	17	72	7	2722	4035	1938	98	8923	243724

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LARGE B AT SPP	MYOSPP	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
09/05/2017	0	0	0	0	4	0	4	0	0	0	2	10	24
10/05/2017	0	0	5	0	9	0	42	18	0	0	2	76	153
11/05/2017	2	0	4	1	61	10	212	94	16	0	5	405	356
12/05/2017	4	0	4	0	13	8	245	106	20	0	10	410	779
13/05/2017	0	0	6	1	28	5	105	45	0	0	6	196	1253
14/05/2017	0	1	2	1	11	8	85	16	9	0	1	134	1116
15/05/2017	0	0	1	0	5	1	22	1	0	0	2	32	709
16/05/2017	0	0	0	1	18	3	119	14	5	0	6	166	1485
17/05/2017	0	0	1	0	2	0	133	23	1	0	3	163	3626
18/05/2017	0	0	3	0	8	0	18	11	1	0	0	41	2419
19/05/2017	0	0	0	0	0	0	32	7	1	0	0	40	1005
20/05/2017	0	0	1	0	9	0	33	4	0	0	0	47	638
21/05/2017	0	0	3	1	10	0	166	132	2	0	4	318	517
22/05/2017	0	0	2	3	4	7	294	132	5	0	8	455	593
23/05/2017	0	0	2	1	14	4	148	35	6	0	1	211	338

Date\Species	BARBAR	EPTSER	LARGBAT SPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
24/05/2017	0	0	5	0	48	9	246	173	33	0	3	517	628
25/05/2017	0	0	0	0	11	1	122	29	0	0	2	165	173
30/05/2017	0	0	2	0	1	2	35	3	3	0	0	46	692
31/05/2017	0	0	0	0	0	0	16	0	0	0	0	16	526
01/06/2017	0	0	5	0	8	0	7	0	0	0	0	20	215
02/06/2017	0	0	21	0	51	0	34	0	5	0	5	116	918
03/06/2017	0	0	64	0	144	0	22	0	3	0	2	235	665
04/06/2017	0	0	16	0	53	0	15	0	0	0	3	87	407
05/06/2017	0	0	0	0	8	0	0	0	0	0	3	11	183
26/06/2017	0	0	0	2	1	0	294	37	4	0	2	340	2553
27/06/2017	0	0	0	1	41	0	67	185	43	0	4	341	661
28/06/2017	0	0	0	0	3	0	0	0	0	0	0	3	833
29/06/2017	0	0	0	0	3	1	6	21	1	0	0	32	162
30/06/2017	0	1	0	0	0	0	472	182	68	0	6	729	2154
01/07/2017	0	0	0	0	2	0	271	359	124	1	2	759	1172
02/07/2017	0	0	0	0	6	0	31	41	7	0	2	87	528
03/07/2017	0	0	1	0	3	0	157	134	57	0	3	355	215
04/07/2017	0	0	3	0	8	1	169	129	64	0	5	379	1530
05/07/2017	0	0	3	0	8	0	262	135	134	0	9	551	249
06/07/2017	0	0	1	0	3	0	118	145	153	0	1	421	149
07/07/2017	0	0	1	0	9	1	145	149	228	0	4	537	515
08/07/2017	0	0	1	0	4	0	76	64	101	0	1	247	159
09/07/2017	0	0	0	0	1	0	5	8	1	0	0	15	130
10/07/2017	0	0	0	0	4	0	0	1	1	0	0	6	17
12/07/2017	0	0	2	0	0	3	2	47	8	0	2	64	274
13/07/2017	0	0	10	1	66	0	156	35	7	0	10	285	390

Date\Species	BARBAR	EPTSER	LARGBAT SPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
14/07/2017	0	0	8	1	75	1	78	53	30	0	7	253	477
15/07/2017	0	0	4	0	115	0	125	46	18	0	6	314	681
16/07/2017	0	0	3	1	46	15	206	120	86	0	12	489	1193
17/07/2017	0	0	7	0	51	4	20	61	3	0	2	148	278
31/07/2017	0	0	0	0	0	4	321	10	2	0	2	339	5384
01/08/2017	1	3	3	1	13	4	501	50	5	0	4	585	23431
02/08/2017	0	0	3	6	4	11	293	101	14	1	6	439	9748
03/08/2017	0	0	0	0	0	0	58	14	0	0	2	74	10907
04/08/2017	0	0	4	4	0	2	485	108	19	1	16	639	21615
05/08/2017	0	0	2	3	5	0	211	95	46	1	6	369	24882
06/08/2017	0	0	3	9	24	1	379	153	11	1	13	594	28829
07/08/2017	0	0	1	2	5	0	527	334	13	0	27	909	11981
08/08/2017	1	0	2	1	1	2	462	180	41	3	6	699	15706
09/08/2017	0	0	1	0	0	0	71	1117	405	0	11	1605	12331
10/08/2017	0	0	1	4	0	2	240	897	367	0	9	1520	15132
11/08/2017	0	0	0	2	6	48	279	93	17	0	5	450	23551
12/08/2017	0	0	4	3	7	10	965	406	53	1	55	1504	27538
13/08/2017	0	0	2	1	2	7	1051	131	28	0	46	1268	26801
14/08/2017	0	3	2	5	5	24	1396	135	44	0	32	1646	21672
15/08/2017	0	1	1	6	1	14	502	250	25	0	11	811	24077
16/08/2017	0	0	11	4	33	6	447	69	20	1	19	610	11855
17/08/2017	0	0	0	0	1	4	126	15	9	0	3	158	2560
21/08/2017	0	0	1	2	0	0	502	25	3	0	7	540	471
22/08/2017	1	1	6	2	20	3	1661	762	164	1	60	2681	1717
23/08/2017	0	2	0	0	3	2	1375	311	97	0	37	1827	785
24/08/2017	0	1	1	1	2	0	191	13	3	0	5	217	838

Date\Species	BARBAR	EPTSER	LARGBAT SPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
25/08/2017	0	0	0	2	2	0	554	41	11	2	8	620	4407
26/08/2017	0	0	0	2	3	0	1599	208	41	2	29	1884	2728
27/08/2017	0	0	3	1	2	0	989	48	23	1	16	1083	872
28/08/2017	0	0	2	0	3	1	1087	62	23	0	8	1186	679
Grand Total	9	13	244	76	1111	229	21087	8423	2732	16	589	34529	364235

4.5. Map showing key bat activity

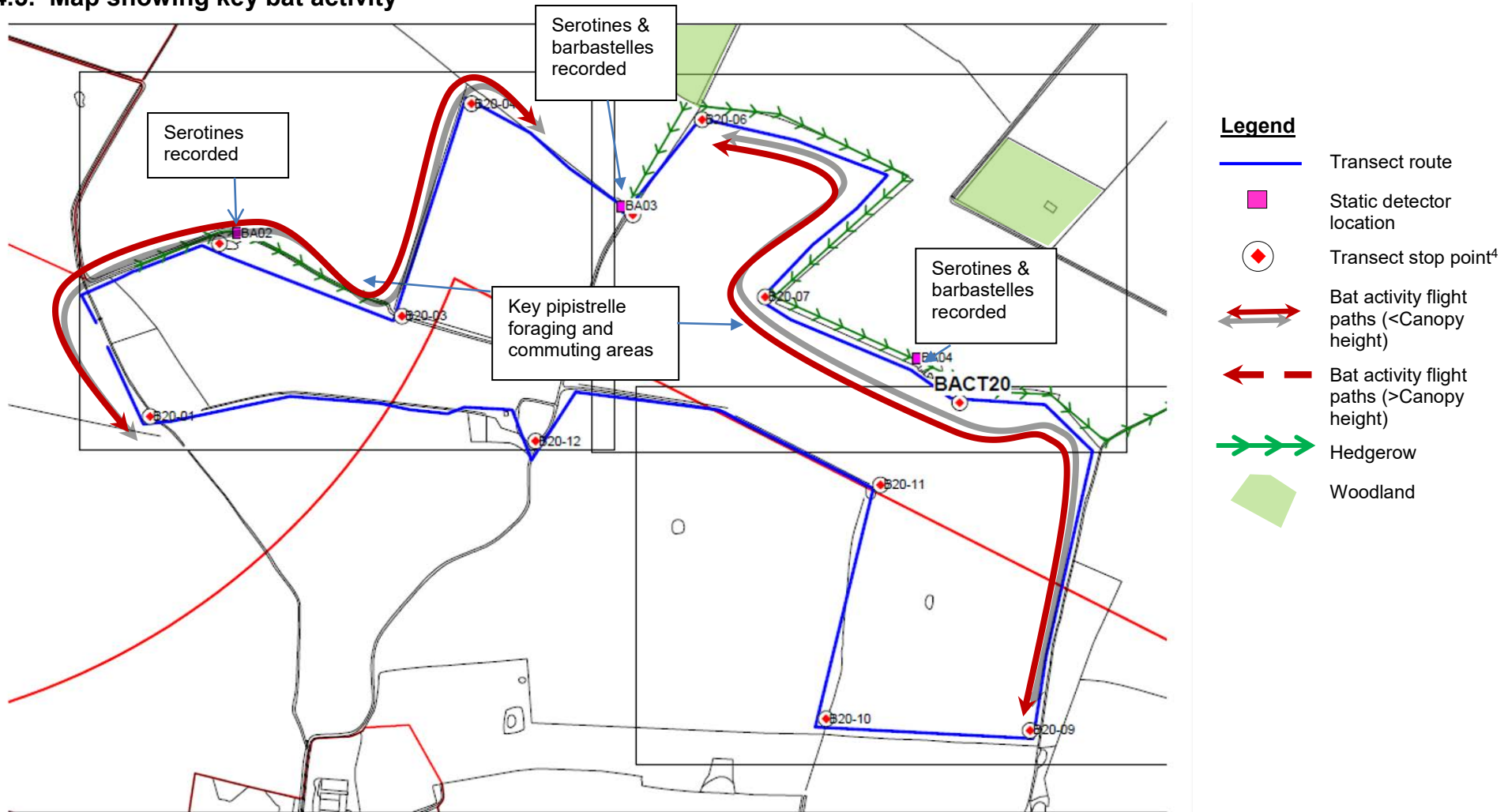


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.

⁴ Associated code (e.g. B20_01) is reference to transect number and the transect stop number.



Transect Summary: BACT21, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT21
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	20/12/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT21, North Walsham

- 1.1. Grid reference: TG295316.
- 1.2. Transect designation: High quality.
- 1.3. Static detectors: BA62X, BA76X & BA106X.

2. Description of transect

Land use at transect

- 2.1. To the north of BACT21 the adjacent land is made up of deciduous woodland and rough grassland.
- 2.2. The Paston way (disused railway line) runs from west to east to the north of the transect and intercepts many of the transect route's linear features.
- 2.3. Along the western edge the transect runs parallel to the disused North Walsham and Dilham canal, the land is primarily wet grassland with patches of fen.
- 2.4. Towards the south the transect surrounds an arable field and is bordered by established hedgerows along Hall Lane and patches of deciduous woodland.
- 2.5. An Anglian Water water treatment plant is located adjacent to the north-east corner of the transect along Hall lane.

Key commuting and foraging features

- 2.6. Noctules were often seen commuting from the south-west of the transect.
- 2.7. Common and soprano pipistrelles were frequently seen foraging above Hall Lane.
- 2.8. Species of *Myotis* bats were recorded foraging along the North Walsham and Dilham Canal.
- 2.9. Common and soprano pipistrelles were frequently seen and recorded foraging along the northern most edge of the arable field bordering woodland.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked twelve times from May to October. The static at BA62X was deployed eight times for a total of 60 nights, BA76X was deployed three times for a total of 21 nights and that BA106X was deployed five times for a total of 35 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA62X	Visit 1 - 22/05/2017	22/05/2017	30/05/2017	9
	Visit 2 - 31/05/2017	31/05/2017	06/06/2017	7
	Visit 3 - 19/06/2017	19/06/2017	26/06/2017	7
	Visit 4 - 29/06/2017	29/05/2017	05/06/2017	7
	Visit 5 - 31/07/2017	31/07/2017	07/08/2017	8
	Visit 6 - 30/08/2017	30/08/2017	04/09/2017	6
	Visit 7 - 04/09/2017	04/09/2017	13/09/2017	10
	Visit 8 - 03/10/2017	03/10/2017	08/10/2017	6
BA76X	Visit 1 - 19/06/2017	19/06/2017	26/06/2017	8
	Visit 2 - 07/08/2017	07/08/2017	13/08/2017	6
	Visit 3 - 17/10/2017	17/10/2017	23/10/2017	7
BA106X	Visit 1 - 19/06/2017	19/06/2017	26/06/2017	8
	Visit 2 - 31/07/2017	31/07/2017	07/08/2017	8
	Visit 3 - 07/08/2017	07/08/2017	14/08/2017	8
	Visit 4 - 04/09/2017	04/09/2017	13/09/2017	10
	Visit 5 - 17/10/2017	17/10/2017	17/10/2017	1

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	JG, JH	22.05.17	20:50	23:09
2	Dusk	BM, JH	31.05.17	21:07	23:00
3	Dusk	RM, JH	19.06.17	22:44	23:27
4	Dusk	AG, JH	29.06.17	21:21	23:11
5	Dawn	JWH, JH	31.07.17	20:50	22:35
6	Dusk	JG, JH	07.08.17	20:47	23:00
7	Dusk	JWH, AV	30.08.17	19:50	20:47
8	Dusk	JG, BM	04.09.17	19:36	22:00
9	Dusk	JG, JH	18.09.17	19:06	21:05
10	Dawn	JG, JWH	19.09.17	04:49	06:35
11	Dusk	BM, CB	03.10.17	18:21	20:24
12	Dusk	BM, CB	17.10.17	17:54	19:53

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017)

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✓*	Occasional pass recorded by surveyor adjacent to the east.	June to August on transects.	N/A
Serotine	EPTSER	✗	✗	None recorded	N/A	N/A
Large bat spp.	LARGEBATSP	✓	✓	Occasional pass	N/A	N/A
Myotis spp	MYOSPP	✓	✓	Recorded foraging and commuting over the N. Walsham and Dilham Canal	Recorded in the late evening.	N/A
Noctule	NYCNOC	✓	✓	Frequent passes across the transect, often sighted commuting from the SW over the transect area	Recorded throughout survey season	N/A
Nathusius' pipistrelle	PIP NAT	✓	✓	Occasional pass	Recorded early in the season in May/June and again towards the end of the season in September/October.	N/A
Common pipistrelle	PIPIPI	✓	✓	Frequent passes; consistently present	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequent passes; consistently present	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Brown long-eared	PLEAUR	✗	✗	None recorded	N/A	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOG	PIPPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	22.05.17	20:50	23:09	16°C	15°C	BS2	2/8	None	2	0	0	0	0	0	0	0	2
2	Dusk	31.05.17	21:07	23:00	13°C	12°C	BS0	0/8	None	1	0	0	5	48	15	0	2	71
3	Dusk	19.06.17	22:44	23:27	27°C	20°C	BS2	5/8	None	1	0	0	1	10	10	14	1	37
4	Dusk	29.06.17	21:21	23:11	17°C	13°C	BS1	7/8	None	0	0	1	2	16	3	7	1	30
5	Dawn	31.07.17	20:50	22:35	19°C	17°C	BS0	6/8	Light rain at end	0	0	0	1	55	8	5	0	69
6	Dusk	07.08.17	20:47	23:00	15°C	16°C	BS1	8/8	None	8	0	0	2	14	18	0	3	45
7	Dusk	30.08.17	19:50	20:47	18°C	12°C	BS0	8/8	Drizzle	2	0	0	3	21	29	0	1	56
8	Dusk	04.09.17	19:36	22:00	17°C	15°C	BS0	0/8	None	0	0	2	1	12	12	0	0	27
9	Dusk	18.09.17	19:06	21:05	13°C	11°C	BS3	6/8	None	0	0	2	3	20	10	0	1	36
9	Dawn	19.09.17	04:49	06:35	10°C	11°C	BS3	8/8	At Start. Called off until 05.19	0	0	0	8	19	11	5	0	43
10	Dusk	03.10.17	18:21	20:24	12°C	12°C	BS0	8/8	None	0	0	0	0	3	5	0	0	8
11	Dusk	17.07.17	17:54	19:00	14°C	13°C	BS1	8/8	Light rain, 18:17 for 10 minutes	0	0	0	3	6	2	8	0	19

² All bats not identified to species level.

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	22.05.17	0	1	0	3	0	40	4	1	2	51	325
2	Dusk	31.05.17	0	0	0	3	2	56	30	4	2	97	928
3	Dusk	19.06.17	0	2	0	5	0		1	0	5	13	672
4	Dusk	29.06.17	0	0	0	1	0	28	12	0	0	41	86
5*	Dawn	31.07.17											
6	Dusk	07.08.17	0	1	0	0	0	24	31	1	1	58	920
7*	Dusk	30.08.17											
8	Dusk	04.09.17	0	0	0	3	1	27	46	7	3	87	223
9	Dusk	18.09.17	0	2	1	5		16	89	0	16	129	1307
9	Dawn	19.09.17	0	2	2	5	2	5	6	0	9	31	1046
10	Dusk	03.10.17	2	1	0	2	1	7	20	2	5	40	1557
11	Dusk	17.10.17	0	1	0	4	0	19	4	0	2	30	1171

*Equipment had not successfully recorded on these occasions

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA62X.

Deployment\Species	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 22/05/2017	48	0	85	7	491	235	11	49	926	1709
Visit 2 - 31/05/2017	20	0	45	0	1	2	0	3	71	897
Visit 3 - 19/06/2017	17	0	72	0	1	0	1	4	95	682
Visit 4 - 29/06/2017	5	0	48	0	0	23	0	2	78	965
Visit 5 - 31/07/2017	10	0	95	0	0	0	0	10	115	6273
Visit 6 - 30/08/2017	5	0	12	0	20	63	0	7	107	4045
Visit 7 - 04/09/2017	2	0	3	0	0	0	0	2	7	2775
Visit 8 - 03/10/2017	0	0	2	1	5	0	0	1	9	4573
Grand Total	107	0	362	8	518	323	12	78	1408	21919

Table 7: Static data from BA point BA76X.

Deployment\Species	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 19/06/2017	26	0	116	8	209	24	5	46	434	1643
Visit 2 - 07/08/2017	4	0	14	0	11	8	1	5	43	6843
Visit 3 - 17/10/2017	8	1	11	1	49	15	0	43	128	58464
Grand Total	38	1	141	9	269	47	6	94	605	66950

Table 8: Static data from BA point BA106X.

Deployment\Species	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 19/06/2017	53	0	152	19	164	1	45	34	468	1304
Visit 2 - 31/07/2017	18	0	119	0	31	2	1	15	186	1368
Visit 3 - 07/08/2017	46	0	158	0	1	0	0	16	221	1792
Visit 4 - 04/09/2017	15	2	35	1	1058	2	4	11	1128	14560
Visit 5 - 17/10/2017	0	0	0	0	10	0	0	0	10	265
Grand Total	132	2	464	20	1264	5	50	76	2013	19289

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

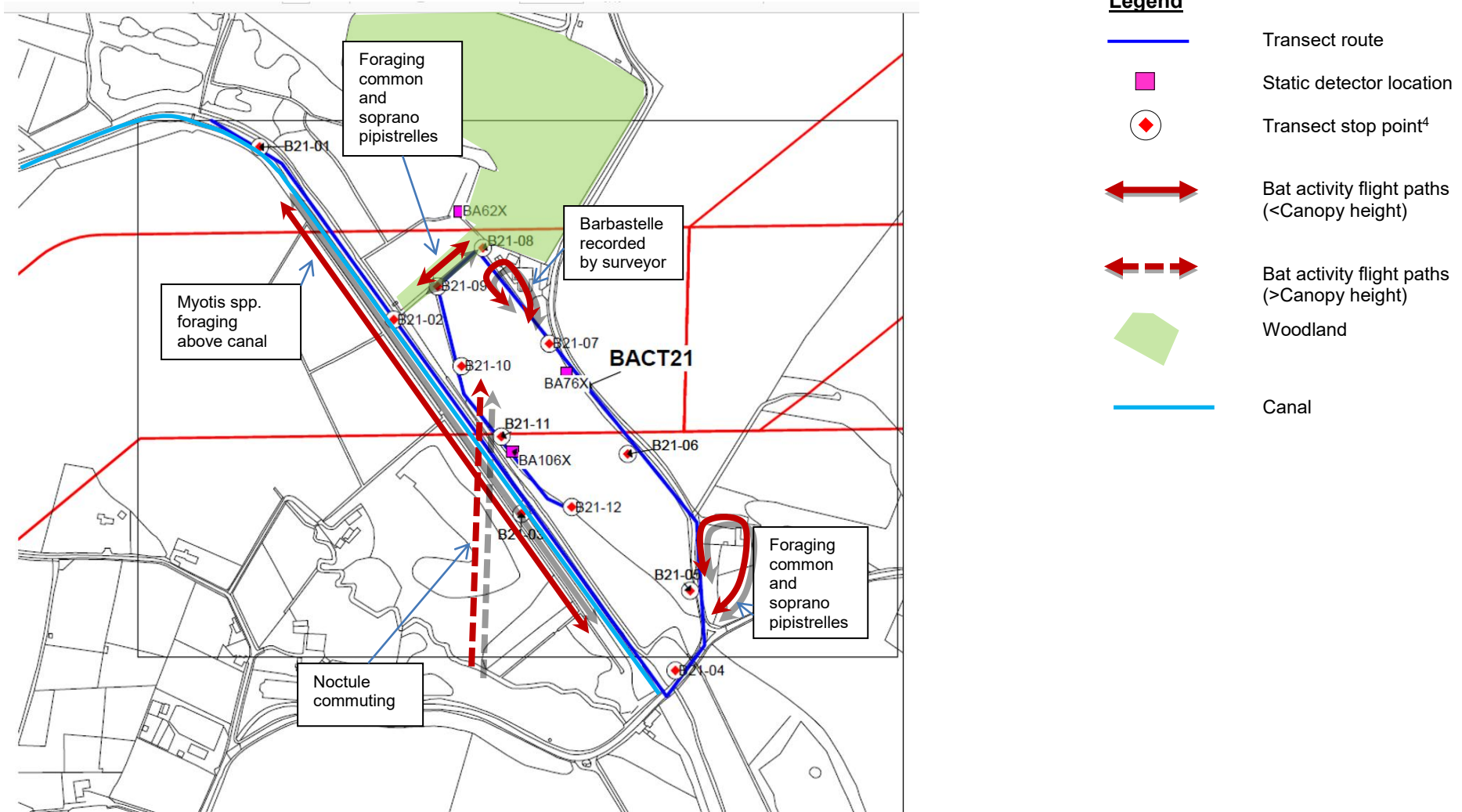
Date\Species	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
22/05/2017	0	0	0	0	5	0	0	0	5	3
23/05/2017	2	0	9	0	56	26	1	6	100	200
24/05/2017	2	0	4	0	30	27	1	5	69	144
25/05/2017	5	0	20	1	44	18	0	11	99	211
26/05/2017	3	0	4	0	90	42	1	3	143	251
27/05/2017	4	0	6	1	109	42	2	5	169	286
28/05/2017	18	0	26	2	74	53	3	5	181	298
29/05/2017	3	0	11	2	39	21	3	6	85	112
30/05/2017	11	0	5	1	44	6	0	8	75	204
31/05/2017	0	0	0	0	0	0	0	0	0	34
01/06/2017	16	0	43	0	0	0	0	3	62	82
02/06/2017	0	0	0	0	0	0	0	0	0	201
03/06/2017	0	0	0	0	0	0	0	0	0	89
04/06/2017	1	0	1	0	1	2	0	0	5	101
05/06/2017	2	0	0	0	0	0	0	0	2	295
06/06/2017	1	0	1	0	0	0	0	0	2	95
19/06/2017	4	0	7	2	8	3	1	4	29	173
20/06/2017	11	0	65	1	64	10	0	20	171	340
21/06/2017	6	0	9	4	89	6	0	4	118	205
22/06/2017	19	0	38	1	29	1	5	8	101	265
23/06/2017	23	0	64	0	54	1	2	17	161	882
24/06/2017	24	0	91	18	80	4	36	21	274	1293
25/06/2017	5	0	63	1	44	0	6	10	129	379
26/06/2017	4	0	3	0	6	0	1	0	14	92
29/06/2017	0	0	0	0	0	1	0	0	1	33
30/06/2017	0	0	0	0	0	6	0	0	6	685

