A38 Derby Junctions

TR010022

Volume 6

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Appendix 8.9d: Bat Activity Surveys in 2017

Regulation 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

April 2019

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A38 Derby Junctions Development Consent Order 202[ ]

6.3 Environmental Statement Appendices
Appendix 8.9d: Bat Activity Surveys in 2017

Regulation Number	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010022
Application Document Reference	6.3
Author	A38 Derby Junctions Project Team, Highways England

Version	Date	Status of Version
1	April 2019	DCO Application

A38 Derby Junctions

Bat Activity Survey Report

Report Number: HE514503-ACM-EBD-A38_SW_PR_ZZ-RP-EG-0005 P02 S4
August 2018

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1 INTRODUCTION

1.1 Background and Scope

1.1.1 AECOM Infrastructure & Environment UK Limited (AECOM) has been commissioned by Highways England to provide design services with regards to the A38 Derby Junctions scheme (referred to as the proposed scheme herein).

1.1.2 The proposed scheme concerns the grade separation of three junctions on the A38 in Derby, namely:

- A38/ A61 Little Eaton junction;
- A38/ A52 Markeaton junction; and
- A38/ A5111 Kingsway junction.

1.1.3 These three junctions are located along an approximate 5.5km length of the A38 national trunk road, to the west and north of Derby.

1.1.4 To assist with the assessment of the proposed scheme's potential environmental effects, a range of environmental surveys has been undertaken to define prevailing baseline conditions.

1.1.5 Bat activity surveys, comprising walked transect and static detector surveys were previously undertaken across the proposed scheme between May and September 2015 based upon Bat Conservation Trust (BCT) Good Practice Survey Guidance (Hundt, 2012) and AECOM bat standards (AECOM 2015). Refer to the A38 Derby Junctions Bat Activity Survey Report produced by AECOM in 2016 (AECOM, 2016), for further information. Each of the two transects (one covering Kingsway and Markeaton junctions; and one covering Little Eaton junction) was carried out three times, with surveys undertaken in May, June and July 2015. The frequency and timing of activity surveys was generally based upon the minimum recommendations/ guidance for a low risk (i.e. low habitat quality), large sized (i.e. >15 ha) site (Hundt, 2012).

1.1.6 Concentrations of bat activity, comprising of multiple bat passes ('Hotspots') were identified in three key areas along the proposed scheme in 2015: one immediately adjacent to the east of Markeaton junction (including Earl of Harrington Lake and adjacent woodland); one immediately adjacent to the west of Markeaton junction (woodland area along the miniature railway); and one at Little Eaton junction (under and surrounding the River Derwent overbridge).

1.1.7 The habitat suitability for foraging and commuting bats was reassessed in 2017 based upon data gathered from 2015 and the updated BCT survey guidance (Collins, 2016). The proposed scheme boundary was also updated in 2017 to include additional areas proposed for potential flood storage, construction compounds and ecological compensation. Therefore, bat activity surveys were updated across the proposed scheme in 2017, to ensure bat survey data covered any additional areas (where applicable); all data was up to date across all three junctions; and methods were based upon current best practice guidance.

1.1.8 Results of the 2017 bat activity surveys are documented herein, together with the updated desktop data. The following figures present the findings of the results throughout the report and are presented in Appendix A:

- Figure 1 – A38 Derby Junctions Overview Bat Transects 2017;
- Figure 2.1 – A38 Derby Junctions Bat Survey Kingsway & Markeaton Bat Survey Transect Route A;
- Figure 2.2 – A38 Derby Junctions Bat Survey Little Eaton Transect Route B;
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- Figure 5.1 – A38 Derby Junctions Bat Survey Kingsway & Markeaton Transect Route A Modifications;
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- Figure 6.1 – A38 Derby Junctions Bat Survey Kingsway & Markeaton Transect A – Dusk 04/05/2017;
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- Figure 8.8 – A38 Derby Junctions Bat Survey Little Eaton Transect C – Dusk 17/10/2017;
- Figure 9 – A38 Derby Junctions Bat Survey Kingsway & Markeaton Transect A – Bat Activity Hotspots;
- Figure 10 – A38 Derby Junctions Bat Survey Little Eaton Transect B & C – Bat Activity Hotspots.

1.1.9 Further information on the bat work conducted in 2017 with regards to roosts in trees, buildings and structures can be found in the following separate reports:

- Bat Roost: Buildings and Structures Report (AECOM 2018(a)HE514503-ACM-EBD-A38_SW_PR_ZZ-RP-EG-0006);
- Bat Roost: Trees Report (AECOM 2018(b)HE514503-ACM-EBD-A38_SW_PR_ZZ-TN-EG-002);
- Bat Trapping and Radio Tracking at Markeaton Park (IDW 2018).

1.2 Study Site

1.2.1 The proposed scheme encompasses Kingsway and Markeaton junctions, west of the City of Derby (Centroid SK 32801 36103) and Little Eaton junction north of Derby (Centroid SK 36402 39990). A plan showing the proposed scheme boundary (in 2017) (hereafter referred to as 'the site') is presented in Figure 1, Appendix A. The ecological study area as referred to herein extends up to 50m beyond the proposed scheme boundary.

1.2.2 The A38 is a busy arterial 'A' road carrying traffic around the west and north of the City of Derby. South of the Kingsway junction, the existing road enters a cutting and is bordered by semi-improved grassland and scrub covered verges. The central reservation south of Kingsway junction and the junction island in this location support a mosaic of habitat types, including semi-improved neutral grassland and native broadleaved woodland. Bramble Brook flows from the west of the proposed scheme in this location through culverts located under the north-bound carriageway and the central reservation before connecting with further culverts located between the junction islands. North of Kingsway junction there is an area of mixed plantation represented by semi-mature trees on embankment.

1.2.3 Markeaton junction is bordered to the east by residential properties and to the west by parkland with veteran trees. The outfall from Markeaton Lake and Markeaton Brook flows through culverts beneath the existing A38 at the northern extent of the Markeaton junction section of the proposed scheme.

1.2.4 The western boundary of the proposed scheme at Little Eaton junction borders the road bridge over the River Derwent. The existing A38 is on embankment in this location, with the embankments themselves represented by areas of scrub and immature broadleaved plantation habitats. A variety of grassland habitats exist at the base of the embankments in this location.

1.3 Relevant Legislation and Policy

1.3.1 All species of bat and their roosts (whether bats are present or not) are protected under the Conservation of Habitats and Species Regulations 2017 and under the Wildlife and Countryside Act 1981 (as amended). Taken together, this legislation makes it an offence to deliberately damage, destroy or obstruct access to a bat roost or to deliberately kill, damage, take or disturb bats.

1.3.2 A bat roost is defined as 'any structure or place, which is used for shelter or protection' or a 'breeding site or resting place'. Since bats commonly use the same roosts at particular times of the year after periods of absence, the roost is protected whether or not bats are resident.

1.3.3 Given the above legislation the potential presence of bats at a site represents a material consideration in the planning process. Even where planning permission is not required there is still a legal responsibility placed on the developer to ensure that a Natural England licence is obtained to cover any works that have the potential to result in an offence under the above legislation.

1.3.4 Seven of the UK bat species are listed as Species of Principal Importance in England under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006, with a species action plan prepared: namely, barbastelle *(Barbastella barbastellus*), Bechstein's bat (*Myotis bechsteinii*), noctule (*Nyctalus noctula*), soprano pipistrelle (*Pipistrellus pygmaeus*), brown long-eared bat (*Plecotus auritus*), greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*). In addition, Species Action Plans within the local Lowland Derbyshire Biodiversity Action Plan (2012) have been prepared for common pipistrelle (*Pipistrellus pipistrellus*), whiskered bat (*Myotis mystacinus*), Brandt's bat (*Myotis brandtii*), Natterer's bat (*Myotis nattereri*), Leisler's bat (*Nyctalus leisleri*) and Nathusius' pipistrelle (*Pipistrellus nathusii*).

1.3.5 Highways England, through the national Road Investment Strategy (RIS), has set an aspiration that the operation, maintenance, and enhancement of the Strategic Road Network (SRN) should move to a position that delivers no net loss of biodiversity; and, in the long term, Highways England should deliver a net gain in biodiversity across its broader range of works. Highways England's 'Our plan to protect biodiversity'' dated 2015 shows how it will work with service providers to halt overall biodiversity loss, and maintain and enhance habitats and ecological networks. The Government requires Highways England to demonstrate progress against the 2015 Biodiversity Plan, to secure an ongoing annual reduction in the loss of net biodiversity due to its activities. The 2015 Biodiversity Plan provides a general plan to protect and increase biodiversity. The 2015 Biodiversity Plan supersedes the preceding 2002 Highways Agency (now Highways England) Biodiversity Action Plan (BAP), which still however carries some relevance as it lists specific species of conservation concern. Bats are listed in the 2002 Highways BAP as priority species. The objectives of this species action plan for bats is to avoid mortality to bats or loss of bat habitat as a result of construction and operation of the network, and to enhance habitats for bats where this can be achieved safely.

2 METHODOLOGY

2.1 Desk Based Study

2.1.1 A desk-based study was undertaken as part of the Extended Phase 1 Habitat Survey report in 2017 (AECOM 2018c) to identify internationally, nationally and locally designated statutory sites, local designated non-statutory sites, sites of local interest and records of protected and/ or notable species of potential relevance to the proposed scheme.

2.1.2 As part of the desk-based study, data relating to bats was obtained from the Derbyshire Wildlife Trust (DWT) covering approximately 3.5km from SK32801 36103 (Kingsway and Markeaton junctions) and SK36402 39990 (Little Eaton junction). Data was also obtained from the Derbyshire Bat Conservation Group (DBCG) in August 2017 for bat records covering 50 x 1km OS grid squares giving coverage of approximately 2km from the proposed scheme boundary. Results from DBCG and DWT are provided within this report.

2.2 Bat Activity Surveys

2.2.1 The number of bat activity surveys required to achieve a reasonable survey effort was assessed in relation to habitat suitability, following the Bat Conservation Trust Bat Surveys for Professional Ecologists (Collins, 2016).

Kingsway Junction

2.2.2 The habitat suitability for foraging and commuting bats at Kingsway junction was assessed in 2017 to be of low suitability for bats. Therefore, one survey visit per season (spring- April/ May, summer – June/ July/ August, autumn – September/ October) was concluded in appropriate weather conditions. Also, two automated detectors were deployed each season along the transect (Transect A) for a minimum of 5 consecutive nights in appropriate weather conditions for bats.

Markeaton Junction

2.2.3 The habitat suitability for foraging and commuting bats at Markeaton Junction was assessed in 2017 to be of moderate to high value given the mixture of water and woodland habitats with connective features; and confirmed roosts, moderate and high potential roosting features on and around the site., Advanced bat survey techniques i.e. bat trapping and radio-tracking were proposed, which provided further information of activity patterns and home ranges of key species/ populations in this area (IDW 2018). This approach is supported by best practice guidance (Collins, 2016).

2.2.4 The bat activity transect, was combined with the Kingsway junction survey (one in spring, autumn and winter), and are complimentary to the bat trapping and tracking surveys. Automated detector surveys however were not considered to be required at Markeaton junction given the use of the advanced survey techniques.

Little Eaton Junction

2.2.5 The habitat suitability for foraging and commuting bats at Little Eaton junction was assessed in 2017 to be of moderate to high value given the mixture of water and woodland habitats with connective features. Therefore, one survey visit per month (April to October) was concluded in appropriate weather conditions with one dusk/

dawn survey conducted within the same 24 hour period. The site was divided into two transect routes (Transect B and C). Also, three automated detectors per transect was deployed per month (April to October) for a minimum of 5 consecutive nights in appropriate weather conditions for bats.

All Junctions

2.2.6 Each activity survey involved two surveyors walking a pre-determined transect route which included a series of 'spot counts' selected to represent the different habitats in the survey area. At each 'spot count', the surveyors remain stationary for short, set periods of time (3 - 5 minutes) and, using bat echolocation detectors, bat activity is noted as well as bat flight direction. Any additional activity encountered whilst walking between spot counts was also noted. The survey route was designed to include potential flight paths or foraging areas within the Site, and also the mature trees, which offer potential roost sites. The starting point and direction of the transect was varied during each survey visit in order to ensure different areas of the transect were walked close to dusk. Each transect route is shown on Figures 2.1 - 2.3.

2.2.7 Surveyors carried echolocation detectors (Elekon Batlogger M) to help determine the species present. In accordance with the BCT survey guidelines, dusk surveys were carried out from sunset to at least 2 hours after dusk, and dawn surveys commenced 2 hours before sunrise. The time, location, number, species (where possible) and direction of flight were recorded for each bat pass (discrete burst of echolocation heard, or bat activity observed) encountered during the survey. All sound files were analysed using Analook W software, where possible down to species level following the call parameters outlined in British Bat Calls, A Guide to Species Identification (Russ, 2013).

2.2.8 All surveys were undertaken during favourable weather conditions as presented in Table 1.

Table 1: Transect Weather Conditions

Transect	Date of survey	Weather conditions
A	04/05/2017 DUSK	Cool 9°C dropping to 7°C during the survey, dry, strong breeze and clear sky.
	25/07/2017 DAWN	Dry, 10°C, clear skies and still air.
	26/09/2017 DUSK	Dry, 15°C, still with scattered clouds.
B & C	09/05/2017 DUSK	10°C dropped to 6°C, dry, clear skies, still.
	12/06/2017 DUSK	16°C, light breeze, scattered clouds, brief light shower at end of survey.
	18/07/2017 DAWN	Clear sky, 14°C, dry, 82% humidity, light air.

Transect	Date of survey	Weather conditions
	14/08/2017 DUSK	Warm 17°C, overcast with light air, sporadic light showers up to an hour into the survey.
	15/08/2017 DAWN	Warm, dry 15°C, light air with clear skies.
	31/08/2017 DUSK	Dry, 15°C, light air, clear skies, 67% humidity.
	26/09/2017 DAWN	Dry, 15°C humid, overcast and still.
	17/10/2017 DUSK	Dry, 13°C, overcast with a light breeze.

2.2.9 The foraging and commuting data collected for each species group (depending on the level of identification possible from the recordings made) has been used to assess the value using a geographical frame of reference. This assessment uses a range of variables such as species, number of bats, roosts/ potential roosts nearby, and the type and complexity of the linear features to derive an overall geographical value of the Site for each species using guidance in Wray *et al.*, 2010 (see Appendix B).

2.3 Automated Detector Surveys

2.3.1 To provide supplementary information to the bat activity surveys, in accordance with the published guidelines (Collins, 2016), SM2BAT+/SM4BAT Full Spectrum automated bat detectors was placed along each of the transect routes. The locations of the automated detectors are shown on Figures 2.1 - 2.3. The automated detectors were set up to record bat echolocation over a period of 5 consecutive nights as set out in the guidance.

2.3.2 The locations of the automated detectors were determined in order to cover a variety of habitat types and locations across the proposed scheme extent, based upon suitable bat foraging and commuting features. The detectors were placed in the same location during each survey period to allow for quantitative analysis to be undertaken.

Kingsway and Markeaton Junction Transect A

2.3.3 Two automated detectors were deployed across the transect each season.

2.3.4 The location of each detector is described below and shown on Figure 2.1.

2.3.5 Transect A automated detector Locations:

- Location 1: within the woodland on the downward sloping embankment south of Kingsway Island between the north and south bound A38 lanes.
- Location 2: within Mackworth park hedgerow which runs immediately south from the allotments.

2.3.6 Automated survey recording period is presented in Table 2.

Table 2: Automated Detector Survey Recording Periods

Month	Date Dusk to Dawn	Location 1	Location 2
May	19/05/17 to 24/05/17	x	x
July	22/07/17 to 27/07/17	x	
	25/07/17 30/07/17		x
September	19/09/17 to 24/09/17	x	x

Little Eaton Transect B and C

2.3.7 Six automated detectors (three per transect) were deployed across the transects each month.

2.3.8 The location of each detector is described below and shown on Figures 2.2 (Transect B) and 2.3 (Transect C).

2.3.9 Transect B automated detector Locations:

- Location 3: to the south-east of the A38, adjacent to the River Derwent in a hawthorn hedge.
- Location 4: along the eastern railway boundary between spot counts 9 - 8 close to the underpass.
- Location 5: along the western railway boundary and public footpath in a willow tree north of the A38.

2.3.10 Transect C automated detector Locations:

- Location 6: land to the north of Freeburn Recycling to the east of the railway line in a hawthorn tree.
- Location 7: along Peg Low woodland ride to the east of the A38.
- Location 8: situated to the west of the railway line along the boundary fence line of Talbot Turf and south of the railway A38 overbridge.

2.3.11 Automated survey recording period is presented in Table 3.

Table 3: Automated Data Recording Period

Month	Date Dusk to Dawn	Location 3	Location 4	Location 5	Location 6	Location 7	Location 8
May	10/05/17 to 15/05/17	x	x		x		x
	19/05/17 to 24/05/17			x			
	11/05/17 to 16/05/17					x	
June	13/06/17 to 18/06/17	x	x	x	x	x	x
July	22/07/17 to 27/07/17	x	x	x	x	x	x

Month	Date Dusk to Dawn	Location 3	Location 4	Location 5	Location 6	Location 7	Location 8
August	15/08/17 to 20/08/17	x	x	x	x	x	x
September	19/08/17 to 24/08/17	x	x	x	x	x	x
October	19/10/17 to 24/10/17		x	x	x	x	X
	17/10/17 to 22/10/17	x					

2.3.12 The static detector data collected were analysed to determine the total number of bat passes for each species or species group (depending on the level of identification possible from the recordings made) and then used to derive a metric; the Bat Activity Index (BAI) for the relative bat activity per hour at each survey location. This analysis provides an indication of:

- Seasonal variation in species activity and composition at each survey location;
- Relative levels of bat activity across the Site;
- Potential roosting sites, important foraging areas and commuting routes.

2.3.13 BAI values for each detector location have been calculated by averaging the number of bat passes per hour. Full automated detector results for each season for Transect A are presented in Appendix C and for Transect B and C each month, are presented in Appendices D and E. This data was used to calculate the BAI for each location and gives an indication of bat abundance and activity at a particular location per month.

2.3.14 The term ‘pass’ is defined as a single file made up of bat pulses of a single species i.e. this may be one bat or many bats in a single file.

2.3.15 No guidance is available on what constitutes low, moderate or high bat activity based on number of passes. As such a relative scale called a ‘bat activity value’ is used in this report where:

- Very Low Activity is less than 2 passes per hour (at each survey location);
- Low Activity is 2 to 25 passes per hour;
- Moderate Activity is 26 to 99 passes per hour;
- High Activity is over 100 passes per hour.

2.4 Statistical Analysis

2.4.1 Statistical analysis was performed on the automatic static detector data at each location.

2.4.2 PRIMER (Plymouth Routines in Multivariate Ecological Research), a statistical software package specifically designed to analyse complex assemblage based data sets, was used to analyse the automated static detector data at each location. The data was analysed using Multidimensional Scaling (MDS) and was used to broadly determine if there was a significant difference in bat species composition (diversity) and abundance (bat passes) between the 8 automated detector locations. The results were used to aid in the evaluation of foraging and commuting habitat across

the proposed scheme and determining key bat activity 'hotspots' used by foraging and commuting bats.

2.4.3 Using PRIMER, a graphical representation of the data sets was produced; with sites that are similar closer together than sites that are dissimilar in activity levels and species.

2.4.4 It should be noted that the data was not transformed prior to the multivariate analysis. This therefore means that the analysis could have been largely driven by the abundance of a few species. Transforming the data would have reduced the reliance on abundance differences and focused the analysis on the species composition of each location. However, as the aim of this task was to identify the areas of higher bat activity, analysis of transformed data was not conducted at this stage.

2.4.5 MDS generates a plot using non-parametric regression then re-runs the analysis. In PRIMER the default number of re-runs is 10. The stress value represents how good a fit the regression is to the data (the lower the stress value the more accurate the representation of the scatter of the samples on the graph).

2.4.6 Following the MDS a deductive test was performed to determine if there was a significant difference in the data from each location. Analysis of Similarity (ANOSIM) is a test that for significant differences in similarity of the locations as a whole. The test result has to be <5% to be significant.

2.5 Bat Trapping and Tracking

2.5.1 Bat trapping was undertaken in 2015 whereby free-flying bats were trapped to identify cryptic *Myotis* species and the breeding status of bats using the area potentially affected by the proposed road improvement works from which a more informed evaluation and impact assessment could be undertaken (Davidson-Watts 2016).

2.5.2 Further bat trapping and tracking was undertaken in 2017 (Davidson-Watts 2017). The method was to trap free-flying bats and to radio-track individual bats to locate maternity and other roost types, which may be potentially impacted by the proposed scheme at Markeaton junction. Basic information of activity patterns was also gained from tagged bats and home ranges of key species/ populations established.

2.5.3 Two surveys sessions of approximately one week each were undertaken in June 2017 and September 2017. Three bats per session were radio tagged and subsequently followed by radio tracking to locate roost sites, where access was possible, emergence counts were undertaken. Full details are presented in the Bat Trapping and Radio Tracking Baseline Report and Evaluation, A38 Derby Junctions Report (Davidson-Watts 2017) and results are referenced/ referred to here as appropriate.

2.6 Thermal Imaging Research Study

2.6.1 An MSc student conducted a research study 'Assessing the Efficacy and Efficiency of Thermal Imaging as a New Bat Survey Technique' in parallel with the A38 surveys. The student conducted his assessment of a 125m stretch of the A38 focusing on the footbridge which crosses the A38 at Markeaton Park. These assessments were conducted during the same survey period as the survey data presented below. The

results of these findings and associated conclusions are summarised within this report (where applicable).

2.7 Evaluation of Commuting and Foraging Habitats for Bats

2.7.1 The relative ecology and nature conservation value of any bat population associated with the site has been determined using the principles described in Valuing Bats in Ecological Assessment (Wray *et al*. 2010) (see method in Appendix B). Particular consideration has been given to their distribution and rarity at different geographical levels, value of roosts, commuting and foraging areas.

2.7.2 Results from biological records, bat activity transect surveys, automated detector surveys and advanced bat trapping and tracking surveys were used where applicable to assist with the evaluation of foraging and commuting bat habitat across the proposed scheme. For this evaluation, reference has also been made to:

- Lowland Derbyshire Biodiversity Action Plan;
- Derbyshire Mammal Group – Bats in Derbyshire distribution information;
- UK Mammals: Species Status and Population Trends (Battersby, 2005);
- The State of the UK's Bats: National Bat Monitoring Programme Populations Trends 2017 (BCT 2017);
- The state of Britain's Mammals (Macdonald and Burnham 2008);
- Joint Nature Conservation Committee. 2007. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. Available from: www.jncc.gov.uk/article17;
- Habitat management for bats. A guide for land managers, land owners and their advisors (Entwistle *et al* 2001).

2.7.3 Bat activity 'hotspots' (concentrations of bat activity comprising of multiple bat passes) and notable 'flyways' (commuting routes) were also identified based on evaluation of results from all survey techniques and using professional judgement. By identifying these key areas and features used by foraging and commuting bats this would aim to facilitate detailed design and mitigation proposals (where applicable).

2.8 Survey Constraints

2.8.1 Due to bad weather conditions in April 2017, a transect was not conducted during this month. To compensate for the loss of this data, an additional survey was conducted in August 2017 to evaluate if any parts of the site were utilised as a swarming site.

2.8.2 Between May to October 2017 varying levels of vegetation was present on site resulting in some areas along the transects becoming inaccessible. As such, where necessary, transect routes were changed for health and safety reasons. The changes to the transect routes are presented in Figures 5.1 - 5.2 and are not considered to significantly impact upon the data collected or the overall results obtained.

2.8.3 During the deployment of the automated devices upon collection it was noted that some detectors failed, this was either as a result of the batteries becoming dislodged or a fault occurring with the device. When this occurred an additional device was re-deployed and a further 5 nights recording was conducted. In October 2017 at Location 3 this was not possible as the deployment and failure was at the end of the month and so a full data set was not obtained at this Location in October 2017.

2.8.4 Both SM2Bat + and SM4BAT static detectors were utilised on site. The SM4 records in full spectrum (FS), whereas the SM2 was set to record in zero crossing (ZC) files, to prolong battery life and prevent the memory card from filling up and causing file errors. To ensure consistency with SM2 data, the SM4 FS data was converted into ZC files for subsequent analysis. All other parameters were the same (e.g. file length, microphone gain settings) and therefore the use of two different detectors was not considered to affect the results obtained.

3 RESULTS

3.1 Desk-based Study

3.1.1 Up to date bat records were obtained from the DBCG and DWT. Table 4 presents a list of the closest known roosts for each species within 1km of the proposed scheme in the last 10 years; and are also illustrated on Figures 3 and 4.

Table 4: Biological Data Records for Bat Species from DWT, DBCG and AECOM for the last 10 years within 1km of the Site (*Maternity Roost)

Common Name	Scientific Name	Description of record	Location of nearest record (km) and bearing	Date of record	Source of data	Status
Kingsway and Markeaton Junctions						
Common pipistrelle	*Pipistrellus pipistrellus*	Roost in M39 tree	Within the site	2015	AECOM	Hab Regs, W&CA
		Roost	0.09	2012	DBCG	
			0.10	2015	DWT	
			0.15	2014	DBCG	
			0.20	2009	DWT	
			0.20	2014	DWT	
			0.20*	2015	DBCG	
			0.65	2011	DBCG	
			0.85*	2007	DWT	
Soprano pipistrelle	*Pipistrelle pygmaeus*	Roost	0.09	2012	DBCG	HabRegs; W&CA; LBAP
			0.70	2012	DBCG	
Pipistrelle sp	*Pipistrelle sp*	Roost	Within the site	2016	DBCG	Hab Regs, W&CA
			0.40	2016	DWT	
			0.75*	2012	DWT	
Brown long-eared bat	*Plecotus auritus*	Roost	0.09	2012	DBCG	Hab Regs, W&CA LBAP
			0.20	2014	DWT	
Unidentified bat	*Chiroptera*	Roost	On site boundary	2015	DBCG	Hab Regs, W&CA
Little Eaton Junction						
Common pipistrelle	*Pipistrellus pipistrellus*	Roost in B3	Within the site	2015	AECOM	Hab Regs, W&CA.
		Roost	0.60	2013	DWT	
			0.65	2007	DWT	
Soprano pipistrelle	*Pipistrelle pygmaeus*	Roost	0.40	2015	DWT	HabRegs: W&CA; LBAP
Pipistrelle specie	*Pipistrellus sp*	Roost	0.55	2016	DWT	Hab Regs, W&CA.
Brown long-eared	*Plecotus auritus*	Roost in B2	Within the site	2015	AECOM	Hab Regs, W&CA LBAP
		Roost	0.28	2015	DBCG	
			0.35	2016	DBCG	
			0.45	2016	DWT	
			0.75	2013	DWT	
			0.90	2007	DWT	

3.1.2 Around Kingsway and Markeaton junctions proposed scheme boundary there are 3 identified known roosts situated within the site; these include a common pipistrelle, *Pipistrellus* species (common or soprano pipistrelle) and an unidentified species roosts. Up to 1km from the proposed scheme boundary there are 8 common pipistrelle, 2 soprano pipistrelle, 2 *Pipistrellus* species and 2 brown long-eared known roosts.

3.1.3 Around Little Eaton junction proposed scheme boundary 2 bat roosts are recorded within the site; a common pipistrelle and brown long-eared roost. Up to 1km from the proposed scheme boundary there are 2 common pipistrelle, 1 soprano pipistrelle, 2 *Pipistrellus* species and 5 brown long-eared known roosts.

3.2 Bat Activity Survey

3.2.1 Full bat activity results are presented in Appendices C - E and shown on Figures 6 - 8. Below is a descriptive summary of each transect survey completed during 2017.

Kingsway and Markeaton - Transect A

3.2.2 Three bat species; common pipistrelle, soprano pipistrelle and *Myotis* species were detected across the transects; all three species were only detected during the June 2017 (summer) transect.