Date\Species	LARGBATSP	MYOSPP	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
01/07/2017	0	0	2	0	0	1	0	0	3	89
02/07/2017	5	0	32	0	0	0	0	2	39	79
03/07/2017	0	0	5	0	0	2	0	0	7	16
04/07/2017	0	0	5	0	0	10	0	0	15	45
05/07/2017	0	0	4	0	0	3	0	0	7	18
31/07/2017	0	0	49	0	2	0	0	3	54	2732
01/08/2017	1	0	0	0	0	0	0	0	1	1111
02/08/2017	2	0	6	0	14	0	0	4	26	145
03/08/2017	9	0	47	0	13	0	1	9	79	1234
04/08/2017	8	0	79	0	1	1	0	4	93	1415
05/08/2017	6	0	19	0	1	1	0	4	31	174
06/08/2017	2	0	6	0	0	0	0	0	8	779
07/08/2017	2	0	15	0	6	8	1	1	33	945
08/08/2017	14	0	22	0	5	0	0	8	49	2973
09/08/2017	0	0	4	0	0	0	0	0	4	943
10/08/2017	12	0	68	0	0	0	0	4	84	91
11/08/2017	0	0	4	0	1	0	0	0	5	147
12/08/2017	18	0	51	0	0	0	0	8	77	2688
13/08/2017	4	0	16	0	0	0	0	1	21	893
14/08/2017	0	0	0	0	0	0	0	0	0	6
30/08/2017	1	0	6	0	18	63	0	5	93	1108
31/08/2017	0	0	0	0	1	0	0	0	1	241
01/09/2017	0	0	3	0	1	0	0	0	4	37
02/09/2017	3	0	0	0	0	0	0	0	3	75
03/09/2017	1	0	0	0	0	0	0	0	1	707
04/09/2017	0	0	3	0	22	0	1	3	29	7359
05/09/2017	6	2	17	0	12	0	0	2	39	1339
06/09/2017	1	0	10	1	13	0	0	2	27	2362

Date\Species	LARGEATSP	MYOSPP	NYCNO	PIPNA	PIPIP	PIPPY	PIPSPP	OTHER	Total all bats	NOISE
07/09/2017	5	0	0	0	8	0	0	0	13	2080
08/09/2017	1	0	5	0	3	0	0	1	10	306
09/09/2017	0	0	0	0	0	0	0	0	0	27
10/09/2017	0	0	0	0	525	1	2	1	529	797
11/09/2017	1	0	4	0	439	1	1	4	450	2459
12/09/2017	3	0	2	0	33	0	0	2	40	2037
13/09/2017	0	0	0	0	3	0	0	0	3	446
03/10/2017	0	0	0	0	0	0	0	0	0	203
04/10/2017	0	0	2	0	1	0	0	0	3	857
05/10/2017	0	0	0	1	3	0	0	0	4	934
06/10/2017	0	0	0	0	0	0	0	1	1	2418
07/10/2017	0	0	0	0	1	0	0	0	1	148
08/10/2017	0	0	0	0	0	0	0	0	0	13
17/10/2017	0	1	1	0	17	0	0	3	22	5103
18/10/2017	5	0	3	0	22	12	0	29	71	384
19/10/2017	3	0	5	0	5	1	0	4	18	21447
20/10/2017	0	0	2	1	15	2	0	3	23	8791
21/10/2017	0	0	0	0	0	0	0	1	1	11242
22/10/2017	0	0	0	0	0	0	0	1	1	11723
23/10/2017	0	0	0	0	0	0	0	1	1	39
Grand Total	277	3	967	37	2051	375	68	247	4025	108158

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B21_01) is reference to transect number and the transect stop number.



Transect Summary: BACT22, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT22
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	20/12/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT22, Witton

- 1.1. Grid reference: TG323313.
- 1.2. Transect designation: High quality.
- 1.3. Static detectors: BA48, BA60X & BA107X.

2. Description of transect

Land use at transect

- 2.1. The transect followed the boundary of two arable fields
- 2.2. To the west, north-west and north-east are areas of deciduous woodland.
- 2.3. The transect has roads on the eastern and southern boundaries.
- 2.4. The conifer plantations of Witton Heath lie within 200m of the south-east corner of the transect.

Key commuting and foraging features

- 2.5. The woodlands provide good connecting habitat to foraging areas within Witton Heath and beyond to the North Walsham and Dilham Canal.
- 2.6. The western edge adjacent to the woodland was a key foraging and commuting route for bats.
- 2.7. The road along the southern edge was a good foraging route for common pipistrelles.
- 2.8. Barbastelles were recorded across the transect at all static detector locations.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked nine times from May to October. The static at BA48 was deployed five times for a total of 33 nights, the static at BA60X was deployed four times for a total of 31 nights and the static at BA107X was deployed three times for a total of 19 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA48	Visit 1 - 30.05.2017	30/05/2017	06/06/2017	7
	Visit 2 - 15.06.2017	15/06/2017	20/06/2017	5
	Visit 3 - 23.08.2017	23/08/2017	29/08/2017	6
	Visit 4 - 12.09.2017	12/09/2017	20/09/2017	8
	Visit 5 - 24.10.2017	24/10/2017	30/10/2017	7
BA60X	Visit 1 - 16.05.2017	16/05/2017	25/05/2017	10
	Visit 2 - 29.08.2017	29/08/2017	05/09/2017	8
	Visit 3 - 26.09.2017	26/09/2017	02/10/2017	7
	Visit 4 - 10.10.2017	10/10/2017	16/10/2017	6
BA107X	Visit 1 - 22.08.2017	22/08/2017	25/08/2017	4
	Visit 2 - 29.08.2017	12/09/2017	20/09/2017	8
	Visit 3 - 24.10.2017	24/10/2017	30/10/2017	7

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, CS	22.05.17	21:19	23:06
2	Dusk	AG & BM	15.06.17	21:20	22:52
3	Dusk	JWH, CB	22.08.17	20:05	21:45
4	Dawn	JWH, CB	23.08.17	03:54	05:40
5	Dusk	JWH, CB	29.08.17	19:49	21:29
6	Dusk	JWH, CB	12.09.17	19:17	20:41
7	Dusk	JWH & CB	26.09.17	18:42	20:12
8	Dusk	JWH, CB	10.10.17	18:12	20:11
9	Dusk	JWH, BB	24.10.17	12:00	19:35

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017)

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✓	Frequent passes	Throughout survey period	N/A
Serotine	EPTSER	✓*	✓	Most frequently recorded by static BA60X on the western edge of the transect. However all statics and the transect detectors recorded EPTSER across the transect.	Throughout survey period	N/A
Large bat species	LARGEBATSP	✓*	✓	Heard across the transect, recorded on each static	Recorded throughout the night on each static deployment.	N/A
Myotis spp	MYOSPP	✓*	✓	Frequent across the transect.	Throughout survey period	N/A
Noctule	NYCNOC	✓*	✓	Commonly heard across the transect.	Throughout survey period	N/A
Nathusius' pipistrelle	PIP NAT	✓	✓	Rarely recorded on walked transects, more commonly recorded by statics BA60 and BA48.	Occasional records	N/A
Common pipistrelle	PIPIPI	✓	✓	Frequent passes; consistently present	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequent passes; consistently present	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Brown long-eared	PLEAUR	X	X	N/A	N/A	N/A

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOG	PIPPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	22.05.17	21:19	23:06	16°C	15°C	BS1	1/8	None	0	0	0	0	9	2	3	2	16
2	Dusk	15.06.17	21:20	22:52	18°C	17°C	BS1	3/8	None	0	3	0	0	10	0	2	0	15
3	Dusk	22.08.17	20:05	21:45	19°C	16°C	BS1	8/8	None	0	0	1	5	10	2	1	1	20
3	Dawn	23.08.17	03:54	05:40	19°C	17°C	BS2	8/8	None	0	0	0	1	8	0	0	0	9
4	Dusk	29.08.17	19:49	21:29	16°C	16°C	BS2	8/8	None	0	0	0	0	0	0	14	2	16
5	Dusk	12.09.17	19:17	20:41	19°C	15°C	BS1	7/8	None	0	0	0	1	10	7	1	1	20
6	Dusk	26.09.17	18:42	20:12	15°C	13°C	BS0	0/8	None	0	0	1	1	13	3	0	0	18
7	Dusk	10.10.17	18:12	20:11	16°C	15°C	BS3	2/8	None	0	0	0	0	14	6	1	0	21
8	Dusk	24.10.17	12:00	19:35	18°C	17°C	BS2	7/8	None	0	0	0	0	12	2	0	0	14

² All bats not identified to species level.

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPSTER	LARGEATSPP	MYOSPP	NYCNOG	PIP NAT	PIPIPI	PIPIYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	22.05.17	1	0	0	0	1	1	45	0	2	2	52	955
2	Dusk	15.06.17	0	1	0	0	0	0	4	4	0	1	10	544
3	Dusk	22.08.17	0	51	1	0	0	0	19	6	0	29	106	485
3	Dawn	23.08.17	0	0	1	0	1	0	29	1	0	4	36	1118
4	Dusk	29.08.17	0	1	0	1	0	0	31	3	3	3	44	490
5	Dusk	12.09.17	2	1	1	0	0	0	30	54	0	11	99	1021
6	Dusk	26.09.17	1	1	0	1	0	0	23	15	0	4	45	1065
7	Dusk	10.10.17	0	0	1	0	0	0	21	14	0	2	38	1025
8	Dusk	24.10.17	5	0	2	0	1	0	9	28	0	2	47	961

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA48.

Deployment/Species	BARBAR	EPTSER	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 30.05.2017	0	0	0	5	2	21	1281	78	43	11	1441	1391
Visit 2 - 15.06.2017	1	1	4	69	3	9	699	18	43	31	878	684
Visit 3 - 23.08.2017	0	0	3	1	14	0	287	9	0	11	325	68522
Visit 4 - 12.09.2017	1	0	3	2	5	0	46	13	1	4	75	6660
Visit 5 - 24.10.2017	13	0	7	2	15	0	331	43	0	21	432	5510
Grand Total	15	1	17	79	39	30	2644	161	87	78	3151	82767

Table 7: Static data from BA point BA60X.

Deployment/Species	BARBAR	EPTSER	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 16.05.2017	0	0	11	0	23	9	360	10	19	7	439	5158
Visit 2 - 29.08.2017	3	4	17	9	36	1	1918	330	29	110	2457	1494
Visit 3 - 26.09.2017	2	56	37	22	41	0	367	122	8	58	713	437
Visit 4 - 10.10.2017	1	2	17	15	50	4	2188	572	36	133	3018	1499
Grand Total	6	62	82	46	150	14	4833	1034	92	308	6627	8588

Table 8: Static data from BA point BA107X

Deployment/Species	BARBAR	EPTSER	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 22.08.2017	3	19	52	0	40	0	279	191	3	71	658	1007
Visit 2 - 29.08.2017	0	0	0	4	8	0	45	262	1	7	327	3567
Visit 3 - 24.10.2017	1		1	1	3	0	125	102	1	17	251	2377
Grand Total	4	19	53	5	51	0	449	555	5	95	1236	6951

4.4. Bat activity by date

Table 8: Number of registrations recorded each calendar day of deployment across all statics.

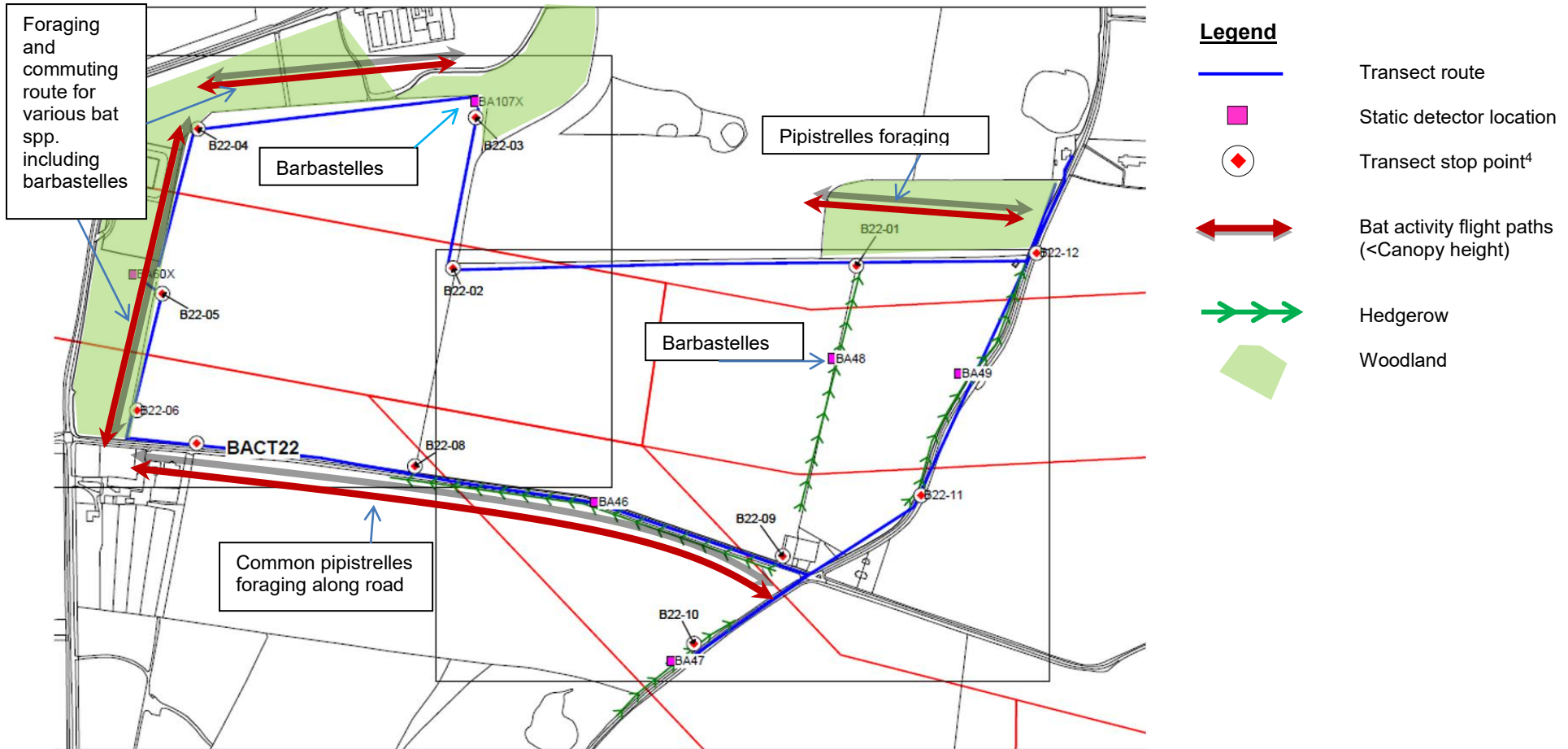
Date/Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
16/05/17	0	0	1	0	0	0	9	4	0	0	14	2526
17/05/17	0	0	0	0	0	0	11	0	0	0	11	456
18/05/17	0	0	2	0	2	0	8	0	0	0	12	750
19/05/17	0	0	0	0	0	0	4	1	0	0	5	352
20/05/17	0	0	0	0	1	0	17	0	0	0	18	154
21/05/17	0	0	0	0	0	0	51	1	0	0	52	123
22/05/17	0	0	5	0	16	0	22	0	0	1	44	62
23/05/17	0	0	0	0	0	4	67	2	5	2	80	213
24/05/17	0	0	2	0	0	3	111	2	9	2	129	353
25/05/17	0	0	1	0	4	2	60	0	5	2	74	169
30/05/17	0	0	0	0	0	7	253	19	15	5	299	149
31/05/17	0	0	0	0	0	0	61	7	0	0	68	89
01/06/17	0	0	0	0	0	1	95	2	0	0	98	63
02/06/17	0	0	0	0	2	2	106	0	3	0	113	114
03/06/17	0	0	0	0	0	2	268	18	12	3	303	122
04/06/17	0	0	0	2	0	8	425	31	12	2	480	170
05/06/17	0	0	0	2	0	1	73	1	1	1	79	508
06/06/17	0	0	0	1	0	0	0	0	0	0	1	176
15/06/17	0	0	0	0	0	0	13	0	9	2	24	44
16/06/17	1	0	0	19	0	4	267	4	10	6	311	139
17/06/17	0	0	2	11	1	4	206	11	14	8	257	155
18/06/17	0	1	1	18	1	0	109	0	1	1	132	120
19/06/17	0	0	1	14	1	1	80	2	7	12	118	206
20/06/17	0	0	0	7	0	0	24	1	2	2	36	20
22/08/17	1	0	8	0	9	0	50	4	1	8	81	239

Date/Species	BARBAR	EPTSER	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
23/08/17	1	3	23	0	31	0	176	17	2	45	298	16507
24/08/17	0	2	11	0	2	0	168	173	0	16	372	18680
25/08/17	1	14	11	0	0	0	20	5	0	9	60	22016
26/08/17	0	0	2	1	4	0	23	0	0	1	31	11038
27/08/17	0	0	0	0	3	0	44	0	0	1	48	184
28/08/17	0	0	0	0	2	0	18	0	0	1	21	478
29/08/17	0	5	4	2	13	0	184	14	6	9	237	479
30/08/17	0	13	5	2	5	0	76	20	2	9	132	62
31/08/17	0	11	8	5	5	0	15	12	0	11	67	55
01/09/17	0	9	10	3	7	0	47	27	0	15	118	95
02/09/17	0	5	3	3	3	0	12	22	0	1	49	23
03/09/17	1	5	4	2	1	0	14	6	0	3	36	46
04/09/17	1	4	3	2	8	0	55	11	0	7	91	41
05/09/17	0	4	0	3	2	0	31	11	0	4	55	23
12/09/17	0	0	0	0	0	0	3	10	0	0	13	1228
13/09/17	0	0	0	0	0	0	2	146	0	6	154	2753
14/09/17	0	0	1	1	1	0	5	10	0	1	19	980
15/09/17	0	0	0	0	1	0	15	8	0	0	24	523
16/09/17	0	0	0	1	0	0	4	2	0	0	7	610
17/09/17	0	0	0	2	2	0	4	16	0	1	25	602
18/09/17	0	0	0	1	0	0	36	20	2	0	59	1798
19/09/17	1	0	2	0	9	0	22	62	0	3	99	1480
20/09/17	0	0	0	1	0	0	0	1	0	0	2	253
26/09/17	0	1	0	1	0	0	3	32	0	2	39	23
27/09/17	0	1	4	0	0	1	220	66	3	1	296	79
28/09/17	1	0	2	1	4	0	129	17	0	17	171	449
29/09/17	1	0	6	2	13	0	357	48	9	61	497	272
30/09/17	1	2	4	4	11	0	547	66	13	10	658	195

Date/Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNO	PIP	PIPIP	PIPYG	PIPSPP	OTHER	Total all bats	NOISE
01/10/17	0	0	0	0	1	0	87	24	1	4	117	141
02/10/17	0	0	1	1	7	0	575	77	3	15	679	335
10/10/17	0	0	1	6	1	0	45	41	0	4	98	61
11/10/17	0	0	2	2	4	3	658	163	20	37	889	455
12/10/17	0	0	6	1	6	1	1369	181	16	70	1650	678
13/10/17	1	0	2	3	4	0	60	17	0	8	95	67
14/10/17	0	2	5	1	29	0	43	84	0	11	175	151
15/10/17	0	0	1	1	6	0	11	57	0	2	78	76
16/10/17	0	0	0	1	0	0	2	29	0	1	33	11
24/10/17	0	0	0	0	1	0	1	4	0	3	9	1068
25/10/17	5	0	3	3	1	0	114	35	0	22	183	2280
26/10/17	9	0	3	0	16	0	151	26	0	8	213	425
27/10/17	0	0	0	0	0	0	112	22	0	3	137	641
28/10/17	0	0	0	0	0	0	1	2	0	0	3	1849
29/10/17	0	0	2	0	0	0	63	26	1	2	94	1440
30/10/17	0	0	0	0	0	0	14	30	0	0	44	184
Grand Total	25	82	152	130	240	44	7926	1750	184	481	11014	98306

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B22_01) is reference to transect number and the transect stop number.



Transect Summary: BACT24, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT24
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	20/12/17	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/18	All	All	Final report	Chris Smith

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1. Transect summary: BACT24, Ridlington

- 1.1. Grid reference: TG356303.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA65X.

2. Description of transect

Land use at transect

- 2.1. Within the centre of the transect area the land use is predominantly arable agriculture, with a small area of grassland used for grazing by sheep to the north.
- 2.2. The area of grassland is divided by drainage ditches.
- 2.3. Several small patches of mixed woodland are situated along the western length of the route.
- 2.4. Nash Lane runs east to west along the north of the transect.
- 2.5. Munn's track runs north to south along the eastern edge, this is an ancient tree lined track.

Key commuting and foraging features

- 2.6. Munn's track was used as a foraging corridor for pipistrelle bats.
- 2.7. Common pipistrelles foraged above alder lined drainages ditches within the grassland to the north.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked once in June. The static at BA65X was deployed once for a total of 5 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA65X	Visit 1 - 07.06.17	07/06/2017	12/06/2017	5

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BB, BM	07/06/17	21:14	23:05

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017)

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	✓*	Occasional possible records.	Single possible between 2100hrs and 2200hrs.	N/A
Serotine	EPTSER	X	✓*	Possible occasional records on statics	Scattered dates	N/A
Large bat	LARGEATSPP	X	✓	Occasional records on statics only	Throughout survey period.	N/A
Noctule	NYCNOC	✓	✓	Not seen by surveyor on transect.	Static detector only recorded noctules in the early morning.	N/A
Nathusius' pipistrelle	PIP NAT	X	✓*	Occasional records.	Only one recording between 2200hrs and 2300hrs.	N/A
Common pipistrelle	PIPIPI	✓	✓	Commonly foraging along the eastern length of the transect along Munn's track.	Heard from 30 minutes into survey until the end.	N/A
Soprano pipistrelle	PIPPYG	X	✓*	Occasional records.	Several recordings throughout the night.	N/A
Brown long-eared	PLEAUR	X	X	None recorded	N/A	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	MYOSPP	NYCLEI	NYCNOG	PIPPIP	PYPYGG	PIPSPP	OTHER ²	Total all bats
1	Dusk	07/06/17	21:14	23:05	15°C	14°C	BS3	6/8	Rain from 22:55	0	0	0	0	2	0	11	0	13

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	PIPPIP	Total all bats	NOISE ³
1	Dusk	03.07.17	3	3	1150

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA65X.

Deployment\Species	BARBAR	EPTSER	LARGEATSPP	NYCNOC	PIP NAT	PIPPIP	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Survey 1 - 07.06.17	1	2	10	13	1	74	2	1	1	105	2835

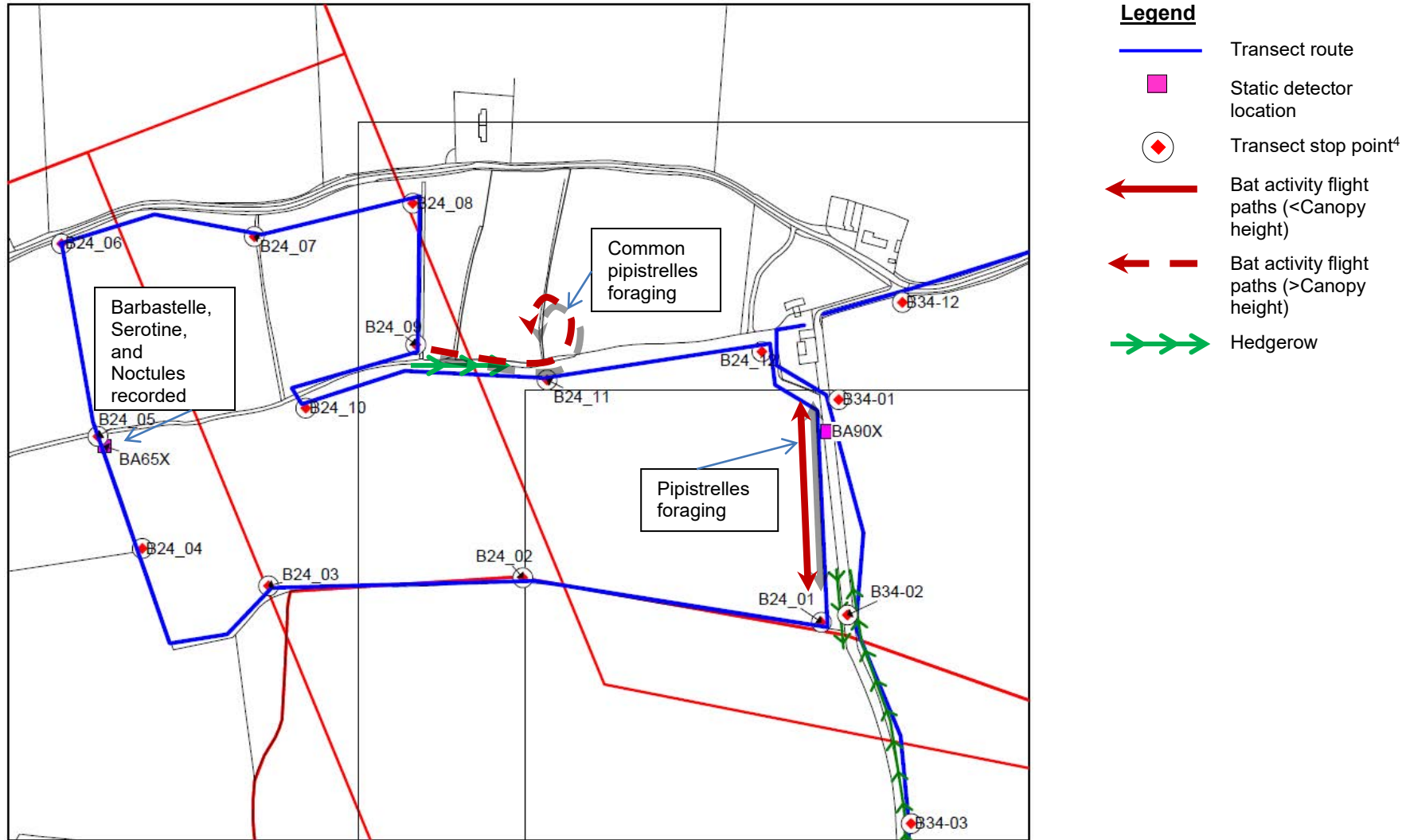
4.4. Bat activity by date

Table 7: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LARGEAT SPP	NYCNOC	PIP NAT	PIPPIP	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
07/06/2017	0	0	0	0	0	3	0	0	0	3	2225
08/06/2017	1	0	3	4	1	12	0	0	0	21	358
09/06/2017	0	2	0	0	0	27	0	1	0	30	80
10/06/2017	0	0	4	4	0	11	2	0	0	21	66
11/06/2017	0	0	0	1	0	7	0	0	1	9	51
12/06/2017	0	0	2	4	0	8	0	0	0	14	35
13/06/2017	0	0	1	0	0	6	0	0	0	7	20
Grand Total	1	2	10	13	1	74	2	1	1	105	2835

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B24_01) is reference to transect number and the transect stop number.



Transect Summary: BACT26, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT26
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	03/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT26, Bushy Common

- 1.1. Grid reference: TF947132.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA79X & BA80X.

2. Description of transect

Land use at transect

- 2.1. The transect was through arable land and grassland.
- 2.2. The east of the transect passed through arable land with bordering hedgerows and tree standards on the northern, western and eastern sides.
- 2.3. The western part of the transect was a hay meadow with native species rich hedgerows along the western and northern boundaries with scattered mature willow and oak trees to the south.
- 2.4. A river, small area of wet woodland and road borders the transect to the south.

Key commuting and foraging features

- 2.5. Pipistrelle foraging activity is high to the south of the transect at stop ten where the road joins the field.
- 2.6. The western hedgerow is an important foraging and commuting route for bats.

3. Survey effort

- 3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.
- 3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.
- 3.3. The transect was walked six times from June to October. The static detector at BA79X was deployed five times between June and October once for a total of 31 nights. The static detector at BA80X was deployed five times between June and October once for a total of 25 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA79X	Visit 1 - 20.06.2017	20/06/2017	26/06/2017	7
	Visit 2 - 31.07.2017	31/07/2017	01/08/2017	2
	Visit 3 - 08.08.2017	08/08/2017	16/08/2017	9
	Visit 4 - 21.09.2017	21/09/2017	26/09/2017	6
	Visit 5 - 05.10.2017	05/10/2017	11/10/2017	7
BA80X	Visit 1 - 21.06.2017	21/06/2017	26/06/2017	6
	Visit 2 - 31.07.2017	31/07/2017	01/08/2017	2
	Visit 3 - 08.08.2017	08/08/2017	10/08/2017	3
	Visit 4 - 21.09.2017	21/09/2017	26/09/2017	6
	Visit 5 - 05.10.2017	05/10/2017	11/10/2017	7

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, JH	20/06/2017	21:20	23:31
2	Dawn	BM, JH	21/06/2017	02:30	04:11
3	Dusk	KC, AV	31/07/2017	20:55	22:17
4	Dusk	BM, AV	08/08/2017	20:34	21:48
5	Dusk	BM, JWH	21/09/2017	19:05	20:04
6	Dusk	BM, CB	05/10/2017	18:22	19:35

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017)

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	✓*	One recording on static detector BA80X.	June only.	N/A
Serotine	EPTSER	✓*	✓*	Occasional recordings on both static detectors. Single pass recorded by surveyors.	Throughout survey period.	N/A
Large bat spp.	LARGBATSP	✓*	✓	Occasional recordings on both static detectors with only one record on transect data.	Throughout survey period.	N/A
Myotis spp.	MYOSPP	X	✓*	Occasional recordings on both static detectors.	Throughout survey period.	N/A
Leisler's	NYCLEI	X	✓*	One recording on static detector BA80X.	June only.	N/A
Noctule	NYCNOC	✓*	✓	Frequently recorded on both static detectors with only one record on transect data.	Throughout survey period.	N/A
Nathusius' pipistrelle	PIP NAT	X	✓*	Occasional recordings on both static detectors.	June and September only.	N/A
Common pipistrelle	PIPIPI	✓	✓	Frequent passes; consistently present in the south and west.	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequent passes; consistently present in the south and west. Significantly less calls than PIPPIPI.	Heard approximately from 20 minutes after sunset for the duration of the survey.	N/A
Pipistrelle spp.	PIPSPP	✓*	✓	Occasional recordings.	Throughout survey period.	N/A
Brown Long-Eared	PLEAUR	X	✓*	Recorded across the transect on both static detectors.	Only recorded in the evening.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOG	PIPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	20/06/2017	21:20	23:31	15°C	14°C	BWS3	1/8	None	0	0	0	0	5	0	5	1	11
2	Dawn	21/06/2017	02:30	04:11	14°C	14°C	BWS1	0/8	None	0	1	0	0	3	0	5	0	9
3	Dusk	31/07/2017	20:55	22:17	18°C	17°C	BWS0	4/8	Drizzle first 10 minutes	0	0	0	0	5	6	0	0	11
4	Dusk	08/08/2017	20:34	21:48	16°C	14°C	BWS3	6/8	Rain started at 21:36	0	1	0	0	1	0	2	0	4
5	Dusk	21/09/2017	19:05	20:04	16°C	16°C	BWS3	8/8	Light rain	0	0	0	0	1	5	0	0	6
6	Dusk	05/10/2017	18:22	19:35	13°C	10°C	BWS2	5/8	Rain showers - getting heavier/longer Survey abandoned after 1 circuit	0	0	0	0	6	0	1	0	7

² All bats not identified to species level.

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	NYCNOC	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
Visit 1	Dusk	20.06.2017	0	5	9	2	0	16	639
Visit 2	Dawn	21.06.2017	1	0	0	0	0	1	266
Visit 4	Dusk	08.08.2017	0	2	3	0	1	6	762
Visit 5	Dusk	21.09.2017	0	2	16	2	0	20	569
Visit 6	Dusk	05.10.2017	0	7	5	0	2	14	861

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA79X.

Deployment\Species	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	Total all bats	NOISE
BA79X\Visit 1 - 20.06.2017	1	6	3	31	0	84	156	13	0	294	763
BA79X\Visit 2 - 31.07.2017	0	0	0	1	0	0	0	0	0	1	16382
BA79X\Visit 3 - 08.08.2017	0	3	0	3	0	0	0	0	0	6	111324
BA79X\Visit 4 - 21.09.2017	2	1	1	1	4	19	31	6	2	67	5423
BA79X\Visit 5 - 05.10.2017	0	1	0	2	0	34	139	24	1	201	3556
Grand Total	3	11	4	38	4	137	326	43	3	569	137448

Table 7: Static data from BA point BA80X.

Deployment\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPSPP	PIPPYG	PLEAUR	Total all bats	NOISE
BA80X\Visit 1 - 21.06.2017	1	4	1	0	1	4	1	7	0	8	0	27	659
BA80X\Visit 2 - 31.07.2017	0	0	0	0	0	0	0	0	0	0	0	0	194
BA80X\Visit 3 - 08.08.2017	0	0	0	0	0	0	0	7	3	1485	0	1495	14835
BA80X\Visit 4 - 21.09.2017	0	0	0	1	0	28	0	12	3	55	1	100	956
BA80X\Visit 5 - 05.10.2017	0	0	3	1	0	19	0	272	2	86	0	383	7688
Grand Total	1	4	4	2	1	51	1	298	8	1634	1	2005	24332

4.4. Bat activity by date

Table 8: Number of registrations recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCLEI	NYCNOC	PIPNAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	Total all bats	NOISE
20/06/2017	0	0	1	0	1	1	0	2	1	0	0	6	24
21/06/2017	0	0	0	0	0	0	0	16	9	0	0	25	122
22/06/2017	0	2	0	1	0	1	1	13	15	2	0	35	87
23/06/2017	0	0	2	1	0	11	0	8	11	0	0	33	706
24/06/2017	0	2	4	1	0	21	0	18	59	6	0	111	368
25/06/2017	1	0	0	0	0	0	0	10	56	5	0	72	72
26/06/2017	0	1	0	0	0	1	0	24	13	0	0	39	43
31/07/2017	0	0	0	0	0	0	0	0	0	0	0	0	7710
01/08/2017	0	0	0	0	0	1	0	0	0	0	0	1	8850
03/08/2017	0	0	0	0	0	0	0	0	0	0	0	0	16
08/08/2017	0	0	0	0	0	0	0	2	1	0	0	3	14640
09/08/2017	0	0	1	0	0	3	0	5	975	3	0	987	24954
10/08/2017	0	0	0	0	0	0	0	0	509	0	0	509	10808
11/08/2017	0	0	2	0	0	0	0	0	0	0	0	2	12147
12/08/2017	0	0	0	0	0	0	0	0	0	0	0	0	18394
13/08/2017	0	0	0	0	0	0	0	0	0	0	0	0	24070
14/08/2017	0	0	0	0	0	0	0	0	0	0	0	0	12179
15/08/2017	0	0	0	0	0	0	0	0	0	0	0	0	7708
16/08/2017	0	0	0	0	0	0	0	0	0	0	0	0	1259
21/09/2017	0	0	0	1	0	0	1	3	27	1	0	33	683
22/09/2017	0	0	1	1	0	7	1	5	6	2	0	23	287
23/09/2017	0	0	0	0	0	1	1	5	5	4	1	17	775
24/09/2017	0	2	0	0	0	1	1	7	12	0	0	23	2328
25/09/2017	0	0	0	0	0	20	0	4	19	1	1	45	1672
26/09/2017	0	0	0	0	0	0	0	7	17	1	1	26	634

Date\Species	BARBAR	EPTSER	LARGEATSPP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	Total all bats	NOISE
05/10/2017	0	0	0	0	0	1	0	257	34	6	1	299	1914
06/10/2017	0	0	0	0	0	0	0	5	13	0	0	18	1801
07/10/2017	0	0	0	0	0	0	0	13	28	0	0	41	1629
08/10/2017	0	0	3	0	0	14	0	16	45	9	0	87	240
09/10/2017	0	0	1	1	0	5	0	11	36	7	0	61	1008
10/10/2017	0	0	0	0	0	0	0	3	69	4	0	76	2673
11/10/2017	0	0	0	0	0	1	0	1	0	0	0	2	1979
Grand Total	1	7	15	6	1	89	5	435	1960	51	4	2574	0

4.5. Map showing key bat activity

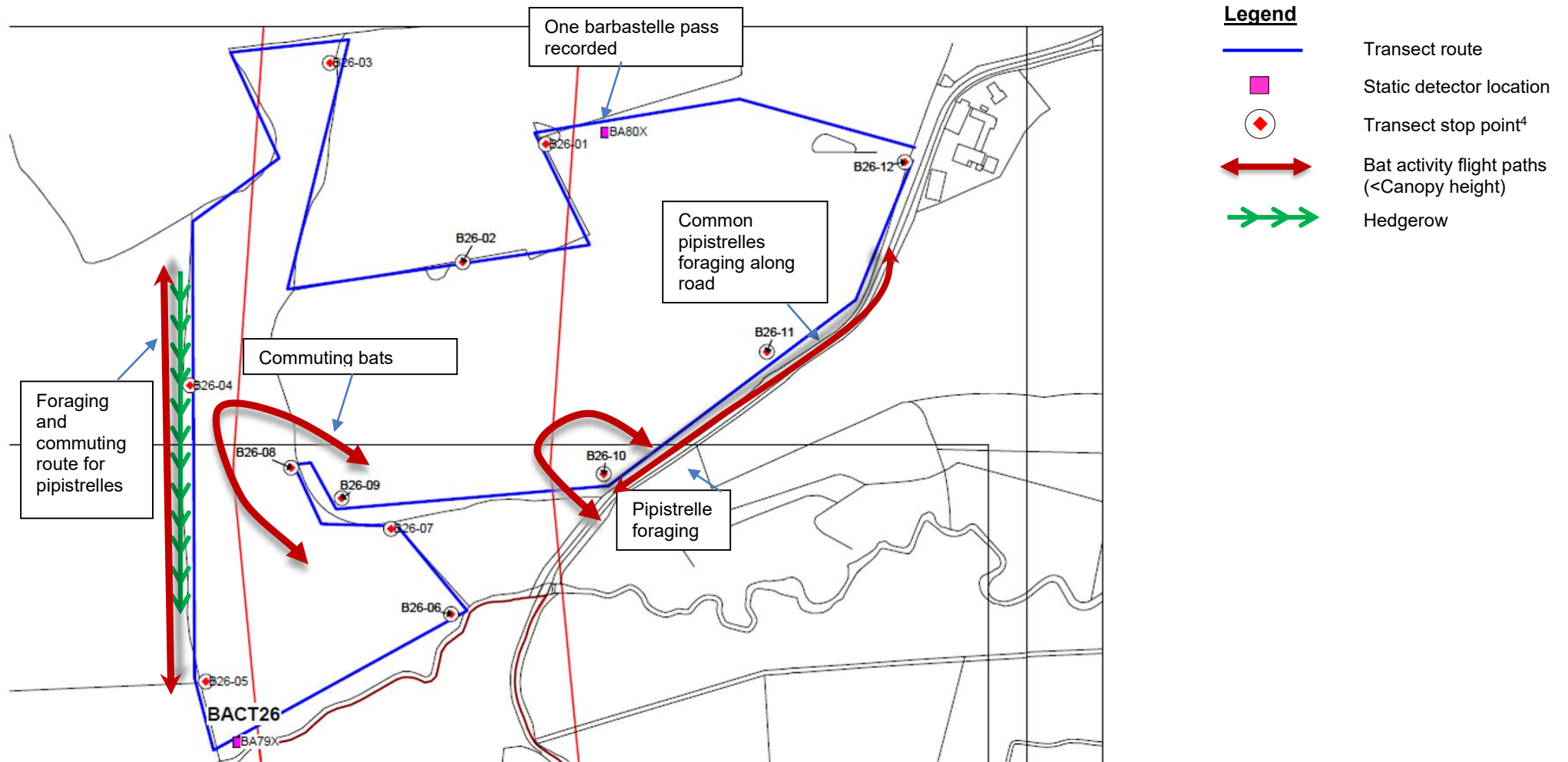


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.

⁴ Associated code (e.g. B26_01) is reference to transect number and the transect stop number.



Transect Summary: BACT27, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT27
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	04/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Sally McColl

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1. Transect summary: BACT27, Sparrow Green

- 1.1. Grid reference: TF955144.
1.2. Survey effort: Medium quality.
1.3. Static detectors: BA81X and BA82X.

2. Description of transect

Land use at transect

- 2.1. A very rural setting, the transect route is around a network of arable fields with tall mixed native hedgerows with tree standards. There are some properties adjacent to the transect to the north-west.
2.2. At the north-east corner of the transect at BA82X, is an area of mixed deciduous woodland which extends to the north and east.
2.3. At the south-east corner of the transect at BA81X, is a small area of mixed deciduous woodland in the corner of the field.

Key commuting and foraging features

- 2.4. Hedgerows to the south and east of the transect provided important foraging and commuting habitat for bats, including the woodland areas to the north-east and south-east.
2.5. The oak tree near to stop 7 was an important foraging area for bats.

3. Survey effort

- 3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.
3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.
3.3. The transect was walked six times between June and October. The static at BA81X was deployed four times between June and October for a total of 28 nights. The static at BA82X was deployed four times between June and October for a total of 24 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA81X	Visit 1 - 13.06.2017	13/06/2017	19/06/2017	6
	Visit 2 - 03.07.2017	03/07/2017	07/07/2017	4
	Visit 3 - 30.08.2017	30/08/2017	12/09/2017	13
	Visit 4 - 13.10.2017	13/10/2017	18/10/2017	5
BA82X	Visit 1 - 13.06.2017	13/06/2017	19/06/2017	6
	Visit 2 - 03.07.2017	03/07/2017	07/07/2017	4
	Visit 3 - 30.08.2017	30/08/2017	08/09/2017	9
	Visit 4 - 13.10.2017	13/10/2017	18/10/2017	5

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BC, JH	13.06.2017	21:19	23:25
2	Dusk	SM, RE	03.07.2017	21:23	23:11
3	Dusk	GH, MP	30.08.2017	20:04	21:10
4	Dusk	JWH, JH	08.09.2017	19:30	20:38
5	Dawn	JWH, JH	09.09.2017	05:00	06:00
6	Dusk	JWH, JH	13.10.2017	18:04	19:49

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017)

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Large Bat Species	LARGBATSPP	✓*	✓*	Records from both static detectors.	Tracks scattered throughout dawn and dusk, with slight peaks late evenings and in early September.	N/A
Myotis species	MYOSPP	✓*	✓	Noted on two surveys mid transect to the south west of the transect. All recordings on static detector BA82X.	Throughout survey period.	N/A
Leisler's	NYCLEI	✗	✓	All recordings on static detector BA81X on 02/09/17.	September only around midnight.	N/A
Noctule	NYCNOC	✓	✓	Throughout the transect.	Static recordings throughout dawn to dusk period.	N/A
Nathusius' pipistrelle	PIP NAT	✗	✓*	Low number of recordings from static detector BA81X.	Recorded on June evenings.	N/A
Common pipistrelle	PIPIPI	✓	✓	Picked up in high numbers by statics throughout survey. Noted foraging along the north west and western boundaries of the transect during transect.	Statics recordings throughout dawn to dusk period Noted from 60 minutes after sunset until the end of transect.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Picked up in high numbers by statics throughout survey. Noted throughout the transect. Most commonly noted foraging around the north eastern, eastern and southern boundaries of the transect.	Static recordings throughout dawn to dusk period. Noted from 45 minutes after sunset until the end of transect.	N/A
Pipistrelle Species	PIPSPP	✓*	✓	Throughout the transect.	Statics recordings throughout dawn to dusk period, and peaking early September.	N/A
Brown long eared	PLEAUR	✗	✓*	Two recordings on static detector BA82X.	June only.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	MYOSPP	PIPIP	PIPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	13.06.17	21:19:00	23:25:00	17°C	15°C	BS0	3/8	None	1	6	22	21	0	50
2	Dusk	03.07.17	21:23:00	23:11:00	14°C	15°C	BS0	6/8	None	0	5	23	1	0	29
3	Dusk	30.08.17	20:04:00	21:10:00	18°C	12°C	BS0	4/8	Heavy rain prior	0	1	0	1	0	2
4	Dusk	08.09.17	19:30:00	20:38:00	19°C	12°C	BS0	1/8	Rain prior	1	0	14	0	0	15
5	Dawn	09.09.17	05:00:00	06:00:00	10°C	9°C	BS0	8/8	None	0	0	0	0	0	0
6	Dusk	13.10.17	18:04:00	19:49:00	19°C	17°C	BS3	1/8	None	0	4	12	0	2	18

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	LARGEBATSP	NYCNOC	PIPPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	13.06.17	1	1	19	71	5	0	97	199
2	Dusk	03.07.17	9	7	11	52	1	26	106	682
3	Dusk	30.08.17	0	2	6	19	0	3	30	143
4	Dusk	08.09.17	0	0	0	0	0	0	0	15
5	Dawn	09.09.17	0	0	0	0	0	0	0	28
6	Dusk	13.10.17	0	0	0	12	0	2	14	661

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA81X.

Deployment\Species	LARGE BAT SPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 13.06.2017	17	0	75	9	2409	209	31	2	2752	5544
Visit 2 - 03.07.2017	2	0	8	0	598	529	57	0	1194	894
Visit 3 - 30.08.2017	26	15	60	1	381	5050	1293	0	6826	134410
Visit 4 - 13.10.2017	3	0	11	0	168	168	22	10	382	2973
Grand Total	48	15	154	10	3556	5956	1403	12	11154	143821

Table 7: Static data from BA point BA82X.