3.2.3 Bat activity was relatively similar across all surveys; however the distribution of bats detected differed across the seasons.

3.2.4 Overall activity across all seasons along the transect route was low.

3.2.5 Table 5 provides a detailed assessment of the activity across the transect each season. The data is presented in Figures 6.1 - 6.3. Locations across the majority of the transects, to the south of the transect between spot counts 1 - 5 and to the north spot counts 7 - 9 both areas are within close proximity to the River Derwent. However in October 2017 the distribution of bat passes were more evenly distributed across the whole transect compared to that of previous surveys.

Little Eaton - Transect B

3.2.6 The highest level of bat activity was recorded in June and August 2017 with June and 31 August 2017 both having similar bat activity. The greatest species diversity was however detected in May 2017, with six species were detected. Across all survey months a total of seven (possibly 8) species were detected.

3.2.7 Bat activity was predominantly clustered in two locations across the majority of the transect, to the south of the transect between spot counts 1 - 5 and to the north spot counts 7 - 9 both areas are within close proximity to the River Derwent. However, in October 2017 the distribution of bat passes were more evenly distributed across the whole transect compared to that of previous surveys.

3.2.8 Table 6 provides a detailed assessment of the activity across the transect per month. The data is presented in Figures 7.1 - 7.8.

Table 5: Transect A: Bat Activity Assessment

Survey season	Survey Date	Dusk/Dawn Route Anticlockwise/ clockwise (AC or C)	Bat Activity Description	Species Encountered
Spring	04/05/2017	DUSK AC	Pipistrelle bat species only were detected during the survey. The first bat detected was a pipistrelle species at 30 minutes after sunset. Activity detected during the survey was low. Bat distribution was concentrated adjacent to Mill Pond and Markeaton Park either side of the footbridge around spot count 5-6 and 6-7 Infrequent passes by pipistrelle species were also noted between spot counts 1-2 in low numbers.	Common pipistrelle Soprano pipistrelle *Pipistrelle species*
Summer	25/07/2017	DAWN C	Three bat species were detected during the survey. Common pipistrelle was the most frequently detected species, with a single *Myotis* and soprano pipistrelle pass only. Bat activity was clustered in two locations only; one between spot counts 6-7 along the edge of Markeaton park and the other within and around Mackworth Park between the start and spot count - 10. The number of bat passes detected in both locations was low. The last bat detected was a common pipistrelle 46 minutes before sunrise foraging along the edge of Markeaton park between spot counts 6-7.	Common pipistrelle Soprano pipistrelle *Pipistrelle species* *Myotis species*
Autumn	26/09/2017	DUSK C	Pipistrelle bat species only were detected during the survey. The bat distribution during the survey differed from that of previous surveys, with pipistrelle activity being more widespread across the transect. No concentration of bat activity was observed around Markeaton Park and Mill Pond between spot counts 7-6 as previously detected. The first bat detected was a forging soprano pipistrelle 14 minutes after sunset within Mackworth Park around spot count 10. Activity was predominantly detected south of the transect from Kingsway island with activity noted around spot count 9. Most bats apart from the first bat detected were observed commuting only.	Common pipistrelle Soprano pipistrelle *Pipistrelle species*

Table 6: Transect B: Bat Activity Assessment

Survey Month	Survey Date	Dusk/ Dawn Route (AC or C)	Bat Activity Description	Species Encountered
May	09/05/2017	DUSK C	Six species were detected during the survey. The first bat detected was a soprano pipistrelle foraging adjacent to the River Derwent between spot counts 2-3, 20 minutes after sunset. Bat distribution was concentrated between spot counts 3-5, with pipistrelle activity dominant, a single noctule and *Myotis* sp. pass only was detected between these points. A second concentration of bat activity was noted between spot counts 6-7 adjacent to the River Derwent where four species (Brown long-eared bat, common pipistrelle, soprano pipistrelle and whiskered or Brandt's bat) were detected. Brown long-eared bat was only detected during this transect. A Daubenton's bat and *Myotis* species was detected immediately adjacent to the underpass between spot counts 8-9. A mix of commuting and foraging activity was noted during the survey, foraging activity levels were greatest in the southern half of the transect whereas a greater species abundance was detected in the northern half.	Common pipistrelle Soprano pipistrelle Noctule Brown long-eared bat *Myotis* species Whiskered or Brandt's Daubenton's
June	12/06/2017	DUSK AC	Five species (possibly 6) were detected during the survey. Bat distribution coverage was significant greater than that of the previous month with a distinctive pattern of species distribution being noted. Two concentrations of bat activity were noted during the survey. A cluster of bat activity was noted in the southern half of the transect between the end of the transect and spot count5 where a mix of pipistrelle and *Myotis* species (including whiskered or Brandt's) were detected. The second cluster of bat activity was noted between spot counts 6-8 predominantly along the River Derwent, bat species detected composed of pipistrelles, noctule bats and *Myotis* species with active foraging noted by all species. Between spot counts 8-10 noctule activity was most abundant. The first bat detected was a noctule at 24 minutes after sunset between spot counts 9-10 foraging across the field from the railway line across the fields to the north-west. A greater number of individual bats were observed during the activity survey compared to all other monthly transect surveys and species abundance of individual species was significantly different as shown in Figure 7.2.	Common pipistrelle Soprano pipistrelle *Pipistrelle* sp. Noctule *Nyctalus sp.* *Myotis* species Whiskered or Brandt's
July	18/07/2017	DAWN C	Five species (possibly six) were detected during the survey. Bat distribution was similar to that of the June transect however detectability was significantly less. Bat distribution was concentrated between spot counts 1-2 to the south of the A38 where pipistrelle activity was dominant with brief passes of whiskered or Brandt's bats around the site. A second smaller cluster of bat	Common pipistrelle Soprano pipistrelle Noctule *Myotis* species Whiskered or

Survey Month	Survey Date	Dusk/ Dawn Route (AC or C)	Bat Activity Description	Species Encountered
			activity was noted between spot counts 3-5 which consisted of a mixture of pipistrelle foraging activity along the river with a few foraging *Myotis* species including Daubenton's bat. A further concentration of bat activity predominantly by noctule bats was observed between spot count 9 and the end of the transect. No *Myotis* species were detected along the northern half of the transect between spot counts 6-8 as previously detected. The last bat detected was a noctule bat 33 minutes before sunrise in the south-east corner between spot count 10 and the end of the transect Most bats detected along the transect route were observed foraging.	Brandt's Daubenton's bat
August	14/08/2017	DUSK AC	Three bat species (possibly four) were detected during the transect. Foraging activity was high during the survey by a small number of bats. Pipistrelle activity was predominantly between spot counts 1-2 3-5 and 7-9 A single whiskered or Brandt's bat was detected in the southern half of the transect near spot count 2. Pipistrelle activity was also concentrated within the woodland between the end of the transect and spot count1 . Activity in the northern half of the site from spot-count 7 was more widespread than that previously, with a greater spread of pipistrelle activity with infrequent *Myotis* species passes, active foraging was observed within Site 7b. The first bat detected was a soprano pipistrelle 34 minutes after sunset between spot counts 10-9 in the northeast corner of the site. All bats apart from three passes detected were of foraging bats; no commuting activity was noted during the survey.	Common pipistrelle Soprano pipistrelle *Myotis* species Whiskered or Brandt's
	15/08/2017	DAWN C	Four bat species (possibly five) were detected during the transect. Activity observed during the dawn transect was similar to that of the dusk activity transect in terms of bat distribution however the species detected were slightly different. Pipistrelle activity only was detected in the southern half of the transect route between spot counts 1-2 and 3-4. Pipistrelle activity was abundant within the woodland and along the River Derwent. In the northern half of the transect only a single *Myotis* species was detected, noctule/*Nyctalus* species which had not been detected during the dusk transect were detected along the River Derwent between spot counts 7-8. The highest species abundance changed in the northern half of the site from *Myotis* species to *Nyctalus* species between the dusk and dawn transects. Activity noted on site was a mix of foraging and commuting.	Common pipistrelle Soprano pipistrelle *Pipistrelle* sp. Noctule *Nyctalus/Eptesicus* sp. *Nyctalus* sp. *Myotis* species
	31/08/2017	DUSK	Five bat species were detected during the transect route. The first bat detected was a common pipistrelle bat 19 minutes after sunset at spot count 1. Less activity between the start of the transect and spot count 2 was	Common pipistrelle Soprano pipistrelle *Pipistrelle* sp.

Survey Month	Survey Date	Dusk/ Dawn Route (AC or C)	Bat Activity Description	Species Encountered
			detected compared to previous surveys however pipistrelle activity was more dominant between spot counts 3-5. Pipistrelle species only were detected in the southern half of the transect route. A greater abundance of bat activity was also noted adjacent to the River Derwent between spot counts 6-8 compared to previous surveys, where pipistrelle activity was predominant however, whiskered or Brandt's bat and Daubenton's bats were detected. Bat activity continued from spot count 8 to the end of the transect in less abundance with soprano pipistrelle and *Myotis* species including whiskered or Brandt's and Daubenton's bat being detected around the whole of the transect route.	*Myotis* species Whiskered or Brandt's Daubenton's bat
September	26/09/2017	DAWN	Four bat species were detected during the transect route. Bat coverage was similar to that of previous transects however bat activity detected overall was less, particularly along the River Derwent around spot count 7. Active foraging was observed by both *Myotis* species and pipistrelles bat species. Activity between spot count 10 and the start of the transect was more abundant than previously detected with an abundance of whiskered or Brandt's bat and *Myotis* species present. The last bat detected was a soprano pipistrelle 14 minutes before sunrise which was observed foraging around the hedgerow at spot count 1.	Common pipistrelle Soprano pipistrelle *Myotis* species Whiskered or Brandt's
October	17/10/2017	DUSK	Three bat species were detected during the transect route. Bat activity was fairly scattered throughout the transect route with no specific clustering. Bat activity was notable along the River Derwent between spot counts 7-8 (Site 7a), where *Myotis* species were predominantly detected. The first bat detected was a soprano pipistrelle 17 minutes after sunset between spot counts 1-2 along the hedgerow. Bat activity was similar to that of the August dawn transect in terms of species distribution however the numbers of species encountered were less than that of previous surveys.	Common pipistrelle Soprano pipistrelle *Myotis* species

Little Eaton - Transect C

3.2.9 The highest level of bat activity was recorded in June and 14 August 2017, with October 2017 having a high level of foraging activity, represented by a few individuals only. The greatest species diversity was detected in July and August 31 2017 with six species detected. Across all survey months a total of eight species were detected.

3.2.10 Bat activity was predominantly clustered in the southern half of the transect below the A38 between spot counts 1 - 3 and 6 - 7. Noctule and Myotis species were primarily detected to the east of the railway line.

3.2.11 Table 7 provides a detailed assessment of the activity across the transect per month. The data is presented in Figures 8.1 - 8.8.

Table 7: Transect C: Bat Activity Assessment

Survey Month	Survey Date	Dusk/ Dawn Route (AC or C)	Bat Activity Description	Species Encountered
May	09/05/2017	DUSK C	Four bat species were detected during the transect route. Activity across the transect was low, with common pipistrelle being the most detected species. Bat activity was predominantly detected around spot count 4 where common pipistrelle and a single noctule pass was detected. The first bat detected was a common pipistrelle 28 minutes after sunset around spot count 3 at the underpass under the A38. A single brown long-eared bat was detected adjacent to spot count 5 just below the lagoons, as well as a noctule bat. Most bat passes were brief with very little foraging activity observed. No bat activity was noted to the east of the Little Eaton roundabout.	Common pipistrelle Soprano pipistrelle Brown long-eared bat Noctule
June	12/06/2017	DUSK AC	Five bat species (possibly six) were detected during the transect route. Bat distribution and abundance was significantly more abundant than that of the previous transect, with activity noted along the entire length of the transect. The highest level of activity was noted between spot counts 7-6 where four bat species were detected. Activity between spot counts 4-5 was less than that previous detected. Noctule/Nyctalus species were most predominantly detected to the east of the Little Eaton junction. Whiskered or Brandt's bats were mostly detected to the south of the A38. The first bat detected was a *Nyctalus* species observed commuting at 31 minutes after sunset at spot count 9.	Common pipistrelle Soprano pipistrelle Noctule *Nyctalus* species *Myotis* species Whiskered or Brandt's
July	18/07/2017	DAWN C	Six bat species were detected during the transect route. Bat distribution was fairly scattered across the whole of the transect route. The most prominent species detected was that of common pipistrelle bats with a concentration of bat activity between the start of the transect and spot count 3. A single Daubenton's bat was observed foraging within close proximity to the River Derwent between spot counts 1-2, a single brief pass by a natterer's bat was also observed between spot counts 7-8 along the eastern site boundary. Noctule bats were predominantly detected to the east of the Little Eaton roundabout. The last bat detected was a noctule bat at 39 minutes before sunrise at spot count 9	Common pipistrelle Soprano pipistrelle *Pipistrelle* species Noctule *Myotis* species Daubenton's bat Natterer's bat
August	14/08/2017	DUSK C	Five bat species were detected along the transect route. The first bat detected was a common pipistrelle 1 minute after sunset, the call was brief and the bat was not seen only heard at the start of the transect adjacent to the River Derwent Bat activity was detected throughout the length of the transect however a concentration of activity was	Common pipistrelle Soprano pipistrelle *Pipistrelle* species Noctule

Survey Month	Survey Date	Dusk/ Dawn Route (AC or C)	Bat Activity Description	Species Encountered
			noted to the south of the A38 between spot counts 6-7, where four species were detected. Pipistrelle species were detected across the whole of the transect and were the only species detected between the start of the transect and spot count 3 and spot counts 4-6. *Myotis* species were predominantly recorded to the east of the Little Eaton junction. Bat distribution was similar to that of June transect however species composition differed. A high level of foraging activity was noted during the survey.	*Myotis* species Whiskered or Brandt's
	15/08/2017	DAWN AC	Five bat species (possibly 6) were detected during the survey. Bat activity was scattered throughout the transect route in low abundance. A small concentration of bat activity by whiskered or Brandt's bats was observed between the start of the transect and spot count9 in the north-east part of the transect. Noctule bats were the second most abundant species, however there distribution was scattered across the transect with no specific clustering in any one location *Myotis* species were only detected to the east of the Little Eaton junction. The last bat detected was a common pipistrelle at 28 minutes before sunrise between spot counts 3-2. Bat passes detected during the transect were predominantly brief with little foraging activity noted.	Common pipistrelle Soprano pipistrelle Noctule *Nyctalus/Eptesicus* sp *Myotis* species Whiskered or Brandt's
	31/08/2017	DUSK C	Six bat species were detected across the transect route. Bat activity was scattered around the transect route with only small clusters of bat activity noted. A small cluster of bat activity was detected at spot count 3 where pipistrelle activity was dominant, as well as between spot counts 7-8 in the south-east corner of the site where whiskered or Brandt's bat and common pipistrelle was detected. *Myotis* species were only detected to the east of the railway line. A single noctule bat was detected in the south of the site between spot counts 6-7 along with a daubenton's bat. The first bat detected was a common pipistrelle 6 minutes after sunset at spot count start. Bat activity was similar to that of 14th August however pipistrelle activity was less abundant. Bat activity noted during the transect was a mixture of commuting and foraging activity	Common pipistrelle Soprano pipistrelle *Pipistrelle* species Noctule *Myotis* species Whiskered or Brandt's Daubenton's bat
September	26/09/2017	DAWN AC	Three bat species were detected across the transect route. Bat activity across the transect route was low and scattered with bats only being detected to the east of the railway line. Bat activity was predominantly detected to the east of the Little Eaton Junction where all three species were detected. The last bat detected was a pipistrelle species 21 minutes before sunrise between spot counts 4-5. Most bat passes detected during the transect route were brief with very little foraging activity noted.	Common pipistrelle Soprano pipistrelle *Pipistrelle* species *Myotis* species
October	17/10/2017	DUSK AC	Three bat species were detected across the transect route. Bat activity was predominantly detected to the south of the A38 where pipistrelle activity was principal species. Bat activity was greatest between spot counts 6-8 with pipistrelle species being detected.	Common pipistrelle Soprano pipistrelle *Pipistrelle* species

Survey Month	Survey Date	Dusk/ Dawn Route (AC or C)	Bat Activity Description	Species Encountered
			Two *Myotis* species only were detected immediately north of the A38 at spot counts End and 3. The first bat detected was a foraging soprano pipistrelle at spot count 9. A high level of foraging activity was noted during the transect compared to previous surveys resulting in a high level of bat activity being noted but by a few individuals only.	*Myotis* species

3.3 Value of Commuting and Foraging Habitats

3.3.1 The values of the commuting and foraging bats recorded across each transect is present in Tables 8 - 11 for each species.

Kingsway and Markeaton

3.3.2 The highest geographical value for commuting and foraging bats around Kingsway and Markeaton junctions across all species is of local value only using Wray *et al* (2010).

3.3.3 Although a number of roosts have been recorded within close proximity to Kingsway and Markeaton junctions the number of bat passes detected during the surveys was low.

Table 8: Commuting Value per Species Transect A

Species	National Rarity	Number of bats	Site/Nearby Roost Potential	Type & Complexity of Linear Features	Total Score	Value
Common pipistrelle	2	5	4	3	14	**Local**
Soprano pipistrelle	2	5	3	3	14	**Local**
Myotis sp.	5	5	4	3	17	**Local**

Table 9: Foraging Value per Species Transect A

Species	National Rarity	Number of bats	Site/Nearby Roost Potential	Type & Complexity of Linear Features	Total Score	Value
Common pipistrelle	2	5	4	3	14	**Local**
Soprano pipistrelle	2	5	3	3	14	**Local**

3.3.4 Figure 9 presents the foraging and commuting hotspots (concentrations of bat activity, comprising of multiple bat passes) identified from the bat activity transects which were predominantly along the boundary of Markeaton Park and Mill Pond and Mackworth Park, as well as to the west of Kingsway Island.

Little Eaton

3.3.5 The highest geographical value for commuting bats recorded during the activity survey is of County value for common pipistrelle, Noctule bats, whiskered/ Brandt's bat and *Myotis* species. All other species were determined to be of Local value only.

Table 10: Commuting Values per Species Transect B & C

Species	National Rarity	Number of bats	Site/Nearby Roost Potential	Type & Complexity of Linear Features	Total Score	Value
Common pipistrelle	2	10	5	5	22	**County**

Species	National Rarity	Number of bats	Site/Nearby Roost Potential	Type & Complexity of Linear Features	Total Score	Value
Soprano pipistrelle	2	5	2	5	14	**Local**
Noctule	5	10	4	5	24	**County**
Nyctalus/Eptesicus	5	5	4	5	19	**Local**
BLE	2	5	5	5	17	**Local**
Whiskered/Brandt's	5	10	4	5	24	**County**
Daubenton's bat	5	5	4	5	19	**Local**
Natterer's bat	5	5	4	5	19	**Local**
Myotis sp	5	10	4	5	24	**County**

3.3.6 The highest geographical value for foraging bats recorded during the activity survey is of County value for common pipistrelle, Noctule bats and *Myotis* species. All other species were determined to be of Local value only.

Table 11: Foraging Value per Species Transect B & C

Species	National Rarity	Number of bats	Site/Nearby Roost Potential	Type & Complexity of Linear Features	Total Score	Value
Common pipistrelle	2	10	5	4	21	**County**
Soprano pipistrelle	2	5	2	4	13	**Local**
Noctule	5	10	4	4	22	**County**
Nyctalus/Eptesicus	5	5	4	4	18	**Local**
Whiskered/Brandt's	5	5	4	4	18	**Local**
Daubenton's bat	5	5	4	4	18	**Local**
Myotis sp	5	10	4	4	23	**County**

3.3.7 Figure 10 presents the foraging and commuting hotspots identified from the bat activity transects combining both transect B and C. Hotspots were primarily noted along the River Derwent in three locations; in the woodland to the south of the A38; to the north of the A38 along the River Derwent, and adjacent to the River to the west of the railway line near the Southern Trent Water (STW) plant. A further bat concentration hotspot was also noted to the north of the flood arch bridge through to Talbot Turf.

3.4 Automated Detector Surveys

Transect A - Kingsway and Markeaton

3.4.1 Two SM2BAT+ detector recorders were placed out along the transect route for a minimum of five consecutive nights each month, see Figure 2.1 for the location of automated detectors and Appendix F for full automated data.

3.4.2 Registrations of bats were made on:

- 5 of 15 full nights of recordings nights at Location 1;
- 10 of 15 full nights of recordings nights at Location 2.

3.4.3 Graph 1 shows the species composition at Locations 1 and 2, per season along Transect A. Table 12 presents the automated detector survey results for Transect A.

3.4.4 Four species were recorded at Location 2; common pipistrelle, soprano pipistrelle, noctule and *Myotis* species. Only *Myotis* species were detected at Location 1.

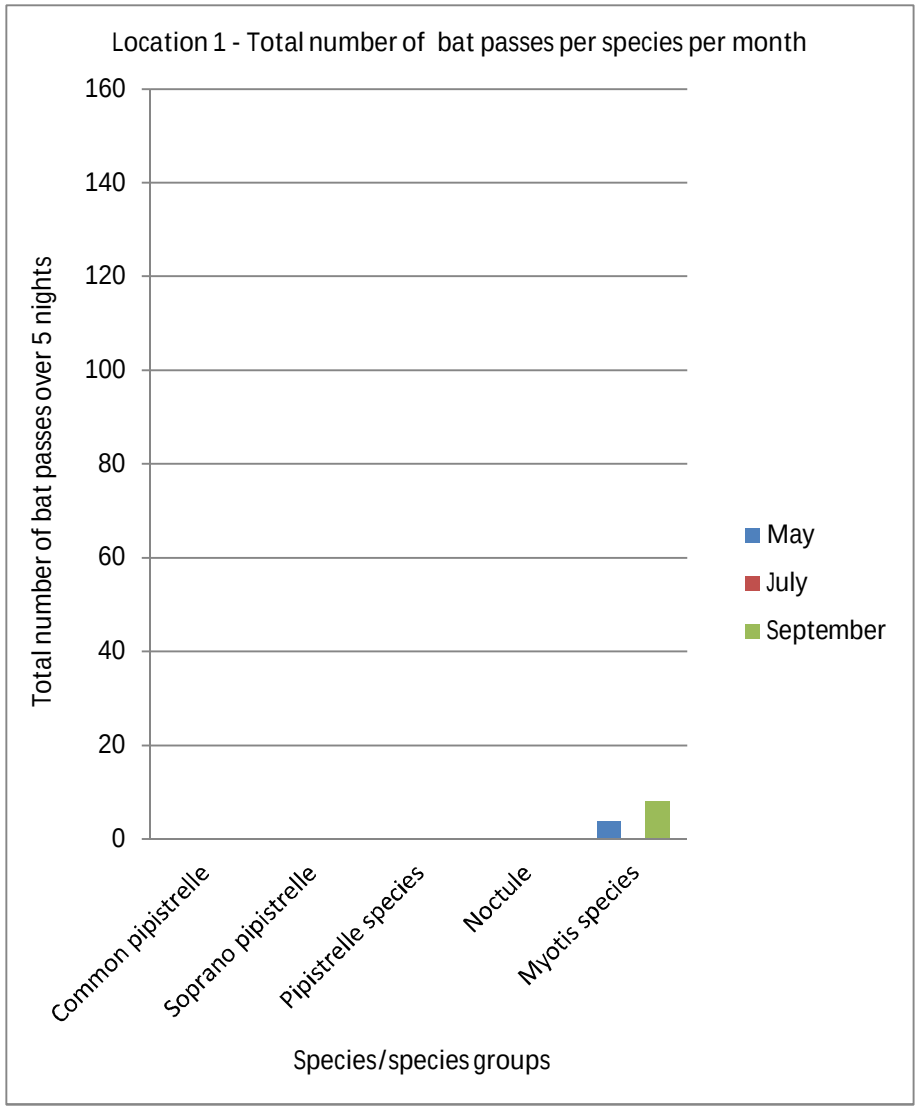
3.4.5 The number of passes detected at Location 1 was minimal with only spring (May) and autumn (September) detecting any bats. Although Location 2 detected more bat species there were still a limited number of bat passes detected across the five nights.

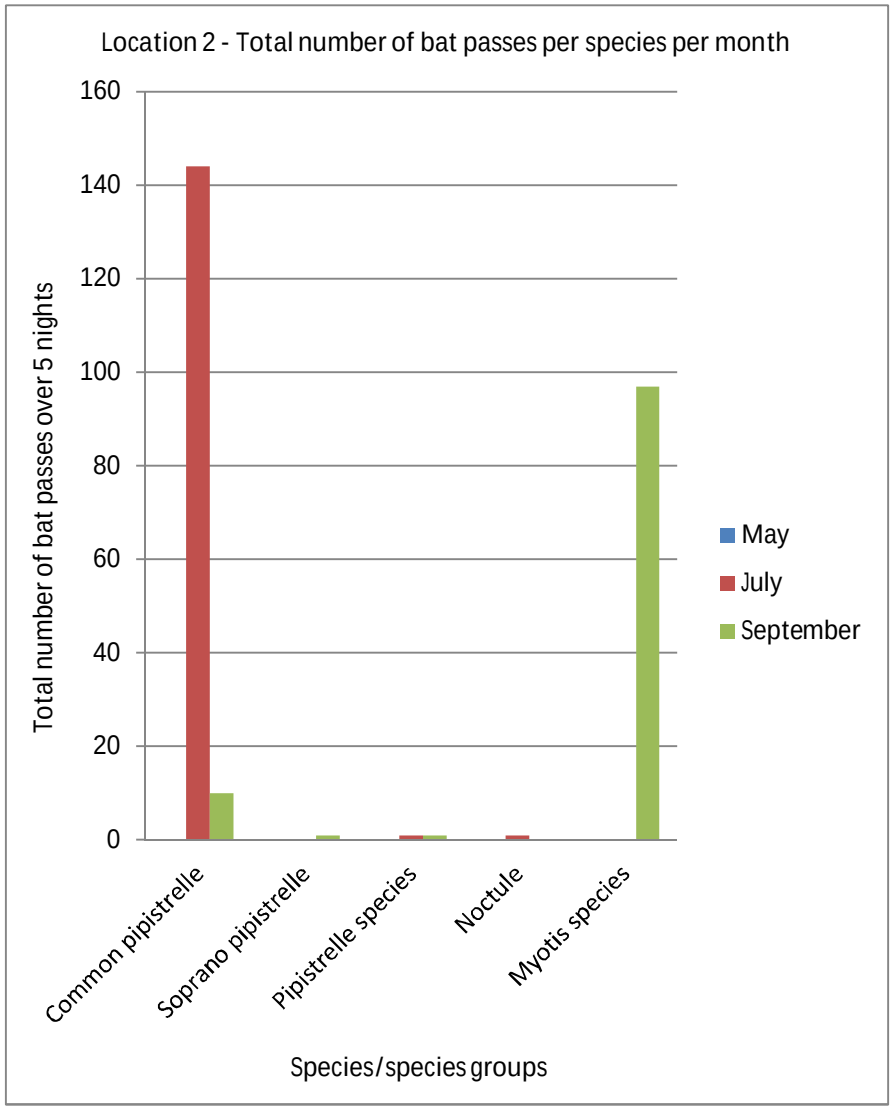
3.4.6 A summary of the results from Transect A is provided below:

- The highest BAI detected was in July 2017 at Location 2 and categorised as a low bat activity value;
- A very low bat value was recorded across all seasons at Location 1 with only *Myotis* species detected;
- July and September 2017 had the highest BAI of bat passes detected at Location 2;
- In July 2017, the most frequently recorded bat species was common pipistrelle, however in September *Myotis* species were most abundant;
- A single noctule pass was detected in July 2017 at Location 2 only;
- No bat passes were detected at Location 2 in May or in July 2017 at Location 1;
- Bat activity was predominantly detected after midnight at both locations;
- A total of four bat species were detected across both locations and seasons.

Table 12: Summary of Automated Detector - Transect A

Month	Detector Location	Number of passes per bat species (over five consecutive nights)					Total Number of Bat Passes	Bat Activity Index (bat passes per hour*)	Bat Activity Value
		Common pipistrelle	Soprano pipistrelle	*Pipistrelle* species	Noctule	*Myotis* species			
May	**1**	-	-	-	-	4	4	0.10	**Very Low**
	2	-	-	-	-	-	0	0	**-**
July	**1**	-	-	-	-	-	0	0	**-**
	2	144	-	1	1	-	146	3.70	**Low**
September	**1**	-	-	-	-	8	8	0.13	**Very low**
	2	10	1	1		97	109	1.82	**Very low**





Graph 1: Locations 1 and 2 total number of bat passes per species per month

3.4.7 The highest BAI across all survey months and locations was Low at Location 2; however no activity was detected in May 2017.

3.4.8 At Location 1 BAI was never more than Very Low with no bat activity detected in July 2017.

Transect B – Little Eaton

3.4.9 Three SM2BAT+ detector recorders were placed out on the transect for a minimum of five consecutive nights each month, see Figure 2.2 for location of automated detectors and Appendix G for full automated data.

3.4.10 Registrations of bats were made on:

- 20 of 30 full nights of recording Location 3;
- 29 of 30 full nights of recordings Location 4;
- 26 of 30 full nights of recordings Location 5.

3.4.11 Graph 2 presents the species composition at all locations and Table 13 presents the automated detector survey results for Transect B.

3.4.12 The BAI is presented in Table 13 and presented as a whole for Little Eaton junction across Transects B & C in Graph 4. The highest bat activity across Locations 3, 4 and 5 was Moderate.

3.4.13 Six species (possibly seven) were detected at Location 3; common pipistrelle, soprano pipistrelle, noctule, serotine and *Myotis* species with possible Leisler's. All six species were detected in May 2017 only.

3.4.14 Five species (possibly 6) were detected at Location 4; common pipistrelle, soprano pipistrelle, noctule, *Myoti*s species and brown long-eared bat with possible Leisler's. All five species were only detected in August 2017.

3.4.15 Six species were detected at location 5; common pipistrelle, soprano pipistrelle, noctule, Leisler's and *Myotis* species and brown long-eared bat. No survey month detected all bat species; however May and August 2017 both recorded five species.

3.4.16 In summary, Transect B:

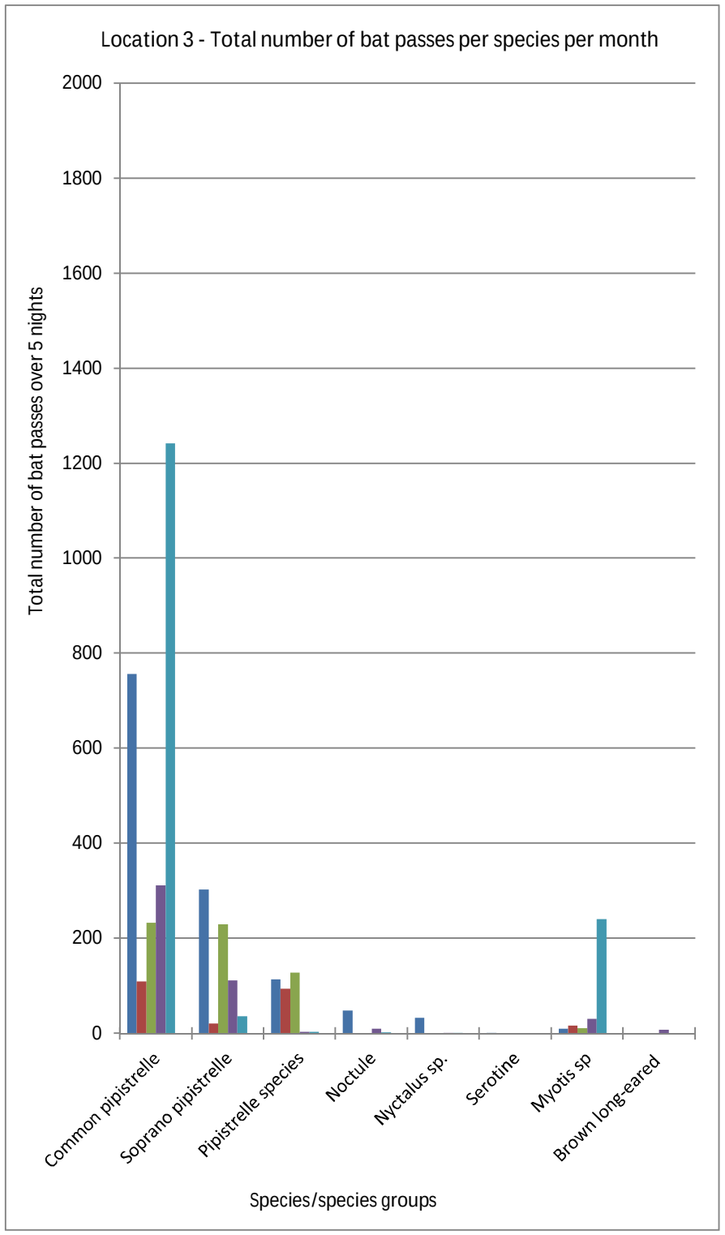
- The highest BAI across all survey months was Moderate at Location 3 and 4 in May (Location 3), July (Location 4) and September (Locations 3 and 4) 2017;
- The highest BAI was detected at Location 4 in July 2017, which was dominated by pipistrelle species;
- The BAI at Location 5 was Low for months May - September with October 2017 being Very Low;
- Common pipistrelle bat was the most abundant bat species across all surveys months and locations;
- September 2017 had a significant abundant number of passes compared to all other survey months for all locations apart from Location 4 in July 2017;
- *Myotis* species passes were significant more abundant in September 2017 across all locations;

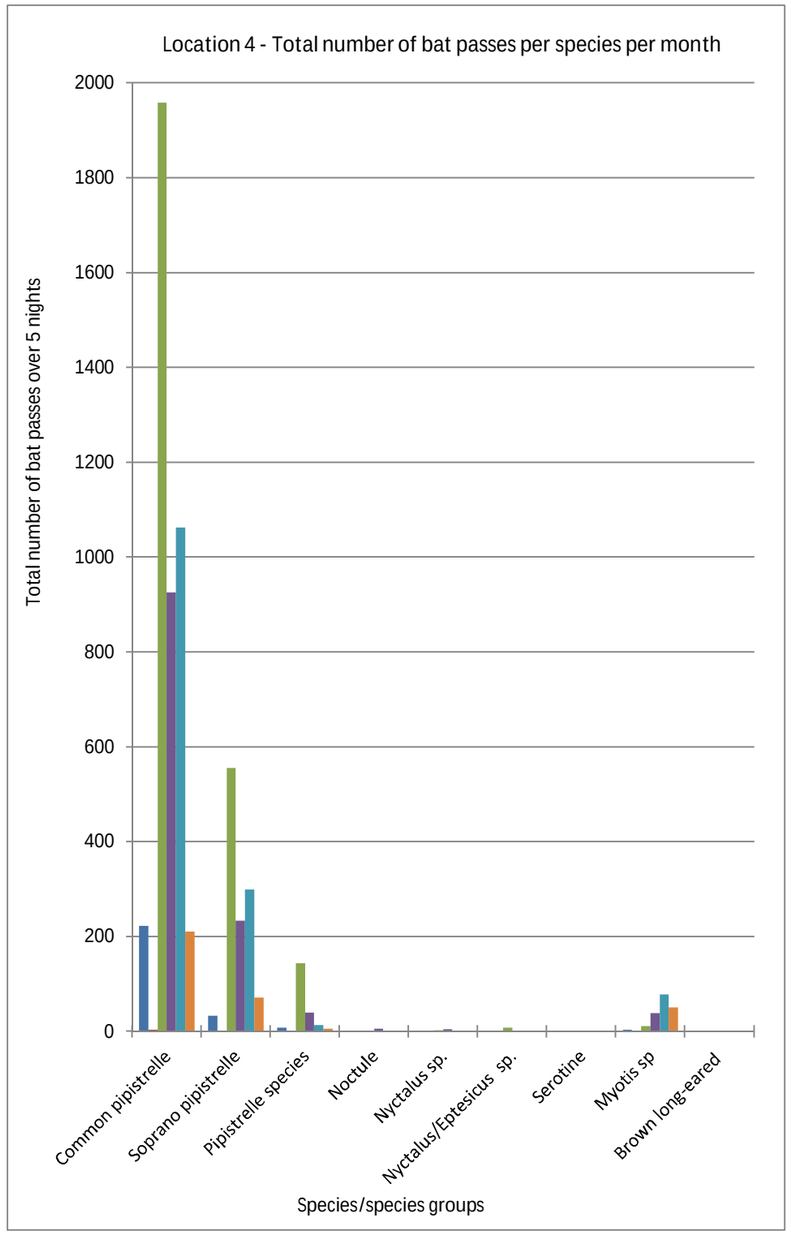
- A single serotine bat pass was detected in May 2017 at Location 3 and July 2017 at Location 4;
- Brown long-eared bat passes were only detected in August 2017 in low abundance at all locations;
- At Location 5, bats were detected immediately after sunset and just before sunrise indicating a roost is likely to occur somewhere within close proximity.

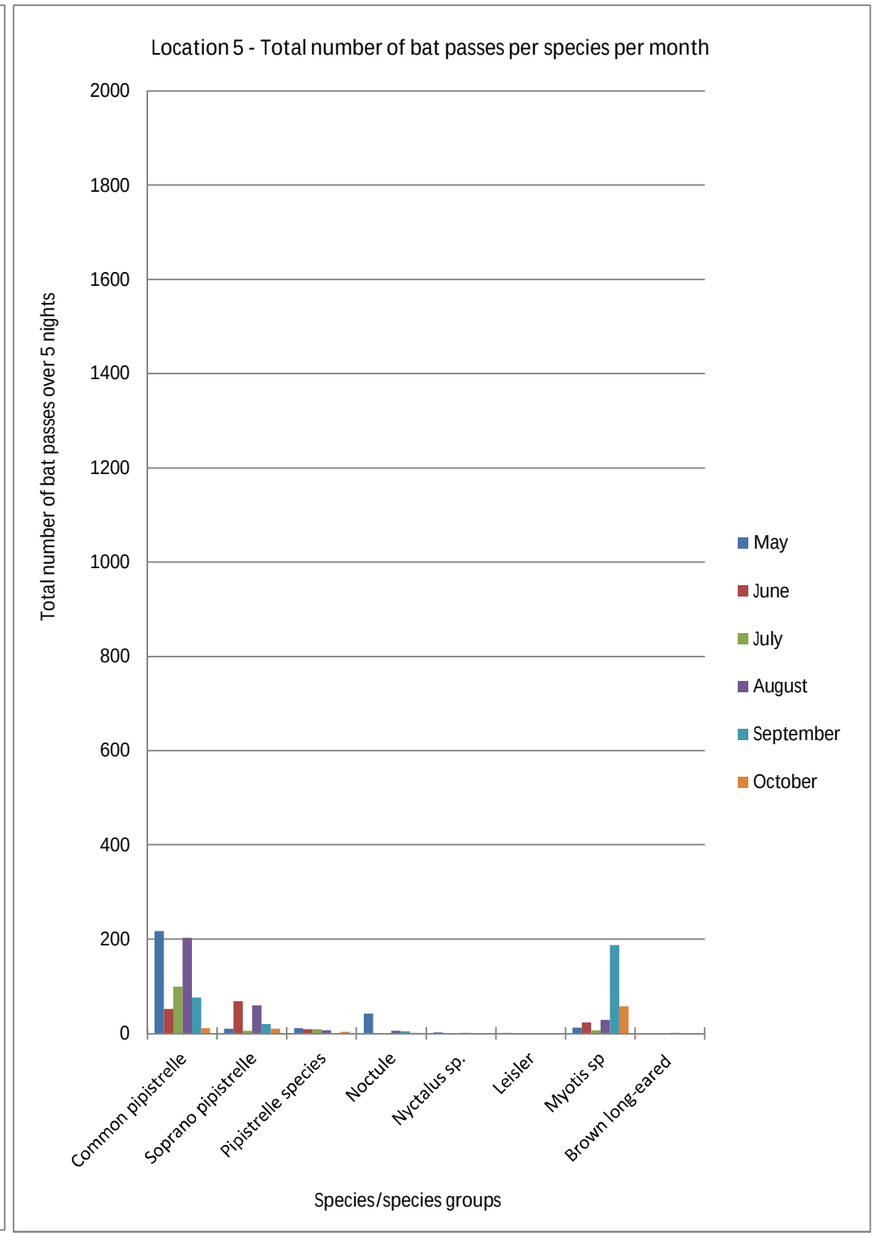
Table 13: Summary of Automated Detectors - Transect B

Month	Detector Location	Number of passes per bat species (over five consecutive nights)										Total Number of Bat Passes	Bat Activity Index (bat passes per hour*)	Bat Activity Value
		Common pipistrelle	Soprano pipistrelle	Pipistrelle species	Noctule	*Nyctalus* sp.	*Nyctalus/Eptesicus* sp.	Leisler's	Serotine	*Myotis* sp	Brown long-eared			
May	**3**	757	303	114	48	33	-	-	1	10	-	1266	31.65	**Moderate**
	4	223	33	8	-	-	-	-	-	4	-	268	6.70	**Low**
	5	218	10	11	42	3	-	1	-	12	-	297	7.43	**Low**
June	**3**	109	21	94	-	-	-	-	-	16	-	240	6.86	**Low**
	4	4	1	1	-	-	-	-	-	-	-	6	0.17	**Very Low**
	5	52	69	9	-	-	-	-	-	24	-	154	4.40	**Low**
July	**3**	233	230	128	-	-	-	-	-	11	-	602	15.05	**Low**
	4	1959	556	144	2	3	8	-	1	11	-	2686	67.15	**Moderate**
	5	100	6	9	-	-	-	-	-	7	-	122	3.05	**Low**
August	**3**	312	112	3	10	1	-	-	-	31	8	477	10.04	**Low**
	4	926	234	40	6	5	-	-	-	39	1	1251	25.02	**Low**

Month	Detector Location	Number of passes per bat species (over five consecutive nights)										Total Number of Bat Passes	Bat Activity Index (bat passes per hour*)	Bat Activity Value
		Common pipistrelle	Soprano pipistrelle	Pipistrelle species	Noctule	*Nyctalus* sp.	*Nyctalus/Eptesicus* sp.	Leisler's	Serotine	*Myotis* sp	Brown long-eared			
	5	203	60	7	6	2	-	-	-	29	1	308	6.16	**Low**
September	**3**	1242	36	3	2	1	-	-	-	241	-	1525	27.73	**Moderate**
	4	1063	299	14	-	-	-	-	-	78	-	1454	26.43	**Moderate**
	5	76	20	-	5	-	-	-	-	188	-	289	5.25	**Low**
October	**3**	-	-	-	-	-	-	-	-	-	-	-	-	**-**
	4	211	72	6	1	-	-	-	-	51	-	341	4.96	**Low**
	5	11	10	4	1	-	-	-	-	58	-	84	1.22	**Very low**







Graph 2: Locations 3-5 Total number of bat passes per species per month

Transect C – Little Eaton

3.4.17 Three SM2BAT+ detector recorders were placed out on Site for a minimum of five consecutive nights each month, see Figure 2.3 for location of automated detectors and Appendix H for full automated data.

3.4.18 Registrations of bats were made on:

- 28 of 30 nights Location 6;
- 27 of 30 nights Location 7;
- 20 of 30 nights Location 8.

3.4.19 Graph 3 presents the species composition at Locations 6, 7 and 8 and Table 13 presents the automated detector survey results for Transect C.

3.4.20 The BAI is presented in Table 14 and presented as a whole for Little Eaton junction across Transects B& C in Graph 4. The highest bat activity across Locations 7, 8 and 9 was Moderate.

3.4.21 Five species were detected at Location 6; common pipistrelle, soprano pipistrelle, noctule, Leisler and *Myotis* species. All five species were only detected in May 2017.

3.4.22 Five species (possibly six) were detected at Location 7; common pipistrelle, soprano pipistrelle, noctule, *Myotis* species and brown long-eared bat and possibly Leisler. All five species were detected in July 2017 only.

3.4.23 Six species (possibly seven) were detected at Location 8; common pipistrelle, soprano pipistrelle, noctule, Leisler, *Myotis* species and brown long-eared bat and possible serotine. All six species were detected in July 2017 only.

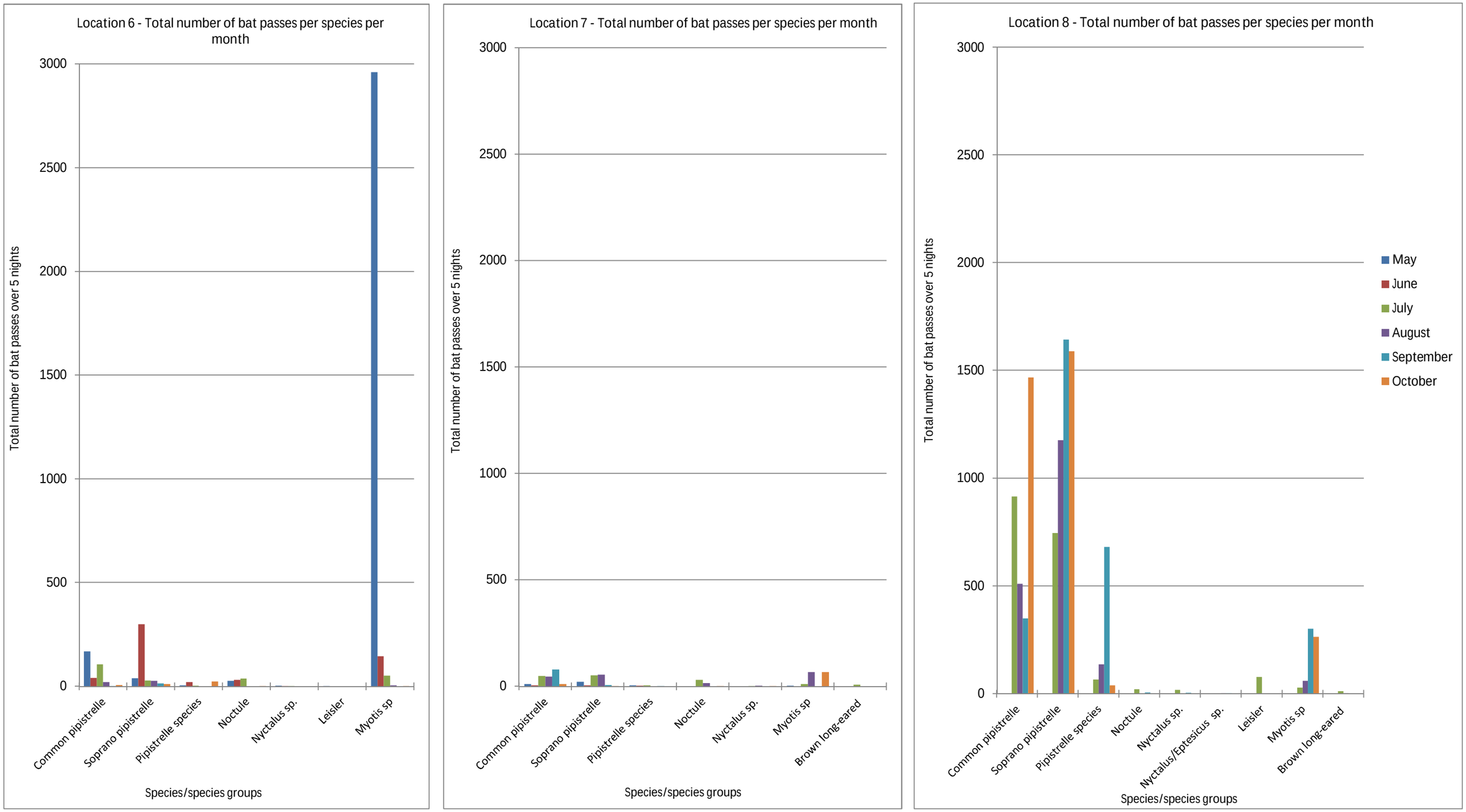
3.4.24 In summary, Transect C:

- The highest bat activity value across all locations was Moderate. A Moderate activity value was detected at location 8 from July to October 2017;
- A Moderate bat activity value was also detected at Location 6 in May 2017; all other months had Low to Very Low activity;
- The highest BAI was detected in September 2017at Location 8;
- The highest number of bat passes detected during any 5 consecutive nights was at Location 6 in May 2017by *Myotis* species;
- Bat activity was generally highest at Location 8 from July - October 2017; however no bats were detected at Location 8 in May and June 2017. Bat activity was greatest at Location 6 during this period;
- Soprano pipistrelle bats were the most abundantly recorded species followed by common pipistrelles across all survey months and locations, apart from May 2017 at location 6, where *Myotis* species were dominant;
- Brown long-eared bats were only detected in July 2017;
- The number of bat passes by *Myotis* species was significantly greater at Locations 6, 7 and 8 than other locations;
- Leisler's bats were detected frequently in July at Location 8 with the only other record in May 2017 at Location 6;
- Bat activity was fairly constant throughout the night in late October 2017 at Location 8 - see Figure 8.8.

Table 14: Summary of Automated Detector - Transect C

Month	Detector Location	Number of passes per bat species (over five consecutive nights)										Total Number of Bat Passes		
		Common pipistrelle	Soprano pipistrelle	Pipistrelle species	Noctule	*Nyctalus* sp.	*Nyctalus/Eptesicus* sp.	Leisler's	Serotine	*Myotis* sp	Brown long-eared			
May	**6**	169	39	5	27	3	-	1	-	2961	-	3205	80.13	**Moderate**
	7	11	22	4	-	-	-	-	-	3	-	40	1.00	**Very low**
	8	-	-	-	-	-	-	-	-	-	-	-	-	**-**
June	**6**	41	300	21	32	1	-	-	-	145	-	540	15.43	**Low**
	7	4	4	3	-	-	-	-	-	-	-	11	0.31	**Very low**
	8	-	-	-	-	-	-	-	-	-	-	-	-	**-**
July	**6**	106	28	3	37	2	-	-	-	52	-	228	5.70	**Low**
	7	49	51	4	30	2	-	-	-	11	8	155	3.88	**Low**
	8	915	746	66	20	18	-	77	-	28	12	1882	47.05	**Moderate**
August	**6**	20	26	-	-	-	-	-	-	4	-	50	1.00	**Very low**
	7	46	55	-	16	3	-	-	-	67	-	187	3.74	**Low**

Month	Detector Location	Number of passes per bat species (over five consecutive nights)										Total Number of Bat Passes		
		Common pipistrelle	Soprano pipistrelle	Pipistrelle species	Noctule	*Nyctalus* sp.	*Nyctalus/Eptesicus* sp.	Leisler's	Serotine	*Myotis* sp	Brown long-eared			
	8	510	1176	136	-	1	2	-	-	60	2	1887	37.74	**Moderate**
September	**6**	1	14	-	-	-	-	-	-	-	-	15	0.27	**Very low**
	7	79	6	1	-	-	-	-	-	-	-	86	1.56	**Very low**
	8	350	1643	681	6	4	3	-	-	302	-	2989	54.35	**Moderate**
October	**6**	7	11	23	1	-	-	-	-	1	-	43	0.63	**Very low**
	7	11	2	-	1	1	-	-	-	67	-	82	1.19	**Very low**
	8	1467	1589	39	1	-	-	-	-	263	-	3359	48.86	**Moderate**



Graph 3: Locations 6-8 total number of bat passes per species per month

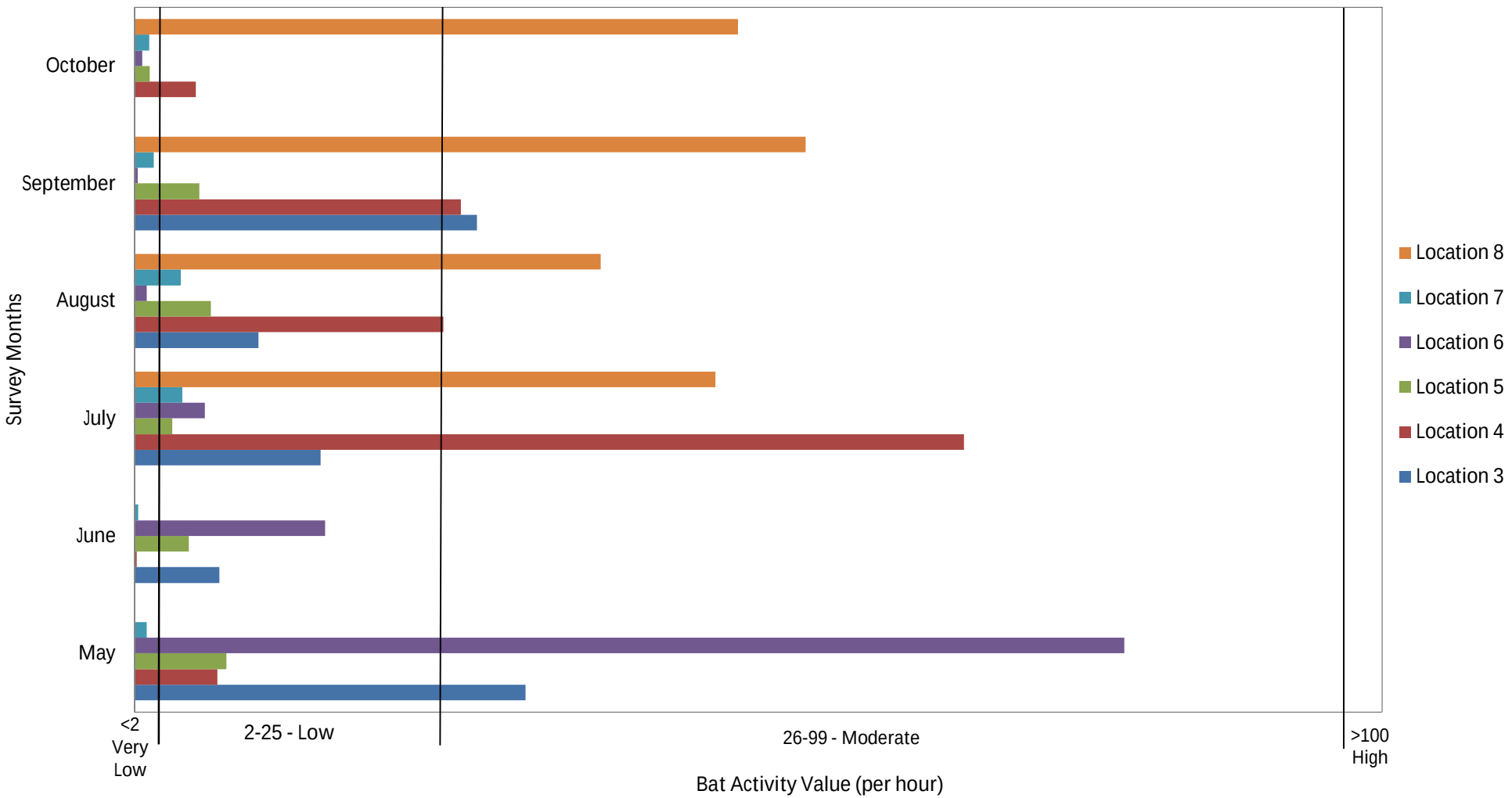
3.5 Bat Activity Value – Little Eaton

3.5.1 The bat activity value across all locations at Little Eaton junction is presented in Graph 4.

3.5.2 The highest activity value detected across all survey months and locations was Moderate.

3.5.3 Location 8 overall had the most frequently detected moderate bat activity value between July - October 2017, which is situated to the west of the railway immediately south of the A38 railway overbridge.