Deployment\Species	LARGE BAT SPP	MYOSPP	NYCNOC	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 13.06.2017	7	0	55	9	57	4	2	0	134	2635
Visit 2 - 03.07.2017	10	1	46	75	124	16	0	2	274	4005
Visit 3 - 30.08.2017	42	82	88	590	1937	12	0	389	3140	8204
Visit 4 - 13.10.2017	4	0	3	0	15	1	0	0	23	2487
Grand Total	63	83	192	674	2133	33	2	391	3571	17331

4.4. Bat activity by date

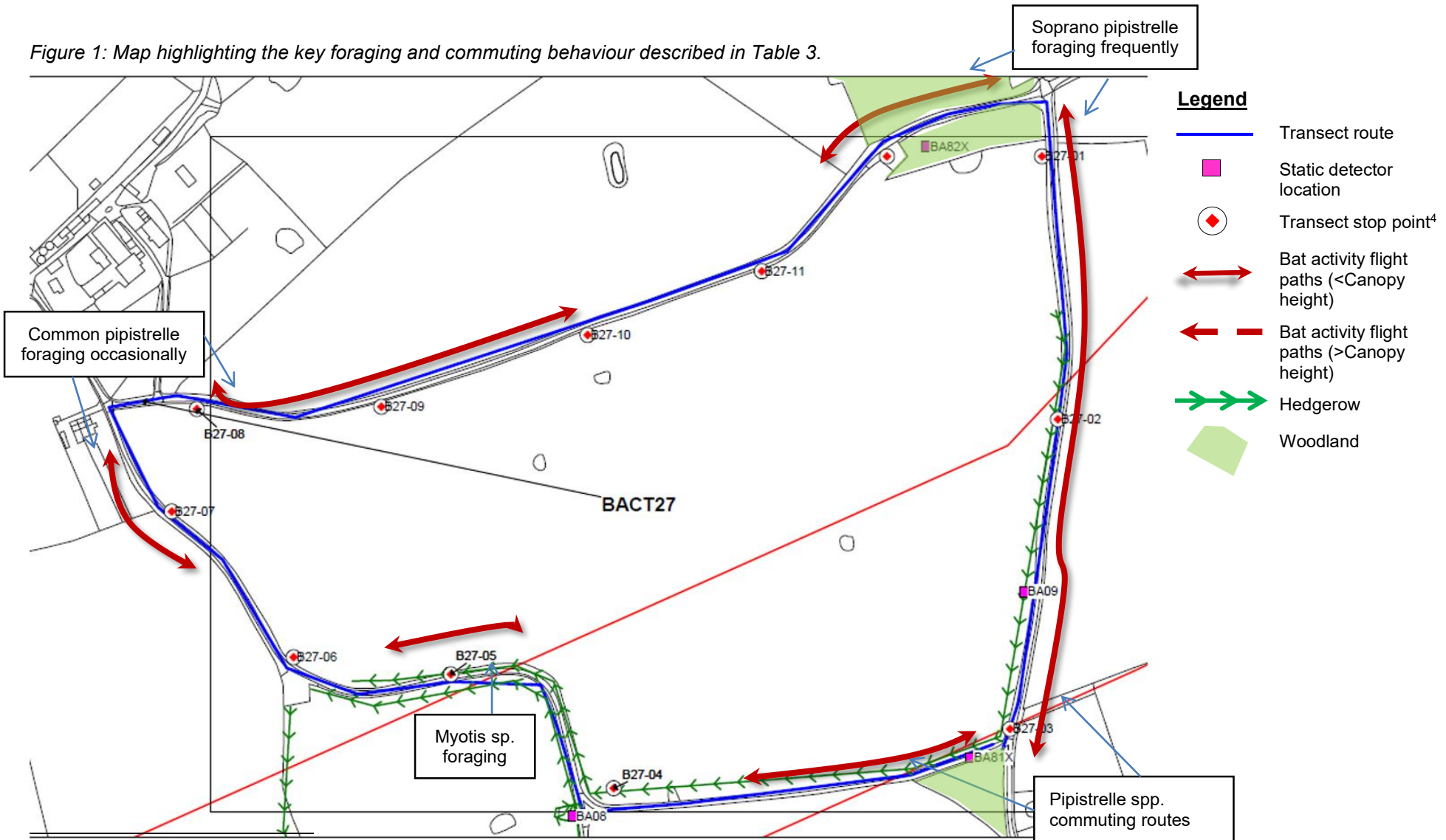
Table 8: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	LARBAT SPP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	Noise
13/06/2017	1	0	0	0	3	507	43	10	0	0	564	2620
14/06/2017	0	0	0	17	1	413	48	1	1	0	481	1263
15/06/2017	1	0	0	6	0	286	55	4	0	2	354	776
16/06/2017	0	0	0	3	0	220	45	7	0	0	275	1056
17/06/2017	17	0	0	61	0	212	19	4	1	0	314	729
18/06/2017	0	0	0	8	2	481	20	4	0	0	515	1048
19/06/2017	5	0	0	35	3	299	36	6	0	0	384	687
03/07/2017	0	0	0	0	0	38	21	2	0	1	62	300
04/07/2017	1	0	0	4	0	166	193	30	0	1	395	1260
05/07/2017	1	0	0	7	0	175	197	22	0	0	402	1242
06/07/2017	3	0	0	3	0	114	113	11	0	0	244	1340
07/07/2017	7	1	0	40	0	180	129	14	0	0	371	757
30/08/2017	0	62	0	0	0	2	8	0	0	60	132	584
31/08/2017	10	6	0	6	0	136	187	20	0	44	409	10311
01/09/2017	5	0	0	26	0	57	179	35	0	31	333	16511
02/09/2017	15	2	15	5	0	22	120	9	0	13	201	18934
03/09/2017	3	0	0	10	0	26	457	21	0	31	548	21513
04/09/2017	10	8	0	17	0	206	760	53	0	46	1100	22205
05/09/2017	8	2	0	34	0	154	1312	255	0	82	1847	15886
06/09/2017	9	2	0	24	0	258	2000	848	0	69	3210	3612
07/09/2017	3	0	0	4	0	4	426	28	0	16	481	2567
08/09/2017	2	0	0	1	0	17	547	49	0	5	621	4472
09/09/2017	0	0	0	5	0	1	11	2	0	0	19	8237
10/09/2017	3	0	0	13	1	6	50	16	0	0	89	4342
11/09/2017	0	0	0	1	0	82	890	219	0	2	1194	10271

Date\Species	LARGBAT SPP	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	Noise
12/09/2017	0	0	0	2	0	0	40	0	0	0	42	3169
13/10/2017	2	0	0	2	0	8	2	2	0	0	16	325
14/10/2017	1	0	0	0	0	75	23	2	0	0	101	604
15/10/2017	1	0	0	6	0	17	55	8	0	0	87	572
16/10/2017	0	0	0	1	0	44	4	0	0	0	49	1545
17/10/2017	1	0	0	3	0	19	44	6	0	0	73	1045
18/10/2017	2	0	0	2	0	5	55	5	0	0	69	1369
Grand Total	111	83	15	346	10	4230	8089	1693	2	403	14982	161152

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B27_01) is reference to transect number and the transect stop number.



Transect Summary: BACT28, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT28
Date of report :	30/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	09/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT28, Dillington

- 1.1. Grid reference: TF986154.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA13 and BA111X.

2. Description of transect

Land use at transect

- 2.1. Land use within the transect route was solely arable agriculture and consisted of a large single crop field.
- 2.2. A mature hedgerow surrounds the transect on both the eastern and western boundaries.
- 2.3. The southern boundary is adjacent to deciduous woodland.
- 2.4. The northern edge of the transect is very short and cuts across the end of the field, there is no hedgerow along this part of the transect.

Key commuting and foraging features

- 2.5. The eastern and western hedgerows provided good commuting and foraging habitat for bats.
- 2.6. The southern edge also provided opportunities for bats to forage along.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is because due to resource availability, it was not always possible to deploy detectors at the same time or on the same night the transect was carried out.

3.3. The transect was walked seven times from June to October. The static at BA111X was deployed six times for a total of 25 nights and that at BA13 five times for a total of 26 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA111X	Visit 1 - 22.06.2017	22/06/2017	23/06/2017	1
	Visit 2 - 03.07.2017	29/06/2017	03/07/2017	4
	Visit 3 - 19.07.2017	19/07/2017	24/07/2017	5
	Visit 4 - 23.08.2017	23/08/2017	28/08/2017	5
	Visit 5 - 13.09.2017	13/09/2017	18/09/2017	5
	Visit 6 - 11.10.2017	11/10/2017	16/10/2017	5
BA13	Visit 1 - 21.06.2017	21/06/2017	27/06/2017	6
	Visit 2 - 19.07.2017	19/07/2017	24/07/2017	5
	Visit 3 - 23.08.2017	23/08/2017	28/08/2017	5
	Visit 4 - 14.09.2017	14/09/2017	19/09/2017	5
	Visit 5 - 11.10.2017	11/10/2017	16/10/2017	5

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	JA, NT	21.06.17	21:18	23:20
2	Dusk	BC, CB	29.06.17	21:20	23:25
3	Dusk	GH, MP	19.07.17	21:06	22:37
4	Dusk	JG, MP	23.08.17	20:18	21:58
5	Dusk	GH, JH	13.09.17	19:21	20:31
6	Dawn	JWH, GH	14.09.17	05:08	06:20
7	Dusk	GH, JH	11.10.17	18:30	19:52

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys report 2016/131.3

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✓*	Very occasional passes, likely commuting.	Solitary calls across the summer.	N/A
Serotine	EPTSER	✓*	✓*	Single passes on just two nights. Recorded on static detector BA13 only.	Solitary calls in June and August	N/A
Large bat spp.	LARGEBATSP	✓	✓	Recorded throughout the transect.	Throughout survey season.	N/A
Myotis sp.	MYOSPP	✓*	✓	Occasional passes, the majority of recordings to the west at BA13.	Occasional passes throughout survey season; peak numbers in June.	N/A
Noctule	NYCNOC	✓*	✓	Occasional passes throughout transect but predominantly to the east in vicinity of BA111X.	Occasional passes throughout survey season, and with a peak in October.	N/A
Nathusius' pipistrelle	PIP NAT	✓*	✓*	Very occasional passes on transect and static data, with most calls (9) recorded on static detector BA111X.	Very occasional passes from June – August.	N/A
Common pipistrelle	PIPIPI	✓	✓	Frequent passes; consistently present. Lower numbers recorded on transects, more commonly recorded by static detectors - predominantly BA13.	Heard for duration of survey and season; peaking June to July.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequent passes; consistently present. Lower numbers recorded on transects, more commonly recorded by static detectors – predominantly BA13.	Heard for duration of survey from June – August.	N/A
Pipistrelle spp.	PIPSPP	✓*	✓	Frequent recordings throughout transect.	Throughout survey period.	N/A
Brown long-eared	PLEAUR	✗	✓*	Very occasional passes on from statics only.	Solitary calls in August and September.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOC	PIPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	21.06.17	21:18	23:20	22°C	21°C	BWS2	6/8	None	0	0	0	0	0	0	11	0	11
2	Dusk	29.06.17	21:20	23:25	15°C	13°C	BWS1	3/8	None	0	0	0	0	0	0	45	0	45
3	Dusk	19.07.17	21:06	22:37	21°C	21°C	BWS2	8/8	None	0	0	0	1	8	0	0	0	9
4	Dusk	23.08.17	20:18	21:58	19°C	18°C	BWS1	6/8	None	1	1	0	1	11	22	0	2	38
5	Dusk	13.09.17	19:21	20:31	11°C	10°C	BWS2	7/8	None	0	0	0	1	0	5	0	0	6
6	Dawn	14.09.17	05:08	06:20	8°C	9°C	BWS1	0/8	None	0	0	0	0	0	0	0	0	0
7	Dusk	11.10.17	18:30	19:52	16.5°C	15.5°C	BWS2	7/8	V. light drizzle	0	0	0	1	3	0	0	0	4

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	EPSTER	LARGEBATSPP	MYOSPP	NYCNOC	PIPNAT	PIPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	21.06.17	1	2	0	1	0	7	3	0	1	15	385
2	Dusk	29.06.17	0	0	1	1	0	37	17	0	0	56	1055
3	Dusk	19.07.17	0	1	0	2	0	18	0	1	2	24	548
4	Dusk	23.08.17	3	3	0	1	3	32	24	0	4	70	731
5	Dusk	13.09.17	0	1	0	0	0	8	8	0	1	18	617
6	Dawn	14.09.17	0	0	0	0	0	0	0	0	0	0	138
7	Dusk	11.10.17	0	0	0	1	0	21	0	1	1	24	1169

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consists of ambient background noise, rain, wind and other biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA13.

Deployment\Species	BARBAR	EPTSER	LARGEBA TSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	Total all bats	NOISE
Visit 1 - 21.06.2017	1	1	3	28	18	3	802	1022	53	0	1931	408
Visit 2 - 19.07.2017	1		1	0	5	0	219	443	22	0	691	45120
Visit 3 - 23.08.2017	2	1	9	2	19	0	204	456	10	2	705	21605
Visit 4 - 14.09.2017	0	0	0	0	6	0	114	14	3	0	137	1049
Visit 5 - 11.10.2017	0	0	8	0	18	0	15	14	0	0	55	18659
Grand Total	4	2	21	30	66	3	1354	1949	88	2	3519	86841

Table 7: Static data from BA point BA111X.

Deployment\Species	BARBAR	LARGEBA TSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	Total all bats	NOISE
Visit 1 - 22.06.2017	0	0	0	4	5	127	24	0	0	160	505
Visit 2 - 03.07.2017	0	10	6	9	0	373	161	10	0	569	3351
Visit 3 - 19.07.2017	0	1	0	5	1	24	47	0	0	78	1806
Visit 4 - 23.08.2017	1	1	11	7	0	23	313	7	6	369	8857
Visit 5 - 13.09.2017	0	2	1	1	0	13	8	0	1	26	1309
Visit 6 - 11.10.2017	1	9	0	55	0	26	18	0	0	109	3504
Grand Total	2	23	18	81	6	586	571	17	7	1311	19332

4.4. Bat activity by date

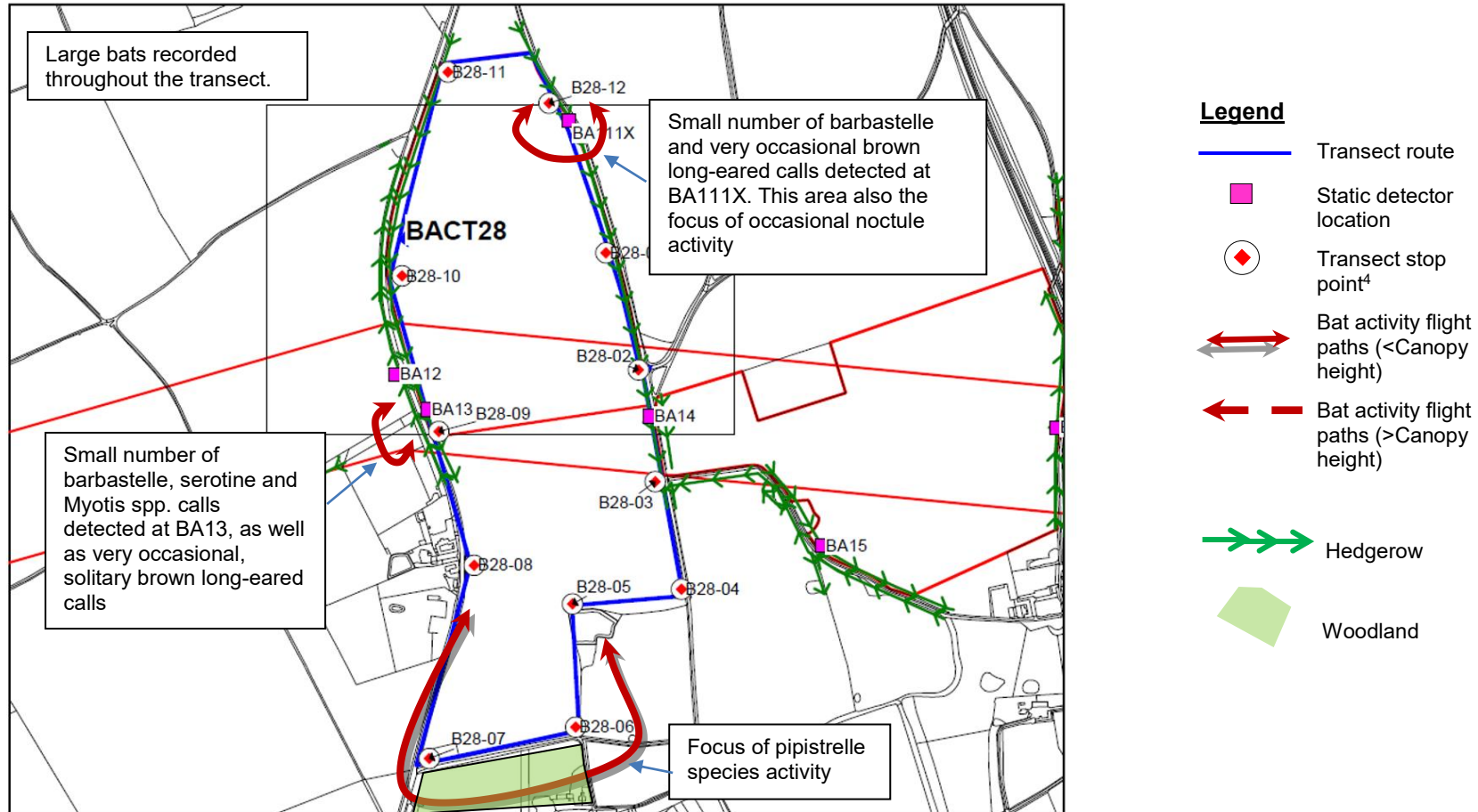
Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

Date \ Species	BARBAR	EPTSER	LARGEBATSPP	MYOSPP	NYCNOC	PIPNAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	Total all bats	NOISE
21/06/2017	0	0	0	0	0	0	4	1	0	0	5	63
22/06/2017	0	0	0	3	6	5	94	172	3	0	283	468
23/06/2017	0	1	3	14	5	1	131	253	11	0	419	176
24/06/2017	0	0	0	0	0	0	322	221	13	0	566	94
25/06/2017	1	0	0	0	0	0	205	261	13	0	491	54
26/06/2017	0	0	0	0	0	0	164	134	13	0	314	33
27/06/2017	0	0	0	0	0	0	9	4	0	0	13	25
29/06/2017	0	0	0	0	0	0	2	7	0	0	9	88
30/06/2017	0	0	3	0	0	0	44	49	2	0	103	688
01/07/2017	0	0	1	0	0	0	34	47	1	0	85	543
02/07/2017	0	0	0	0	0	0	148	46	2	0	201	1086
03/07/2017	0	0	6	0	0	0	145	12	5	0	171	946
19/07/2017	0	0	1	0	0	0	41	94	10	0	147	2332
20/07/2017	0	0	0	0	0	0	85	84	7	0	178	9751
21/07/2017	0	0	0	0	0	0	13	8	0	0	23	9879
22/07/2017	0	0	1	0	0	0	8	33	0	0	47	9179
23/07/2017	0	0	0	0	0	0	67	177	2	0	247	8732
24/07/2017	1	0	0	0	0	0	29	94	3	0	127	7053
23/08/2017	0	0	3	0	0	0	77	341	9	0	430	2810
24/08/2017	1	1	2	1	9	0	33	117	0	2	166	10296
25/08/2017	1	0	0	0	7	0	0	133	0	2	183	3795
26/08/2017	0	0	0	0	2	0	0	153	0	0	231	6683
27/08/2017	1	0	0	0	7	0	0	18	0	4	56	4761
28/08/2017	0	0	0	0	1	0	0	7	0	0	8	2117

Date \ Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	Total all bats	NOISE
13/09/2017	0	0	0	0	0	0	0	0	0	0	0	79
14/09/2017	0	0	0	1	0	0	48	9	1	1	60	688
15/09/2017	0	0	1	0	1	0	13	0	0	0	15	371
16/09/2017	0	0	0	0	0	0	15	0	0	0	15	298
17/09/2017	0	0	1	0	6	0	17	12	0	0	38	420
18/09/2017	0	0	0	0	0	0	34	1	0	0	35	298
19/09/2017	0	0	0	0	0	0	0	0	0	0	0	204
11/10/2017	0	0	1	0	2	0	0	0	0	0	3	640
12/10/2017	0	0	3	0	8	0	2	7	0	0	20	2642
13/10/2017	0	0	3	0	5	0	4	5	0	0	17	3248
14/10/2017	0	0	1	0	11	0	23	6	0	0	41	5765
15/10/2017	1	0	2	0	22	0	10	9	0	0	44	6502
16/10/2017	0	0	7	0	25	0	2	5	0	0	39	3366
Grand Total	6	2	44	48	147	9	1940	2520	105	9	4830	106173

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B28_01) is reference to transect number and the transect stop number.



Transect Summary: BACT29, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT29
Date of report :	30/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	10/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT29, Sparham

- 1.1. Grid reference: TG062203.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA25 & BA26.

2. Description of transect

Land use at transect

- 2.1. The land in and around the transect route is used for arable agriculture.
- 2.2. To the south of the transect a small strip of mixed woodland exists.
- 2.3. To the north, the transect borders a patch of deciduous woodland which surrounds a large pond fed by a stream running east – west.
- 2.4. The western edge of the transect runs parallel to a farm track and established hedgerow.
- 2.5. An established native species hedgerow runs along the entire length of the eastern boundary.

Key commuting and foraging features

- 2.6. The western hedgerow has good connectivity within the wider landscape with other linear features and patches of deciduous woodland.
- 2.7. The stream which runs along the north also has good links to other nearby linear features and joins to a large patch of woodland to the north-west of the transect.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. Due to resource availability, it was not always possible to deploy detectors at the same time or on the same night that the transect was carried out.

3.3. The transect was walked six times from April to October. The statics at BA25 & BA26 were deployed five times, for a total of 26 nights each.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA25	Visit 1 - 04/07/2017	04/07/2017	10/07/2017	6
	Visit 2 - 11/08/2017	11/08/2017	15/08/2017	4
	Visit 3 - 30/08/2017	30/08/2017	04/09/2017	5
	Visit 4 - 05/09/2017	05/09/2017	12/09/2017	7
	Visit 5 - 02/10/2017	02/10/2017	06/10/2017	4
BA26	Visit 1 - 04/07/2017	04/07/2017	05/07/2017	1
	Visit 2 - 11/08/2017	11/08/2017	16/08/2017	5
	Visit 3 - 30/08/2017	30/08/2017	04/09/2017	5
	Visit 4 - 04/09/2017	04/09/2017	12/09/2017	8
	Visit 5 - 02/10/2017	02/10/2017	09/10/2017	7

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, BB	04/07/17	21:20	23:11
2	Dusk	KC, BM	11/08/17	20:23	21:25
3	Dusk	JG, CB	30/08/17	19:48	21:35
4	Dusk	BM, AV	04/09/17	19:36	21:30
5	Dawn	BM, AV	05/09/17	04:15	06:03
6	Dusk	JG, CB	02/10/17	18:31	20:34

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	X	N/A	N/A	N/A
Serotine	EPTSER	X	✓*	Single pass recorded at BA25.	Recorded once in August in the early hours of the morning.	N/A
Large bat	LARGEBA TSPP	✓*	X	5 passes recorded on the transects, one in July and four in September.	July and September only.	N/A
Leislars	NYCLEI	X	✓	Recorded on each of the static detectors.	Static detectors recorded throughout the night.	N/A
Myotis sp.	MYOSPP	✓*	✓	Recorded on each of the static detectors and once in July on the transect.	Static detectors recorded throughout the night with majority of recordings throughout August.	N/A
Noctule	NYCNOC	✓	✓	Recorded across the entire transect with recordings on each static detectors with occasional passes recorded by surveyors.	In August and July recorded only in the early hours of the morning then in September appeared close to sunset.	N/A
Nathusius' pipistrelle	PIP NAT	X	✓*	Recorded twice on BA25.	Recorded twice in July at approximately 9pm.	N/A
Common pipistrelle	PIPPIP	✓	✓	Continual foraging and commuting recorded by both BA points and surveyors.	Constant activity from start to finish.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Continual foraging and commuting recorded by both BA points (majority at BA25) and surveyors.	Constant activity from start to finish.	N/A
Pipistrelle spp.	PIPSPP	✓	X	Only recorded by transect surveys	Throughout the survey period	N/A
Brown long-eared	PLEAUR	X	✓*	Single pass recorded at BA25.	Recorded once in September in the early hours of the morning.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOG	PIPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	04.07.17	21:20:00	23:11:00	18°C	18°C	BS0	7/8	None	0	0	0	0	8	9	8	2	27
2	Dusk	11.08.17	20:23:00	21:25:00	16°C	17°C	BS0	7/8	None	0	0	0	0	7	1	0	0	8
3	Dusk	30.08.17	19:48:00	21:35:00	12°C	11°C	BS1	1/8	Drizzle at start	0	0	0	0	0	0	0	0	0
4	Dusk	04.09.17	19:36:00	21:30:00	13°C	18°C	BS0	5/8	None	0	0	0	0	9	5	2	0	16
5	Dawn	05.09.17	04:15:00	06:03:00	15°C	17°C	BS0	8/8	None	0	0	0	0	2	1	3	0	6
6	Dusk	02.10.17	18:31:00	20:34:00	14°C	13°C	BS4	8/8	None	0	0	0	0	0	4	1	0	5

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	LARGE BATS ¹	MYOSPP	NYCNOG	PIPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	04.07.17	1	1	6	24	46	3	2	83	689
2*	Dusk	11.08.17									
3	Dusk	30.08.17	0	0	0	5	2	1	1	9	1239
4	Dawn	04.09.17	1	0	0	17	27	1	2	48	1134
5	Dusk	05.09.17	3	0	10	1	10	0	3	27	1285
6	Dusk	02.10.17	0	0	0	1	1	0	3	5	920

*Equipment (microphone) failure at this deployment

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consists of ambient background noise, rain, wind and other biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA25.

Deployment\Species	EPTSER	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 04/07/2017	0	0	0	22	2	133	468	0	47	672	633
Visit 2 - 11/08/2017	0	0	0	0	0	0	0	0	0	0	4082
Visit 3 - 30/08/2017	1	1	19	48	0	24	44	1	90	228	1889
Visit 4 - 05/09/2017	0	6	96	134	0	216	369	0	140	961	11711
Visit 5 - 02/10/2017	0	0	0	0	0	22	60	0	5	87	5898
Grand Total	1	7	115	204	2	395	941	1	282	1948	24213

Table 7: Static data from BA point BA26.

Deployment\Species	MYOSPP	NYCLEI	NYCNOC	PIPIPI	PIPPYG	OTHER	Total all bats	NOISE
Visit 1 - 04/07/2017	0	0	0	15	7	4	26	39
Visit 2 - 11/08/2017	3	2	9	65	77	9	165	114375
Visit 3 - 30/08/2017	0	67	32	53	42	45	239	87198
Visit 4 - 04/09/2017	0	6	1	18	12	7	44	103772
Visit 5 - 02/10/2017	1	0	2	10	19	2	34	4689
Grand Total	4	75	44	161	157	67	508	310073

4.4. Bat activity by date

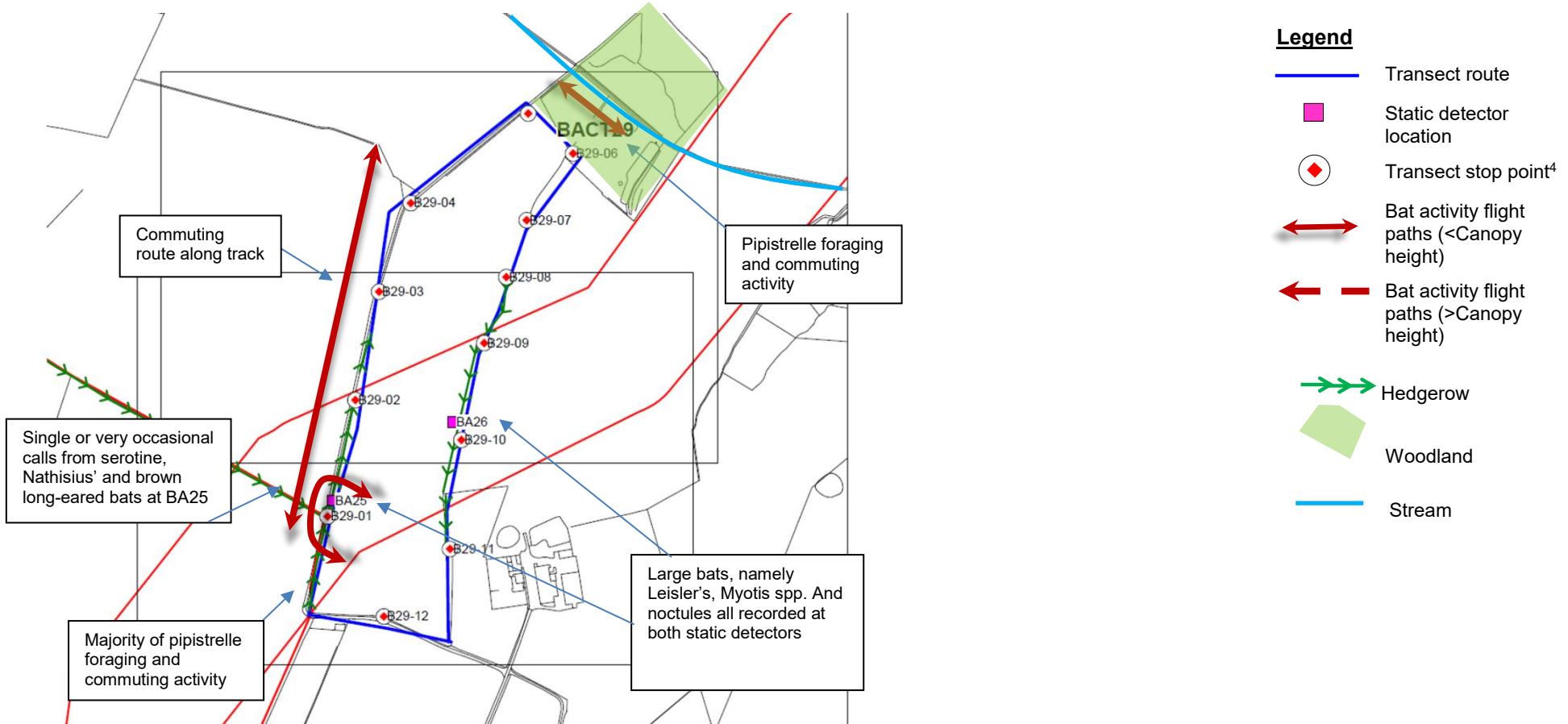
Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

DateSpecies	EPTSER	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PLEAUR	OTHER	Total all bats	NOISE
04/07/2017	0	0	0	10	0	44	136	0	11	201	189
05/07/2017	0	0	0	4	0	32	90	0	6	132	149
06/07/2017	0	0	0	3	0	16	68	0	11	98	134
07/07/2017	0	0	0	0	1	10	30	0	1	42	40
08/07/2017	0	0	0	0	0	31	19	0	7	57	44
09/07/2017	0	0	0	5	1	15	132	0	15	168	116
11/08/2017	0	0	0	0	0	3	4	0	1	8	23428
12/08/2017	0	0	0	3	0	5	1	0	1	10	24559
13/08/2017	0	1	0	1	0	15	20	0	2	39	25381
14/08/2017	0	2	2	0	0	30	45	0	1	80	28328
15/08/2017	0	0	0	5	0	12	7	0	4	28	16761
30/08/2017	1	0	18	35	0	3	2	0	71	130	17903
31/08/2017	0	1	65	41	0	30	49	1	47	234	9795
01/09/2017	0	0	0	0	0	10	16	0	102	312	19438
02/09/2017	0	0	0	0	0	71	77	0	16	193	9269
03/09/2017	0	0	0	0	0	161	258	0	20	446	31677
04/09/2017	0	0	0	0	0	13	10	0	3	29	35842
05/09/2017	0	0	0	0	0	6	10	0	4	27	8894
06/09/2017	0	0	0	0	0	3	2	0	8	24	30707
07/09/2017	0	0	0	0	0	9	15	0	9	41	24143
08/09/2017	0	0	0	0	0	2	11	0	1	15	2927
09/09/2017	0	0	0	0	0	3	14	0	1	18	1817
10/09/2017	0	0	0	0	0	0	3	0	0	3	7281
11/09/2017	0	0	0	0	0	0	0	0	0	0	4877

Date\Species	EPTSER	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PLEAUR	OTHER	Total all bats	NOISE
02/10/2017	0	0	0	0	0	0	0	0	0	0	5229
03/10/2017	0	0	0	1	0	0	0	0	1	2	522
04/10/2017	0	0	0	0	0	0	0	0	0	0	2350
05/10/2017	0	0	0	0	0	15	27	0	1	43	947
06/10/2017	0	0	0	0	0	12	41	0	3	56	1391
07/10/2017	0	0	0	0	0	0	0	0	0	0	60
08/10/2017	0	1	0	1	0	5	11	0	2	20	88
Grand Total	1	11	190	248	2	556	1098	1	349	2456	334286

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B29_01) is reference to transect number and the transect stop number.



Transect Summary: BACT30, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT30
Date of report :	30/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	10/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT30, Reepham

- 1.1. Grid reference: TG074228.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA64X & BA87X.

2. Description of transect

Land use at transect

- 2.1. The transect route surrounds an area of land used for arable agriculture.
- 2.2. Along the northern edge runs the Marriott's Way, a dis-used railway, now a footpath, lined with trees and shrubs.
- 2.3. The eastern and southern edges are bordered by a road with minimal trees and no hedgerow separating the road from the fields.
- 2.4. The south-western and western borders of the transect run parallel with established native species rich hedgerow which separate the arable land from domestic gardens.

Key commuting and foraging features

- 2.5. Along the northern section of the transect is an optimal commuting and foraging habitat for bats. Due to the nature of its design, the old tree lined railway embankments provide cover from the weather for bats.
- 2.6. The south-western and western lengths of the transect also provide good foraging habitat for bats.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked seven times from May to October. The static at BA64X was deployed six times for a total of 36 nights and the static at BA87X was deployed five times for a total of 30 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA64X	Visit 1 - 26/05/2017	26/05/2017	06/06/2017	11
	Visit 2 - 28/06/2017	28/06/2017	04/07/2017	6
	Visit 3 - 27/07/2017	27/07/2017	31/07/2017	4
	Visit 4 - 25/08/2017	25/08/2017	30/08/2017	5
	Visit 5 - 20/09/2017	20/09/2017	25/09/2017	5
	Visit 6 - 19/10/2017	19/10/2017	24/10/2017	5
BA87X	Visit 1 - 28/06/2017	28/06/2017	04/07/2017	6
	Visit 2 - 25/07/2017	25/07/2017	31/07/2017	6
	Visit 3 - 22/08/2017	22/08/2017	29/08/2017	7
	Visit 4 - 19/09/2017	19/09/2017	25/09/2017	6
	Visit 5 - 19/10/2017	19/10/2017	24/10/2017	5

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BM, KC	26/05/17	21:04	22:59
2	Dusk	SM, MP	29/06/17	21:24	23:31
3	Dusk	CB, AV	25/07/17	20:58	22:40
4	Dusk	BM, AV	22/08/17	20:05	22:01
5	Dusk	BM, CB	19/09/17	19:12	20:25
6	Dawn	BM, CB	20/09/17	03:52	06:02
7	Dusk	BM, CB	19/10/17	17:49	18:51

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✗	✓*	Recorded by both static detector points.	Four passes recorded only in June and September	N/A
Serotine	EPTSER	✗	✓	Recorded by both static detector points.	Two passes recorded only in May and June	N/A
Leislars	NYCLEI	✓*	✓	Recorded by both static detector point and once on the transects.	Static detectors recorded passes only in the early hours of the morning.	N/A
Myotis sp.	MYOSPP	✓	✓	Occasional passes recorded foraging in the SW of the transect	Static detectors recorded activity approximately an hour after sunset.	N/A
Noctule	NYCNOC	✓	✓	Majority of activity recorded by static BA64X in NE of transect.	Usually heard very close to sunset and again near sunrise.	N/A
Nathusius' pipistrelle	PIPNAT	✓	✓	Occasional passes recorded by both static points and during transects.	Majority of recorded activity took place in one night in August with only occasional passes recorded in July and September.	N/A
Common pipistrelle	PIPPIP	✓	✓	Throughout the transect, especially prevalent along the northern and SW boundaries.	Throughout the survey period.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Majority recorded along the northern and SW boundaries.	Throughout the survey period with numbers dropping in August and October.	N/A
Pipistrelle spp.	PIPSPP	✓	✗	Throughout the transect.	Throughout the survey period.	N/A
Brown long-eared	PLEAUR	✓*	✓	Occasional passes throughout the transect.	Recorded throughout the night from July onwards	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	PIPSPP	PIPIP	PIPPYG	MYOSPP	OTHER ²	Total all bats
1	Dusk	26.05.17	21:04	22:59	17°C	15°C	BS2	0/8	None	0	2	12	1	1	0	16
2	Dusk	29.06.17	21:24	23:31	13°C	13°C	BS3	8/8	Drizzle for first 10 minutes then dry.	0	0	28	1	0	0	29
3	Dusk	25.07.17	20:58	22:40	16°C	13°C	BS0	0/8	None	0	17	28	1	0	0	46
4	Dusk	22.08.17	20:05	22:01	17°C	16°C	BS1	6/8	None	0	5	13	3	0	0	21
5	Dusk	19.09.17	19:12	20:25	16°C	10°C	BS0	0/8	None	0	2	31	4	0	0	37
6	Dawn	20.09.17	03:52	06:02	6°C	6°C	BS0	0/8	None	0	0	0	0	0	0	0
7	Dusk	19.10.17	17:49	18:51	16°C	15°C	BS3	8/8	None	0	2	5	2	0	1	10

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	NYCNOC	PIP NAT	PIPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	26.05.17	1	0	24	2	0	0	27	346
2	Dusk	29.06.17	1	0	155	3	1	3	163	539
3	Dusk	25.07.17	0	0	0	0	0	0	0	419
4	Dusk	22.08.17	1	17	54	4	1	2	79	1258
5	Dusk	19.09.17	0	2	46	6	2	6	62	338
6	Dawn	20.09.17	0	0	0	0	0	0	0	403
7	Dusk	19.10.17	0	0	15	3	0	1	19	498

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consists of ambient background noise, rain, wind and other biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA64X.

Deployment/Species	BARBAR	EPTSER	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 26.05.2017	1	1	0	3	347	0	2365	178	0	85	2980	7669
Visit 2 - 28.06.2017	0	0	0	0	91	2	1333	41	0	174	1641	8313
Visit 3 - 27.07.2017	0	0	0	0	0	0	0	0	0	0	0	64
Visit 4 - 25.08.2017	0	0	2	0	4	0	159	6	1	6	178	87440
Visit 5 - 20.09.2017	1	0	1	1	140	0	1091	365	78	918	2595	4239
Visit 6 - 19.10.2017	0	0	0	9	4	0	5	4	0	6	28	2878
Grand Total	2	1	3	13	586	2	4953	594	79	1189	7422	110603

Table 7: Static data from BA point BA87X.

Deployment/Species	BARBAR	EPTSER	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 28.06.2017	1	1	0	1	26	0	440	38	0	21	528	1856
Visit 2 - 25.07.2017	0	0	0	0	2	1	6541	285	3	127	6959	6091
Visit 3 - 22.08.2017	0	0	0	0	0	0	0	0	0	0	0	71
Visit 4 - 19.09.2017	0	0	0	2	32	0	1960	28	22	245	2289	20154
Visit 5 - 19.10.2017	0	0	1	3	10	0	166	38	3	22	243	4749
Grand Total	1	1	1	6	70	1	9107	389	28	415	10019	32921

4.4. Bat activity by date

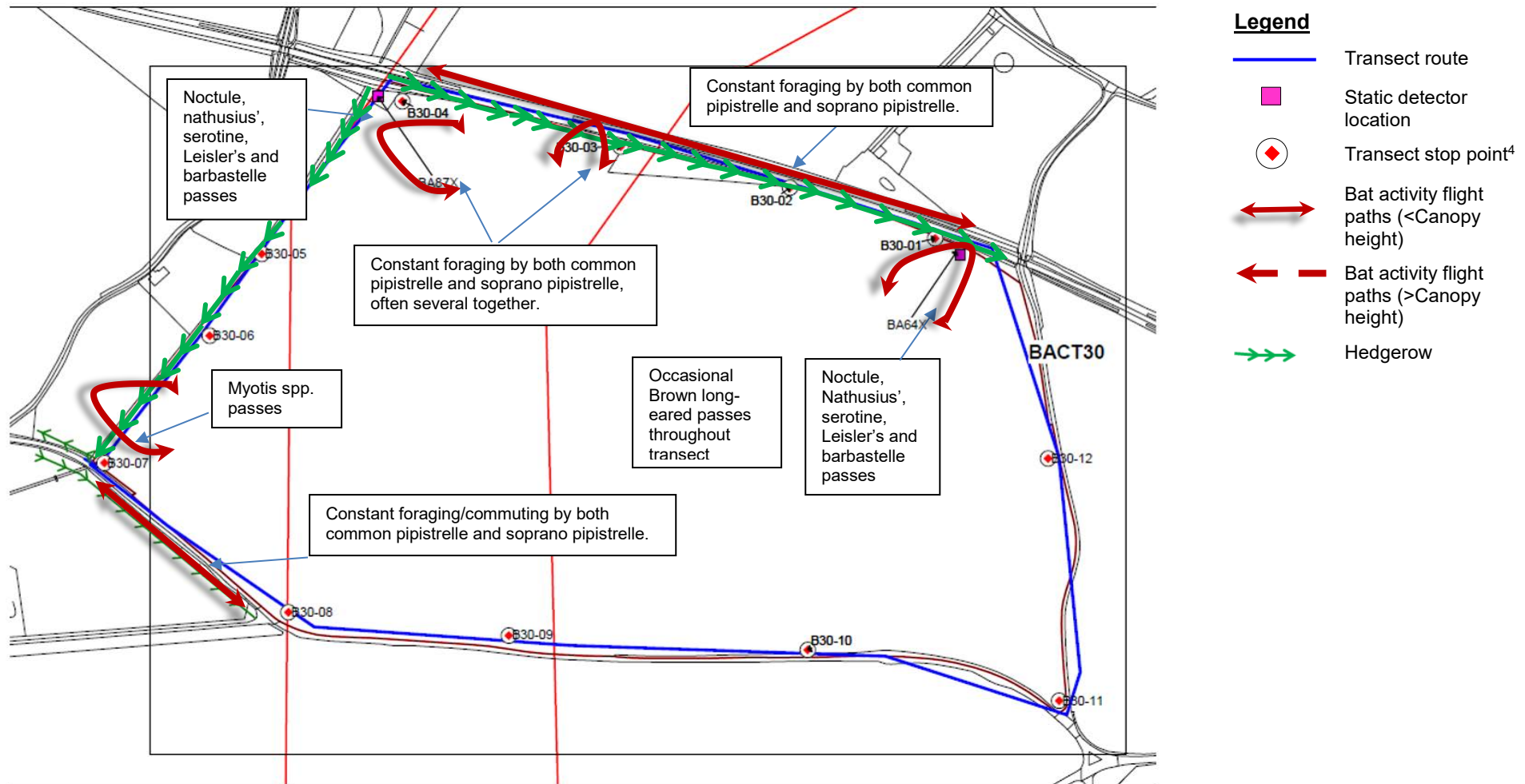
Table 8: Number of registrations of species recorded each calendar day of deployment across all statics.

Date/Species	BARBAR	EPTSER	MYOSPP	OTHER	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	Total all bats	Noise
26/05/2017	0	0	0	3	0	6	0	30	1	0	40	315
27/05/2017	0	0	0	8	1	83	0	90	0	0	182	471
28/05/2017	0	0	0	7	0	21	0	188	18	0	234	770
29/05/2017	0	0	0	3	0	12	0	302	18	0	335	364
30/05/2017	0	1	0	11	0	45	0	312	28	0	397	501
31/05/2017	0	0	0	8	0	0	0	188	25	0	221	494
01/06/2017	0	0	0	15	2	33	0	447	20	0	517	596
02/06/2017	1	0	0	6	0	30	0	250	5	0	292	560
03/06/2017	0	0	0	14	0	61	0	262	40	0	377	1435
04/06/2017	0	0	0	9	0	50	0	295	23	0	377	641
05/06/2017	0	0	0	1	0	6	0	1	0	0	8	1522
28/06/2017	0	0	0	6	0	3	0	31	0	0	40	752
29/06/2017	1	1	0	22	0	22	0	156	24	0	226	1382
30/06/2017	0	0	0	57	0	50	0	414	20	0	541	2468
01/07/2017	0	0	0	33	1	30	0	393	8	0	465	1747
02/07/2017	0	0	0	28	0	5	1	289	18	0	341	1642
03/07/2017	0	0	0	49	0	7	1	490	9	0	556	2178
25/07/2017	0	0	0	7	0	1	0	485	21	0	514	552
26/07/2017	0	0	0	41	0	0	1	2445	168	2	2657	1007
27/07/2017	0	0	0	46	0	0	0	1620	44	1	1711	2069
28/07/2017	0	0	0	19	0	0	0	1701	16	0	1736	784
29/07/2017	0	0	0	12	0	1	0	252	35	0	300	1196
30/07/2017	0	0	0	2	0	0	0	38	1	0	41	547
22/08/2017	0	0	0	0	0	0	0	0	0	0	0	56
23/08/2017	0	0	0	0	0	0	0	0	0	0	0	3

Date/Species	BARBAR	EPTSER	MYOSPP	OTHER	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	Total all bats	Noise
24/08/2017	0	0	0	0	0	0	0	1	0	0	1	953
25/08/2017	0	0	0	0	0	1	0	22	0	0	23	11458
26/08/2017	0	0	2	2	0	3	0	31	1	0	39	22100
27/08/2017	0	0	0	1	0	0	0	31	1	0	33	29257
28/08/2017	0	0	0	3	0	0	0	58	4	1	66	19082
29/08/2017	0	0	0	0	0	0	0	16	0	0	16	4602
19/09/2017	0	0	0	18	1	13	0	53	1	1	87	1402
20/09/2017	0	0	0	18	0	10	0	102	86	2	218	2840
21/09/2017	0	0	0	43	0	6	0	242	8	2	301	3151
22/09/2017	0	0	0	55	0	9	0	591	88	15	758	4994
23/09/2017	1	0	1	180	2	15	0	1103	50	14	1366	7544
24/09/2017	0	0	0	849	0	119	0	960	160	66	2154	4462
19/10/2017	0	0	0	0	0	0	0	1	0	0	1	1766
20/10/2017	0	0	0	0	0	2	0	2	1	0	5	1257
21/10/2017	0	0	0	6	3	0	0	53	3	0	65	2884
22/10/2017	0	0	1	17	0	11	0	111	35	3	178	1195
23/10/2017	0	0	0	5	9	1	0	4	3	0	22	525
Total	3	2	4	1604	19	656	3	14060	983	107	17441	143524

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B30_01) is reference to transect number and the transect stop number.