3.5.4 The highest overall bat activity was noted in May 2017 at Location 6 situated to the east of the railway line.



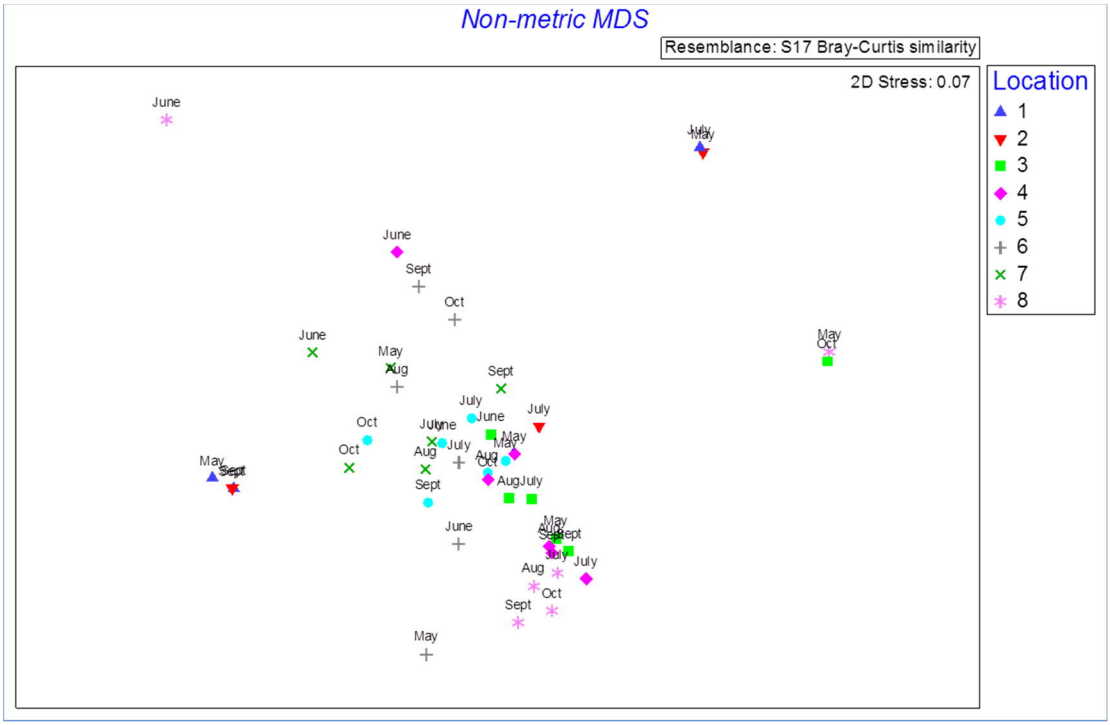
Graph 4: Bat Activity Value (based on number of bat passes per hour) - Little Eaton

3.6 Statistical Analysis of the Automated Data

3.6.1 Graph 5 provides a visual representation of the results of an MDS analysis of the automated data using a Bray-Curtis similarity matrix. The data was also analysed using a deductive test, Analysis of Similarity (ANOSIM R test) to determine if there was a significant difference in similarity between the locations. If P (probability of significance) is <5% then the difference in similarity between locations is significant.

3.6.2 In summary, there were significant differences in terms of species composition (diversity) and abundance (number of bat passes) between the following locations (across all months):

- **Location 1 and Locations 4, 5, 6 and 7** (R = >0.667, P =1.2%): A significantly higher species diversity and abundance was detected at Little Eaton junction (Location 4, 5, 6 and 7) compared to that of Kingsway and Markeaton junctions (Location 1);
- **Location 3 and 7** (R=0.407, P=0.2%): At Little Eaton junction, a significantly higher species diversity and abundance of bats was recorded along the River Derwent (Location 3) than that of the Peg Low woodland ride (Location 7);
- **Location 5 and 8** (R=0.525, P=0.2%): At Little Eaton junction, a significantly higher species diversity and abundance immediately south of the A38 at Little Eaton junction (Location 5) compared to that of the north A38 along the railway line at Little Eaton junction (Location 8), possibly suggesting that a roost is within close proximity to Location 5;
- **Location 7 and 8** (R=0.506, P=0.2%): At Little Eaton junction, a significantly higher species diversity and abundance was detected along the railway line (Location 8) compared to that of the woodland rise at Peg Low (Location 7).



Graph 5: MDS analysis on a Bray-Curtis similarity matrix across all Locations

3.7 Bat Trapping and Tracking

3.7.1 Nine bat species were caught across the two trapping sessions; common pipistrelle (breeding females), soprano pipistrelle (breeding females), whiskered bat (males only), Brandt's bat (male only), Daubenton's bat (breeding females), noctule (males only), serotine (breeding female), brown long-eared bat (post breeding females) and Natterer's bat (male only).

3.7.2 The following species; Daubenton's bat (male), Brandt's, noctule, brown long-eared bat and Natterer's bat were tagged during the trapping sessions and seven roosts were determined, of which six were situated within 500m of the proposed scheme boundary. No breeding roosts were confirmed during the survey.

3.7.3 The tracking and trapping data found more bat species at Markeaton junction than detected from the bat activity transects alone. This is likely to be a result of the transect running alongside the existing A38 roadway and not entering the park in contrast to the trapping which took place in the park. The tracking also confirmed much higher activity levels in the area of Markeaton, in areas away from the immediate roadway. From this data it was confirmed that Markeaton Park is a valuable foraging area for a number of species with one bat travelling up to 5km from its roosting site to the park.

3.7.4 The trapping also resulted in the first in hand record of a serotine bat for Derbyshire, therefore, indicating that Markeaton is a possible valuable foraging and commuting route for this species.

3.8 Thermal Imaging Research Study

3.8.1 Although the main aim of the study was to assess the differences between survey techniques, the study did determine that a small number of bats were crossing the A38, by the over footbridge. Therefore, the over footbridge may potentially be being used as a navigational cue by foraging and commuting bats; with this linear feature connecting the eastern and western habitat situated either side of the A38.

4 DISCUSSION

4.1 Desk Study

Kingsway and Markeaton

4.1.1 There were records of three bat roosts within the site of which two species (Soprano pipistrelle and brown long-eared bat) are listed under the Local Biodiversity Action Plan (LBAP); records of a further 10 roosts were situated within 500m of the proposed scheme boundary. Three species (common pipistrelle, soprano pipistrelle and brown long-eared bat) are known to be roosting within 1km of the proposed scheme boundary.

Little Eaton

4.1.2 There were records of two bat roosts within the proposed scheme boundary of which one species (brown long-eared bat) is listed under the LBAP; records of a further 4 roosts were situated within 500m of the proposed scheme boundary. Three species (common pipistrelle, soprano pipistrelle and brown long-eared bat) were known to be roosting within 1km of the proposed scheme boundary.

4.1.3 An assessment of the value of the bat roosts identified in the desk study and through the field surveys in 2016 and 2017 is provided in a separate report (AECOM 2018(a)).

4.2 Field Surveys and Evaluation of Commuting and Foraging Habitat

4.2.1 The field surveys identified the following bat species foraging and commuting across the proposed scheme:

- **Markeaton and Kingsway**: common pipistrelle, soprano pipistrelle, brown long-eared bat, noctule and *Myotis sp* (likely whiskered or Brandt's);
- **Markeaton Park**: common pipistrelle, soprano pipistrelle, brown long-eared, Daubenton's, Brandt's, whiskered, natterer's, noctule and serotine;
- **Long Eaton:** common pipistrelle, soprano pipistrelle, brown long-eared, whiskered (possible Brandt's), Daubenton's, natterer's, *Myotis sp.,* noctule, Leisler's and serotine.

4.2.2 The foraging and commuting assessment for Kingsway and Markeaton junctions and Little Eaton junction is presented in Table 15. The results of all the survey techniques have been used along with published species (see Section 2.7.2) distribution and population trends to assess the overall value of the site for commuting and foraging bats species and habitats for each area.

4.2.3 In summary, the foraging and commuting value for bats (all species) at Kingsway and Markeaton junctions along the roadside and immediate site boundary is assessed to be of **Local** value, based on activity in these areas being low.

4.2.4 The foraging and commuting value for bats (all species) at Markeaton Park is assessed to be of up to **County** value given the relatively high bat activity, species diversity, presence of foraging serotine and foraging use of the habitats by bats roosting offsite.

4.2.5 The value of foraging and commuting bats (all species) at Little Eaton junction is assessed to be of up to **County** value given the relatively high level of bat activity along the River Derwent, presence of foraging whiskered or Brandt's bats (also

confirmed as breeding locally close to the site (Davidson-Watts 2016)) and foraging noctule bats.

4.2.6 Key bat activity hotspots were identified within Markeaton Park and along the River Derwent (north and south of the A38) as well as to the north of the Flood Arch bridge at Little Eaton junction (Talbot Turf land).

Table 15: Overall combined conclusion of bat value for foraging and commuting bat species

Nature Conservation Receptor	Kingsway and Markeaton Junctions	Little Eaton Junction	Rationale	Overall Value
Foraging and Commuting bats(all species)	✓		Roadside ▪ The level of bat activity detected during the seasonal activity transects was low, with only three bat species detected (common pipistrelle, soprano pipistrelle and *Myotis* species). Bat activity was primarily clustered around Markeaton Park/Mill pond and Mackworth. ▪ Bats were identified crossing the A38 via the over footbridge linking habitats from the east-west side of the A38 at Markeaton park. ▪ Across all automated data locations and survey seasons the maximum number of bat species detected across Kingsway and Markeaton was four species; common pipistrelle, soprano pipistrelle, noctule and *Myotis* species. The most frequently recorded bat species was common pipistrelles; however in September *Myotis* species were most abundant.	Local
			Markeaton Park ▪ At Markeaton Park, nine bat species were captured across the two trapping sessions; common pipistrelle (breeding females), soprano pipistrelle (breeding females), whiskered bat (males only), Brandt's bat (male only), Daubenton's bat (breeding females), noctule (males only), serotine (breeding female), brown long-eared bat (post breeding females), Natterer's bat (male only) were confirmed using the Site. ▪ Seven roosts were identified from the trapping and tracking sessions of which six roosts were within the site boundary. Three roosts were situated on or within 10m of the site boundary.	County
		✓	▪ The level of bat activity detected during the monthly transects across Transects B and C (Little Eaton) was Moderate. Eight species were detected across all transects and survey months (common pipistrelle, soprano pipistrelle, brown long-eared bat, noctule, *Nyctalus/Eptesicus* species (possible Leisler's or	County

Nature Conservation Receptor	Kingsway and Markeaton Junctions	Little Eaton Junction	Rationale	Overall Value
			serotine), *Myotis* species, whiskered/Brandt's bats, Daubenton's bat, natterer's bat). ▪ Seasonal variations were observed with more activity noted in June and August, indicating that these areas are important habitat for females foraging during the maternity period. ▪ Activity was most abundant along the River Derwent, within Peg Low woodland and the land between the A38 and railway line and underpass. Activity elsewhere across Little Eaton was scattered and not consistently detected in the same locations. ▪ Statistical analysis has indicated that the habitats at Little Eaton are of significantly higher value to commuting and foraging bats than that of Kingsway and Markeaton. Analysis has also shown that bat abundance is greatest along the railway line and River Derwent. Significantly greater diversity was noted along the railway line than the other locations, indicating that the linear mosaic habitats are important to the local bat population.	
Foraging and commuting bats – populations of 'rarer' species	✓		<u>Roadside</u> ▪ Noctule and *Myotis* species (likely whiskered or Brandt's) are classed as rarer species nationally (Wray *et al* 2010). Low numbers of individual bat passes (>2) of these species were detected at Kingsway and Markeaton during the activity transects and therefore this habitat is not considered important for these species. ▪ Noctules are an LBAP species for Lowland Derbyshire; according to population trends the species is declining (Macdonald and Burnham 2008).	Local

Nature Conservation Receptor	Kingsway and Markeaton Junctions	Little Eaton Junction	Rationale	Overall Value
			Markeaton Park ▪ Whiskered, Brandt's, Daubenton's, natterer's, noctule and serotine are classed as a rarer species nationally (Wray *et al* 2010), of which two (Daubenton's and serotine) have been confirmed breeding in the area. ▪ Brown long-eared and noctule bats are LBAP species for Lowland Derbyshire. ▪ Serotine is classed as a rarer species nationally (Wray *et al* 2010). Distribution of Serotine bats in Derbyshire is unknown (Derbyshire Mammal Group n.d.). According to population trends the species is declining (Macdonald and Burnham 2008). ▪ The UK supports an internationally significant population of natterer's but which is widespread in the UK (Macdonald and Burnham 2008).	County
		✓	▪ Brown long-eared bats, noctule, *Nyctalus*/*Eptesicus* (possible Leisler's or serotine), Daubenton's and whiskered/Brandt's bat are classed as a rarer species nationally (Wray *et al* 2010) which were detected in Little Eaton. Noctule is an LBAP species for Lowland Derbyshire. ▪ Moderate numbers of *Myotis* bat species were detected, including, Daubenton's which were observed foraging along the River Derwent, which supports a mosaic and complex network of habitats. The abundance of this species provides a good indicator of riparian habitat management and water quality (Battersby *et al* 2005) with a mosaic and complex network of habitat, thus increasing the ecological value of this receptor. ▪ Daubenton's species trends for waterways for England is slowly declining since 2007 (Macdonald and Burnham 2008) ▪ A low number of serotine passes were detected which is classed as a rarer species nationally (Wray *et al* 2010). Distribution of serotine in Derbyshire is unknown (Derbyshire Mammal Group n.d.).	County
Foraging and commuting bats - a breeding population of whiskered		✓	▪ The whiskered bat is a rarer species at the national scale (Wray *et al* 2010). Little Eaton junction is characterised by a mosaic of habitat types including fields, rivers and woodland. A small number of whiskered bats, including	County

Nature Conservation Receptor	Kingsway and Markeaton Junctions	Little Eaton Junction	Rationale	Overall Value
bats (confirmed in Davidson-Watts 2016) in the vicinity of Little Eaton junction.			breeding females, are known to commute and forage in this area. Baseline data also suggests a whiskered bat breeding roost exists beyond the proposed scheme boundaries, but in the general locality. Consequently, potential impacts on foraging and commuting individuals of this species are considered in this assessment. ▪ Whiskered bat is not listed as an LBAP species. HABAP 2002 lists all bat species.	
Foraging and commuting bats - population of noctule bats in the vicinity of Little Eaton junction.		✓	▪ Noctule is a rarer species nationally (Wray *et al* 2010) and LBAP species. Population trends for this species show a decline (Macdonald and Burnham 2008). The distribution of noctules detected at Little Eaton suggests that the open improved cattle grazed fields, which provide a valuable food source for this species (Entwistle *et al* 2001) are of county importance for these species	County
Breeding population of serotine in the vicinity of Kingsway and Markeaton	✓		▪ Serotine bat is a rare species at a national scale (Wray *et al* 2010); population trends for this species are decreasing (Macdonald and Burnham 2008). This species requires a complex mosaic of habitat to support its foraging, roosting and commuting behaviour (Joint Nature Conservation Committee 2007);he presence of a pregnant female suggests that this habitat is extremely valuable at County level for this species.	County
Foraging and commuting bats -populations of 'common' species (common pipistrelle; soprano pipistrelle at various locations including at the River Derwent, Markeaton Park and Earl of Harington Lake).	✓	✓	▪ Moderate to high levels of commuting and foraging activity were recorded at Markeaton Park and Earl of Harington Lake. ▪ Low but widespread bat activity was detected during transect surveys undertaken at Little Eaton junction. However, high levels of foraging and bat activity were recorded at the River Derwent. ▪ The levels of bat activity at Markeaton Park, Earl of Harrington Lake and the River Derwent suggest that these habitats are valuable to bats within the wider area. Thus, the valuation for foraging and commuting bats has been valued higher than roosting bats. ▪ Soprano pipistrelle is an LBAP species, species of principal importance and HABAP 2002 species and was the most frequently detected. This species is	County

Nature Conservation Receptor	Kingsway and Markeaton Junctions	Little Eaton Junction	Rationale	Overall Value
			more reliant on aquatic habitats than common pipistrelle (Battersby *et al* 2005) and as such the habitat is of County value for the species.	

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Appendix A Figures

Transect A

Transect B

Transect C

N

400 0 400 800 1200 1600 2000 Metres

Legend

- Scheme boundary - indicative
- Transect A
- Transect B
- Transect C

Project Title/Drawing Title

A38 DERBY JUNCTIONS BAT SURVEY LOCATION OF TRANSECTS A, B & C

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB/CAA	SC	.
Date	Scale @ A3	Purpose of issue
08/12/2017	1:20,000	FINAL
Drawing Number		Rev
Figure 1		.

A38 Derby Junctions Project
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38 Colmore Circus
Birmingham
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File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\A38_OverviewBatTransects_2017.mxd

N

1 2 3 4 5 6 7 8 9 10 End Start

100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary - indicative
- **Bat transect route**
- Transect A
- Stop Point

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\A38_BatTransect Route C_2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
KINGSWAY & MARKEATON
TRANSECT ROUTE A

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB/CAA	SC	.
Date	**Scale @ A3**	**Purpose of issue**
08/12/2017	1:7,000	FINAL
Drawing Number		**Rev**
Figure 2.1		.

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N

Start
End
1
2
3
4
5
6
7
8
9
10

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect B

Stop Point

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\A38_BatTransect Route B_2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT ROUTE B

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB/CAA	SC	.
Date	Scale @ A3	Purpose of issue
08/12/2017	1:5,600	FINAL
Drawing Number		Rev
Figure 2.2		.

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N

Start

End

1 2 3 4 5 6 7 8 9 10

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect C

Stop Point

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\A38_Bat Transect_RouteA_2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT ROUTE C

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	**Scale @ A3**	**Purpose of issue**
08/12/2017	1:4,000	FINAL
Drawing Number		**Rev**
Figure 2.3		.

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N

Legend

- Scheme boundary - indicative
- 500 m buffer
- 1 km buffer
- 2 km buffer

Data provision:

- Derbyshire Bat Conservation Group (2017)
- Derbyshire Wildlife Trust (2016)
- AECOM (2015)

Roost - Bat Species:

- Soprano pipistrelle
- Common pipistrelle
- Pipistrelle
- Myotis bat
- Whiskered/Brandt's bat
- Natterer's bat
- Brown long-eared bat
- Unidentified bat

400 0 400 800 1200 1600 2000 Metres

Project Title/Drawing Title

A38 DERBY JUNCTIONS KINGSWAY MARKEATON DESK STUDY 2017 BAT ROOSTS RECORDS

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB	SC	.
Date	Scale @ A3	Purpose of issue
08/12/2017	1:20,000	FINAL
Drawing Number		Rev
Figure 3		.

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File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Desk Study\A38_DeskStudy_Bats_KM_2017.mxd

N

400 0 400 800 1200 1600 2000 Metres

Legend

- Scheme boundary - indicative
- 2 km buffer
- 1 km buffer
- 500 m buffer

Data provision:

- Derbyshire Wildlife Trust (2016)
- Derbyshire Bat Conservation Group (2017)
- AECOM (2015)

Roost - Bat Species:

- Soprano pipistrelle
- Common pipistrelle
- Pipistrelle
- Whiskered/Brandt's bat
- Natterer's bat
- Brown long-eared bat
- Unidentified bat

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Desk Study\A38_DeskStudy_Bats_LE_2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
LITTLE EATON
DESK STUDY 2017
BAT ROOSTS RECORDS

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB	SC	.
Date	Scale @ A3	Purpose of issue
08/12/2017	1:20,000	FINAL
Drawing Number		Rev
Figure 4		.

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N

1
2
3
4
5
6
7
8
9
10
End
Start

Heavy scrub, inaccessible from the (insert month here).

100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary - indicative
- Transect

Bat transect route

- Transect
- Stop Point

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\A38_BatTransect Route A Modifications_2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
KINGSWAY & MARKEATON
TRANSECT ROUTE A MODIFICATIONS

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB/CAA	SC	.
Date	**Scale @ A3**	**Purpose of issue**
12/12/2017	1:7,000	FINAL
Drawing Number		**Rev**
Figure 5.1		.

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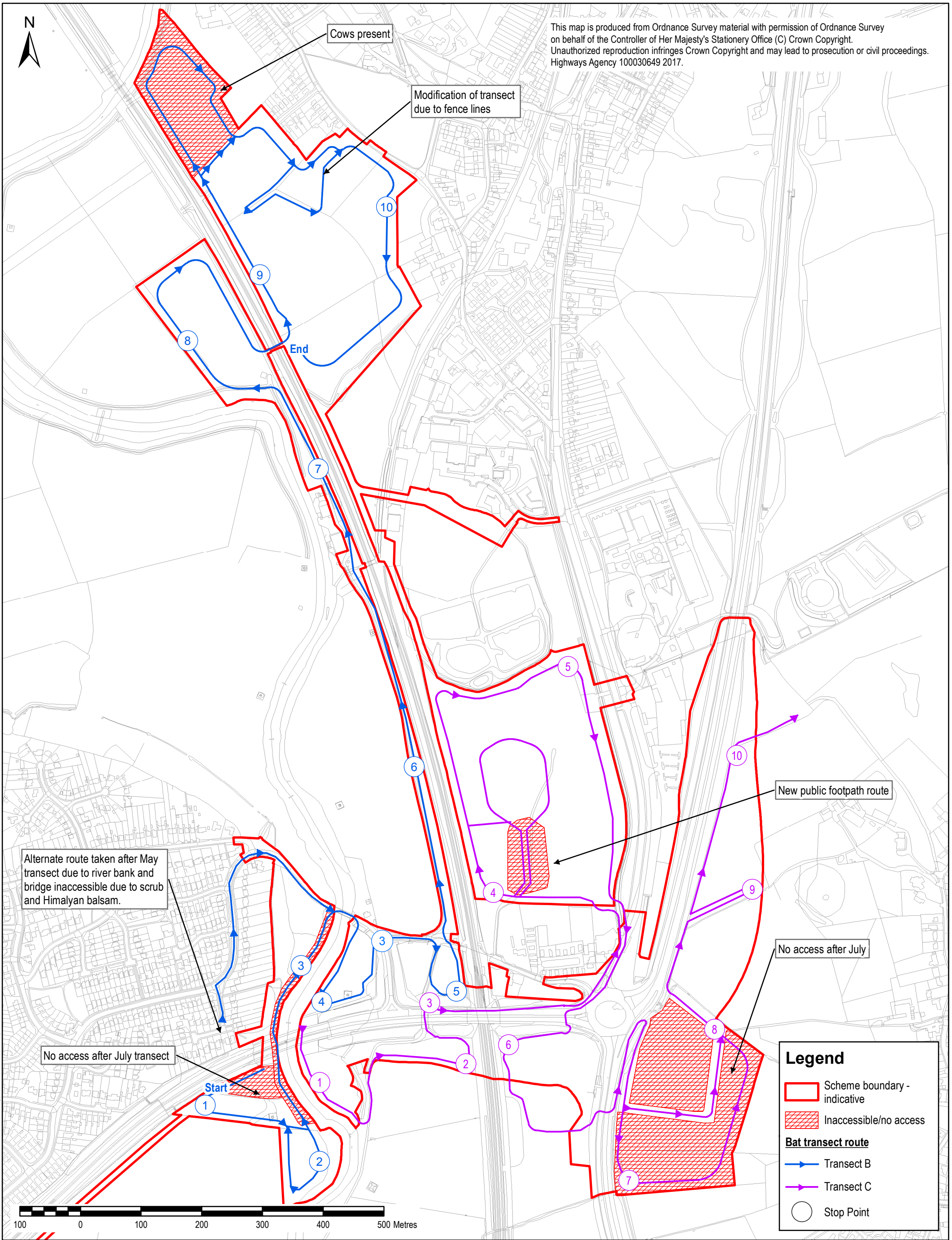

File Name:X:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\A38_BatTransect Route B Modifications_2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT ROUTE B & C MODIFICATIONS

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
CAA	SC	PB
Date	**Scale @ A3**	**Purpose of issue**
19/02/2018	1:5,600	FINAL
Drawing Number		**Rev**
Figure 5.2		.

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N

Start

1

21:09 1xPip. Sp

2

21:32 1xCP

21:30 1xCP

3

4

5

6

22:08 - 22:09 1xSP

22:12 1xSP

22:14 - 22:19 1xCP

22:15 - 22:19 2xSP

22:10 2xCP

22:05 2xCP

22:03 2xCP

7

8

9

10

End

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect A

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Pipistrelle species Pip. sp

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\MK Transect C\C1_A38_BatTransect C_04May2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
KINGSWAY & MARKEATON
TRANSECT A - DUSK 04/05/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB	SC	.
Date	**Scale @ A3**	**Purpose of issue**
08/12/2017	1:7,000	FINAL
Drawing Number		**Rev**
Figure 6.1		.

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N

1
2
3
4
5
6
7
8
9
10
Start
End

04:27 1xMY
04:26 - 04:27 1xCP
04:25 1xSP
04:24 2xCP
04:17 1xCP
04:04 1xCP
03:35 - 03:38 1xPip. sp
03:28 - 03:29 1xCP
03:25 1xCP
03:24 1xCP

100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary - indicative
- **Bat transect route**
  - Transect A
  - Stop Point
- **Bat species (with record time and number of bats)**
  - Soprano pipistrelle SP
  - Common pipistrelle CP
  - Pipistrelle species Pip. sp
  - *Myotis* MY

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\MK Transect C\C2_A38_BatTransect C_25July2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
KINGSWAY & MARKEATON
TRANSECT A - DAWN 25/07/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB	SC	.
Date	**Scale @ A3**	**Purpose of issue**
08/12/2017	1:7,000	FINAL
Drawing Number		**Rev**
Figure 6.2		.

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N

20:04 2xSP

20:21 1xPip. sp

20:47 1xCP

19:29 - 19:32 2xCP

19:33 1xCP

19:35 1xCP

21:10 - 21:11 1xCP

19:07 - 19:08 1xSP

Start

End

1 2 3 4 5 6 7 8 9 10

100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary - indicative

Bat transect route

- Transect A
- Stop Point

Bat species (with record time and number of bats)

- Soprano pipistrelle SP
- Common pipistrelle CP
- Pipistrelle species Pip. sp

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\MK Transect C\C3_A38_BatTransect C_26Sept2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
KINGSWAY & MARKEATON
TRANSECT A - DUSK 26/09/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
08/12/2017	1:7,000	FINAL
Drawing Number		Rev
Figure 6.3		.

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N

1
2
3
4
5
6
7
8
9
10

Start
End

21:19 1xCP
21:23 - 21:26 1xCP
21:17 1xSP
21:24 - 21:25 1xSP
21:38 - 21:39 1xCP
21:42 1xCP
21:15 1xSP
21:30 -21:31 1xMY
21:31 - 21:39 1xCP
21:32 1xNoc
21:39 - 21:41 1xSP
21:06 - 21:14 1x SP
21:29 - 21:32 1xSP
22:23 1xMY
22:23 1xDA
22:10 1xMY my/br
22:10 - 22:11 1xSP
22:05 - 22:06 1xSP
22:04 1xCP
22:01 1xBLE

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

- Transect B
- Stop Point

Bat species (with record time and number of bats)

- Soprano pipistrelle SP
- Common pipistrelle CP
- Noctule Noc
- Daubenton's DA
- Whiskered/Brandt's MY my/br
- *Myotis* MY
- Brown long-eared BLE

Bat flight (with species, record time and number of bats)

- Soprano pipistrelle SP
- Common pipistrelle CP

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect B\B1_A38_BatTransect B_09May2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT B - DUSK 09/05/2017

AECOM Internal Project Number
60533462

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Date	Scale @ A3	Purpose of issue
07/12/2017	1:5,600	FINAL
Drawing Number		Rev
Figure 7.1		.