Transect Summary: BACT31, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT31 FINAL
Date of report :	30/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	10/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT31, Aylsham, River Bure

- 1.1. Grid reference: TG196288.
1.2. Transect designation: High quality.
1.3. Static detectors: BA67X, BA68X & BA114X

2. Description of transect

Land use at transect

- 2.1. The south-western corner of the transect follows the length of an arable field. This area is at the highest altitude of the transect.
- 2.2. A patch of mature deciduous woodland lies adjacent to the south-west of the transect.
- 2.3. The remainder of the transect is situated at a lower altitude and bordered on its outer edge by the river Bure. It consists of wet, grazed grassland.
- 2.4. The low lying wet grassland contained abundant scattered dead (and living) trees with plenty of roost features for bats, although none were spotted entering or leaving.
- 2.5. The grassland is divided by cut ditches to improve drainage and in the lowest lying parts are scattered ephemeral pools.

Key commuting and foraging features

- 2.6. The River Bure which borders the transect from the north border all the way around to the eastern border provides an excellent foraging and commuting route for bats due to its linear characteristics and bankside tree line.
- 2.7. The river is of particular interest for foraging Daubenton's which appear to forage most in areas where the river is widest due to cattle poaching.
- 2.8. The short section along the south-western edge bordering the small patch of mature deciduous woodland proved excellent foraging ground for Pipistrelles.
- 2.9. Centrally, an established, native, species-rich hedge bordered the arable field, and was favored by bats as both a commuting and foraging route.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked ten times from June to October. The static at BA67X was deployed six times for a total of 38 nights, the static at BA68X was deployed seven times for a total of 48 nights and the static at BA114X was deployed five times for a total of 27 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA67X	Visit 1 - 12/06/2017	12/06/2017	19/06/2017	7
	Visit 2 - 26/06/2017	26/06/2017	30/06/2017	4
	Visit 3 - 12/07/2017	12/07/2017	17/07/2017	5
	Visit 4 - 26/07/2017	26/07/2017	03/08/2017	8
	Visit 5 - 31/08/2017	31/08/2017	06/09/2017	6
	Visit 6 - 09/10/2017	09/10/2017	17/10/2017	8
BA68X	Visit 1 - 12/06/2017	12/06/2017	19/06/2017	7
	Visit 2 - 26/06/2017	26/06/2017	30/06/2017	4
	Visit 3 - 12/07/2017	12/07/2017	17/07/2017	5
	Visit 4 - 26/07/2017	26/07/2017	03/08/2017	8
	Visit 5 - 23/08/2017	23/08/2017	29/08/2017	6
	Visit 6 - 15/09/2017	15/09/2017	25/09/2017	10
	Visit 7 - 09/10/2017	09/10/2017	17/10/2017	8
BA114X	Visit 1 - 26/06/2017	26/06/2017	30/06/2017	4
	Visit 2 - 12/07/2017	12/07/2017	17/07/2017	5
	Visit 3 - 26/07/2017	26/07/2017	03/08/2017	8
	Visit 4 - 01/09/2017	01/09/2017	06/09/2017	5
	Visit 5 - 25/10/2017	25/10/2017	30/10/2017	5

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	KC, BM	12.06.17	21:18:00	23:18:00
2	Dusk	RM, AV	26.06.17	21:24:00	22:28:00
3	Dusk	BM, AV	12.07.17	21:15:00	23:18:00
4	Dusk	BM, AV	26.07.17	20:56:00	22:58:00
5	Dusk	BM, AV	23.08.17	20:03:00	21:54:00
6	Dusk	JWH, BM	31.08.17	20:52:00	21:56:00
7	Dawn	JWH, BM	01.09.17	04:02:00	05:45:00
8	Dusk	KC, JH	15.09.17	19:41:00	20:37:00
9	Dusk	KC, CB	09.10.17	18:12:00	20:19:00
10	Dusk	BM, ML	25.10.17	17:32:00	19:35:00

¹ Surveyor initials are referenced with full names in Appendix 7 in the overarching Norfolk Vanguard Bat Activity Surveys Report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✓*	Very occasional passes, likely commuting.	Solitary calls across the summer	N/A
Serotine	EPTSER	✓*	✓*	Occasional passes recorded by surveyors on transects and by BA67X and BA114X.	Occasional passes throughout survey season	N/A
Large bat spp.	LARGEBATSP	✓*	✗	Occasional passes.	Occasional dusk passes towards end of survey season	N/A
Myotis sp.	MYOSPP	✓*	✓*	Majority of recordings to the east at BA67X.	Passes throughout survey season; peak numbers in July and October	N/A
Noctule	NYCNOC	✓*	✓	Passes throughout transect but majority at the eastern and western boundaries at BA67X and BA68X.	Passes throughout survey season and throughout the night, earliest calls very close to sunset.	N/A
Nathusius' pipistrelle	PIP NAT	✗	✓*	Occasional passes with majority of recordings at BA114X.	Majority of passes from June - July	N/A
Common pipistrelle	PIPIPI	✓	✓	Frequent passes; consistently present. Lower numbers recorded on transects, more commonly recorded by statics - predominantly BA68X.	Heard for duration of survey and season; peaking June to July.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequent passes; consistently present. Lower numbers recorded on transects, more commonly recorded by statics – highest numbers at BA67X and BA68X.	Heard for duration of survey season with numbers dropping away in August.	N/A
Pipistrelle spp.	PIPSPP	✓	✗	Several recordings throughout the transect.	Throughout the survey season	N/A
Brown long-eared	PLEAUR	✗	✓*	Occasional passes on from statics only with majority recorded at BA67X	Occasional passes throughout survey season	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOG	PIPPIP	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	12.06.17	21:18:00	23:18:00	16.1°C	13°C	BS1	7/8	None	0	1	2	1	16	14	2	0	36
2	Dusk	26.06.17	21:24:00	22:28:00	13°C	11°C	BS1	3/8	None	0	0	1	1	8	8	3	0	21
3	Dusk	12.07.17	21:15:00	23:18:00	12°C	12°C	BS0	1/8	Misty	0	2	0	0	2	6	9	1	20
4	Dusk	26.07.17	20:56:00	22:58:00	18°C	17°C	BS3	6/8	None	0	0	0	0	14	5	5	0	24
5	Dusk	23.08.17	20:03:00	21:54:00	17°C	18°C	BS0	8/8	None	0	0	3	1	8	0	4	0	16
6	Dusk	31.08.17	20:52:00	21:56:00	13°C	13°C	BS0	2/8	None	0	0	1	0	10	21	1	0	33
7	Dawn	01.09.17	04:02:00	05:45:00	11°C	8°C	BS0	0/8	None	0	0	0	0	2	0	0	0	2
8	Dusk	15.09.17	19:41:00	20:37:00	13°C	12°C	BS0	2/8	None	0	0	5	0	11	12	1	3	32
9	Dusk	09.10.17	18:12:00	20:19:00	13°C	12°C	BS3	4/8	None	0	1	11	1	28	27	3	0	71
10	Dusk	25.10.17	17:32:00	19:35:00	15°C	14°C	BS1	7/8	None	0	2	6	4	26	1	2	0	41

² All bats not identified to species level.

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	BARBAR	EPSTER	LARGEBATSP	MYOSPP	NYCNOC	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	12.06.17	0	0	1	0	2	4	2	0	0	9	265
2	Dusk	26.06.17	0	0	0	0	0	0	0	0	0	0	1353
3	Dusk	12.07.17	0	0	0	0	0	19	4	2	0	25	154
4	Dusk	26.07.17	1	0	0	0	1	62	22	1	3	90	691
5	Dusk	23.08.17	0	0	0	0	3	9	3	0	2	17	693
6	Dusk	31.08.17	1	0	0	1	5	26	57	1	6	97	1227
7	Dawn	01.09.17	0	0	0	0	0	0	7	0	1	8	740
8	Dusk	15.09.17	0	0	0	0	0	8	9	0	3	20	467
9	Dusk	09.10.17	0	1	3	0	1	100	126	7	1	239	448
10*	Dusk	25.10.17											

*Data corrupted during recording

³ Non bat files analysed by Kaleidoscope software which consists of ambient background noise, rain, wind and other biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA67X.

Deployment\Species	BARBAR	EPTSER	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	Total all bats	NOISE
Visit 1 - 12.06.2017	1	4	4	2	101	6	59	192	2	371	1055
Visit 2 - 26.06.2017	0	0	4	0	6	0	3	252	6	271	2715
Visit 3 - 12.07.2017	0	0	14	3	32	0	88	423	4	564	1091
Visit 4 - 26.07.2017	1	3	108	1	113	2	38	1977	8	2251	7496
Visit 5 - 31.08.2017	2	5	7	15	157	0	57	667	3	913	3012
Visit 6 - 09.10.2017	0	0	381	1	64	9	193	1267	10	1925	6277
Grand Total	4	12	518	22	473	17	438	4778	33	6295	21646

Table 7: Static data from BA point BA68X.

Deployment\Species	BARBAR	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	Total all bats	NOISE
Visit 1 - 12.06.2017	0	0	1	268	1	3386	807	0	4463	2108
Visit 2 - 26.06.2017	0	0	0	49	0	859	154	1	1063	1152
Visit 3 - 12.07.2017	0	0	1	13	2	2636	1618	2	4272	3208
Visit 4 - 26.07.2017	0	0	0	74	0	6269	704	0	7047	8281
Visit 5 - 23.08.2017	1	1	1	27	0	469	27	1	527	3644
Visit 6 - 15.09.2017	0	0	0	15	1	1940	58	0	2014	12789
Visit 7 - 09.10.2017	0	0	0	0	0	2128	1236	0	3364	3984
Grand Total	1	1	3	446	4	17687	4604	4	22750	35166

Table 8: Static data from BA point BA114X.

Deployment\Species	BARBAR	EPTSER	MYOSPP	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	Total All Bats	NOISE
Visit 1 - 26.06.2017	0	1	0	0	19	48	1384	958	10	2420	846
Visit 2 - 12.07.2017	0	1	1	0	8	25	580	304	1	920	2603
Visit 3 - 26.07.2017	0	0	0	0	13	0	127	55	0	195	4977
Visit 4 - 01.09.2017	0	0	2	1	30	0	156	67	4	260	1403
Visit 5 - 25.10.2017	1	0	6	0	103	0	88	89	2	289	3015
Grand Total	1	2	9	1	173	73	2335	1473	17	4084	12844

4.4. Bat activity by date

Table 9: Number of registrations of species recorded each calendar day of deployment across all statics.

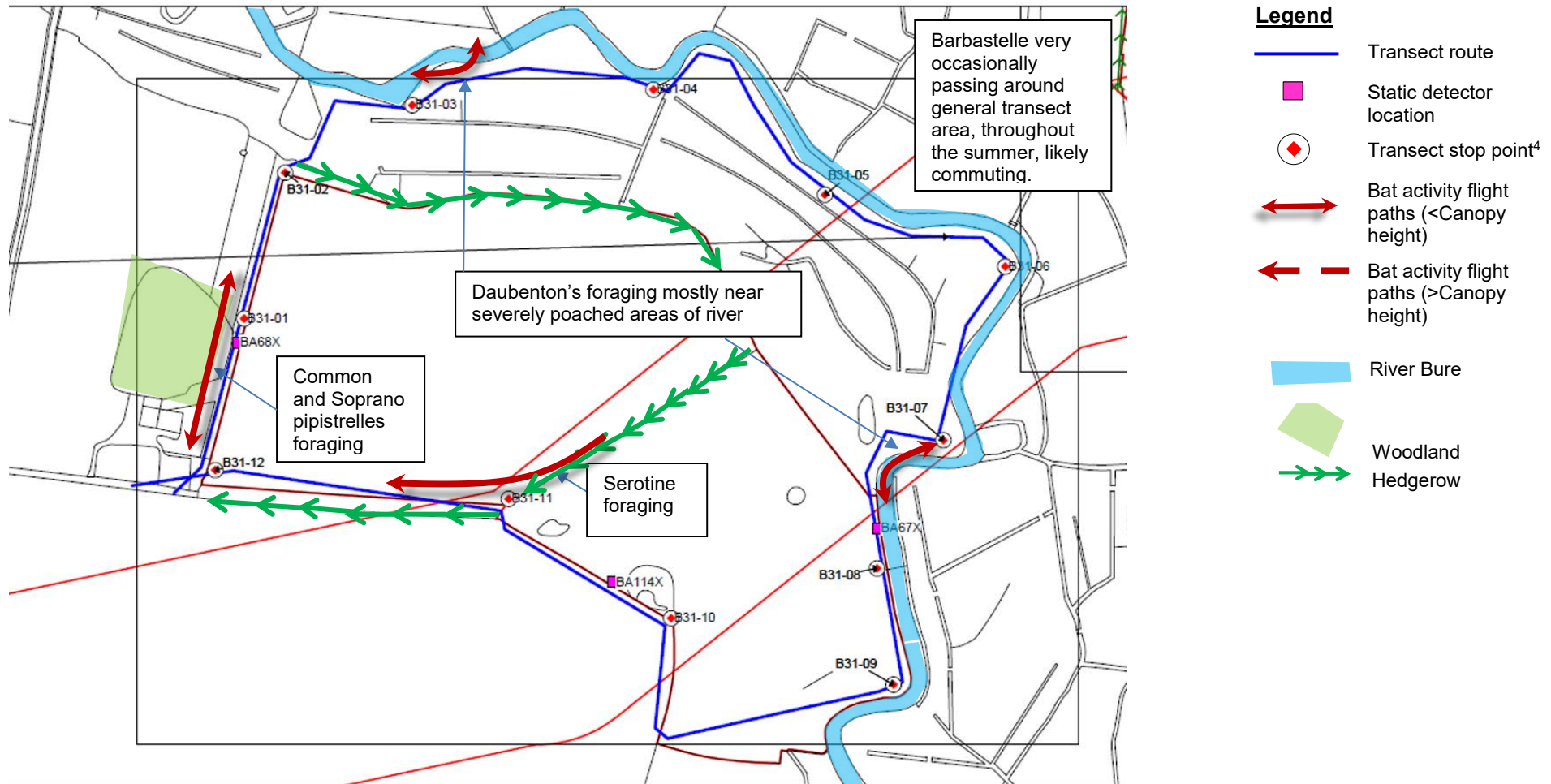
Date/Species	BARBAR	EPTSER	MYOSPP	OTHER	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	Total all bats	NOISE
12/06/2018	0	0	1	19	1	207	1	340	287	0	856	683
13/06/2018	1	0	0	28	0	57	0	716	258	0	1060	535
14/06/2018	0	2	1	17	0	22	0	506	266	1	815	530
15/06/2018	0	0	0	15	0	8	0	645	100	0	768	492
16/06/2018	0	0	1	26	0	30	4	574	31	1	667	425
17/06/2018	0	1	0	21	2	31	0	49	32	0	136	207
18/06/2018	0	1	1	12	0	14	2	615	25	0	670	291
26/06/2018	0	0	4	64	0	39	0	466	295	7	875	3150
27/06/2018	0	0	0	245	0	7	48	1366	957	8	2631	930
28/06/2018	0	0	0	10	0	11	0	248	7	0	276	364
29/06/2018	0	1	0	11	0	17	0	166	105	2	302	269
12/07/2018	0	1	7	10	0	1	0	38	12	0	69	297
13/07/2018	0	0	4	73	3	2	12	788	608	3	1493	1524
14/07/2018	0	0	1	76	0	15	1	863	951	1	1908	2213
15/07/2018	0	0	2	74	1	29	12	690	320	2	1130	1271
16/07/2018	0	0	1	64	0	6	2	925	454	1	1453	1597
26/07/2018	0	0	20	25	0	3	1	718	108	3	878	1773
27/07/2018	1	0	16	40	0	1	0	473	421	0	952	907
28/07/2018	0	0	22	59	0	84	0	1484	123	0	1772	3243
29/07/2018	0	0	3	36	0	13	0	254	423	3	732	4088
30/07/2018	0	0	37	79	0	15	0	684	361	1	1177	2267
31/07/2018	0	0	5	26	1	17	1	1302	499	0	1851	1670
01/08/2018	0	2	2	55	0	51	0	1099	666	0	1875	3007
02/08/2018	0	1	4	22	0	16	0	420	135	1	599	3799
23/08/2018	0	0	0	7	0	5	0	118	9	1	140	498

Date/Species	BARBAR	EPTSER	MYOSPP	OTHER	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPIYG	PLEAUR	Total all bats	NOISE
24/08/2018	1	0	0	4	0	3	0	54	2	0	64	916
25/08/2018	0	0	0	9	0	2	0	4	0	0	15	65
26/08/2018	0	0	0	6	0	4	0	6	5	0	21	195
27/08/2018	0	0	1	3	0	6	0	21	5	0	36	106
28/08/2018	0	0	0	5	1	7	0	266	6	0	285	1864
31/08/2018	0	3	4	14	0	4	0	14	40	0	79	173
01/09/2018	0	0	0	12	3	1	0	32	17	1	66	510
02/09/2018	0	0	2	41	0	39	0	15	11	1	109	242
03/09/2018	1	1	1	84	8	90	0	78	154	2	419	982
04/09/2018	1	0	2	45	1	24	0	52	428	1	554	1709
05/09/2018	0	1	0	49	4	29	0	22	84	2	191	799
15/09/2018	0	0	0	2	0	9	0	0	4	0	15	123
16/09/2018	0	0	0	4	0	2	0	157	0	0	163	320
17/09/2018	0	0	0	2	0	0	0	124	0	0	126	3866
18/09/2018	0	0	0	11	0	0	0	911	37	0	959	3306
19/09/2018	0	0	0	1	0	0	0	54	6	0	61	566
20/09/2018	0	0	0	3	0	2	0	12	2	0	19	2023
21/09/2018	0	0	0	9	0	0	0	459	8	0	476	1345
22/09/2018	0	0	0	4	0	0	1	174	1	0	180	200
23/09/2018	0	0	0	3	0	0	0	40	0	0	43	217
24/09/2018	0	0	0	1	0	2	0	9	0	0	12	823
09/10/2018	0	0	71	30	0	5	0	39	181	1	327	602
10/10/2018	0	0	100	63	0	9	4	169	681	0	1026	1193
11/10/2018	0	0	14	23	0	2	0	773	281	2	1095	1848
12/10/2018	0	0	40	24	0	0	2	258	252	1	577	1329
13/10/2018	0	0	64	69	0	29	1	595	573	1	1332	2251
14/10/2018	0	0	25	39	0	15	2	279	288	4	652	1031

Date/Species	BARBAR	EPTSER	MYOSPP	OTHER	NYCLEI	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PLEAUR	Total all bats	NOISE
15/10/2018	0	0	43	25	0	3	0	184	92	1	348	681
16/10/2018	0	0	22	36	1	1	0	24	155	0	239	1326
25/10/2018	0	0	6	24	0	17	0	71	25	2	145	1010
26/10/2018	0	0	0	38	0	72	0	2	38	0	150	371
27/10/2018	0	0	0	14	0	13	0	0	1	0	28	380
28/10/2018	0	0	0	0	0	0	0	0	1	0	1	1163
29/10/2018	1	0	0	1	0	1	0	15	24	0	42	91
Grand Total	6	14	529	1812	26	1092	94	20460	10855	54	34942	69656

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B31_01) is reference to transect number and the transect stop number.



Transect Summary: BACT32, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT32
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	10/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT32, Aylsham

- 1.1. Grid reference: TG167269.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA88X & BA89X.

2. Description of transect

Land use at transect

- 2.1. Land use within the transect route was mainly arable fields with pockets of planted woodland.
- 2.2. Along the north western boundary of the transect is a belt of woodland approximately 30-40 years old. This is split by a minor highway.
- 2.3. A mixed hedgerow runs through arable fields on the eastern boundary.
- 2.4. Woodland plantation runs part way along the southern boundary.

Key commuting and foraging features

- 2.5. The tree belt along the north and western boundary provides a linear feature and shelters from winds from the south to the north-east.
- 2.6. The road through the tree belt at the north of the transect creates a tunnel effect and a high proportion of activity was recorded at this location.
- 2.7. The transect has good connectivity with the wider landscape.

3. Survey effort

- 3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.
- 3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.
- 3.3. The transect was walked five times from June to October. The static at BA88X was deployed five times for a total of 31 nights and the static at BA89X was deployed five times for a total of 33 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	Start date	End date	Nights deployed
BA88X	Visit 1 - 15/06/2017	15/06/2017	23/06/2017	8
	Visit 2 - 12/07/2017	12/07/2017	17/07/2017	5
	Visit 3 - 16/08/2017	16/08/2017	21/08/2017	5
	Visit 4 - 19/09/2017	19/09/2017	25/09/2017	6
	Visit 5 - 16/10/2017	16/10/2017	23/10/2017	7
BA89X	Visit 1 - 15/06/2017	15/06/2017	23/06/2017	8
	Visit 2 - 12/07/2017	12/07/2017	17/07/2017	5
	Visit 3 - 16/08/2017	15/08/2017	21/08/2017	6
	Visit 4 - 19/09/2017	19/09/2017	26/09/2017	7
	Visit 5 - 16/10/2017	16/10/2017	23/10/2017	7

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BC, JH	15/06/17	21:24	23:07
2	Dusk	JA, CB	12/07/17	21:06	23:03
3	Dusk	RM, CB	15/08/17	20:23	22:39
4	Dawn	JWH, BM	16/08/17	03:47	05:55
5	Dusk	JWH, BB	19/09/17	19:02	20:13

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys report 2016/131.3

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	✓*	✓*	Occasional records. Recorded across the transect at both statics and by transect detector.	Recorded in the evening only.	N/A
Serotine	EPTSER	✓*	✓*	Occasional records. Recorded by both the transect detector and at static BA88X.	Only recorded in the early evening.	N/A
Large bat spp.	LARGEATSPP	✓*	✓	Few unidentified large bats on walked transect, many more across both statics.	Recorded throughout the night.	N/A
Leislars	NYCLEI	✗	✗	N/A	N/A	N/A
Myotis sp.	MYOSPP	✓*	✓*	Occasional records, however MYOSPP was recorded across the transect.	Recorded late evening and early morning.	N/A
Noctule	NYCNOC	✓*	✓	Higher concentration of recordings along the north of the transect at BA88X.	Recorded throughout the night.	N/A
Nathusius' pipistrelle	PIP NAT	✗	✓*	Occasional records on both statics.	Recorded in the evening only.	N/A
Common pipistrelle	PIPPIP	✓	✓	Woodland in the south and north-west of the transect provided foraging routes for PIPPIP.	Recorded throughout the night.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Frequently recorded across the transect by surveyor and both static detectors.	Recorded throughout the night.	N/A
Pipistrelle spp.	PIPSPP	✓	✓	Recorded across the transect by surveyor and both static detectors.	Recorded throughout the night.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	EPTSER	MYOSPP	NYCNOC	PIPIP	PIPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	15/06/17	21:24	23:07	18°C	17°C	BS1	4/8	None	0	0	0	0	15	7	5	0	27
2	Dusk	12/07/17	21:06	23:03	24°C	11°C	BS1	1/8	None	0	0	0	0	0	0	19	0	19
3	Dusk	15/08/17	20:23	22:39	15°C	14°C	BS0	1/8	None	0	0	1	0	44	7	6	6	64
4	Dawn	16/08/17	03:47	05:55	12°C	10°C	BS0	0/8	None	0	0	0	0	3	0	1	3	7
5	Dusk	19/09/17	19:02	20:13	12°C	10°C	BS2	2/8	None	0	0	0	1	12	2	0	9	24

Table 5: Compiled acoustic data from transect recordings.