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N

21:54 1xNoc
21:59 1xNoc
22:04 1xSP
22:05 1xNoc
22:20 1xPip. sp
Start
22:08 - 22:11 1xNoc
22:25 1xSP
22:26 1xMY
22:15 - 22:24 2xNoc
22:24 1xMY
22:26 - 22:28 1xSP
22:24 1xCP
22:28 - 22:31 1xNoc
22:25 1xNoc
22:28 1xMY
22:28 - 22:32 1xCP
22:28 - 22:31 1xSP
22:32 3xSP
22:33 1xNoc
22:33 2xCP
22:33 1xNY
22:37 - 22:38 1xSP
22:36 - 22:38 1xCP
22:37 1xPip. sp
22:33 - 22:35 1xSP
22:40 -22:41 1xCP
22:40 - 22:41 2xSP
23:04 1xMY
23:29 - 23:32 1xSP
23:36 1xSP
23:14 - 23:17 1xCP
23:35 - 23:36 1xPip. sp
23:39 - 23:40 1xPip. sp
23:41 - 23:42 1xMY
23:09 - 23:11 1xCP
23:24 1xMY
23:23 1xPip. sp
23:51 - 23:55 1xCP
23:52 - 23:55 1xSP
End
00:14 1xCP
00:11 1xMY
00:13 1xSP
00:04 1xMY, my/br
00:08 - 00:11 1xCP
00:06 1xPip. sp
23:59 1xCP
00:03 - 00:04 1xPip. sp

10 9 8 7 6 5 4 3 2 1

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect B

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Pipistrelle species Pip. sp

Noctule Noc

Nyctalus NY

Whiskered/Brandt's MY my/br

Myotis MY

Bat flight (with species, record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Noctule Noc

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect B\B2_A38_BatTransect B_12June2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT B - DUSK 12/06/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
07/12/2017	1:5,600	FINAL
Drawing Number		Rev
Figure 7.2		.

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N

Start

End

1
2
3
4
5
6
7
8
9
10

02:33 1xMY
02:30 1xSP
02:23 - 02:24 1xSP
02:28 1xCP
02:26 - 02:28 1x SP
02:04 - 02:06 1xSP
02:22 - 02:25 1xCP
02:07 1xCP
02:12 1xSP
02:13 - 02:16 1xCP
02:15 1xWHSK
02:20 1xCP
02:20 1xWHSK
02:44 - 02:49 1xCP
02:52 - 02:57 1xCP
02:54 - 02:55 1xDA
03:03 1xWHSK
03:01 - 03:03 1xCP
03:10 1xCP
03:28 1xSP
03:39 - 03:45 2xCP
03:34 - 03:38 1xSP
03:47 - 03:49 3xCP
03:45 1xSP
04:11 1xNoc
04:11 1xSP
04:15 1xNoc
04:02 1xNoc
04:01 1xCP
04:26 1xCP
04:00 1xNoc
04:31 1xNoc

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect B

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Noctule Noc

Daubenton's DA

Whiskered/Brandt's MY my/br

Myotis MY

Bat flight (with species, record time and number of bats)

Common pipistrelle CP

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect B\B3_A38_BatTransect B_18July2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT B - DAWN 18/07/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
07/12/2017	1:5,600	FINAL
Drawing Number		Rev
Figure 7.3		.

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N

21:14 1xMY
21:14 1xSP
21:06 - 21:07 1xSP
10
21:19 - 21:23 1xCP
21:16 - 21:18 1xCP
9
21:20 1xMY
21:24 1xMY my/br
21:29 - 21:31 2xCP
21:26 1xCP
21:23 - 21:24 1xCP
8
21:24 - 21:26 1xCP
Start
21:24 - 21:26 1xCP
21:34 - 21:37 1xCP
21:37 2xCP
21:33 1xSP
21:34 - 21:37 1xSP
21:38 - 21:40 1xCP
21:40 - 21:41 1xSP
21:40 - 21:47 2xCP
7
6
22:30 1xCP
22:14 - 22:17 1xCP
22:19 - 22:20 1xCP
22:05 1xSP
22:05 - 22:09 2xCP
22:07 - 22:10 1xSP
22:11 1xSP
3
5
4
22:22 - 22:28 1xCP
22:10 - 22:11 2xCP
23:03 - 23:06 2xCP
22:45 1xSP
End
22:44 - 22:45 1xCP
22:42 - 22:43 1xSP
23:06 1xSP
22:48 1xSP
22:51 - 22:53 1xCP
22:51 1xSP
1
23:00 1xSP
22:56 - 23:00 1xCP
22:55 1xMY my/br
2

100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary - indicative

Bat transect route

- Transect B
- Stop Point

Bat species (with record time and number of bats)

- Soprano pipistrelle SP
- Common pipistrelle CP
- Whiskered/Brandt's MY my/br
- *Myotis* MY

Bat flight (with species, record time and number of bats)

- Soprano pipistrelle SP
- Common pipistrelle CP

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect B\B4_A38_BatTransect B_14Aug2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT B - DUSK 14/08/2017

AECOM Internal Project Number
60533462

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Date	**Scale @ A3**	**Purpose of issue**
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Drawing Number		**Rev**
Figure 7.4		.

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N

04:28 1xCP
04:31 1xNoc
04:33 1xCP
04:37 1xCP
04:28 1xSP
04:41 1xCP
04:22 1xCP
10
04:46 1xCP
04:16 1xSP
9
8
04:11 1xMY
04:13 1xCP
End
04:56 1xSP
04:04 1xNY
04:11 1xSP
04:03 - 04:04 1xNY/EP
04:03 - 04:07 1xSP
04:01 - 04:03 1xCP
7
03:56 1xCP
03:56 1xSP
03:56 1xNY/EP
6
03:24 1xSP
03:24 1xCP
03:26 - 03:27 1xCP
03:35 1xSP
03:31 1xCP
3
4
5
02:52 1xSP
Start
02:52 1xCP
02:47 - 02:50 1xSP
02:46 - 02:51 1xCP
03:03 1xSP
03:03 1xCP
1
02:55 - 03:00 2xCP
2

100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary - indicative

Bat transect route

- Transect B
- Stop Point

Bat species (with record time and number of bats)

- Soprano pipistrelle SP
- Common pipistrelle CP
- Noctule Noc
- Nyctalus/Eptesicus sp. NY/EP
- *Nyctalus* NY
- *Myotis* MY

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect B\B5_A38_BatTransectB_15Aug2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT B - DAWN 15/08/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB/CAA	SC	.
Date	Scale @ A3	Purpose of issue
07/12/2017	1:5,600	FINAL
Drawing Number		Rev
Figure 7.5		.

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N

Start
End

1
2
3
4
5
6
7
8
9
10

20:19 1xSP
20:19 1xCP
20:22 - 20:23 1xCP
20:21 1xCP
20:31 1xCP
20:33 1xCP
20:42 - 20:44 2xCP
20:39 2xCP
20:43 1xSP
20:42 1xPip. sp
20:42 1xSP
20:52 1xCP
20:44 1xSP
20:50 1xCP
20:48 1xCP
21:02 1xCP
20:20 1xSP
21:19 1xCP
21:18 - 21:19 1xSP
21:16 1xCP
21:16 - 21:18 1xSP
21:16 1xMY my/br
21:15 1xCP
21:22 1xCP
21:25 2xSP
21:28 1xCP
21:27 1xMY
21:26 - 21:28 2xSP
21:29 - 21:31 1xCP
21:27 1xCP
21:29 - 21:31 1xSP
21:33 1xCP
21:34 - 21:35 1xCP
21:25 - 21:26 1xCP
21:29 1xDA
21:32 2xCP
21:35 1xSP
21:33 1xSP
21:42 1xMY
21:44 1xSP
21:50 1xSP
22:00 1xMY my/br
22:09 1xMY
21:55 1xSP
21:54 1xSP
22:12 1xCP
22:14 1xDA

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

- Transect B
- Stop Point

Bat species (with record time and number of bats)

- Soprano pipistrelle SP
- Common pipistrelle CP
- Pipistrelle species Pip. sp
- Daubenton's DA
- Whiskered/Brandt's MY my/br
- *Myotis* MY

Bat flight (with species, record time and number of bats)

- Soprano pipistrelle SP
- Common pipistrelle CP
- *Myotis* MY

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT B - DUSK 31/08/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
07/12/2017	1:5,600	FINAL
Drawing Number		Rev
Figure 7.6		.

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N

05:01 - 05:02 1xSP
05:03 - 05:06 1xSP
10
9
04:54 1xMY my/br
04:36 1xMY my/br
04:49 - 04:52 1xMY
8
Start
04:31 1xCP
05:31 1xSP
05:32 - 05:33 1xSP
7
6
06:06 1xCP
06:11 - 06:12 1xCP
06:03 1xMY
06:05 1xMY my/br
3
06:09 - 06:11 1xCP
4
5
End
1
06:39 1xSP
06:40 - 06:42 1xSP
2

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect B

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Whiskered/Brandt's MY my/br

Myotis MY

Bat flight (with species, record time and number of bats)

Soprano pipistrelle SP

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect B\B7_A38_BatTransectB_26Sept2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT B - DAWN 26/09/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB/CAA	SC	.
Date	Scale @ A3	Purpose of issue
07/12/2017	1:5,600	FINAL
Drawing Number		Rev
Figure 7.7		.

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N

19:50 1xSP
19:47 1xCP
19:41 - 19:43 1xMY
19:40 - 19:43 1xSP
19:51 - 19:54 1xCP
19:54 - 19:58 1xCP
19:58 - 19:59 1xCP
10
19:37 1xSP
9
19:34 - 19:39 1xCP
19:31 1xCP
8
End
19:28 1xSP
19:29 - 19:32 1xSP
19:23 - 19:25 1xCP
19:24 1xMY
19:22 1xMY
19:22 - 19:23 1xSP
19:19 1xSP
7
19:17 1xMY
19:12 1xSP
19:11 - 19:13 1xCP
6
19:02 1xSP
18:57 - 18:58 1xSP
18:41 - 18:42 1xCP
18.40 1xCP
3
18:44 - 18:49 1xCP
4
5
Start
18:27 - 18:42 1xSP
18:26 1xSP
1
18:23 1xSP
18:24 1xSP
2

100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary - indicative

Bat transect route

- Transect B
- Stop Point

Bat species (with record time and number of bats)

- Soprano pipistrelle SP
- Common pipistrelle CP
- *Myotis* MY

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect B\B8_A38_BatTransect_B_17Oct2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT B - DUSK 17/10/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB/CAA	SC	.
Date	Scale @ A3	Purpose of issue
07/12/2017	1:5,600	FINAL
Drawing Number		Rev
Figure 7.8		.

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N

21:52 1xNoc

5

21:51 1xBLE

End

10

21:32 1xCP

21:31 1xCP

21:32 1xNoc

4

21:28 - 21:29 1xCP

9

3

21:15 - 21:17 1xCP

21:13 1xCP

Start

22:16 1xSP

6

8

2

1

7

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect C

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Noctule Noc

Brown long-eared BLE

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect svLE Transect AVA1_A38_BatTransect A_09May2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT C - DUSK 09/05/2017

AECOM Internal Project Number
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Drawn	Checked	Approved
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Date	**Scale @ A3**	**Purpose of issue**
07/12/2017	1:4,000	FINAL
Drawing Number		**Rev**
Figure 8.1		.

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N

Start
End
1
2
3
4
5
6
7
8
9
10
00:29 - 00:30 1xCP
00:24 - 00:25 1xCP
00:25 2xSP
00:26 1xCP
00:07 1xCP
00:07 1xMY my/br
00:08 1xCP
00:09 1xMY my/br
00:02 - 00:03 1xCP
23:29 - 23:38 1xCP
23:37 1xMY my/br
23:03 1xSP
22:45 1xCP
22:42 1xPip. sp
22:47 1xCP
22:50 1xCP
22:51 1xMY my/br
22:52 1xNoc
22:39 1xNoc
22:53 - 22:54 2xCP
22:29 1xSP
22:27 - 22:28 1xMY
22:28 - 22:29 1xCP
22:26 - 22:28 2xNoc
22:18 - 22:22 1xNoc
22:10 1xNoc
22:01 1xNY

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect C

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Pipistrelle species Pip. sp

Noctule Noc

Nyctalus NY

Whiskered/Brandt's MY my/br

Myotis MY

Bat flight (with species, record time and number of bats)

Noctule Noc

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect AVA2_A38_BatTransect A_12June2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT C - DUSK 12/06/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
07/12/2017	1:4,000	FINAL
Drawing Number		Rev
Figure 8.2		.

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N

Start

02:13 - 02:15 1xSP
02:14 - 02:16 1xCP
02:10 - 02:15 1xMY
02:12 1xPip. sp
02:09 1xCP
02:20 - 02:21 1xPip. sp
02:22 1xDA
02:22 1xPip. sp
02:22 1xCP
02:36 1xCP
02:32 - 02:33 1xCP
02:29 - 02:30 1xCP
02:28 - 02:30 1xSP
02:57 1xPip. sp
03:28 - 03:29 1xCP
02:45 - 02:46 1xCP
03:43 1xSP
03:43 1xCP
03:48 1xNoc
03:57 1xNoc
04:13 - 04:14 1xCP
04:06 1xMy nat
04:03 1xCP
04:25 1xNoc
04:23 1xSP
End

1 2 3 4 5 6 7 8 9 10

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect C

Stop Point

Bat species (with record time and number of bats)

- Common pipistrelle CP
- Daubenton's DA
- *Myotis* MY
- Natterer's My nat
- Noctule Noc
- Pipistrelle species Pip. sp
- Soprano pipistrelle SP

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect svs\LE Transect AVA3_A38_BatTransect A_18July2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT C - DAWN 18/07/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
07/12/2017	1:4,000	FINAL
Drawing Number		Rev
Figure 8.3		.

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N

Start
20:34 2xCP
20:37 1xCP
1
20:45 - 20:46 2xCP
2
21:59 - 22:02 1xCP
3
21:00 - 21:04 2xCP
21:02 - 21:03 2xSP
20:56 1xCP
4
21:17 1xPip. sp
21:21 1xSP
21:22 1xSP
5
21:36 - 21:38 1xSP
21:47 1xCP
21:53 1xCP
6
21:56 - 21:58 2xCP
21:56 1xMY
21:56 2xSP
21:55 - 21:56 2xCP
22:02 1xCP
22:03 - 22:09 2xCP
22:05 1xNoc
7
22:13 1xMY
22:11 1xSP
8
22:31 - 22:32 1xSP
9
22:38 1xMY my/br
10
23:00 1xCP
22:54 1xMY
22:54 - 22:55 1xCP
End
22:19 - 22:20 1x CP

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect C

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Pipistrelle species Pip. sp

Noctule Noc

Whiskered/Brandt's MY my/br

Myotis MY

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect svLE Transect AVA4_A38_BatTransect A_14Aug2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT C - DUSK 14/08/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
07/12/2017	1:4,000	FINAL
Drawing Number		Rev
Figure 8.4		.

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N

Start

End

1
2
3
4
5
6
7
8
9
10

03:00 1xMY my/br
03:07 1xMY my/br
03:09 1xMY my/br
03:12 1xMY my/br
03:22 1xNoc
03:32 1xNoc
03:43 1xSP
03:44 1xSP
03:48 2xMY
04:00 1xSP
04:00 1xCP
04:45 1xSP
04:55 1xNoc
05:10 1xNY/EP
05:18 1xCP
03:51 1xSP

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect C

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Noctule Noc

Nyctalus/Eptesicus sp. NY/EP

Whiskered/Brandt's MY my/br

Myotis MY

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect AVA5_A38_BatTransect A_15Aug2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT C - DAWN 15/08/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
07/12/2017	1:4,000	FINAL
Drawing Number		Rev
Figure 8.5		.

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N

Start
20:06 1xCP
1
20:21 1xSP
2
20:21 - 20:22 1x CP
20:24 1xCP
3
20:27 1xSP
20:26 - 20:27 1xCP
20:57 - 21:00 1xCP
5
20:58 1xPip. sp
20:28 - 20:29 1x CP
6
21:23 - 21:26 1xMY
21:27 1x Noc
21:28 1xDA
21:38 1xSP
7
21:48 1xCP
21:49 1xMY
21:47 - 21:48
1xMY my/br
8
22:07 1xMY
9
10
22:18 1xMY
End
20:47 1xPip. sp
4
20:45 1xCP
20:37 1xMY

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect C

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Pipistrelle species Pip. sp

Noctule Noc

Daubenton's DA

Whiskered/Brandt's MY my/br

Myotis MY

Bat flight (with species, record time and number of bats)

Common pipistrelle CP

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT C - DUSK 31/08/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB/CAA	SC	.
Date	Scale @ A3	Purpose of issue
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Drawing Number		Rev
Figure 8.6		.

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N

Start

End

1
2
3
4
5
6
7
8
9
10

06:11 1xPip. sp

06:08 1xMY

06:35 1xPip. sp

04:56 1xMY

04:59 1xMY

05:43 - 05:44 1xSP

05:33 1xMY

05:25 1xCP

05:30 - 05:33 1xSP

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect C

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Pipistrelle species Pip. sp

Myotis MY

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect AVA7_A38_BatTransect A_26Sept2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT C - DAWN 26/09/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
GSB/CAA	SC	.
Date	Scale @ A3	Purpose of issue
07/12/2017	1:4,000	FINAL
Drawing Number		Rev
Figure 8.7		.

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N

Start

End

5
10
4
9
3
8
2
6
1
7

20:04 1xCP

18:27 - 18:30
1xSP

20:12 1xMY

20:35 - 20:38 3xMY

20:16 - 20:23 2xCP

19:23 - 19:27 2xSP

19:18 - 19:23 1xCP

20:26 - 20:33 1xCP

20:28 1xSP

19:15 - 19:17 1xSP

19:15 - 19:17 1xCP

18:48 - 19:51 1xSP

18:51 - 18:55 1xCP

18:55 - 19:03 1xSP

18:57 - 19:02 1xCP

18:57 - 19:02 1xPip. sp

100 0 100 200 300 400 500 Metres

Legend

Scheme boundary - indicative

Bat transect route

Transect C

Stop Point

Bat species (with record time and number of bats)

Soprano pipistrelle SP

Common pipistrelle CP

Pipistrelle species Pip. sp

Myotis MY

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\LE Transect AVA8_A38_BatTransect A_17Oct2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT C - DUSK 17/10/2017

AECOM Internal Project Number
60533462

Drawn	Checked	Approved
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Date	Scale @ A3	Purpose of issue
07/12/2017	1:4,000	FINAL
Drawing Number		Rev
Figure 8.8		.

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100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary - indicative
- Low bat activity hotspots

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\A38_BatTransect C_hotspots_2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
KINGSWAY & MARKEATON
TRANSECT A - BAT ACTIVITY HOTSPOTS

AECOM Internal Project Number
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Drawn	Checked	Approved
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Date	**Scale @ A3**	**Purpose of issue**
08/12/2017	1:7,000	FINAL
Drawing Number		**Rev**
Figure 9		.

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100 0 100 200 300 400 500 Metres

Legend

- Scheme boundary - indicative
- High bat activity hotspots

File Name:A:\Highways Agency\47071390 A38 Derby Jcns - Environment\Technical\Ecology\GIS_A38_2017\project_files\Bats\Transect sv\A38_BatTransect B&C_hotspots_2017.mxd

Project Title/Drawing Title

A38 DERBY JUNCTIONS
BAT SURVEY
LITTLE EATON
TRANSECT B & C - BAT ACTIVITY HOTSPOTS

AECOM Internal Project Number
60533462

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08/12/2017	1:5,600	FINAL
Drawing Number		Rev
Figure 10		.

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Appendix B Foraging and Commuting Value: Wray (2010)

Table B1: Categorising bats by distribution and rarity

Rarity within range	England
Rarest (popn. Under 10,000)	Greater horseshoe; Bechstein's ; Alcathoe; Greater mouse-eared; Barbastelle; Grey long eared
Rarer (popn. 10,000 – 100,000)	Lesser horseshoe; Whiskered; Brandt's; Daubenton's; Natterer's; Leisler's; Noctule; Nathusius' pipistrelle; Serotine
Common (popn. Over 100,000)	Common pipistrelle; Soprano pipistrelle; Brown long-eared

Table B2: Scoring system for valuing commuting and foraging bats

Geographic frame of reference	Score
Site	1 – 10
Local	11 – 20
County	21 – 30
Regional	31 – 40
National/UK	41 – 50
International	>50

Table B3: Valuing commuting routes

Species	Number of bats	Roosts/potential roosts nearby	Type and complexity of linear features
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
-	-	Small number (3)	Un-vegetated fences and large field sizes (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Walls, gappy or flailed hedgerows, isolated well grown hedgerows, and moderate field sizes (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Well-grown and well-connected hedgerows, small field sizes (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Complex network of mature well-established hedgerows, small fields and rivers/streams (5)

Table B4 Valuing foraging routes

Species	Number of bats	Roosts/potential roosts nearby	Foraging habitat characteristics
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established vegetation (1)
-	-	Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small number of bats (10)	Moderate number/Not known (4)	Isolated woodland patches, less intensive arable and/or small towns and villages (3)
-	-	Large number of roosts, or close to a SSSI for the species (5)	Larger or connected woodland blocks, mixed agriculture, and small villages/hamlets (4)
Rarest (20)	Large number of bats (20)	Close to or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

Appendix C Bat Activity Data – Transect A

May Dusk Activity Transect

May				
Project Name	A38		**Surveyors**	KF & OC
Survey Location	Transect A		**Rain (0-5)**	0
Date	04/05/2017		**Wind (0-7)**	3
Start	20:38		**Cloud Cover (0-5)**	0
Sunset	20:39		**Temperature**	9-7°C
Finish	23:07		**Weather description**	Strong breeze, clear sky and cool
Time	**Species**	**No. of bats**	**Rec. (Y/N)**	**Description of behavior**
21:09	*Pipistrelle* sp.	1	Y	Commuting, heard not seen (HNS)
21:30	Common pipistrelle	1	Y	Commuting, HNS
21:32	Common pipistrelle	1	Y	Foraging, HNS
22:03	Common pipistrelle	2	Y	Foraging, HNS
22:05	Common pipistrelle	2	Y	Foraging, HNS
22:08 – 22:09	Soprano pipistrelle	1	Y	Brief Pass, HNS
22:10	Common pipistrelle	2	Y	Brief Pass, HNS
22:12	Soprano pipistrelle	1	Y	Brief Pass, HNS
22:14 - 22:19	Common pipistrelle	1	Y	Foraging, HNS
22:15 - 22:19	Soprano pipistrelle	2	Y	Foraging, HNS

July Dawn Activity Transect

July				
Project Name	A38		**Surveyors**	SR & CG
Survey Location	Transect A		**Rain (0-5)**	0
Date	25/07/2017		**Wind (0-7)**	0
Start	03:19		**Cloud Cover (0-5)**	0
Sunrise	05:13		**Temperature**	10°C
Finish	05:13		**Weather description**	Dry and clear skies.

Time	Species	No. of bats	Rec. (Y/N)	Description of behavior
03:24	Common pipistrelle	1	Y	Foraging, single pass, seen not heard (SNH)
03:25	Common pipistrelle	1	Y	Brief Pass, Heard not seen (HNS)
03:28 – 03:29	Common pipistrelle	1	Y	Foraging multiple passes, possibly 2 bats, HNS
03:35 – 03:38	*Pipistrelle* sp.	1	Y	Brief Pass, HNS
04:04	Common pipistrelle	1	Y	Brief Pass, HNS
04:17	Common pipistrelle	1	Y	Brief Pass, HNS
04:24	Common pipistrelle	2	Y	Foraging, HNS
04:25	Soprano pipistrelle	1	Y	Brief pass, HNS
04:27	*Myotis* sp.	1	Y	Commuting, HNS
04:26 – 04:27	Common pipistrelle	1	Y	Foraging HNS

September Dusk Activity Transect

September				
Project Name	A38		**Surveyors**	SR & CA
Survey Location	Transect A		**Rain (0-5)**	0
Date	26/09/2017		**Wind (0-7)**	0
Start	18:53		**Cloud Cover (0-5)**	2
Sunset	18:53		**Temperature**	15°C
Finish	21:11		**Weather description**	Clouds high and white, no wind

Time	Species	No. of bats	Rec. (Y/N)	Description of behavior
19:07 – 19:08	Soprano pipistrelle	1	Y	Commuting, heard not seen (HNS)
19:29 – 19:32	Common pipistrelle	2	Y	Commuting, heard and seen (H&S)
19:33	Common pipistrelle	1	Y	Commuting, HNS
19:35	Common pipistrelle	1	Y	Commuting, HNS
20:04	Soprano pipistrelle	2	Y	Foraging, near lake culvert, HNS
20:21	*Pipistrelle* sp.	1	Y	Commuting, HNS
20:47	Common pipistrelle	1	Y	Commuting, HNS
21:10 – 21:11	Common pipistrelle	1	Y	Multiple foraging passes, HNS

Appendix D Bat Activity Data – Transect B

May Dusk Activity Transect

May				
Project Name	A38		**Surveyors**	AD & CA
Survey Location	Transect B		**Rain (0-5)**	0
Date	09/05/2017		**Wind (0-7)**	0
Start	20:30		**Cloud Cover (0-5)**	0
Sunset	20:46		**Temperature**	10°C at start, dropped to 6°C at 21:30
Finish	23:16		**Weather description**	Dry, no cloud cover, no breeze
Time	**Species**	**No. of bats**	**Rec. (Y/N)**	**Description of behavior**
21:06 – 21:14	Soprano pipistrelle	1	Y	Continuous foraging, heard not seen (HNS)
21:15	Soprano pipistrelle	1	Y	Foraging, HNS
21:17	Soprano pipistrelle	1	Y	Commuting south, Heard and seen (H&S)
21:19	Common pipistrelle	1	Y	Foraging, H&S
21:23 – 21:26	Common pipistrelle	1	Y	Foraging, HNS
21:24 – 21:25	Soprano pipistrelle	1	Y	Foraging, H&S
21:29 -21:32	Soprano pipistrelle	1	Y	Continuous foraging, HNS
21:30 – 21:31	*Myotis* sp.	1	Y	Foraging, HNS
21:31 – 21:39	Common pipistrelle	1	Y	Foraging, HNS
21:32	Noctule	1	Y	Commuting, HNS
21:38 – 21:39	Common pipistrelle	1	Y	Foraging, HNS
21:39 – 21:41	Soprano pipistrelle	1	Y	Foraging, HNS
21:42	Common pipistrelle	1	Y	Commuting, HNS
22:01	Brown long-eared (BLE)	1	Y	Commuting, HNS
22:04	Common pipistrelle	1	Y	Commuting, HNS
22:05 – 22:06	Soprano pipistrelle	3	Y	Foraging, HNS
22:10 – 22:11	Soprano pipistrelle	1	Y	Foraging, HNS
22:10	Whiskered/Brandt's	1	Y	Commuting x2 passes, HNS
22:23	*Myotis* sp.	1	Y	Commuting, HNS
22:23	Daubenton's bat	1	Y	Commuting, HNS

June Dusk Activity Transect

June				
Project Name	A38	**Surveyors**	SC & DS	
Survey Location	Transect B	**Rain (0-5)**	1 (Light rain for last 5 mins of survey)	
Date	12/06/2017	**Wind (0-7)**	2	
Start	21:30	**Cloud Cover (0-5)**	2.5	
Sunrise	21:31	**Temperature**	Start: 16°C Finish: 13°C	
Finish	00:30	**Weather description**	Light breeze	

Time	Species	No. of bats	Rec. (Y/N)	Description of behavior
21:54	Noctule	1	Y	Foraging, Heard and seen (H&S)
21:59	Noctule	1	Y	Commuting, Heard not seen (HNS)
22:04	Soprano pipistrelle	1	Y	Brief Pass, HNS
22:05	Noctule	1	Y	Brief Pass, HNS
22:08 – 22:11	Noctule	1	Y	Commuting, HNS. Four passes recorded within three minutes
22:15 – 22:24	Noctule	2	Y	Foraging, HNS. Eleven passes recorded within eleven minutes
22:20	*Pipistrelle* species	1	Y	Brief Pass, HNS
22:24	*Myotis* sp.	1	Y	Foraging, H&S
22:24	Common pipistrelle	1	Y	Foraging, H&S
22:25	Soprano pipistrelle	1	Y	Brief pass, HNS
22:25	Noctule	1	Y	Foraging, HNS
22:26	*Myotis* sp	1	Y	Brief pass, HNS
22:26 – 22:28	Soprano pipistrelle	2	Y	Foraging, HNS. Five passes recorded within two minutes
22:28	*Myotis* sp	1	Y	Brief pass, HNS
22:28 – 22:31	Noctule	1	Y	Foraging, HNS. Four passes recorded within three minutes
22:28 – 22:32	Common pipistrelle	1	Y	Foraging, HNS. Four passes recorded within four minutes
22:28 – 22:31	Soprano pipistrelle	2	Y	Foraging, HNS. Three passes recorded within three minutes
22:32	Soprano pipistrelle	3	Y	Foraging, H&S
22:33	Common pipistrelle	2	Y	Brief pass, HNS
22:33	*Nyctalus sp*	1	Y	Brief pass, HNS
22:33	Noctule	1	Y	Foraging, HNS
22:33 – 22:35	Soprano pipistrelle	1	Y	Foraging, HNS. Three passes recorded within two minutes
22:36 – 22:38	Common pipistrelle	1	Y	Foraging, HNS. Three passes recorded within two minutes
22:37 – 22:38	Soprano pipistrelle	1	Y	Foraging, HNS. Three passes recorded within one minute
22:37	Pipistrelle species	1	Y	Foraging, HNS
22:40 – 22:41	Soprano pipistrelle	2	Y	Foraging, HNS. Two passes recorded within one minute
22:40 – 22:41	Common pipistrelle	1	Y	Foraging, HNS. Three passes recorded within one minute

June				
Time	**Species**	**No. of bats**	**Rec. (Y/N)**	**Description of behavior**
23:04	*Myotis* sp.	1	Y	Brief pass, HNS
23:09 – 23:11	Common pipistrelle	1	Y	Foraging, HNS
23:14 – 23:17	Common pipistrelle	1	Y	Foraging, HNS. Four passes recorded within three minutes
23:23	*Pipistrelle* species	1	Y	Brief pass, HNS
23:24	Myotis sp.	1	Y	Brief pass, HNS
23:29 – 23:32	Soprano pipistrelle	1	Y	Foraging, H&S. Five passes recorded within three minutes
23:35 – 23:36	*Pipistrelle* species	1	Y	Foraging, H&S. Two passes recorded within one minute
23:36	Soprano pipistrelle	1	Y	Brief pass, H&S. Travelling north to south.
23:39 – 23:40	*Pipistrelle* species	1	Y	Foraging, HNS. Two passes recorded within one minute
23:41 -23:42	*Myotis* sp.	1	Y	Two brief pass recorded within a minute, HNS
23:51 – 23:55	Common pipistrelle	1	Y	Foraging, HNS. Five passes recorded within four minutes
23:52 – 23:55	Soprano pipistrelle	1	Y	Foraging, H&S. Three passes recorded within three minutes
23:59	Common pipistrelle	1	Y	Brief pass, HNS
00:03 – 00:04	Pipistrelle species	1	Y	Foraging, HNS. Two passes recorded within a minute
00:04	Whiskered/Brandt's	1	Y	Brief pass, HNS
00:06	*Pipistrelle* species	1	Y	Brief pass, HNS
00:08 – 00:11	Common pipistrelle	1	Y	Foraging, HNS. Four passes recorded within three minutes
00:11	*Myotis* sp.	1	Y	Brief pass, HNS
00:13	Soprano pipistrelle	1	Y	Brief pass, HNS
00:14	Common pipistrelle	1	Y	Brief pass, HNS

July Dawn Activity Transect

July				
Project Name	A38		**Surveyors**	SC & KH
Survey Location	Transect B		**Rain (0-5)**	0
Date	18/07/2017		**Wind (0-7)**	1
Start	02:04		**Cloud Cover (0-5)**	1
Sunset	05:04		**Temperature**	14°C
Finish	05:04		**Weather description**	Clear sky, dry, light air, 82% humidity
Time	**Species**	**No. of bats**	**Rec. (Y/N)**	**Description of behavior**
02:04 – 02:06	Soprano pipistrelle	1	Y	Foraging, HNS
02:07	Common pipistrelle	1	Y	Foraging, HNS
02:12	Soprano pipistrelle	1	Y	Foraging, HNS
02:13 – 02:16	Common pipistrelle	1	Y	Foraging, HNS
02:15	Whiskered/Brandt's	1	Y	Brief pass, HNS
02:20	Whiskered/Brandt's	1	Y	Brief pass, HNS
02:20	Common pipistrelle	1	Y	Foraging, HNS
02:22 – 02:25	Common pipistrelle	1	Y	Foraging, HNS
02:23 – 02:24	Soprano pipistrelle	1	Y	Foraging, HNS
02:26 – 02:28	Soprano pipistrelle	1	Y	Foraging, HNS
02:28	Common pipistrelle	1	Y	Foraging, HNS
02:30	Soprano pipistrelle	1	Y	Foraging, HNS
02:33	*Myotis* sp.	1	Y	Commuting, HNS
02:44 – 02:49	Common pipistrelle	1	Y	Foraging, HNS
02:52 – 02:57	Common pipistrelle	2	Y	Foraging, HNS
02:54 – 02:55	Daubenton's bat	1	Y	Foraging, HNS
03:01 – 03:03	Common pipistrelle	1	1	Foraging, HNS
03:03	Whiskered/Brandt's	1	Y	Commuting, HNS
03:10	Common pipistrelle	1	Y	Foraging, HNS
03:28	Soprano pipistrelle	1	Y	Foraging, HNS
03:34 – 03:38	Soprano pipistrelle	1	Y	Commuting, HNS
03:39 – 03:45	Common pipistrelle	2	Y	Foraging, HNS
03:45	Soprano pipistrelle	1	Y	Foraging, HNS
03:47 – 03:49	Common pipistrelle	3	Y	Foraging, H&S
04:00	Noctule	1	Y	Foraging, HNS
04:01	Common pipistrelle	1	Y	Commuting, HNS
04:02	Noctule	1	Y	Commuting, HNS
04:11	Soprano pipistrelle	1	Y	Foraging, HNS
04:11	Noctule	1	Y	Foraging, HNS
04:15	Noctule	1	Y	Commuting, HNS
04:26	Common pipistrelle	1	Y	Commuting, HNS
04:31	Noctule	1	Y	Foraging, HNS

August Dusk Activity Transect

August Dusk				
Project Name	A38	**Surveyors**	SC &KH	
Survey Location	Little Eaton Transect B	**Rain (0-5)**	1 (sporadic light shower at start of survey for an hour)	
Date	14/08/2017	**Wind (0-7)**	1	
Start	20:33	**Cloud Cover (0-5)**	5	
Sunset	20:33	**Temperature**	17°C	
Finish	23:06	**Weather description**	Warm, light air, overcast with sporadic light shower for an hour into the survey.	

Time	Species	No. of bats	Rec. (Y/N)	Description of behaviour
21:06 – 21:07	Soprano pipistrelle	1	Y	Brief Pass, Heard not seen (HNS)
21:14	*Myotis* sp.	1	Y	Foraging, HNS
21:14	Soprano pipistrelle	1	Y	Foraging, Heard and seen (H&S)
21:16 – 21:18	Common pipistrelle	1	Y	Foraging, HNS
21:19 – 21:23	Common pipistrelle	1	Y	Foraging, H&S
21:20	*Myotis* sp.	1	Y	Brief Pass, HNS
21:23 – 21:24	Common pipistrelle	1	Y	Foraging, HNS
21:24 – 21:26	Common pipistrelle	1	Y	Foraging, H&S
21:24	Whiskered/Brandt's	1	Y	Foraging, HNS
21:26	Common pipistrelle	1	Y	Foraging, HNS
21:29 – 21:31	Common pipistrelle	1	Y	Foraging, HNS
21:33	Soprano pipistrelle	2	Y	Foraging, HNS
21:34 – 21:37	Soprano pipistrelle	1	Y	Foraging, H&S
21:34 – 21:37	Common pipistrelle	1	Y	Foraging, HNS
21:37	Common pipistrelle	2	Y	Foraging, H&S
21:38 – 21:40	Common pipistrelle	1	Y	Foraging, HNS
21:40 – 21:41	Soprano pipistrelle	1	Y	Foraging, HNS
21:40 – 21:47	Common pipistrelle	2	Y	Foraging, HNS
22:05	Soprano pipistrelle	1	Y	Foraging, HNS
22:05 – 22:09	Common pipistrelle	2	Y	Foraging, HNS
22:07 – 21:10	Soprano pipistrelle	1	Y	Foraging, HNS
22:10 – 22:11	Common pipistrelle	2	Y	Foraging, H&S
22:11	Soprano pipistrelle	1	Y	Foraging, HNS
22:14 – 22:17	Common pipistrelle	1	Y	Foraging, HNS
22:19 – 22:20	Common pipistrelle	1	Y	Foraging, HNS
22:22 – 22:28	Common pipistrelle	1	Y	Foraging, HNS
22:30	Common pipistrelle	1	Y	Foraging, HNS
22:42 – 22:43	Soprano pipistrelle	1	Y	Foraging, HNS
22:44 – 22:45	Common pipistrelle	1	Y	Foraging, HNS
22:45	Soprano pipistrelle	1	Y	Foraging, HNS
22:48	Soprano pipistrelle	1	Y	Foraging, HNS
22:51	Soprano pipistrelle	1	Y	Foraging, HNS
22:51 – 21:53	Common pipistrelle	1	Y	Foraging, HNS
22:55	Whiskered/Brandt's	1	Y	Foraging, HNS

August Dawn Activity Transect

August Dawn				
Project Name	A38		**Surveyors**	GB and KH
Survey Location	Transect B		**Rain (0-5)**	0
Date	15/08/2017		**Wind (0-7)**	1
Start	02:52		**Cloud Cover (0-5)**	0
Sunrise	05:46		**Temperature**	15°C
Finish	05:46		**Weather description**	Clear sky, no rain

Time	Species	No. of bats	Rec. (Y/N)	Description of behaviour
02:46 – 02:51	Common pipistrelle	1	Y	Foraging, heard not seen (HNS)
02:47 – 02:50	Soprano pipistrelle	1	Y	Foraging, HNS
02:52	Soprano pipistrelle	1	Y	Foraging, HNS
02:52	Common pipistrelle	1	Y	Commuting, HNS
02:55 – 03:00	Common pipistrelle	2	Y	Consistent foraging, heard and seen (H&S)
03:03	Soprano pipistrelle	1	Y	Commuting, HNS
03:03	Common pipistrelle	1	Y	Commuting, HNS
03:24	Soprano pipistrelle	1	Y	Commuting, HNS
03:24	Common pipistrelle	1	Y	Foraging, HNS
03:26 – 03:27	Common pipistrelle	1	Y	Foraging, HNS
03:31	Common pipistrelle	1	Y	Brief pass, HNS
03:35	Soprano pipistrelle	1	Y	Brief pass, HNS
03:56	*Nyctalus/Eptesicus* sp.	1	Y	Commuting, HNS
03:56	Soprano pipistrelle	1	Y	Foraging, HNS
03:56	Common pipistrelle	1	Y	Foraging, HNS
04:01 – 04:03	Common pipistrelle	1	Y	Foraging, HNS
04:03 – 04:07	Soprano pipistrelle	1	Y	Foraging, HNS
04:03 – 04:04	*Nyctalus/Eptesicus* sp.	1	Y	Foraging, HNS
04:04	*Nyctalus* sp.	1	Y	Commuting, HNS
04:11	*Myotis* sp.	1	Y	Brief pass, HNS
04:11	Soprano pipistrelle	1	Y	Foraging, HNS
04:13	Common pipistrelle	1	Y	Commuting, HNS
04:16	Soprano pipistrelle	1	Y	Commuting, HNS
04:22	Common pipistrelle	1	Y	Commuting, HNS
04:28	Common pipistrelle	1	Y	Brief pass, HNS
04:28	Soprano pipistrelle	1	Y	Commuting, HNS
04:31	Noctule	1	Y	Commuting, HNS
04:33	Common pipistrelle	1	Y	Brief pass, HNS
04:37	Common pipistrelle	1	Y	Commuting, HNS
04:41	Common pipistrelle	1	Y	Brief pass, HNS
04:46	Common pipistrelle	1	Y	Commuting, HNS
04:56	Soprano pipistrelle	1	Y	Commuting, HNS

August Dawn Activity Transect

August Dawn				
Project Name	A38	**Surveyors**	SC DW	
Survey Location	Little Eaton Transect B	**Rain (0-5)**	0	
Date	31/08/2017	**Wind (0-7)**	0	
Start	19:58	**Cloud Cover (0-5)**	0	
Sunrise	20:00	**Temperature**	15°C	
Finish	21:58	**Weather description**	Dry, light air, clear sky, 67% humidity	

Time	Species	No. of bats	Rec. (Y/N)	Description of behaviour
20:19	Common pipistrelle	1	Y	Brief Pass, heard not seen (HNS)
20:19	Soprano pipistrelle	1	Y	Brief Pass, HNS
20:21	Common pipistrelle	1	Y	Foraging, HNS
20:22 – 20:23	Common pipistrelle	1	Y	2 x brief Pass, HNS
20:31	Common pipistrelle	1	Y	Brief Pass, HNS
20:33	Common pipistrelle	1	Y	Brief Pass, HNS
20:39	Common pipistrelle	2	Y	Foraging, HNS
20:42	*Pipistrelle* sp.	1	Y	Brief Pass, HNS
20:42	Soprano pipistrelle	2	Y	Brief Pass, HNS
20:42- 20:44	Common pipistrelle	2	Y	Foraging 3 x passes, HNS
20:43	Soprano pipistrelle	1	Y	Foraging, HNS
20:44	Soprano pipistrelle	1	Y	Brief Pass, HNS
20:48	Common pipistrelle	1	Y	Foraging, HNS
20:50	Common pipistrelle	1	Y	Foraging, HNS
20:52	Common pipistrelle	1	Y	Foraging, HNS
21:02	Common pipistrelle	1	Y	Foraging, HNS
21:15	Common pipistrelle	1	Y	Foraging, HNS
21:16	Whiskered/Brandt's	1	Y	Brief Pass, HNS
21:16-21:18	Soprano pipistrelle	1	Y	Foraging, heard and seen (H&S)
21:16	Common pipistrelle	1	Y	Foraging, HNS
21:18-21:19	Soprano pipistrelle	1	Y	Foraging, HNS
21:19	Common pipistrelle	1	Y	Brief Pass, HNS
21:20	Soprano pipistrelle	1	Y	Brief Pass, HNS
21:22	Common pipistrelle	1	Y	Foraging, HNS
21:25-21:26	Common pipistrelle	1	Y	Foraging, HNS
21:25	Soprano pipistrelle	2	Y	Foraging, HNS
21:26-21:28	Soprano pipistrelle	2	Y	Brief Pass, HNS
21:27	Common pipistrelle	1	Y	Brief Pass, HNS
21:27	*Myotis* sp.	1	Y	Foraging, HNS
21:28	Common pipistrelle	1	Y	Foraging, HNS
21:29	Daubenton's bat	1	Y	Brief Pass, HNS
21:29-21:31	Common pipistrelle	1	Y	Multiple Brief Passes, HNS
21:29-21:31	Soprano pipistrelle	1	Y	3 x Brief Pass, HNS
21:32	Common pipistrelle	2	Y	Brief Pass, HNS
21:33	Soprano pipistrelle	1	Y	Foraging, HNS
21:33	Common pipistrelle	1	Y	Foraging, HNS

August Dawn				
Time	**Species**	**No. of bats**	**Rec. (Y/N)**	**Description of behaviour**
21:34-21:35	Common pipistrelle	1	Y	Foraging, HNS
21:35	Soprano pipistrelle	1	Y	Brief Pass, HNS
21:42	*Myotis* sp.	1	Y	Brief Pass, HNS
21:44	Soprano pipistrelle	1	Y	Brief Pass, HNS
21:50	Soprano pipistrelle	1	Y	Social, HNS
21:54	Soprano pipistrelle	1	Y	Social, HNS
21:55	Soprano pipistrelle	1	Y	Social, HNS
22:00	Whiskered /Brandt's	1	Y	Foraging, HNS
22:09	*Myotis* sp.	1	Y	Brief Pass, HNS
22:12	Common pipistrelle	1	Y	Brief Pass, HNS
22:14	Daubenton's bat	1	Y	Foraging, HNS

September Dawn Activity Transect

September				
Project Name	A38	**Surveyors**	SC & DW	
Survey Location	Little Eaton Transect B	**Rain (0-5)**	0	
Date	26/09/2017	**Wind (0-7)**	0	
Start	04:30	**Cloud Cover (0-5)**	5	
Sunrise	06:56	**Temperature**	15°C	
Finish	06:56	**Weather description**	Dry, humid and overcast	
Time	**Species**	**No. of bats**	**Rec. (Y/N)**	**Description of behavior**
04:31	Common pipistrelle	1	Y	Brief Pass, heard not seen (HNS)
04:36	Whiskered/Brandt's	1	Y	Brief Pass, HNS
04:49 – 04:52	*Myotis* sp.	1	Y	Foraging, HNS
04:54	Whiskered/Brandt's	1	Y	Foraging, heard and seen (H&S)
05:01 - 05:02	Soprano pipistrelle	1	Y	2 x Brief Pass, HNS
05:03 - 05:06	Soprano pipistrelle	1	Y	Foraging, H&S
05:31	Soprano pipistrelle	1	Y	Brief Pass, HNS
05:32 - 05:33	Soprano pipistrelle	1	Y	Foraging, HNS
06:03	*Myotis* sp.	1	Y	Brief Pass, HNS
06:05	Whiskered/Brandt's	1	Y	Brief Pass, HNS
06:06	Common pipistrelle	1	Y	Foraging, HNS
06:09 – 06:11	Common pipistrelle	1	Y	Foraging, HNS
06:11 - 06:12	Common pipistrelle	1	Y	2 x Brief Pass, HNS
06:39	Soprano pipistrelle	1	Y	Brief Pass, HNS
06:40 - 06:42	Soprano pipistrelle	1	Y	Foraging, H&S

October Dusk Activity Transect

October				
Project Name	A38	**Surveyors**	GB & MD	
Survey Location	Transect B	**Rain (0-5)**	0	
Date	17/10/2017	**Wind (0-7)**	1	
Start	18:06	**Cloud Cover (0-5)**	5	
Sunset	18:06	**Temperature**	13°C	
Finish	20:37	**Weather description**	overcast, light breeze, previous night extremely windy	

Time	Species	No. of bats	Rec. (Y/N)	Description of behavior
18:23	Soprano pipistrelle	1	Y	Brief Pass Hear not seen (HNS)
18:24	Soprano pipistrelle	1	Y	Brief Pass, HNS
18:26	Soprano pipistrelle	1	Y	Foraging, HNS
18:27 - 18:42	Soprano pipistrelle	1	Y	Continuous foraging, HNS
18:40	Common pipistrelle	1	Y	Brief Pass, HNS
18:41- 18:42	Common pipistrelle	1	Y	Continuous foraging, HNS
18:44 - 18:49	Common pipistrelle	1	Y	Continuous foraging, HNS
18:57-18:58	Soprano pipistrelle	1	Y	Continuous foraging, HNS
19:02	Soprano pipistrelle	1	Y	Brief Pass, HNS
19:11 - 19:13	Common pipistrelle	1	Y	Continuous foraging, HNS
19:12	Soprano pipistrelle	1	Y	Foraging, HNS
19:17	*Myotis* sp.	1	Y	Brief Pass, HNS
19:19	Soprano pipistrelle	1	Y	Foraging, HNS
19:22-19:23	Soprano pipistrelle	1	Y	Continuous foraging, HNS
19:22	*Myotis* sp.	1	Y	Brief Pass, HNS
19:23 - 19:25	Common pipistrelle	1	Y	Continuous foraging, HNS
19:24	*Myotis* sp.	1	Y	Foraging, HNS
19:28	Soprano pipistrelle	1	Y	Brief Pass, HNS
19:29 - 19:32	Soprano pipistrelle	1	Y	Continuous foraging, HNS
19:31	Common pipistrelle	1	Y	Brief Pass, HNS
19:34 - 19:39	Common pipistrelle	1	Y	Continuous foraging, HNS
19:37	Soprano pipistrelle	1	Y	Foraging, HNS
19:40 - 19:43	Soprano pipistrelle	1	Y	Foraging, HNS
19:41 - 19:43	*Myotis* sp.	1	Y	Brief Pass x 3, HNS
19:47	Common pipistrelle	1	Y	Foraging, HNS
19:50	Soprano pipistrelle	1	Y	Foraging, HNS
19:51 - 19:54	Common pipistrelle	1	Y	Continuous foraging, HNS
19:54 - 19:58	Common pipistrelle	1	Y	Continuous foraging, HNS
19:58 - 19:59	Common pipistrelle	1	Y	Continuous foraging, HNS

Appendix E Bat Activity Data – Transect C

May Dusk Activity Transect

May				
Project Name	A38		**Surveyors**	SR & CG
Survey Location	Transect B		**Rain (0-5)**	0
Date	09/05/2017		**Wind (0-7)**	0
Start	20:30		**Cloud Cover (0-5)**	0
Sunset	20:46		**Temperature**	10°C at start, dropped to 6°C at 21:30
Finish	23:16		**Weather description**	Dry, no cloud cover, no breeze

Time	Species	No. of bats	Rec. (Y/N)	Description of behavior
21:13	Common pipistrelle	1	Y	Brief Pass, Heard not seen (HNS)
21:15 – 21:17	Common pipistrelle	1	Y	3 Foraging, Heard and seen (H&S)
21:28 – 21:29	Common pipistrelle	1	Y	Foraging, H&S
21:31	Common pipistrelle	1	Y	Foraging, HNS
21:32	Noctule	1	Y	Brief Pass, HNS
21:32	Common pipistrelle	1	Y	Brief Pass, HNS
21:51	Brown long-eared (BLE)	1	Y	Brief Pass, HNS
21:52	Noctule	1	Y	Brief Pass, HNS
22:16	Soprano Pipistrelle	1	Y	Brief Pass, HNS

June Dusk Activity Transect

June				
Project Name	A38	**Surveyors**	JE & GB	
Survey Location	Transect B	**Rain (0-5)**	1 (Light rain for last 5 mins of survey)	
Date	12/06/2017	**Wind (0-7)**	2	
Start	21:30	**Cloud Cover (0-5)**	2.5	
Sunrise	21:31	**Temperature**	Start: 16°C Finish: 13°C	
Finish	00:30	**Weather description**	Light breeze	

Time	Species	No. of bats	Rec. (Y/N)	Description of behavior
22:01	Nyctalus sp.	1	Y	Commuting, heard not seen (HNS)
22:10	Noctule	1	Y	Commuting, HNS
22:18 - 22:22	Noctule	1	Y	Foraging, HNS
22:26 – 22:30	Noctule	2	Y	Foraging, heard and seen (H&S)
22:27 -22:28	Myotis sp.	1	Y	Foraging, HNS
22:28 22:29	Common pipistrelle	1	Y	Foraging, HNS
22:29	Soprano pipistrelle	1	Y	Commuting, HNS
22:39	Noctule	1	Y	Commuting, HNS
22:42	Pipistrelle sp.	1	Y	Commuting, HNS
22:45	Common pipistrelle	1	Y	Commuting, HNS
22:47	Common pipistrelle	1	Y	Foraging, HNS
22:50	Common pipistrelle	1	Y	Foraging, HNS
22:51	Whiskered/Brandt's	1	Y	Commuting, HNS
22:52	Noctule	1	Y	Commuting, HNS
22:53 – 22:54	Common pipistrelle	2	Y	Foraging, HNS
23:03	Soprano pipistrelle	1	Y	Commuting, HNS
23:29 – 23:38	Common pipistrelle	1	Y	Foraging, HNS
23:37	Whiskered/Brandt's	1	Y	Commuting, HNS
00:02 – 00:03	Common pipistrelle	1	Y	Foraging, HNS
00:07	Whiskered/Brandt's	1	Y	Foraging, HNS
00:07	Common pipistrelle	1	Y	Commuting, HNS
00:08	Common pipistrelle	1	Y	Commuting, HNS
00:09	Whiskered/Brandt's	1	Y	Brief pass, HNS
00:24 – 00:25	Common pipistrelle	1	Y	Foraging, HNS
00:25	Soprano pipistrelle	2	Y	Commuting, HNS
00:26	Common pipistrelle	1	Y	Brief pass, HNS
00:29 - 00:30	Common pipistrelle	1	Y	Foraging, HNS

July Dawn Activity Transect

July				
Project Name	A38		**Surveyors**	SR & CG
Survey Location	Transect B		**Rain (0-5)**	0
Date	18/07/2017		**Wind (0-7)**	1
Start	02:04		**Cloud Cover (0-5)**	1
Sunset	05:04		**Temperature**	14°C
Finish	05:04		**Weather description**	Clear sky, dry, light air, 82% humidity

Time	Species	No. of bats	Rec. (Y/N)	Description of behavior
02:09	Common pipistrelle	1	Y	Brief pass. HNS
02:10 – 02:15	Myotis sp.	1	Y	Foraging, HNS.
02:12	Pipistrelle sp.	1	Y	Brief pass, HNS
02:13 – 02:15	Soprano pipistrelle	1	Y	Foraging, HNS
02:14 – 02:16	Common pipistrelle	1	Y	Foraging, HNS
02:20 – 02:21	Pipistrelle sp.	1	Y	Foraging, HNS
02:22	Pipistrelle sp.	1	Y	Brief pass, HNS
02:22	Common pipistrelle	1	Y	Foraging, HNS
02:22	Daubenton's Bat	1	Y	Brief pass, HNS
02:28 – 02:30	Soprano pipistrelle	1	Y	Foraging, HNS
02:29 – 02:30	Common pipistrelle	1	Y	Foraging, HNS
02:32 – 02:33	Common pipistrelle	1	Y	Foraging HNS.
02:36	Common pipistrelle	1	Y	Foraging, HNS
02:45 – 02:46	Common pipistrelle	1	Y	Foraging, HNS
02:57	Pipistrelle sp.	1	Y	Brief pass, HNS
03:28 - 03:29	Common pipistrelle	1	Y	Foraging, HNS
03:43	Soprano pipistrelle	1	Y	Foraging, HNS
03:43	Common pipistrelle	1	Y	Brief pass, HNS
03:48	Noctule	1	Y	Brief pass, HNS
03:57	Noctule	1	Y	Brief pass, HNS
04:03	Common pipistrelle	1	Y	Brief pass, HNS
04:06	Natterer's bat	1	Y	Brief pass, HNS
04:13 – 04:14	Common pipistrelle	1	Y	Foraging, HNS
04:23	Soprano pipistrelle	1	Y	Brief pass, HNS
04:25	Noctule	1	Y	Brief pass, HNS
02:09	Common pipistrelle	1	Y	Brief pass. HNS
02:10 – 02:15	Myotis sp.	1	Y	Foraging, HNS.
02:12	Pipistrelle sp.	1	Y	Brief pass, HNS
02:13 – 02:15	Soprano pipistrelle	1	Y	Foraging, HNS
02:14 – 02:16	Common pipistrelle	1	Y	Foraging, HNS
02:20 – 02:21	Pipistrelle sp.	1	Y	Foraging, HNS
02:22	Pipistrelle sp.	1	Y	Brief pass, HNS

August Dusk Activity Transect

August Dusk				
Project Name	A38	**Surveyors**	SR &CG	
Survey Location	Little Eaton Transect B	**Rain (0-5)**	1 (sporadic light shower at start of survey for an hour)	
Date	14/08/2017	**Wind (0-7)**	1	
Start	20:33	**Cloud Cover (0-5)**	5	
Sunset	20:33	**Temperature**	17°C	
Finish	23:06	**Weather description**	Warm, light air, overcast with sporadic light shower for an hour into the survey.	