Visit	Dawn/Dusk	Date	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIPIP	PIPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	15/06/17	0	0	0	0	0	13	9	0	0	22	310
2	Dusk	12/07/17	0	0	2	1	5	47	5	1	5	66	1009
3	Dusk	15/08/17	8	1	3	0	4	95	19	2	18	150	1163
4	Dawn	16/08/17	3	3	2	0	0	4	0	0	0	12	864
5	Dusk	19/09/17	0	0	4	0	1	12	2	1	4	24	246

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA88X.

Deployment\Species	BARBAR	EPTSER	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 15/06/2017	1	0	10	1	50	3	37	6	4	10	122	1381
Visit 2 - 12/07/2017	0	0	5	0	7	0	4	0	0	3	19	1701
Visit 3 - 16/08/2017	1	0	6	0	25	0	175	14	6	13	240	55802
Visit 4 - 19/09/2017	3	6	40	0	382	0	743	163	18	50	1405	8484
Visit 5 - 16/10/2017	0	0	453	0	60	0	699	357	33	102	1704	5363
Grand Total	5	6	514	1	524	3	1658	540	61	178	3490	72731

Table 7: Static data from BA point BA89X.

Deployment\Species	BARBAR	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPPIP	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 - 15/06/2017	0	19	6	44	0	756	52	7	10	894	1601
Visit 2 - 12/07/2017	0	5	2	10	0	519	234	5	6	781	1565
Visit 3 - 16/08/2017	2	13	1	7	0	4189	59	33	177	4481	20769
Visit 4 - 19/09/2017	0	2	0	2	1	654	37	10	21	727	7529
Visit 5 - 16/10/2017	1	5	0	11	0	1416	421	43	66	1963	7726
Grand Total	3	44	9	74	1	7534	803	98	280	8846	39190

4.4. Bat activity by date

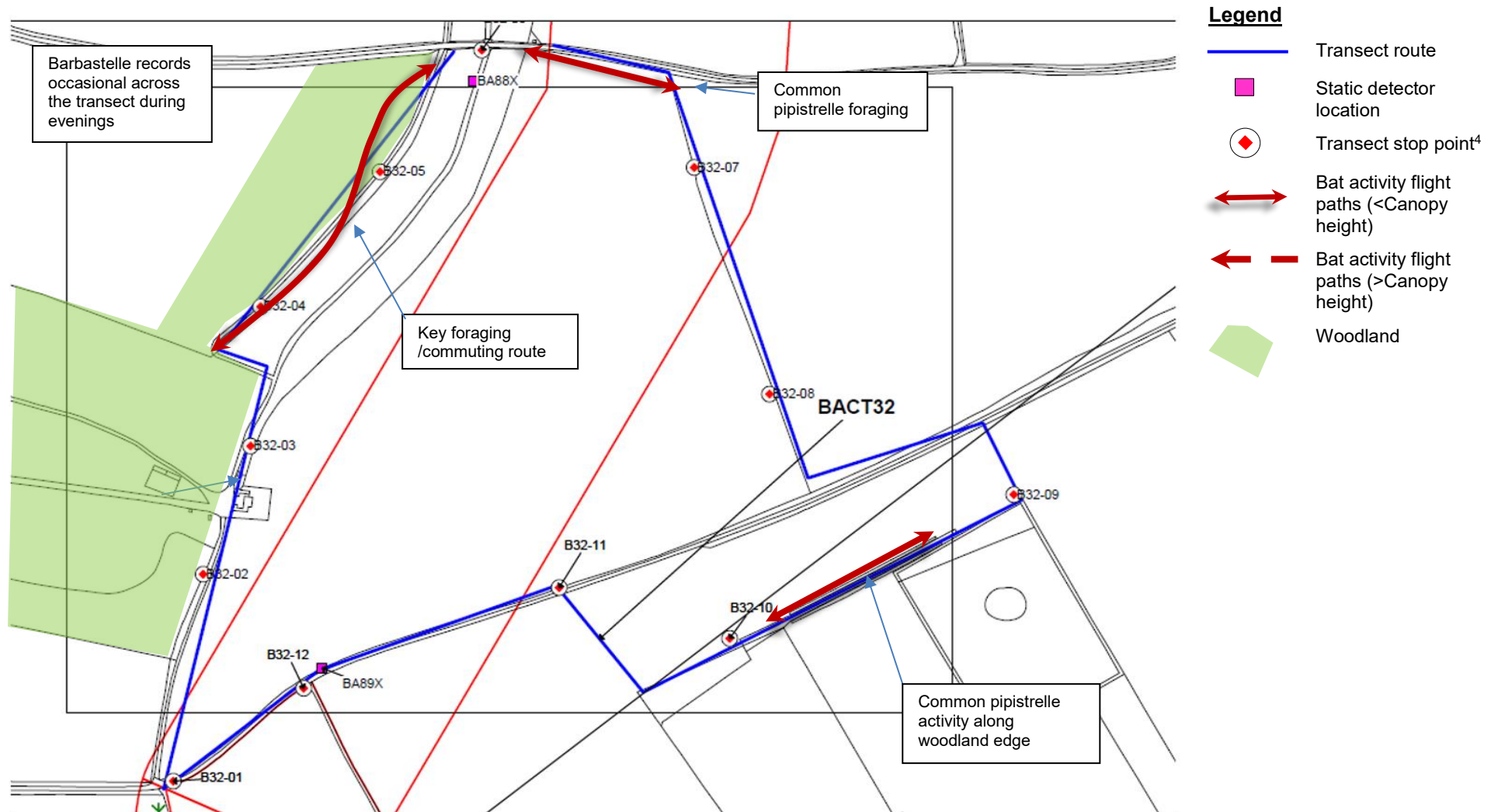
Table 8: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIPNAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
15/06/2017	0	0	0	0	0	1	18	1	2	0	22	252
16/06/2017	0	0	1	1	1	0	140	5	1	0	149	327
17/06/2017	0	0	2	0	1	0	133	8	2	2	148	306
18/06/2017	1	0	1	1	10	0	104	4	2	4	127	291
19/06/2017	0	0	4	0	31	0	49	5	0	2	91	380
20/06/2017	0	0	12	1	26	2	63	2	0	6	112	381
21/06/2017	0	0	8	2	7	0	108	12	1	1	139	272
22/06/2017	0	0	0	1	7	0	153	14	3	4	182	539
23/06/2017	0	0	1	1	11	0	25	7	0	1	46	234
12/07/2017	0	0	1	0	0	0	4	0	0	1	6	265
13/07/2017	0	0	6	0	6	0	148	27	2	3	192	509
14/07/2017	0	0	1	1	3	0	182	159	0	3	349	959
15/07/2017	0	0	1	1	4	0	64	36	2	0	108	608
16/07/2017	0	0	1	0	2	0	120	11	1	2	137	743
17/07/2017	0	0	0	0	2	0	5	1	0	0	8	182
15/08/2017	0	0	1	1	1	0	476	0	0	3	482	258
16/08/2017	0	0	2	0	1	0	77	9	3	21	113	5101
17/08/2017	0	0	1	0	7	0	331	11	3	31	384	21931
18/08/2017	1	0	0	0	10	0	571	3	2	90	677	17638
19/08/2017	1	0	2	0	1	0	1174	6	12	14	1210	14217
20/08/2017	1	0	13	0	8	0	1271	38	12	28	1371	14193
21/08/2017	0	0	0	0	4	0	464	6	7	3	484	3233
19/09/2017	0	1	1	0	0	0	12	1	0	2	17	319

Date\Species	BARBAR	EPTSER	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
20/09/2017	0	2	5	0	69	0	256	22	7	16	377	3231
21/09/2017	0	1	10	0	56	0	258	45	6	12	388	3462
22/09/2017	0	0	7	0	66	0	166	78	5	12	334	2244
23/09/2017	1	2	5	0	67	0	404	31	5	14	529	4266
24/09/2017	1	0	9	0	81	1	230	15	5	7	349	1812
25/09/2017	1	0	4	0	45	0	69	8	0	8	135	661
26/09/2017	0	0	1	0	0	0	2	0	0	0	3	18
16/10/2017	0	0	27	0	2	0	156	0	9	17	211	944
17/10/2017	0	0	24	0	9	0	1035	222	26	77	1393	2693
18/10/2017	1	0	64	0	17	0	681	273	35	35	1106	1565
19/10/2017	0	0	121	0	17	0	92	71	3	11	315	1573
20/10/2017	0	0	27	0	4	0	116	64	0	15	226	1842
21/10/2017	0	0	100	0	11	0	20	122	3	3	259	2642
22/10/2017	0	0	47	0	6	0	11	21	0	7	92	1540
23/10/2017	0	0	48	0	5	0	4	5	0	3	65	290
Grand Total	8	6	558	10	598	4	9192	1343	159	458	12336	111921

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B32_01) is reference to transect number and the transect stop number.



Transect Summary: BACT33, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT33
Date of report :	30/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	11/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	30/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT33, Felmingham

- 1.1. Grid reference: TG237304.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA40 & BA41.

2. Description of transect

Land use at transect

- 2.1. Within and around the transect route the land use is arable agriculture.
- 2.2. Along the east and west lengths, the transect is bordered by established native species rich hedgerows.
- 2.3. A minor road also borders both the east and west lengths of the transect.

Key commuting and foraging features

- 2.4. The section of road along the north-west of the transect (between stop eight and nine) was well sheltered by mature poplar trees and was a particularly popular foraging route.
- 2.5. The hedgerows surrounding the transect provided foraging routes for pipistrelles.
- 2.6. From the east of the transect (continuing from stop point two) a mature tree line extends southwards and adjoins a woodland which has further linear features running into the wider landscape.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked five times from June to September. The static at BA40 was deployed five times for a total of 28 nights and the static at BA41 was deployed five times for a total of 27 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	Start date	End date	Nights deployed
BA40	Visit 1 – 14.06.2017	14/06/2017	19/06/2017	5
	Visit 2 – 21.07.2017	21/07/2017	26/07/2017	5
	Visit 3 – 24.08.2017	24/08/2017	30/08/2017	6
	Visit 4 – 29.09.2017	29/09/2017	04/10/2017	5
	Visit 5 – 23.10.2017	23/10/2017	30/10/2017	7
BA41	Visit 1 – 14.06.2017	14/06/2017	19/06/2017	5
	Visit 2 – 21.07.2017	21/07/2017	26/07/2017	5
	Visit 3 – 25.08.2017	25/08/2017	30/08/2017	5
	Visit 4 – 29.09.2017	29/09/2017	04/10/2017	5
	Visit 5 – 23.10.2017	23/10/2017	30/10/2017	7

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	JA, CB	14/06/17	21:12	23:05
2	Dusk	KC, BM	21/07/17	21:03	22:30
3	Dusk	AG, BM	24/08/17	20:14	21:34
4	Dawn	AG, BM	25/08/17	03:50	05:15
5	Dusk	KC, BM	29/09/17	18:35	19:54

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	✓*	Recorded across the transect but only a single pass on each static detector.	Recorded in the evenings only.	N/A
Serotine	EPTSER	X	X	N/A	N/A	N/A
Large bat spp.	LARGEBATSP	✓*	✓	Heard across the transect	Recorded throughout the night.	N/A
Leislars	NYCLEI	X	X	N/A	N/A	N/A
Myotis sp.	MYOSPP	✓*	✓*	Seldom heard on transect visits or static deployments.	Only recorded in the late evenings and early mornings.	N/A
Noctule	NYCNOC	✓*	✓	Few passes detected by transect detector. However substantial records across the transect with the majority of recordings along the eastern side of the transect on BA41.	Recorded throughout the night.	N/A
Nathusius' pipistrelle	PIP NAT	X	✓	Heard across the transect on both static detectors. Majority of recordings along the eastern side of the transect on BA41.	Recorded throughout the evening and early morning.	N/A
Common pipistrelle	PIPPIP	✓	✓	Heard all along the transect, most commonly along the western edge and in particular in the NW corner of the transect where bats would forage along the road under the tree canopy.	Heard from survey start throughout the night.	N/A
Soprano pipistrelle	PIPPYG	✓	✓	Heard all along the transect, most commonly along the western edge and in particular in the NW corner of the transect where bats would forage along the road under the tree canopy.	Heard from about 20 minutes after sunset.	Regular passes heading north along the western side of the transect, suggestive of roost further down the road to the south of the transect
Pipistrelle spp.	PIPSPP	✓	✓	Heard all along the transect, most commonly along the western edge and in particular in the NW corner of the	Heard from survey start throughout the night.	N/A

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
				transect where bats would forage along the road under the tree canopy.		
Brown long-eared	PLEAUR	X	✓*	Seldom heard on static deployments.	Recorded in evening only.	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	MYOSPP	NYCNOC	PIPIPI	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	14.06.17	21:12	23:05	17°C	15°C	BS1	1/8	None	0	0	0	0	0	23	0	23
2	Dusk	21.07.17	21:03	22:30	18°C	18°C	BS1	2/8	None	0	1	0	19	3	0	0	23
3	Dusk	24.08.17	20:14	21:34	17°C	15°C	BS1	2/8	None	0	0	0	43	6	0	0	49
4	Dawn	25.08.17	03:50	05:15	10°C	10°C	BS0	1/8	None	0	0	0	0	4	0	0	4
5	Dusk	29.09.17	18:35	19:54	16°C	15°C	BS0	7/8	None	0	0	0	21	12	1	0	34

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	LARGEATSPP	NYCNOC	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE ³
1	Dusk	14.06.17	0	1	60	26	1	1	89	1051
2	Dusk	21.07.17	0	8	54	3	1	4	70	327
3	Dusk	24.08.17	1	3	52	4	0	0	60	717
4	Dawn	25.08.17	0	0	0	6	0	0	6	466
5	Dusk	29.09.17	0	0	30	5	1	4	40	559

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA40.

Deployment\Species	BARBAR	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPIYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 – 14.06.2017	0	16	0	39	10	1508	34	12	2	1621	1487
Visit 2 – 21.07.2017	0	4	0	16	0	2042	132	49	3	2246	7435
Visit 3 – 24.08.2017	0	0	1	4	0	80	109	5	0	199	18512
Visit 4 – 29.09.2017	0	0	0	0	0	345	124	6	0	475	1531
Visit 5 – 23.10.2017	1	1	1	1	0	379	517	56	1	957	7870
Grand Total	1	21	2	60	10	4354	916	128	16	5508	36835

Table 7: Static data from BA point BA41.

Deployment\Species	BARBAR	LARGEATSPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPIYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 – 14.06.2017	0	7	1	1	1	493	26	41	0	1	571	979
Visit 2 – 21.07.2017	0	0	0	0	1	553	53	27	0	0	634	4833
Visit 3 – 25.08.2017	0	3	0	41	0	727	57	10	0	0	838	3178
Visit 4 – 29.09.2017	0	75	1	103	13	4422	789	183	0	26	5612	22377
Visit 5 – 23.10.2017	1	15	0	61	15	4062	1978	162	1	97	6392	9267
Grand Total	1	100	2	206	30	10257	2903	423	1	124	14047	40634

4.4. Bat activity by date

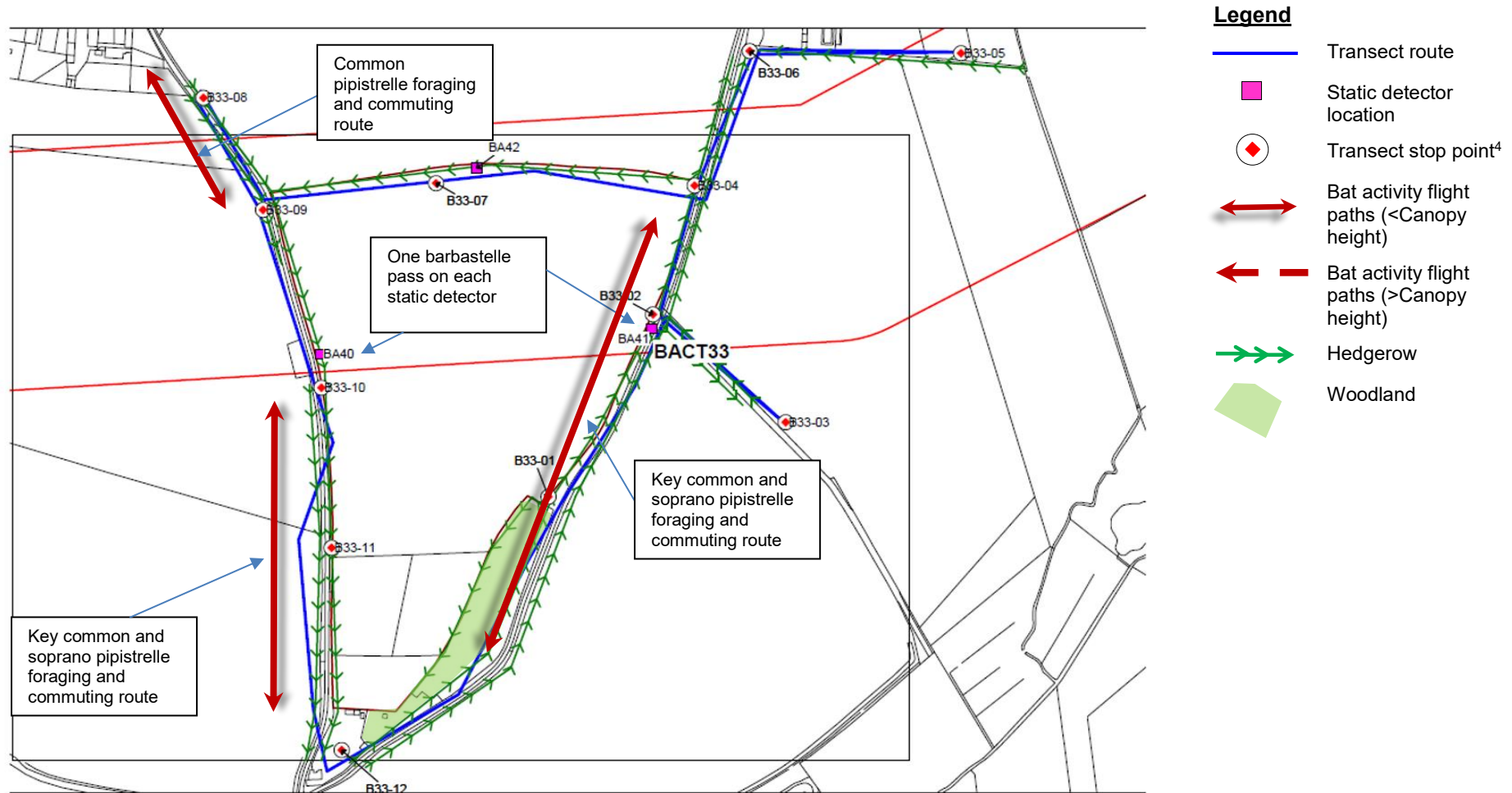
Table 8: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	LARGEBATSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
14/06/2017	0	0	0	2	0	14	0	0	0	0	16	80
15/06/2017	0	3	0	1	4	533	18	24	0	2	585	756
16/06/2017	0	1	1	1	0	768	12	4	0	1	788	408
17/06/2017	0	14	0	30	3	565	9	9	0	8	638	451
18/06/2017	0	4	0	5	4	85	15	12	0	1	126	487
19/06/2017	0	1	0	1	0	36	6	4	0	0	48	284
21/07/2017	0	0	0	0	0	98	2	3	0	1	104	2085
22/07/2017	0	1	0	2	0	635	61	30	0	0	729	3035
23/07/2017	0	2	0	2	0	645	36	12	0	1	698	2740
24/07/2017	0	0	0	2	1	684	14	13	0	0	714	1357
25/07/2017	0	0	0	3	0	424	20	9	0	0	456	1253
26/07/2017	0	1	0	7	0	109	52	9	0	1	179	1798
24/08/2017	0	0	0	0	0	13	7	1	0	0	21	2097
25/08/2017	0	0	0	3	0	197	11	3	0	0	214	5484
26/08/2017	0	1	0	2	0	112	14	3	0	0	132	4812
27/08/2017	0	0	0	15	0	55	20	2	0	0	92	3830
28/08/2017	0	1	0	15	0	259	29	1	0	0	305	2526
29/08/2017	0	0	0	9	0	122	60	4	0	0	195	1200
30/08/2017	0	1	1	1	0	49	25	1	0	0	78	1741
29/09/2017	0	3	0	1	7	1368	70	44	0	3	1496	2557
30/09/2017	0	30	1	29	1	858	419	60	0	5	1403	6877
01/10/2017	0	21	0	33	3	708	74	30	0	7	876	7483
02/10/2017	0	16	0	31	0	845	53	29	0	7	981	4494

Date\Species	BARBAR	LARGEATSPP	MYOSPP	NYCNOG	PIPNT	PIPIP	PIPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
03/10/2017	0	3	0	7	2	532	155	16	0	2	717	1724
04/10/2017	0	2	0	2	0	456	142	10	0	2	614	773
23/10/2017	0	0	0	5	2	1107	70	19	0	1	1204	784
24/10/2017	1	5	0	20	10	1130	892	50	0	6	2114	3100
25/10/2017	1	5	1	17	2	1269	586	105	0	54	2040	4083
26/10/2017	0	1	0	8	0	192	495	13	0	6	715	2067
27/10/2017	0	1	0	9	1	316	126	10	0	12	475	2184
28/10/2017	0	1	0	1	0	5	136	0	0	0	143	1736
29/10/2017	0	0	0	2	0	101	99	3	1	2	208	2320
30/10/2017	0	3	0	0	0	321	91	18	0	17	450	863
Grand Total	2	121	4	266	40	14611	3819	551	1	139	19554	77469

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B33_01) is reference to transect number and the transect stop number.



Transect Summary: BACT34, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT34
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	12/12/2017	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT34, Ridlington

- 1.1. Grid reference: TG360302.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA52 and BA90X.

2. Description of transect

Land use at transect

- 2.1. The transect area consisted mostly of arable land, with a track and double hedgerow running along the western section of the transect.
- 2.2. Along the eastern boundary there is a hedgerow towards the north of the transect and scattered trees to the south.

Key commuting and foraging features

- 2.3. The key area for commuting and foraging bats was a track with hedgerow either side.
- 2.4. The key points for barbastelle bats was also along the western track, namely in proximity to the two static detectors.

3. Survey effort

- 3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.
- 3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.
- 3.3. The transect was walked six times from June to October. The static at BA52 was deployed six times for a total of 30 nights and the static at BA90X was deployed four times for a total of 23 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA52	Visit 1	07/06/2017	11/06/2017	4
	Visit 2	30/06/2017	05/07/2017	5
	Visit 3	05/07/2017	11/07/2017	6
	Visit 4	17/08/2017	24/08/2017	7
	Visit 5	18/09/2017	25/09/2017	7
	Visit 6	10/10/2017	10/10/2017	1
BA90X	Visit 1	30/06/2017	05/07/2017	5
	Visit 2	05/07/2017	11/07/2017	6
	Visit 3	17/08/2017	24/08/2017	7
	Visit 4	11/10/2017	16/10/2017	5

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	BC, AV	30.06.17	21:25:00	21:59:00
2	Dusk	RB, JH	05.07.17	21:35:00	23:01:00
3	Dusk	CB, JWH	17.08.17	20:16:00	21:50:00
4	Dusk	BB, JA	12.09.17	19:40:00	20:33:00
5	Dusk	JG, BM	10.10.17	18:10:00	20:25:00
6	Dawn	JG, BM	11.10.17	05:04:00	07:06:00

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect, based on the transect data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	✓	Occasional but regular records from statics only	Throughout survey period	N/A
Serotine	EPTSER	X	✓	Several records from statics only	July only	N/A
Large bat spp	LARGEBATSP	✓*	✓	Occasional but regular records	Throughout survey period	N/A
Myotis spp	MYOSPP	✓*	✓	Occasional record only	Throughout survey period	N/A
Noctule	NYCNOC	✓	✓	A single commuting bat observed on one visit	22 minutes after survey start	N/A
Nathusius' pipistrelle	NATPIP	X	✓	Occasional but regular records from statics only	Throughout survey period	N/A
Common pipistrelle	PIPPIP	✓	✓	Most frequently recorded bat. Bat activity was generally spread out, with one visit having focused foraging between Stop 1 and Stop 4	Bats were present from the start of the survey onwards	N/A
Soprano pipistrelle	PIPPYG	✓*	✓	Significantly less records than PIPPIP with peak records on statics in September.	From around 20 minutes after survey start onwards	N/A
Pipistrelle spp.	PIPSPP	✓	✓	High numbers recorded with peak records in September	Throughout survey period	N/A
Brown long-eared	PLEAUR	X	✓	Several records from statics only	September and October only	N/A

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	MYOSPP	NYCLEI	NYCNOC	PIPIP	PYPYGY	PIPSPP	OTHER ²	Total all bats
1	Dusk	30.06.17	21:25:00	21:59:00	12°C	15°C	BS4	8/8	None	0	0	0	0	39	0	0	0	39
2	Dusk	05.07.17	21:35:00	23:01:00	17°C	15°C	BS0	0/8	None	0	0	0	0	9	3	1	3	14
3	Dusk	17.08.17	20:16:00	21:50:00	18°C	17°C	BS2	0/8	None	0	0	0	0	7	0	3	0	10
4	Dusk	12.09.17	19:40:00	20:33:00	13°C	13°C	BS2	0/8	Rain at 20:00, 5 minutes	0	0	0	0	0	0	11	0	11
5	Dusk	10.10.17	18:10:00	20:25:00	13°C	13°C	BS4	2/8	None	0	0	0	1	6	0	0	0	7
6	Dawn	11.10.17	05:04:00	07:06:00	15°C	15°C	BS5	8/8	None	0	0	0	0	4	0	0	0	4

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	LARGE BATS ¹	MYOSPP	NYCNOC	PIPIP	PIPYGY	OTHER	Total all bats	NOISE ³
1	Dusk	30.06.17	0	0	0	11	0	0	11	217
2	Dusk	05.07.17	2	1	9	20	1	7	40	1477
3	Dusk	17.08.17	0	0	3	72	4	7	86	1476
4	Dusk	12.09.17	0	0	2	33	1	4	40	1684
5	Dusk	10.10.17	0	0	0	3	0	1	4	1474
6	Dawn	11.10.17	0	1	14	147	6	6	174	1346

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.3. Static data

Table 6: Static data from BA point BA52.

Deployment\Species	BARBAR	EPTSER	LARGE BATSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 07.06.2017	0	0	0	0	0	1	30	0	1	0	2	34	3452
Visit 2 - 30.06.2017	0	0	3	0	7	35	2269	23	82	0	8	2427	3401
Visit 3 - 05.07.2017	0	0	14	1	64	4	8709	6	31	0	18	8847	2766
Visit 4 - 18.08.2017	0	0	13	0	7	0	641	16	45	0	16	738	47323
Visit 5 - 18.09.2017	1	0	8	1	27	25	4074	663	787	8	82	5676	43456
Visit 6 - 10.10.2017	0	0	0	0	0	0	521	113	2	0	2	638	1015
Grand Total	1	0	38	2	105	65	16244	821	948	8	128	18360	101413

Table 7: Static data from BA point BA90X.

Deployment\Species	BARBAR	EPTSER	LARGE BATSP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
Visit 1 - 30.06.2017	0	0	31	0	106	13	7397	28	76	0	20	7671	4540
Visit 2 - 05.07.2017	2	5	47	0	122	2	1050	15	37	0	31	1311	2684
Visit 3 - 17.08.2017	0	0	80	1	19	0	25	1	0	0	44	170	12478
Visit 5 - 11.10.2017	6	0	1	2	11	1	3883	264	76	2	7	4253	13031
Grand Total	8	5	159	3	258	16	12355	308	189	2	102	13405	32733

4.4. Bat activity by date

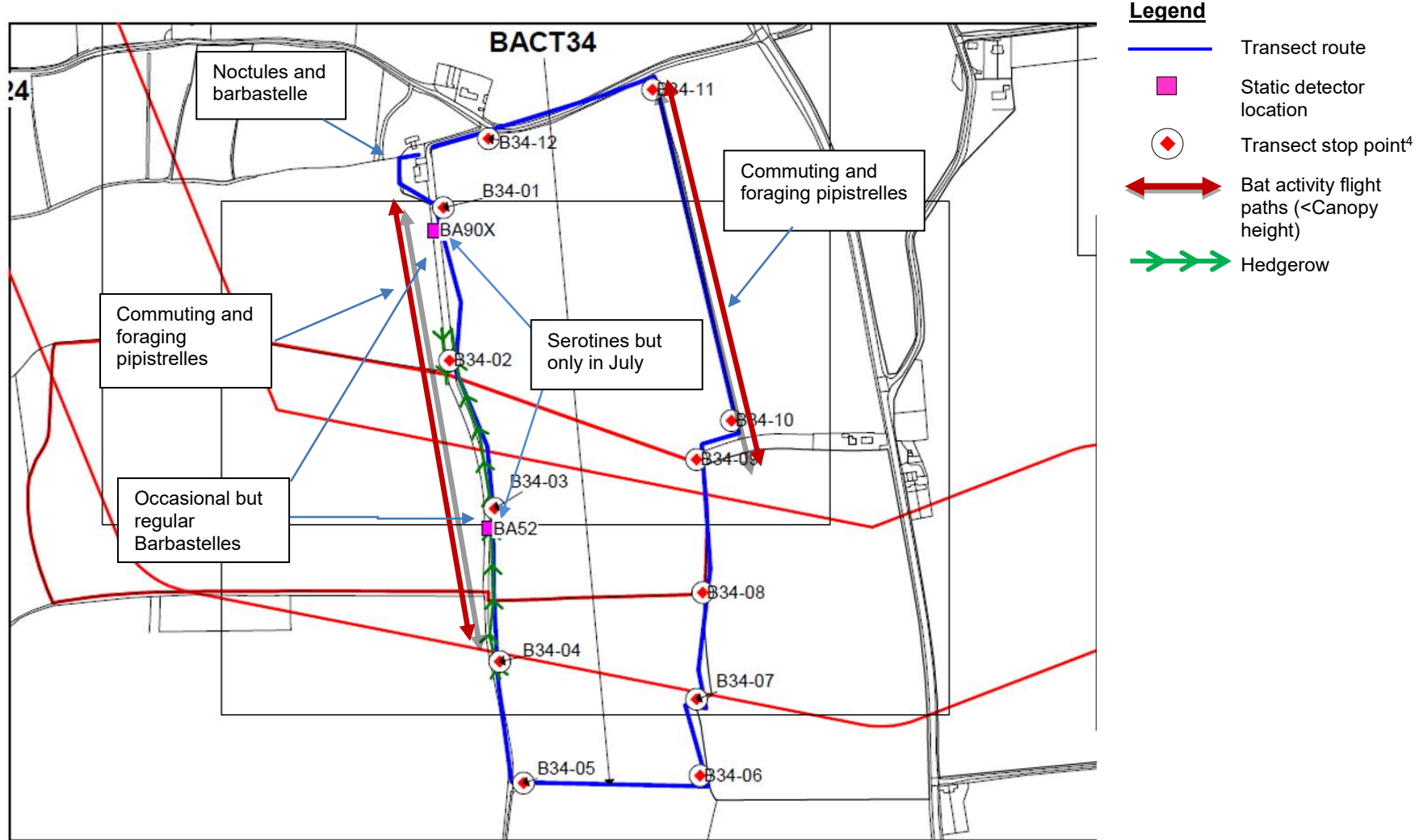
Table 8: Number of registrations recorded each calendar day of deployment across all statics.

Date\Species	BARBAR	EPTSER	LARGE B ATSP	MYOSPP	NYCNOC	PIP NAT	PIPIIP	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
07/06/2017	0	0	0	0	0	0	6	0	0	0	1	7	2222
08/06/2017	0	0	0	0	0	0	3	0	0	0	1	4	449
09/06/2017	0	0	0	0	0	0	17	0	0	0	0	17	216
10/06/2017	0	0	0	0	0	1	3	0	0	0	0	4	245
11/06/2017	0	0	0	0	0	0	1	0	1	0	0	2	320
30/06/2017	0	0	0	0	1	0	299	1	5	0	5	311	1558
01/07/2017	0	0	1	0	2	11	1071	10	51	0	4	1150	1410
02/07/2017	0	0	21	0	20	4	2990	20	25	0	3	3083	1404
03/07/2017	0	0	3	0	21	2	2571	8	12	0	3	2620	1526
04/07/2017	0	0	7	0	48	29	1737	7	50	0	10	1888	1317
05/07/2017	0	0	2	0	36	2	1722	7	20	0	3	1792	1291
06/07/2017	0	0	13	0	68	0	1691	1	4	0	6	1783	626
07/07/2017	0	0	15	0	35	0	1186	2	4	0	2	1244	683
08/07/2017	1	2	3	1	0	1	2213	7	22	0	11	2261	971
09/07/2017	0	0	2	0	26	1	880	1	4	0	4	918	540
10/07/2017	0	2	26	0	36	2	1913	5	25	0	15	2024	1607
11/07/2017	1	1	2	0	6	2	1152	3	4	0	11	1182	458
17/08/2017	0	0	3	0	1	0	6	0	0	0	1	11	4804
18/08/2017	0	0	4	0	2	0	8	0	0	0	3	17	6685
19/08/2017	0	0	0	0	0	0	3	1	0	0	0	4	8102
20/08/2017	0	0	1	0	1	0	177	1	5	0	1	186	6175
21/08/2017	0	0	1	1	1	0	51	5	6	0	3	68	14131
22/08/2017	0	0	2	0	2	0	246	5	20	0	10	285	7013
23/08/2017	0	0	78	0	14	0	174	5	14	0	39	324	9249
24/08/2017	0	0	4	0	5	0	1	0	0	0	3	13	3642

Date\Species	BARBAR	EPTSER	LARGEB ATSPP	MYOSPP	NYCNOC	PIP NAT	PIPIPI	PIPPYG	PIPSPP	PLEAUR	OTHER	Total all bats	NOISE
18/09/2017	0	0	0	0	0	0	29	6	1	0	1	37	3736
19/09/2017	0	0	0	0	0	7	104	36	21	3	0	171	5522
20/09/2017	0	0	1	0	6	18	406	362	184	1	5	983	5833
21/09/2017	1	0	0	0	0	0	1778	82	129	0	8	1998	6343
22/09/2017	0	0	7	0	7	0	581	64	50	1	6	716	6226
23/09/2017	0	0	0	1	0	0	302	59	115	3	14	494	4914
24/09/2017	0	0	0	0	13	0	688	48	172	0	40	961	8020
25/09/2017	0	0	0	0	1	0	186	6	115	0	8	316	2862
10/10/2017	0	0	0	0	0	0	521	113	2	0	2	638	1015
11/10/2017	4	0	0	0	0	0	13	14	0	0	1	32	1027
12/10/2017	0	0	1	0	0	0	1561	32	17	0	3	1614	1125
13/10/2017	0	0	0	1	5	0	703	20	0	0	0	729	4663
14/10/2017	2	0	0	1	3	0	942	74	35	2	1	1060	3390
15/10/2017	0	0	0	0	2	1	562	117	23	0	2	707	2354
16/10/2017	0	0	0	0	1	0	102	7	1	0	0	111	472
Grand Total	9	5	197	5	363	81	28599	1129	1137	10	230	31765	134146

4.5. Map showing key bat activity

Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.



⁴ Associated code (e.g. B34_01) is reference to transect number and the transect stop number.



Transect Summary: BACT35, Norfolk Vanguard

Prepared on behalf of :	Royal HaskoningDHV
Report reference :	BACT35
Date of report :	31/01/2018

Version Number	Date	Section(s)	Page(s)	Summary of Changes	Approved by
1	10/01/2018	All	All	First draft for client. QA of records required.	Chris Smith
2	31/01/2018	All	All	Final report	Chris Smith

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1. Transect summary: BACT35, Necton

- 1.1. Grid reference: TF917102.
- 1.2. Transect designation: Medium quality.
- 1.3. Static detectors: BA118X & BA119X.

2. Description of transect

Land use at transect

- 2.1. This linear transect passes through a mixture of arable land, broadleaved woodland and conifer plantation.
- 2.2. The north-west end and south-east end are both within broadleaved woodland both classified as replanted ancient woodland.
- 2.3. In the middle of the transect there is a short stretch of conifer plantation (c.200m) and broadleaved woodland (c.50m).
- 2.4. The rest of transect runs along arable field boundaries with hedgerow.

Key commuting and foraging features

- 2.5. Hedgerows are good connecting features between the two woodlands at either end of the transect and foraging areas beyond.
- 2.6. The north-western woodland has a ditch running along the eastern boundary and a small pond at the north-western end.

3. Survey effort

3.1. A survey constitutes a walked transect and corresponding deployment of static detectors over five consecutive nights.

3.2. Visit numbers for transects and static deployments are sequential and do not necessarily correspond. This is due to resource availability: it was not always possible to deploy detectors at the same time or on the same night that the transect was walked.

3.3. The transect was walked once in July. The static detectors at BA118X and BA119X were both deployed once for a total of 9 nights.

Static detectors

Table 1: Static detector deployment summary, detailing start and end dates for each deployment and number of nights.

Static	Deployment	First night	Last night	Nights deployed
BA118X	Visit 1 – 30.07.2017	30/07/2017	08/08/2017	9
BA119X	Visit 1 – 30.07.2017	30/07/2017	08/08/2017	9

Transect dates

Table 2: Transect dates summary

Visit	Dusk/Dawn	Surveyor ¹	Date	Start	End
1	Dusk	JWH, JH	30/07/17	21:00	22:36

¹ Surveyor initials are referenced with full names in Appendix 6 in the overarching Norfolk Vanguard Bat Activity Surveys report 2016/131.3 (December 2017).

4. Bat observations

4.1. Bat activity by species from data

4.1.1. A summary of the bat activity on the transect north, based on the data from all visits is given in the following Table 3.

4.1.2. A map summarising key bat activity is given in Figure 1.

Table 3: Bat behaviour by species.

Species present	Code	Confirmed by		Foraging and commuting activity	Timings	Other behaviour
		Transect data	Static data			
Barbastelle	BARBAR	X	X	N/A	N/A	N/A
Serotine	EPTSER	X	X	N/A	N/A	N/A
Large bat spp.	LARGEATSPP	X	✓*	Occasionally recorded. Present across the transect with recordings on each static detector.	Recorded at dawn.	N/A
Leislars	NYCLEI	X	X	N/A	N/A	N/A
Myotis sp.	MYOSPP	X	X	N/A	N/A	N/A
Noctule	NYCNOC	✓*	✓	Present across the transect with recordings on each static detector	Recorded at dusk and dawn only.	N/A
Nathusius' pipistrelle	PIP NAT	X	X	N/A	N/A	N/A
Common pipistrelle	PIPIPI	✓*	✓	Present across the transect with recordings on each static detector with the majority being recorded on static BA118X.	Active throughout the night with recordings through every hour.	N/A
Soprano pipistrelle	PIPIYG	X	✓	Recorded by static BA118X only.	Active throughout the night with recordings through every hour.	N/A
Pipistrelle spp.	PIPSPP	X	✓*	Recorded across the transect.	Recorded throughout the night.	N/A
Brown long-eared	PLEAUR	X	X	N/A	N/A	N/A

* Indicates limited records

4.2. Compiled data sheets

Table 4: Summary from data sheets.

Visit	Dusk/Dawn	Date	Start	End	Start Temp	End Temp	Wind	Cloud	Precip.	BARBAR	MYOSPP	NYCNOC	PIPIPI	PIPPYG	PIPSPP	OTHER ²	Total all bats
1	Dusk	30.07.17	21:00	22:36	14°C	13°C	BS1	7/8	None	0	0	0	0	0	0	2	2

Table 5: Compiled acoustic data from transect recordings.

Visit	Dusk/Dawn	Date	NYCNOC	OTHER	PIPIPI	Total all bats	NOISE ³
1	Dusk	30.07.17	1	0	9	10	782

4.3. Static data

Table 6: Static data from BA point B118X.

Deployment\Species	LARGEBATSP	NYCNOC	PIPIPI	PIPPYG	PIPSPP	OTHER	Total all bats	NOISE
Visit 1 – 30/07/2017	2	44	1174	296	16	2	11534	46969

Table 7: Static data from BA point BA119.

Deployment\Species	LARGEBATSP	NYCNOC	PIPIPI	Total all bats	NOISE
Visit 1 – 30/07/2017	1	1	1	3	1213

² All bats not identified to species level.

³ Non bat files analysed by Kaleidoscope software which consist of ambient background noise, rain, wind and biological signals such as insect calls.

4.4. Bat activity by date

Table 8: Number of registrations of species recorded each calendar day of deployment across all statics.

Date\Species	LARGEBATSP	NYCNOC	PIPIIP	PIPPYG	PIPSOC	PIPSPP	OTHER	Total all bats	NOISE
30/07/2017	0	0	166	62	0	0	0	228	326
31/07/2017	1	4	214	93	0	2	2	316	252
01/08/2017	0	0	186	89	0	4	0	279	1541
02/08/2017	0	1	29	3	0	1	0	34	1532
03/08/2017	0	0	1	1	0	0	0	2	2170
04/08/2017	0	0	145	8	0	1	0	154	11351
05/08/2017	0	0	197	27	1	5	0	230	16149
06/08/2017	1	0	45	10	0	2	0	58	9206
07/08/2017	0	9	65	0	0	0	0	74	2769
08/08/2017	1	31	127	3	0	0	0	162	2886
Grand Total	3	45	1175	296	1	15	2	1537	48182

4.5. Map showing key bat activity

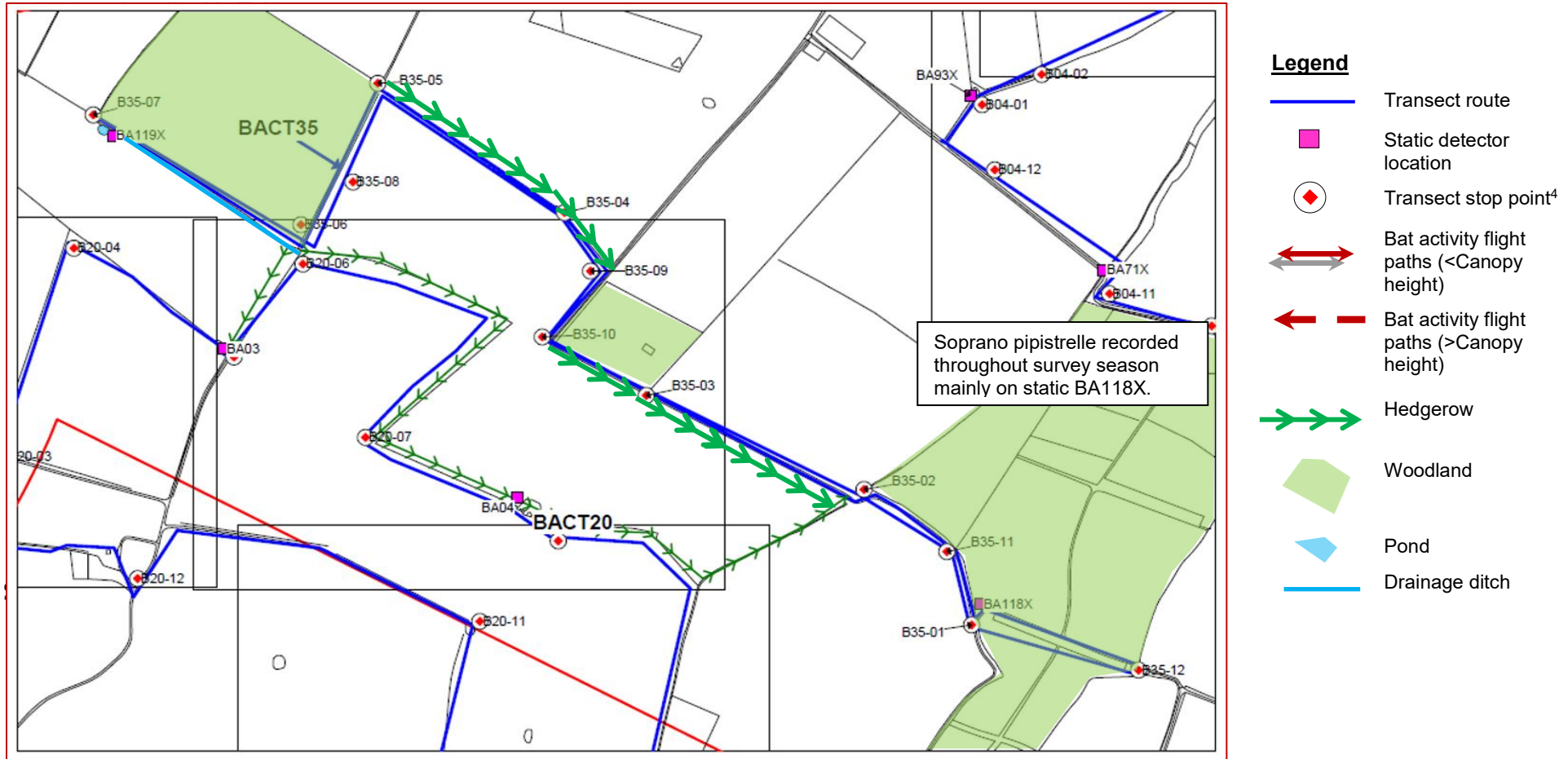


Figure 1: Map highlighting the key foraging and commuting behaviour described in Table 3.

⁴ Associated code (e.g. B35_01) is reference to transect number and the transect stop number.

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