Time	Species	No. of bats	Rec. (Y/N)	Description of behaviour
20:34	Common pipistrelle	2	Y	Brief pass heard not seen (HNS)
20:37	Common pipistrelle	1	Y	Brief pass, HNS
20:45 – 20:46	Common pipistrelle	2	Y	Foraging, HNS
20:56	Common pipistrelle	1	Y	Foraging, HNS
21:00 – 21:04	Common pipistrelle	2	Y	Foraging, HNS
21:02 – 21:03	Soprano pipistrelle	2	Y	Foraging, HNS
21:17	Pipistrelle sp.	1	Y	Commuting , HNS
21:21	Soprano pipistrelle	1	Y	Commuting , HNS
21:22	Soprano pipistrelle	1	Y	Commuting , HNS
21:36 – 21:38	Soprano pipistrelle	1	Y	Foraging , HNS
21:47	Common pipistrelle	1	Y	Commuting , HNS
21:53	Common pipistrelle	1	Y	Commuting , HNS
21:55 – 22:56	Common pipistrelle	2	Y	Foraging, HNS
21:56	Soprano pipistrelle	2	Y	Foraging, HNS
21:56	Myotis sp.	1	Y	Brief pass, HNS
21:56 – 21:58	Common pipistrelle	2	Y	Brief pass, HNS
21:59 – 22:02	Common pipistrelle	1	Y	Foraging, HNS
22:02	Common pipistrelle	1	Y	Foraging, HNS
22:03 – 22:09	Common pipistrelle	2	Y	Foraging, HNS
22:05	Noctule	1	Y	Foraging, HNS
22:11	Soprano pipistrelle	1	Y	Commuting , HNS
22:13	Myotis sp.	1	Y	Commuting , HNS
22:19 – 22:20	Common pipistrelle	1	Y	Foraging, HNS
22:31 – 22:32	Soprano pipistrelle	1	Y	Foraging, HNS
22:38	Whiskered/Brandt's	1	Y	Brief pass, HNS
22:54 – 22:55	Common pipistrelle	1	Y	Foraging, HNS
22:54	Myotis sp.	1	Y	Brief pass, HNS
23:00	Common pipistrelle	1	Y	Foraging, HNS

August Dawn Activity Transect

August Dawn				
Project Name	A38		**Surveyors**	SR & CG
Survey Location	Little Eaton C		**Rain (0-5)**	0
Date	15/08/2017		**Wind (0-7)**	1
Start	02:52		**Cloud Cover (0-5)**	0
Sunset	05:46		**Temperature**	15°C
Finish	05:46		**Weather description**	Clear sky, no rain

Time	Species	No. of bats	Rec. (Y/N)	Description of behaviour
03:00	Whiskered/Brandt's	1	Y	Commuting, HNS
03:07	Whiskered/Brandt's	1	Y	Commuting, HNS
03:09	Whiskered/Brandt's	1	Y	Brief Pass, HNS
03:12	Whiskered/Brandt's	1	Y	Brief Pass, HNS
03:22	Noctule	1	Y	Brief pass, HNS
03:32	Noctule	1	Y	Brief pass HNS
03:43	Soprano pipistrelle	1	Y	Brief Pass, HNS
03:44	Soprano pipistrelle	1	Y	Brief Pass, HNS
03:48	*Myotis* sp.	1	Y	Commuting, HNS
03:51	Soprano pipistrelle	1	Y	Brief Pass, HNS
04:00	Common pipistrelle	1	Y	Foraging, HNS
04:00	Soprano pipistrelle	1	Y	Brief Pass, HNS
04:45	Soprano pipistrelle	1	Y	Brief Pass, HNS
04:55	Noctule	1	Y	Commuting, HNS
05:10	Nyctalus/Eptesicus sp	1	Y	Brief Pass, HNS
05:18	Common pipistrelle	1	Y	Brief Pass, HNS

August Dawn Activity Transect

August Dawn				
Project Name	A38	**Surveyors**	SR & CA	
Survey Location	Little Eaton Transect C	**Rain (0-5)**	0	
Date	31/08/2017	**Wind (0-7)**	0	
Start	19:58	**Cloud Cover (0-5)**	1	
Sunrise	20:00	**Temperature**	16 - 11°C	
Finish	22:22	**Weather description**	Dry, light air, clear sky, 67% humidity	
Time	**Species**	**No. of bats**	**Rec. (Y/N)**	**Description of behaviour**
20:06	Common pipistrelle	1	Y	Brief Pass, heard not seen (HNS)
20:21	Soprano pipistrelle	1	Y	Brief Pass, HNS
20:21 – 20:22	Common pipistrelle	1	Y	Foraging, HNS
20:24	Common pipistrelle	1	Y	Foraging, heard and seen (H&S)
20:26 – 20:27	Common pipistrelle	1	Y	Foraging, HNS
20:27	Soprano pipistrelle	1	Y	Brief Pass, HNS
20:28 – 20:29	Common pipistrelle	1	Y	Brief Pass, HNS
20:37	*Myotis* sp.	1	Y	Commuting, HNS
20:45	Common pipistrelle	1	Y	Brief Pass, HNS
20:47	Pipistrelle sp.	1	Y	Brief Pass, HNS
20:57 – 21:00	Common pipistrelle	1	Y	Foraging, HNS
20:58	*Pipistrelle* sp.	1	Y	Brief Pass, HNS
21:23 – 21:36	*Myotis* sp.	1	Y	Foraging,, HNS
21:27	Noctule	1	Y	Brief Pass, HNS
21:28	Daubenton's	1	Y	Brief Pass, HNS
21:38	Soprano pipistrelle	1	Y	Brief Pass, HNS
21:47 – 21:48	Whiskered/Brandt's	1	Y	2 x brief pass, HNS
21:48	Common pipistrelle	1	Y	Brief Pass, HNS
21:49	*Myotis* sp.	1	Y	Foraging, H&S
22:07	*Myotis* sp.	1	Y	Brief Pass, HNS
22:18	*Myotis* sp.	1	Y	Brief Pass, HNS

September Dawn Activity Transect

September				
Project Name	A38	**Surveyors**	SR & GB	
Survey Location	Little Eaton Transect B	**Rain (0-5)**	0	
Date	26/09/2017	**Wind (0-7)**	0	
Start	04:30	**Cloud Cover (0-5)**	5	
Sunrise	06:56	**Temperature**	15°C	
Finish	06:56	**Weather description**	Dry, humid and overcast	
Time	**Species**	**No. of bats**	**Rec. (Y/N)**	**Description of behavior**
04:56	Myotis sp.	1	Y	Brief pass, heard not seen (HNS)
04:59	Myotis sp.	1	Y	Brief pass, HNS
05:25	Common pipistrelle	1	Y	Brief pass, HNS
05:30 – 05:33	Soprano pipistrelle	1	Y	Foraging, HNS
05:33	Myotis sp.	1	Y	Brief pass, HNS
05:43 – 05:44	Soprano pipistrelle	1	Y	Foraging, HNS
06:08	Myotis sp.	1	Y	Commuting, HNS
06:11	Pipistrelle sp.	1	Y	Brief pass, HNS
06:35	Pipistrelle sp.	1	Y	Brief pass, HNS

October Dusk Activity Transect

October				
Project Name	A38	**Surveyors**	SR & DW	
Survey Location	Transect B	**Rain (0-5)**	0	
Date	17/10/2017	**Wind (0-7)**	1	
Start	18:06	**Cloud Cover (0-5)**	5	
Sunset	18:06	**Temperature**	13°C	
Finish	20:37	**Weather description**	overcast, light breeze, previous night extremely windy	
Time	**Species**	**No. of bats**	**Rec. (Y/N)**	**Description of behavior**
18:27 – 18:30	Soprano pipistrelle	1	Y	Foraging, heard and seen (H&S)
18:48 - 18:51	Soprano pipistrelle	1	Y	Foraging, heard not seen (HNS)
18:51 – 18:55	Common pipistrelle	1	Y	Foraging, HNS
18:55 – 19:03	Soprano pipistrelle	1	Y	Foraging, HNS
18:57 - 19:02	Common pipistrelle	1	Y	Foraging, HNS
18:57 - 19:02	Pipistrelle sp.	1	Y	Foraging, HNS
19:15 - 19:17	Soprano pipistrelle	1	Y	Foraging, HNS
19:15 - 19:17	Common pipistrelle	1	Y	Continuous foraging, HNS
19:18 – 19:23	Common pipistrelle	1	Y	Continuous foraging, HNS
19:23 – 19:27	Common pipistrelle	1	Y	Continuous foraging, HNS
20:04	Common pipistrelle	1	Y	Foraging, HNS
20:12	Myotis sp.	1	Y	Brief pass, HNS
20:16 - 20:23	Common pipistrelle	2	Y	Continuous foraging, HNS
20:26 - 20:33	Common pipistrelle	1	Y	Continuous foraging, HNS
20:28	Soprano pipistrelle	1	Y	Foraging, HNS
20:35 - 20:38	Myotis sp.	3+	Y	Foraging, H&S

Appendix F Automated Detector Raw Data – Transect A

Location 1

May																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/5/17	21:02	10.3 - 15.6			No bats were detected									05:01	0	0	0.10
20/5/17	21:04	8.4 - 14.1			No bats were detected									05:00	0	0	
21/5/17	21:05	11.3 - 17.8	*Myotis* sp.	00:34				1					00:34	04:59	1	1	
22/5/17	21:07	13.6 - 22.7			No bats were detected									04:57	0	0	
23/5/17	21:08	13.3 - 22.2	*Myotis* sp.	23:26			3							04:56	3	3	

July																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
22/7/17	21:12	13.8 - 16.1				No bats were detected									05:13	0	0	0
23/7/17	21:10	16.6 - 19.9				No bats were detected									05:14	0	0	
24/7/17	21:09	13.6 - 22.2				No bats were detected									05:16	0	0	
25/7/17	21:07	15.0 - 24.4				No bats were detected									05:17	0	0	
26/7/17	21:06	13.3 - 22.7				No bats were detected									05:19	0	0	

September																			
Date	**Sunset**	**Min - max temp °C**	**Species**	**First bat pass**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/9/17	19:10	6.4 - 16.0	*Myotis* sp.	01:43							5					01:43	06:49	5	5	
20/9/17	19:07	14.3 17.0	*Myotis* sp.	20:40		1										20:40	06:51	1	1	
21/9/17	19:05	3.4 - 12.8			No bats were detected												06:52	0	0	0.13
22/9/17	19:03	13.2- 14.3			No bats were detected												06:54	0	0	
23/9/17	19:00	8.4 - 16.3	*Myotis* sp.	22:56				2								22:56	06:56	2	2	

Location 2

May																
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/5/17	21:02	7.7 - 12.8			No bats were detected									05:01	0	0	
20/5/17	21:04	6.9 - 11.2			No bats were detected									05:00	0	0	
21/5/17	21:05	9.0 - 16.3			No bats were detected									04:59	0	0	0
22/5/17	21:07	10.5 - 21.1			No bats were detected									04:57	0	0	
23/5/17	21:08	11.0 - 20.9			No bats were detected									04:56	0	0	

July																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
25/7/17	21:22	14.5 - 22.2	Pip 45	21:42	31										05:14	31	32	
			Noctule			1								22:10		1		
26/7/17	21:21	13.3 - 21.9	Pip 45	21:36	26	25	2	1	1			7		04:35	05:16	62	62	
27/7/17	21:20	15.0 - 17.8	Pip 45	21:39	11	13								22:53	05:17	24	24	3.65
28/7/17	21:18	14.3 - 18.1	Pip 45	00:48				1			1	3			05:19	5	6	
			Pip Sp									1		04:30		1		
29/7/17	21:17	14.6 - 19.8	Pip 45	23:04			16	2			1	3		04:42	05:20	22	22	

September																				
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/9/17	19:10	6.4 - 16.0	Pip 45	19:35	2													06:49	2	16	1.82
			Myotis sp.									2	8		4		05:40		14		
20/9/17	19:07	14.3 - 17.0	Pip 45	19:23	1							1		1				06:51	3	21	
			Pip 55			1													1		
			Pip sp.					1											1		
			Myotis sp		.	2			1			2	6	2	3		05:43		16		
21/9/17	19:05	3.4 - 12.8	Pip 45	20:07		1				1							20:07	06:52	2	2	
22/9/17	19:03	13.2 - 14.3	Pip 45	19:36	1													06:54	1	33	
			Myotis sp.						2	1	4	10	7	6	1	1	06:05		32		
23/9/17	19:00	8.4 - 16.3	*Pip 45*	19:32	1			1										06:56	2	37	
			Myotis sp.			3			2		4	7	10	6	3		05:58		35		

Appendix G Automated Detector Raw Data – Transect B

Location 3

Date	Sunset	Min - max temp. °C	Species	First bat pass	21:00 - 22:00	22:00 - 23:00	23:00 - 00:00	00:00 - 01:00	01:00 - 02:00	02:00 - 03:00	03:00 - 04:00	04:00 - 05:00	05:00 - 06:00	Last bat pass	Sunrise	Species total (per night)	Bat total (per night)	BAI per hour
10/5/17	20:48	5.7 - 18.3	Pip 45	21:14	42	5	6	4							05:15	57	242	31.65
			Pip 55		149	5	6									160		
			Pip Sp		15	1	2									18		
			Noctule		1											4		
			Myotis sp.				1	1			1			03:05		3		
11/5/17	20:49	11.5 - 18.9	Pip 45	21:12	44	1	3		2	4		4			05:14	58	136	
			Pip 55		56		1		2		4	1				64		
			Pip Sp		3	2				1	1					7		
			Noctule									1		04:59		1		
			Nyctalus sp.		1											1		
			Myotis sp.			3				1		1				5		
12/5/17	20:51	13.2 - 17.4	Pip 45	21:03	60	36	31	49	14	21	12	43			05:12	266	360	
			Pip 55		16	2	5	2	1	3	3	3				35		
			Pip Sp		14	3	2	4	7	1	4	7				42		
			Noctule		12							2		04:55		14		
			Nyctalus sp.		2					1						3		
13/5/17	20:53	12.5 - 17.6	Pip 45		62	36	25	7	32	2		1		04:04	05:10	165	258	
			Pip 55		8	7	5		2	1						23		
			Pip Sp		10	3	11	7	5							36		
			Noctule	21:06	9											9		
			Serotine						1							1		
			Nyctalus sp.		24											24		
14/5/17	20:54	11.0 - 18.8	Pip 45		139	39	2	6			2	23			05:09	211	270	
			Pip 55		15	2		1			2	1				21		
			Pip Sp		10							1				11		
			Noctule	20:58	14	1						5		04:38		20		
			Nyctalus sp.		3	1				1						5		
			Myotis sp.				1	1								2		

June																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
13/6/17	21:30	10.8 - 19.1	Pip 45			2	7	37		1			02:56	04:41	47	69	6.86
			Pip 55	22:09		3		1	1	1					6		
			Pip Sp				1	4		1					6		
			Myotis sp.			1		2	6	1					10		
14/6/17	21:31	14.0 - 23.7	Pip 45			1	3		13	7				04:41	24	37	
			Pip 55			1			2	1					4		
			Pip Sp					1	4		1				6		
			Myotis sp.	22:10				1			2		03:37		3		
15/6/17	21:31	11.5 - 18.9	Pip 45	22:09		1	1	15	1				01:18	04:41	18	68	
			Pip sp.				1	48	1						50		
16/6/17	21:32	16.8 - 22.1	Pip 45			2				1	5		03:41	04:41	8	21	
			Pip 55	22:17		3					1				4		
			Pip sp.							4	5				9		
17/6/17	21:32	14.8 - 26.7	Pip 45	22:23		1	2	3	3	2	1			04:41	12	45	
			Pip 55			1	2		2		2				7		
			Pip sp.				1	10	1	2	9		03:22		23		
			Myotis sp.				1	1		1					3		

July																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
22/7/17	21:12	13.8 - 16.1	Pip 45			3									05:13	3	6	15.05
			Pip 55			2								22:59		2		
			Myotis sp.	21:55	1											1		
23/7/17	21:10	16.6 - 19.9	Pip 45	22:10		10	4	30	20	7	2	7		04:35	05:14	80	157	
			Pip 55			11	2	11	1	10	8	4				47		
			Pip sp.			1		26	1		1	1				30		
24/7/17	21:09	13.6 - 22.2	Pip 45			14	5	9	11	7	2	6			05:16	54	127	
			Pip 55			9	20	12	1	1	6	7		04:23		56		
			Pip sp.			8	1		1							10		
			Myotis sp.	21:49	3	1		1	1	1						7		
25/7/17	21:07	15.0 - 24.4	Pip 45			42	10	3	5	6	12				05:17	78	251	
			Pip 55			16	27	36	2	4	5					90		
			Pip sp.			7	65	4	1	2	2			03:52		81		
			Myotis sp.	21:48	1		1									2		
26/7/17	21:06	13.3 - 22.7	Pip 45		1	5		2	5	1	4			03:51	05:19	18	61	
			Pip 55			9	15	3	5	2	1					35		
			Pip sp.			5	1	1								7		
			Myotis sp.	21:49	1											1		

August																		
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
15/8/17	20:30	5.7 - 22.2	Pip 45			21	22	5	4	1						05:50	53	104	10.04
			Pip 55			7	9	6	3								25		
			Pip sp.				1										1		
			BLE				2	2									4		
			Noctule	21:02		8		1									9		
			Nyctalus sp.				1										1		
			Myotis sp.				2	5	2		1	1			03:44		11		
16/8/17	20:28	13.8 - 20.4	Pip 45	21:17		28	13	12	4	11	12				02:31	05:51	80	108	
			Pip 55			3	9	2	5	4							23		
			Pip sp.				2										2		
			Noctule				1										1		
			Myotis sp.			1			1								2		
17/8/17	20:26	13.5 - 20.3	Pip 45	09:24		9	9	9	10	8	6		2	1	05:01	05:53	54	96	
			Pip 55			3	4	5	9	11	2	2	2				38		
			Myotis sp.				1	1		2							4		
18/8/17	20:24	8.5 - 16.5	Pip 45	21:20		21	4	2	1							05:55	28	48	
			Pip 55			4	3	2	1			1	2		04:41		13		
			BLE					2	1								3		
			Myotis sp.				1	1				2					4		
19/8/17	20:22	7.2 - 15.0	Pip 45	21:14		46	30	17	4							05:57	97	121	
			Pip 55			2	5	2	1				3		04:44		13		
			BLE					1									1		
			Myotis sp.				4	5				1					10		

September																				
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/9/17	19:10	6.4 - 16.0	Pip 45		10	2								2				06:49	14	60	27.73
			Pip 55	19:41	2											1	06:14		3		
			Myotis sp.			3				3	6	11	7	7	6				43		
20/9/17	19:07	14.3 - 17.0	Pip 45	19:29	86	121	9	58	36	2	22	11	23	7	8	1	06:10	06:51	384	416	
			Pip 55		9														9		
			Pip sp.										2						2		
			Noctule		1														1		
			Nyctalus sp.			1													1		
			Myotis sp.									3	4	7	5				19		
21/9/17	19:05	3.4 - 12.8	Pip 45	19:48	5													06:52	5	10	
			Pip 55			1													1		
			Myotis sp.			2					1	1					02:49		4		
22/9/17	19:03	13.2 - 14.3	Pip 45	19:31	135	143	44	4		1		2	2	5	4	5	06:19	06:54	345	422	
			Pip 55		3	3										1			7		
			Pip sp.			1													1		
			Noctule				1												1		
			Myotis sp.				1		1	9	2	5	16	18	7	9			68		
23/9/17	19:00	8.4 - 16.3	Pip 45	19:27	120	174	19	1		93	54	16	11		1	5	06:30	06:56	494	617	
			Pip 55		10				1	1		1	1			2			16		
			Myotis sp.			3	1		3	10	15	25	18	19	13				107		

October																					
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**18:00 - 19:00**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**07:00 - 08:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
17/10/17	18:04	10.8 - 20.1	No bats were detected																	07:38	0	0	0
18/10/17	18:02	12.3 - 14.8	Detector failed																	07:40	0	0	
19/10/17	18:00	13.0 - 16.0	Detector failed																	07:42	0	0	
20/10/17	17:58	12.5 - 14.8	Detector failed																	07:43	0	0	
21/10/17	17:56	10.5 - 14.8	Detector failed																	07:45	0	0	

Location 4

May																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
10/5/17	20:48	1.9 - 23.1	Pip 45	21:34		28	25	1							05:15	54	56	6.7
			Pip 55					1								1		
			Pip sp.					1						23:27		1		
11/5/17	20:49	9.4 - 17.6	Pip 45	21:21		2	5	6		33	12	20		03:34	05:14	78	78	
12/5/17	20:51	10.7 - 16.6	Pip 45	02:39							5	12	13		05:12	30	62	
			Pip 55								7	9	10	04:31		26		
			Pip sp.										4			4		
			Myotis sp.										2			2		
13/5/17	20:53	13.8 - 22.7	Pip 45	21:24		4	8	15	2	5	3	4		04:17	05:10	41	52	
			Pip 55				2			2	2					6		
			Pip sp.				1	1			1					3		
			Myotis sp.				1			1						2		
14/5/17	20:54	14.6 - 17.6	Pip 45	21:39		1	5	8	4	2				01:15	05:09	20	20	

June																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
13/6/17	21:30	9.5 - 23.9	Pip 45	01:49					3				01:50	04:41	3	3	0.17
14/6/17	21:31	13.0 - 24.7	No bats were detected											04:41	0	0	
15/6/17	21:31	11.0 - 21.2	Pip sp.	03:57							1		03:57	04:41	1	1	
16/6/17	21:32	15.8 - 24.4	Pip 45	03:41							1		03:41	04:41	1	1	
17/6/17	21:32	12.8 - 31.3	Pip 55	03:41							1		03:41	04:41	1	1	

July																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
22/7/17	21:12	13.8 - 16.1	Pip 45			4				1				02:27	05:13	5	7	
			Pip 55	22:22		1										1		
			Myotis sp.			1										1		
23/7/17	21:10	16.6 - 19.9	Pip 45	21:37	17	60	27	130	219	276	260	63			05:14	1052	1295	
			Pip 55			9	6	10	60	20	25	16		04:42		146		
			Pip sp.						13		36	39				88		
			Noctule			2										2		
			Nyctalus sp.			2										2		
			Nyc/Epi sp.			1						1				2		
			Myotis sp.					1		1	1					3		
24/7/17	21:09	13.6 - 22.2	Pip 45		1	45	39	5	20	93	128	24			05:16	355	419	67.15
			Pip 55	21:46	4	12	17	4	1	1	5	5		04:25		49		
			Pip sp.				4	1			2	2				9		
			Noctule			2										2		
			Nyctalus sp.			1										1		
			Myotis sp.			1	1				1					3		
25/7/17	21:07	15.0 - 24.4	Pip 45		1	56	114	60	23	59	24	25			05:17	362	698	
			Pip 55	21:50	2	12	43	37	130	46	17	6		04:31		293		
			Npi Ppi					1								1		
			Pip sp.		1	2	9	11	7	4	4					38		
			Myotis sp.			1	2	1								4		
26/7/17	21:06	13.3 - 22.7	Pip 45		1	32	33	27	37	26	23	6		04:43	05:19	185	267	
			Pip 55	21:48	1	5	3	13	6	18	5	16				67		
			Pip sp.				1	1		5		1				8		
			Serotine			1										1		
			Nyc/Epi sp.			6										6		

August																		
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
15/8/17	20:30	5.7 - 22.2	Pip 45			16	6	5	1		1	1	1		04:47	05:50	31	46	25
			Pip 55			1		3									4		
			Npi Ppi			2											2		
			Noctule	21:05		4	1										5		
			Myotis sp.			1				1		2					4		
16/8/17	20:28	13.8 - 20.4	Pip 45			35	72	30	33	46	31				02:42	05:51	247	310	
			Pip 55	20:52	1	3	2	4	5	21	9						45		
			Npi Ppi			1											1		
			Pip sp.							3							3		
			Nyctalus sp.			3	1				1						5		
			Myotis sp.			2	4	2	1								9		
17/8/17	20:26	13.5 - 20.3	Pip 45			24	38	42	37	24	42	14	20	4	05:09	05:53	245	346	
			Pip 55	20:54	1	4	8	9	10	5	3	10	26	2			78		
			Npi Ppi			1											1		
			Pip sp.			1	3	2	2	1	1	3					13		
			BLE								1						1		
			Noctule							1							1		
			Myotis sp.					1	2	2		2					7		
18/8/17	20:24	8.5 - 16.5	Pip 45			52	49	4	10	2	1	8	1	1		05:55	128	168	
			Pip 55	20:55	2	8	9		4	1		2		1	05:12		27		
			Pip sp.			2	3										5		
			Myotis sp.			2	2	1			1	1	1				8		
19/8/17	20:22	7.2 - 15.0	Pip 45	20:58	2	69	30	59	82	20	12	1				05:57	275	381	
			Pip 55			2		11	29	35	2			1	05:01		80		
			Npi Ppi			11											11		
			Pip sp.			1			3								4		
			Myotis sp.			2		3	4		1		1				11		

September																			
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/9/17	19:10	6.4 - 16.0	Pip 45		11	12										2	06:22	06:49	25	47	26.44
			Pip 55	19:31	11	5													16		
			Pip sp.													1			1		
			Myotis sp.				1		1	2				1					5		
20/9/17	19:07	14.3 - 17.0	Pip 45		69	95	86	68	46	51	34	97	47	36	20	4		06:51	653	903	
			Pip 55	19:22	8	7	13	12	9	18	37	50	26	26	10				216		
			Pip sp.			1		1			1			3	1	1	06:07		8		
			Myotis sp.		4	7		8		1	1	5							26		
21/9/17	19:05	3.4 - 12.8	Pip 45	19:36	7	4												06:52	11	13	
			Pip 55		1														1		
			Myotis sp.										1				03:40		1		
22/9/17	19:03	13.2 - 14.3	Pip 45	19:31	49	10	41	70	82	60	12	9		1	4	3		06:54	341	406	
			Pip 55		3		3	1	1	4	17	10	2	7		2	06:34		50		
			Pip sp.							1									1		
			Myotis sp.			2	1	1	3	1	1		4		1				14		
23/9/17	19:00	8.4 - 16.3	Pip 45	19:23	17	2	1	3		3	7							06:56	33	85	
			Pip 55		1	1	8	1	2	1		1		1					16		
			Pip sp.			2	1						1						4		
			Myotis sp.			1	1	2	1	4	5	4	7	4	2	1	18:05		32		

October																					
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**18:00 - 19:00**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/10/17	18:00	13.0 - 16.0	Pip 45	18:23	10		2							1			1		07:42	14	26	4.96
			Pip 55			1	2										1	06:59		4		
			Pip sp		1															1		
			Myotis sp.			3		1				1		1	1					7		
20/10/17	17:58	12.5 - 14.8	Pip 45	18:21	8	1						1							07:43	10	30	
			Pip 55		2	2									1	1	3			9		
			Myotis sp.		2	3	1	1					1		1		2	06:47		11		
21/10/17	17:56	10.5 - 14.8	Pip 45						2				2						07:45	4	13	
			Pip 55	21:47				1	1		2	1	2	1				03:00		8		
			Myotis sp.									1								1		
22/10/17	17:54	10.0 - 12.8	Pip 45			1	1	2	1	4			1		3				07:47	13	28	
			Pip 55	18:34	3			2		1	1	1								8		
			Myotis sp.					1	1		1	1	1	1		1		05:16		7		
23/10/17	17:51	14.3 - 17.0	Pip 45		50	67	20	11	3	8	1	1	1	6	2				07:49	170	244	
			Pip 55	18:17	3	5	8	2		1	3	16	1		1	2	1	06:58		43		
			Pip sp.		3	2														5		
			Noctule								1									1		
			Myotis sp.		1	4		3			1	3	3	4	2	3	1			25		

Location 5

May																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat Total (per night)**	**BAI per hour**
19/5/17	21:02	10.2 - 18.8	Pip 45		6	7	2			2		2	04:26	05:01	19	36	7.43
			Pip 55		1	2	1								4		
			Pip sp.		2	1									3		
			Noctule	21:18	7	2									9		
			Myotis sp.							1					1		
20/5/17	21:04	8.0 - 23.9	Pip 45		1									05:00	1	17	
			Pip 55									1	04:20		1		
			Pip sp.			2		1							3		
			Noctule	21:05	9	1									10		
			Leisler				1								1		
			Nyctalus sp.			1									1		
21/5/17	21:05	10.8 - 24.6	Pip 45		1	1		1	3	4	1	2	04:30	04:59	13	20	
			Noctule	21:37	2							1			3		
			Nyctalus sp.			1		1							2		
			Myotis sp.					1	1						2		
22/5/17	21:07	13.2 - 30.3	Pip 45		2	19	40	91	1		26	3	04:19	04:57	182	208	
			Pip 55					1	1		1	1			4		
			Pip sp.				5								5		
			Noctule	21:25	9										9		
			Myotis sp.			4	2	2							8		
23/5/17	21:08	13.2 - 30.7	Pip 45			1					1	1	04:15	04:56	3	16	
			Pip 55								1				1		
			Noctule	21:26	10	1									11		
			Myotis sp.			1									1		

June																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
13/6/17	21:30	11.5 - 29.2	Pip 45			3								04:41	3	14	4.74
			Pip 55	22:21		6									6		
			Pip sp.			2									2		
			Myotis sp.			1			1		1		03:14		3		
14/6/17	21:31	15.3 - 28.9	Pip 45			7	1	1			5		03:50	04:41	14	29	
			Pip 55	22:11		8					2				10		
			Pip sp.			1									1		
			Myotis sp.				1		1		2				4		
15/6/17	21:31	14.0 - 23.4	Pip 45			6			1	7	4		03:46	04:41	18	34	
			Pip 55	22:01		5					2				7		
			Pip sp.			2		1							3		
			Myotis sp.			1		1	2	2					6		
16/6/17	21:32	18.6 - 26.5	Pip45			1	1				10			04:41	12	32	
			Pip 55	22:09		3					11				14		
			Pip sp.									1	04:01		1		
			Myotis sp.			1	1				3				5		
17/6/17	21:32	15.5 - 31.8	Pip 45			1				2	2			04:41	5	45	
			Pip 55	22:16		7	1				24		03:48		32		
			Pip sp.			1					1				2		
			Myotis sp.			3			1	1	1				6		

July

Date	Sunset	Min - max temp. °C	Species	First bat pass	21:00 - 22:00	22:00 - 23:00	23:00 - 00:00	00:00 - 01:00	01:00 - 02:00	02:00 - 03:00	03:00 - 04:00	04:00 - 05:00	05:00 - 06:00	Last bat pass	Sunrise	Species total (per night)	Bat total (per night)	BAI per hour
22/7/17	21:12	13.8 - 16.1			No bats were detected										05:13	0	0	3.05
23/7/17	21:10	16.6 - 19.9			No bats were detected										05:14	0	0	
24/7/17	21:09	13.6 - 22.2	Pip 45	09:42	5	1		1		1	1	6		04:30	05:16	15	21	
			Pip sp.		4	1										5		
			Myotis sp.			1										1		
25/7/17	21:07	15.0 - 24.4	Pip 45	21:46	6	2			1		1	2		04:22	05:17	12	16	
			Pip 55			1		1								2		
			Myotis sp.			1			1							2		
26/7/17	21:06	13.3 - 22.7	Pip 45	21:55	3	12	13	31	3	4	3	4			05:19	73	85	
			Pip 55					1			1	2		04:37		4		
			Pip sp.		2					2						4		
			Myotis sp.			2	1			1						4		

August

Date	Sunset	Min - max temp. °C	Species	First bat pass	20:00 - 21:00	21:00 - 22:00	22:00 - 23:00	23:00 - 00:00	00:00 - 01:00	01:00 - 02:00	02:00 - 03:00	03:00 - 04:00	04:00 - 05:00	Last bat pass	Sunrise	Species total (per night)	Bat total (per night)	BAI per hour
15/8/17	20:30	5.7 - 22.2	Pip 45			12	29	6	1						05:50	48	71	6.16
			Pip 55			7	1		1							9		
			Pip sp.			2										2		
			Noctule	20:55	3	1	1									5		
			Myotis sp.		2		2				1	2		03:10		7		
16/8/17	20:28	13.8 - 20.4	Pip 45	20:50	3	12	15	12	5	4	4				05:51	55	96	
			Pip 55		6	4	5	5	2	2	3					27		
			Pip sp.			1		2								3		
			Nyctalus sp.				1	1								2		
			Myotis sp.			2	2			3	1	1		03:19		9		
17/8/17	20:26	13.5 - 20.3	Pip 45	20:03	2	17	60	13	8						05:53	100	141	
			Pip 55		2	7	3	5	7					00:57		24		
			Pip sp.			1		1								2		
			BLE					1								1		
			Noctule			1										1		
			Myotis sp.			6	4	3								13		
18/8/17	20:24	8.5 - 16.5			No bats were detected										05:55	0	0	
19/8/17	20:22	7.2 - 15.0			No bats were detected										05:57	0	0	

September																				
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/9/17	19:10	6.4 - 16.0	Pip45	19:37	10	1	1											06:49	12	32	5.25
			Myotis sp.		2	1	2	6		1	1	1	3		3		05:51		20		
20/9/17	19:07	14.3 - 17.0	Pip45	19:20	7	1	1			2			1		1			06:51	13	55	
			Pip55		2			1	2				1						6		
			Noctule								1		2						3		
			Myotis sp.		2	1	1	1	1		2	3	7	6	5	4	06:16		33		
21/9/17	19:05	3.4 - 12.8	Pip45	19:41	3													06:52	3	4	
			Myotis sp.			1											20:48		1		
22/9/17	19:03	13.2 - 14.3	Pip45		9		1	5	5	1		4	3		2			06:54	30	101	
			Pip55	19:31	2			2								1	06:24		5		
			Noctule		1														1		
			Myotis sp.		3	2	4	2	5	7	8	4	7	9	9	5			65		
23/9/17	19:00	8.4 - 16.3	Pip45	19:26	11	3	1		3									06:56	18	97	
			Pip55		6		2		1										9		
			Noctule			1													1		
			Myotis sp.		3	6	5	1	6	13	9	7	5	5	6	3	06:11		69		

October																					
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**18:00 - 19:00**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**07:00 - 08:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/10/17	18:00	13.0 - 16.0	Pip 45	18:25	3	1														07:42	4	16	1.22
			Pip 55		1									2							3		
			NpiPpi										1								1		
			Myotis sp.										1	6		1			05:30		8		
20/10/17	17:58	12.5 - 14.8	Pip 45	18:26	1															07:43	1	9	
			Myotis sp.		1		1						2		4				04:43		8		
21/10/17	17:56	10.5 - 14.8	Pip 45	02:51									1							07:45	1	2	
			Myotis sp.											1					03:44		1		
22/10/17	17:54	10.0 - 12.8	Pip 55	18:35	3			1												07:47	4	28	
			Myotis sp.			1	2	2	3	3	2	5	2	3	1				04:34		24		
23/10/17	17:51	14.3 - 17.0	Pip 45	18:22	5															07:49	5	29	
			Pip 55		1								1	1							3		
			NpiPpi						1												1		
			Pip sp.		2																2		
			Noctule		1																1		
			Myotis sp.				1	1	1			1	4	2	2	4	1		06:16		17		

Appendix H Automated Detector Raw Data – Transect C

Location 6

May																			
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
10/5/17	20:48	2.6 - 20.1	Pip 45	21:14		7		1							01:46	05:15	8	25	
			Pip 55			2	1										3		
			Noctule			1		1									2		
			Myotis sp.			6	4			2							12		
11/5/17	20:49	9.8 - 17.8	Pip 45	21:23		13	1	1					2		04:27	05:14	17	1116	
			Pip 55			5		7	1	10		7					30		
			Noctule			1		1									2		
			Leisler							1							1		
			Nyctalus sp.							1							1		
			Myotis sp.			83	166	149	10	250	269	118	20				1065		
12/5/17	20:51	11.3 - 17.0	Pip 45	20:58		56		2			3	5	8		04:31	05:12	74	1518	80.13
			Pip 55			1											1		
			Pip sp.			1											1		
			Noctule		2	2		2									6		
			Nyctalus sp.			1											1		
			Myotis sp.			35	43	30	375	356	434	130	32				1435		
13/5/17	20:53	10.8 - 17.9	Pip 45	21:07		59			4						04:17	05:10	63	521	
			Pip 55			4											4		
			Pip sp.			2							1				3		
			Noctule			2			3								5		
			Nyctalus sp.					1									1		
			Myotis sp.			5	15	52	51	176	129	17					445		
14/5/17	20:54	8.2 - 19.6	Pip 45	21:10		7									04:22	05:09	7	25	
			Pip 55										1				1		
			Pip sp.			1											1		
			Noctule			10	1	1									12		
			Myotis sp.			1	1			1		1					4		

June																		
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
13/6/17	21:30	7.7 - 18.8	Pip 45	22:08							2		04:05	04:41	2	51	15.43
			Pip 55			32									32		
			Pip sp.			4									4		
			Noctule			6					2	2			10		
			Myotis sp.			2	1								3		
14/6/17	21:31	11.0 - 22.2	Pip 45	22:09							14		04:07	04:41	14	138	
			Pip 55			45	9	12	2		1				69		
			Pip sp.			1	4				1				6		
			Noctule			1					2	2			5		
			Nyctalus sp.						1						1		
			Myotis sp.			8	8		1	18	8				43		
15/6/17	21:31	10.3 - 18.3	Pip 45	22:21		2				2	13		03:54	04:41	17	99	
			Pip 55			51	1			1	9				62		
			Pip sp.								4				4		
			Noctule			1					2				3		
			Myotis sp.			10	1	2							13		
16/6/17	21:32	16.3 - 25.7	Pip 45	22:14			4						04:07	04:41	4	142	
			Pip 55			60					23				83		
			Pip sp.				2								2		
			Noctule			6	1					3			10		
			Myotis sp.			25	10	5	1	2					43		
17/6/17	21:32	12.7 - 30.2	Pip 45	22:22			1	2			1		03:35	04:41	4	110	
			Pip 55			29	5	1			19				54		
			Pip sp.			2	3								5		
			Noctule			4									4		
			Myotis sp.			7	30	5			1				43		

July																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
22/7/17	21:12	13.8 - 16.1	Noctule	04:06								1		04:06	05:13	1	1	5.70
23/7/17	21:10	16.6 - 19.9	Pip 45	21:34		4		1	44	24				03:37	05:14	73	100	
			Pip 55			1	1		1		1					4		
			Noctule		6											6		
			Myotis sp.			17										17		
24/7/17	21:09	13.6 - 22.2	Pip 45	21:44		9					1	1		04:08	05:16	11	48	
			Pip 55			6		1								7		
			Noctule		14	13										27		
			Nyctalus sp.		1	1										2		
			Myotis sp.			1										1		
25/7/17	21:07	15.0 - 24.4	Pip 45	21:35	2	3	1	1	1					03:59	05:17	8	55	
			Pip 55		3	1	2	2		1	1					10		
			Noctule		2	1										3		
			Myotis sp.			28	6									34		
26/7/17	21:06	13.3 - 22.7	Pip 45	21:54	1	7	2		4					02:54	05:19	14	24	
			Pip 55		1	4			1	1						7		
			Pip sp.			1	2									3		

August																		
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
15/8/17	20:30	5.7 - 22.2	Pip 55	21:23		4								21:26	05:50	4	4	1.00
16/8/17	20:28	13.8 - 20.4	Pip 55	20:59	1									20:59	05:51	1	1	
17/8/17	20:26	13.5 - 20.3	Pip 45	21:00		14			1					00:03	05:53	15	15	
18/8/17	20:24	8.5 - 16.5	Pip 45			3								21:33	05:55	3	14	
			Pip 55			7										7		
			Myotis sp.	20:58	2	2										4		
19/8/17	20:22	7.2 - 15.0	Pip 45			2								21:49	05:57	2	16	
			Pip 55	21:00		14										14		

September																			
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/9/17	19:10	6.4 - 16.0	Pip 45		1											19:48	06:49	1	3	0.27
			Pip 55	19:55	2													2		
20/9/17	19:07	14.3 - 17.0	Pip 55	19:42	1											19:42	06:51	1	1	
21/9/17	19:05	3.4 - 12.8			No bats were detected												06:52	0	0	
22/9/17	19:03	13.2 - 14.3	Pip 55	19:40	1											19:40	06:54	1	1	
23/9/17	19:00	8.4 - 16.3	Pip 55	19:32	10											19:37	06:56	10	10	

October																						
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**18:00 - 19:00**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**07:00 - 08:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/10/17	18:00	13.0 - 16.0	Pip 45	18:26	2															07:42	2	9	0.63
			Pip 55		1																1		
			Pip sp.		6														18:41		6		
20/10/17	17:58	12.5 - 14.8			No bats were detected															07:43	0	0	
21/10/17	17:56	10.5 - 14.8	Pip 45	20:39			1	1											21:58	07:45	2	2	
22/10/17	17:54	10.0 - 12.8	Pip 55	18:36	2	1		2											21:36	07:47	5	5	
23/10/17	17:51	14.3 - 17.0	Pip 45		3																3		
			Pip 55		5																5		
			Pip sp.		17															07:49	17	27	
			Noctule	18:09	1																1		
			Myotis sp.												1				04:48		1		

Location 7

May																						
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
11/5/17	20:49	10.5 - 19.9	Pip 45							2					03:50	05:14	2	17	1.00
			Pip 55			9		1		1		1					12		
			Pip sp.	21:36		3											3		
12/5/17	20:51	11.8 - 21.2	Pip 45	21:44		2										05:12	2	3	
			Myotis sp.							1					01:42		1		
13/5/17	20:53	11.5 - 22.2	Pip 45				2			1					01:33		3		
			Pip 55	21:29		2	3	3								05:10	8	13	
			Pip sp.				1										1		
			Myotis sp.							1							1		
14/5/17	20:54	7.5 - 25.4	Pip 45				1	1							23:59	05:09	2	3	
			Myotis sp.	21:59		1											1		
15/5/17	20:56	16.1 - 18.9	Pip 45	21:41		1	1								22:29	05:07	2	4	
			Pip 55			2											2		

June																	
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
13/6/17	21:30	7.7 - 18.8	Pip 45	03:33							3			04:41	3	4	
			Pip 55								1		03:47		1		
14/6/17	21:31	11.0 - 22.2	Pip 45	21:47	1									04:41	1	4	
			Pip 55		1										1		
			Myotis sp.						1	1			02:10		2		
15/6/17	21:31	10.3 - 18.3	Pip 55	22:06		1					1		03:37	04:41	2	3	0.34
			Myotis sp.					1							1		
16/6/17	21:32	16.3 - 25.7			No bats were detected									04:41	0	0	
17/6/17	21:32	12.7 - 30.2			No bats were detected									04:41	0	0	

July																		
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
22/7/17	21:12	13.8 - 16.1			No bats were detected										05:13	0	0	
23/7/17	21:10	16.6 - 19.9	Pip 45	21:33	4	2			1					03:22	05:14	7	30	
			Pip 55		4	2				1						7		
			BLE							1	1					2		
			Noctule		12	1										13		
			Myotis sp.			1										1		
24/7/17	21:09	13.6 - 22.2	Pip 45	21:40		2	2	2			1			03:59	05:16	7	15	
			Pip 55		1	1										2		
			BLE				1			1	1					3		
			Noctule		2	1										3		
25/7/17	21:07	15.0 - 24.4	Pip 45	21:37	3	4	6	6	2	1				04:14	05:17	22	67	3.88
			Pip 55		9	5	3	1	1	2		1				22		
			Pip sp.			1						1				2		
			BLE			1	1	1								3		
			Noctule		7	3										10		
			Nyctalus sp.			1										1		
			Myotis sp.			2	4				1					7		
26/7/17	21:06	13.3 - 22.7	Pip 45	21:37	6	2			4	1				04:44	05:19	13	43	
			Pip 55		13	1	1	1	1	1		2				20		
			Pip sp.			1						1				2		
			Noctule		1							3				4		
			Nyctalus sp.		1											1		
			Myotis sp.			2	1									3		

August																			
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
15/8/17	20:30	5.7 - 22.2	Pip 45	20:53	1	3		1							23:05	05:50	5	42	3.74
			Pip 55		14	9											23		
			Noctule		6	4											10		
			Nyctalus sp.		1												1		
			Myotis sp.			2	1										3		
16/8/17	20:28	13.8 - 20.4	Pip 45	20:42	11	1	1				1				05:09	05:51	14	52	
			Pip 55		11	1								1			13		
			Noctule						1								1		
			Myotis sp.			3	5	7	3	4	2						24		
17/8/17	20:26	13.5 - 20.3	Pip 45	20:43	1			1							05:31	05:53	2	52	
			Pip 55		1	8								2			11		
			Noctule		1					2							3		
			Nyctalus sp.		1												1		
			Myotis sp.						3	14	9	7	2				35		
18/8/17	20:24	8.5 - 16.5	Pip 45	20:49	1	4	1								23:17	05:55	6	13	
			Pip 55		2	1	1										4		
			Noctule				1										1		
			Myotis sp.			1		1									2		
19/8/17	20:22	7.2 - 15.0	Pip 45	20:44	19										00:25	05:57	19	28	
			Pip 55		4												4		
			Noctule			1											1		
			Nyctalus sp.					1									1		
			Myotis sp.				1		2								3		

September

Date	Sunset	Min - max temp. °C	Species	First bat pass	19:00 - 20:00	20:00 - 21:00	21:00 - 22:00	22:00 - 23:00	23:00 - 00:00	00:00 - 01:00	01:00 - 02:00	02:00 - 03:00	03:00 - 04:00	04:00 - 05:00	05:00 - 06:00	06:00 - 07:00	Last bat pass	Sunrise	Species total (per night)	Bat total (per night)	BAI per hour
19/9/17	19:10	6.4 - 16.0	Pip 45		3			2		1					2		05:30	06:49	8	9	1.56
			Pip 55	19:26	1														1		
20/9/17	19:07	14.3 - 17.0	Pip 45	19:21	31	2				1	5		1			1	06:02	06:51	41	43	
			Pip 55		2														2		
21/9/17	19:05	3.4 - 12.8	Pip 45	20:00		6											20:06	06:52	6	6	
22/9/17	19:03	13.2 - 14.3	Pip 45	19:35	1	2	3	1		1	3	5					02:21	06:54	16	17	
			Pip 55								1								1		
23/9/17	19:00	8.4 - 16.3	Pip 45	19:20	1	1	5		1								23:08	06:56	8	11	
			Pip 55				1	1											2		
			Pip sp.				1												1		

October

Date	Sunset	Min - max temp. °C	Species	First bat pass	18:00 - 19:00	19:00 - 20:00	20:00 - 21:00	21:00 - 22:00	22:00 - 23:00	23:00 - 00:00	00:00 - 01:00	01:00 - 02:00	02:00 - 03:00	03:00 - 04:00	04:00 - 05:00	05:00 - 06:00	06:00 - 07:00	07:00 - 08:00	Last bat pass	Sunrise	Species total (per night)	Bat total (per night)	BAI per hour
19/10/17	18:00	13.0 - 16.0	Pip 45	00:20							1									07:42	1	2	1.19
			Pip 55											1					03:51		1		
20/10/17	17:58	12.5 - 14.8	Pip 45			1														07:43	1	5	
			Myotis sp.	19:13		3		1											21:32		4		
21/10/17	17:56	10.5 - 14.8	*Myotis* sp.	21:42				2	1										22:06	07:45	3	3	
22/10/17	17:54	10.0 - 12.8	*Myotis* sp.	19:19		2	1	6	8	4	3	7	5	7	6	2			05:58	07:47	51	51	
23/10/17	17:51	14.3 - 17.0	Pip 45		1												2	6	07:10		9		
			Pip 55		1																1		
			Noctule	18:42	1															07:49	1	21	
			Nyctalus sp.		1																1		
			Myotis sp.							1	1	3	3			1					9		

Location 8

May																		
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
10/5/17	20:48	2.6 - 20.1			No bats were recorded											05:15	0	0	
11/5/17	20:49	9.8 - 17.8			No bats were recorded											05:14	0	0	
12/5/17	20:51	11.3 - 17.0			No bats were recorded											05:12	0	0	0
13/5/17	20:53	10.8 - 17.9			No bats were recorded											05:10	0	0	
14/5/17	20:54	8.2 - 19.6			No bats were recorded											05:09	0	0	

June																
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
13/6/17	21:30	7.7 - 18.8			No bats were detected									04:41	0	0	
14/6/17	21:31	11.0 - 22.2			No bats were detected									04:41	0	0	
15/6/17	21:31	10.3 - 18.3			No bats were detected									04:41	0	0	0.00
16/6/17	21:32	16.3 - 25.7			No bats were detected									04:41	0	0	
17/6/17	21:32	12.7 - 30.2			No bats were detected									04:41	0	0	

July																		
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
22/7/17	21:12	13.8 - 16.1	Pip 45	22:17		7	3									10		
			Pip 55			1						1		04:29	05:13	2	12	
23/7/17	21:10	16.6 - 19.9	Pip 45		14	40	4	19	15	13	6	6				117		
			Pip 55	21:32	46	133	10	6	7	15	15	9		04:41		241		
			Pip sp.		2	28			1	1						32		
			BLE			1										1		
			Noctule		9							1			05:14	10	465	
			Leisler					20	32							52		
			Nyctalus sp.					8								8		
			Myotis sp.			2			1		1					4		
24/7/17	21:09	13.6 - 22.2	Pip 45		20	50	30	20	4	2	3	1				130		
			Pip 55	21:36	18	66	5	1				8		04:47		98		
			Pip sp.			4	2	1								7		
			BLE				2		1							3		
			Noctule		1	1									05:16	2	261	
			Leisler				1		10							11		
			Daub					1								1		
			Nyctalus sp.				1									1		47.05
			Myotis sp.			1	7									8		
25/7/17	21:07	15.0 - 24.4	Pip 45		12	40	17	23	45	112	97	46		04:37		392		
			Pip 55		49	81	35	35	11	23	22	18				274		
			Pip sp.			1	3	6								10		
			BLE					5	1							6		
			Noctule	21:25	2	3	1								05:17	6	713	
			Leisler			1				3						4		
			Daub						1							1		
			Nyctalus sp.			4				5						9		
			Myotis sp.			2	2	1	3	2	1					11		
26/7/17	21:06	13.3 - 22.7	Pip 45	21:40	10	14	9	22	98	106	6	1				266		
			Pip 55		20	53	16	17	5	15	4	1		04:43		131		
			Pip sp.				8	2	3	3	1					17		
			BLE						2						05:19	2	431	
			Noctule		2											2		
			Leisler					1	8		1					10		
			Myotis sp.				1	1		1						3		

August																		
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
15/8/17	20:30	5.7 - 22.2	Pip 45	20:53	2	172	20	16	9	4				1	05:01	05:50	224	433	37.74
			Pip 55		9	161	7	3	2	2			1				185		
			Pip sp.			1	2	1									4		
			Nyc/Epi			1											1		
			Myotis sp.			1	7	5	1	2	2	1					19		
16/8/17	20:28	13.8 - 20.4	Pip 45	20:47		73	5	2	3	5	10		1		04:13	05:51	99	298	
			Pip 55			115	9	3		23	20						170		
			Pip sp.						1	16	7						24		
			Nyctalus sp.								1						1		
			Myotis sp.			1		2		1							4		
17/8/17	20:26	13.5 - 20.3	Pip 45	20:52	3	15	29	9	5	14	4		3	1			83	557	
			Pip 55			229	17	9	52	51	3	1	2	1	05:29		365		
			Pip sp.			1	14	10	54	19						05:53	98		
			BLE			1			1								2		
			Myotis sp.			2	1	1	3	1			1				9		
18/8/17	20:24	8.5 - 16.5	Pip 45	20:57	2	29	7	11	1				1		05:22	05:55	51	282	
			Pip 55		2	199	5	2		1		2		3			214		
			Pip sp.			3											3		
			Daub						1								1		
			Myotis sp.			3	6	1		3							13		
19/8/17	20:22	7.2 - 15.0	Pip 45	20:49	1	23	7	9	10	3					05:21	05:57	53	317	
			Pip 55		26	145	29	36	3	1			1	1			242		
			Pip sp.				6					1					7		
			Nyc/Epi									1					1		
			Daub					1									1		
			Myotis sp.			2	2	3	2	2		1	1				13		

September																				
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/9/17	19:10	6.4 - 16.0	Pip 45		129	19													148		
			Pip 55		39	2									1	7	06:20		49		
			Pip sp.		1	1												06:49	2	284	
			Noctule	19:19	1				1										2		
			Nyctalus sp.		2											1			3		
			Myotis sp.		6	4	5	6	3	9	8	8	8	9	13	1			80		
20/9/17	19:07	14.3 - 17.0	Pip 45	19:15	12	6	7	14	15	4		1	3	1	19	1			83		
			Pip 55		250	18	10	81	148	94	5	10	10	6	29	15	06:16		676		
			Pip sp.		57	144	8	80	44	25	85	49	68					06:51	560	1340	
			Nyctalus sp.										1						1		
			Myotis sp.		6		1		1			3	6	2	1				20		
21/9/17	19:05	3.4 - 12.8	Pip 45	19:28	18														18		
			Pip 55		15													06:52	15	41	
			Myotis sp.		4	1					1		2				03:44		8		
22/9/17	19:03	13.2 - 14.3	Pip 45		18	16	2	3	3	5	2	8	1	2	2	4			66		
			Pip 55	19:20	176	124	106	28					25	11	26	6	06:26		502		
			Pip sp.			42	57	15										06:54	114	735	
			Nyc/Epi				2												2		
			Myotis sp.			2	5	3	1		4	7	8	10	11				51		
23/9/17	19:00	8.4 - 16.3	Pip 45	19:15	13	8	4		1	3	6								35		
			Pip 55		159	59	51	1	4	1		16	37	24	28	21	06:19		401		
			Pip sp.		3	1	1											06:56	5	589	
			Noctule		3	1													4		
			Nyc/Epi		1														1		
			Myotis sp.		2	5	6		16	13	16	26	26	21	9	3			143		

October																						
Date	**Sunset**	**Min - max temp. °C**	**Species**	**First bat pass**	**17:00 - 18:00**	**18:00 - 19:00**	**19:00 - 20:00**	**20:00 - 21:00**	**21:00 - 22:00**	**22:00 - 23:00**	**23:00 - 00:00**	**00:00 - 01:00**	**01:00 - 02:00**	**02:00 - 03:00**	**03:00 - 04:00**	**04:00 - 05:00**	**05:00 - 06:00**	**06:00 - 07:00**	**07:00 - 08:00**	**Last bat pass**	**Sunrise**	**Species total (per night)**	**Bat total (per night)**	**BAI per hour**
19/10/17	18:00	13.0 - 16.0	Pip 45	18:17		18	4													06:51	07:42	22	76	48.86
			Pip 55			7	8	3						1				5				24		
			Pip sp.			3	11															14		
			Myotis sp.			4	1		1					1		9						16		
20/10/17	17:58	12.5 - 14.8	Pip 45	18:18		54	7	3													07:43	64	163	
			Pip 55			61	30						1				1					93		
			Pip sp.			2																2		
			Myotis sp.			1			1							1		1		06:42		4		
21/10/17	17:56	10.5 - 14.8	Pip 45												5						07:45	5	10	
			Pip 55											2	1			1		06:57		4		
			Myotis sp.	22:26						1												1		
22/10/17	17:54	10.0 - 12.8	Pip 45	18:27		1			3	2		4		1							07:47	11	565	
			Pip 55			24	5		59	8	30	97	99	61	1	5				06:01		389		
			Myotis sp.				7	3	2	1	6	16	16	14	35	35	29	1				165		
23/10/17	17:51	14.3 - 17.0	Pip 45	17:43	3	105	45	115	82	76	264	235	158	160	30	82	9	1		06:45	07:49	1365	2545	
			Pip 55		1	149	192	235	210	119	3	4	9	16	85	56						1079		
			NpiPpi			1	7		9													17		
			Pip sp.		3	3																6		
			Noctule			1																1		
			Myotis sp.			1		9	1	2		11	17	9	5	19	3					77		