



**Bat Activity Transect Surveys
Internal-External Building Assessment**

**Pump and Bloors Farm,
Lower Rainham,
Kent**

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LIABILITIES:

Whilst every effort has been made to guarantee the accuracy of this report, it should be noted that living creatures are capable of migration and whilst protected species may not have been located during the survey duration, their presence may be found on a site at a later date.

The views and opinions contained within this document are based on a reasonable timeframe between the completion of the survey and the commencement of any works. If there is any delay between the commencement of works that may conflict with timeframes laid out within this document, or have the potential to allow the ingress of protected species, a suitably qualified ecologist should be consulted.

It is the duty of care of the landowner/developer to act responsibly and comply with current environmental legislation if protected species are suspected or found prior to or during works.

1.0 Introduction

Background

- 1.1 The Ecology Partnership was commissioned by Rapleys to undertake seasonal bat surveys on land around Pump and Bloors Farm, Lower Rainham, Kent, following the results of a Preliminary Ecological Appraisal conducted in June 2017 by EPR.
- 1.2 The preliminary ecological appraisal by EPR in 2017 identified the hedgerows around the site as suitable linear commuting routes for bats. The site was also shown to lie within the Core Sustainance Zone for a number of maternity roosts in the local area. Transect surveys were therefore recommended around the site throughout the survey season. Internal-external assessments are also recommended to be carried out on the buildings within the redline.
- 1.3 This report presents the findings of the surveys on site, which aim specifically to assess the sites potential to support foraging and roosting bats. Potential mitigation measures and recommendations for the site will be included within this report.
- 1.4 Section 2 of this report sets out the methodology of The Ecology Partnership's survey and the results in Section 3 and the implications discussed in Section 4. Conclusions are provided for in chapter 5 of this report.

Site Context and Status

- 1.5 The site comprises two parcels on either side of Pump Lane, in Lower Rainham, Kent (TQ809674). The land is just less than 250m south of the Medway Estuary and Marshes Special Protection Area. A railway line borders the land to the southwest with the dense suburban area of Twydall just beyond. Further agricultural land is situated to the northwest, and Bloors Lane Community Woodland, allotments and low-density buildings to the southeast.

- 1.6 The aerial photograph below (Figure 1) shows the site and its immediate surroundings. The red line depicts the approximate site boundary and survey area.



Figure 1: Approximate location of the redline boundary.

Description of Proposed Development

- 1.7 The proposals are yet to be finalised however they include a residential development and associated infrastructure and open space to be created within the redline area indicated in Figure 1. The farm buildings and residential houses are to be excluded from the proposals.

Legislation

1.8 Under the NERC Act (2006) it is now the duty of every Government department in carrying out its functions *“to have regard, so far as it is consistent with the proper exercise of those functions, to the purpose of conserving biological diversity in accordance with the Convention”*.

1.9 Bats are covered by the following relevant legislation: the Wildlife and Countryside Act (1981) (as amended); the Countryside and Rights of Way Act, 2000; the Natural Environment and Rural Communities Act (NERC, 2006); and by the Conservation of Habitats and Species Regulations (2010).

Under the WCA 1981 it is an offence to:

- intentionally, recklessly or deliberately disturb a roosting or hibernating bat i.e. disturbing it whilst it is occupying a structure or place used for shelter or protection)
- intentionally or recklessly obstruct access to a roost (i.e. a structure or place used for shelter or protection).

Under the CHSR 2010 it is an offence to:

- deliberately capture (or take), injure or kill a bat
- intentionally, recklessly or deliberately disturb a bat, in particular (i) any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young; (ii) any disturbance which is likely to impair their ability in the case of hibernating or migratory species, to hibernate or migrate; or (iii) any disturbance which is likely to affect significantly the local distribution or abundance of the species to which they belong
- damage or destroy a breeding site or resting place (roost) of a bat.

2.0 Methodology

Bat Transect Activity Surveys

- 2.1 Seasonal surveys were carried out in spring on the 4th June 2018, 23rd July 2018 and the 4th September 2018. The surveys followed BCT guidelines (Collins, 2016). Two predetermined transect routes were agreed and followed for the duration of the survey, during which bat flyovers and activity were recorded. Two transects routes was designed to follow linear features such as hedgerows and tree lines which bats are known to use as commuting corridors. These habitats also provide the most suitable habitat on site for foraging. Figure 2 below displays the layout of the transect route.
- 2.2 The dusk surveys started at sunset and observations were maintained until at least 2 hours after sunset. Dawn surveys began 2hrs prior to sunrise. Bats usually emerge about twenty minutes after sunset depending on the species, light level, weather conditions and time of year. Peak activity will normally last for about two hours after sunset, during times of peak insect activity.
- 2.3 Surveyors were equipped with Echo Meter Touch recording devices as well as Anabat Walkabouts, Bat scanners and Heterodyne Duets.
- 2.4 Three Anabat Express remote recording devices were also deployed over five consecutive nights in May, July and September. The recording devices were placed within treelines and hedgerows that was considered suitable for use by commuting or foraging bats in order to gauge activity levels and species diversity on site (see Figure 3). The subsequent recordings from the Anabat Express device were analysed using Analook software.
- 2.5 The Anabat Express recording devices were established on site between 17th and 21st May 2018, 23rd July to the 29th July 2018, 4th to the 10th September 2018.



Figure 2: Transect routes indicated by the blue and yellow dotted lines with Anabat locations shown by the orange stars

Limitations

- 2.6 It should be noted that whilst every effort has been made to provide a comprehensive description of the site, no single investigation could ensure the complete characterisation and prediction of the natural environment.

3.0 Results

Bat Transect Surveys

- 3.1 Bat activity surveys were carried out seasonally between May and September 2018.
- 3.2 Four bat surveyors followed the two predetermined routes illustrated in Figure 2 above. Activity levels, foraging and commuting behaviour were recorded and species were identified using bat detectors. Surveyors were on site 15 minutes before sunset until 2 hours after sunset. Anabat remote recording devices were placed around the site in the same locations each month as shown in Figure 2.

Spring

- 3.3 The first survey was conducted at dusk on the 4th June 2018. Sunset was at 21.10 and the weather was overcast with a moderate breeze. Seven stops of five minutes each were conducted along each of the routes and the transects were completed once over the course of 2hrs.
- 3.4 The first bat heard along the western blue transect was a common pipistrelle (*Pipistrellus pipistrellus*) at 21.19 along the northern hedgerow commuting west. A low number of common and soprano pipistrelles (*Pipistrellus pygmaeus*) were heard sporadically along the blue transect. Highest foraging activity was recorded in the corners where treelines meet on the western edge of the site. A total of thirteen common pipistrelle passes were recorded, with a peak of two bats seen at any one time. Only four passes from soprano pipistrelles were heard. No other bats were heard along this route.
- 3.5 The first bats heard on the eastern yellow transect were two common pipistrelles at 21.30 at foraging at the eastern end of the public footpath adjacent to Lower Bloors Lane. Common and soprano pipistrelles were heard foraging along the edges of the allotments at 21.40. A low number of individual passes of common pipistrelles were recorded along the southern

railway line. A *Nathusius pipistrelle* (*Pipistrellus nathusii*) was heard at the western end of the public footpath at 22.30.

- 3.6 The Anabat data collected from the positions shown in Figure 3 has been summarised below in Figure 4. Bat activity was considered to be generally low, dominated by common and soprano pipistrelles with very few passes from other species. Activity was considered to be fairly even across the site and all Anabats. Full details can be found in Appendix 1.

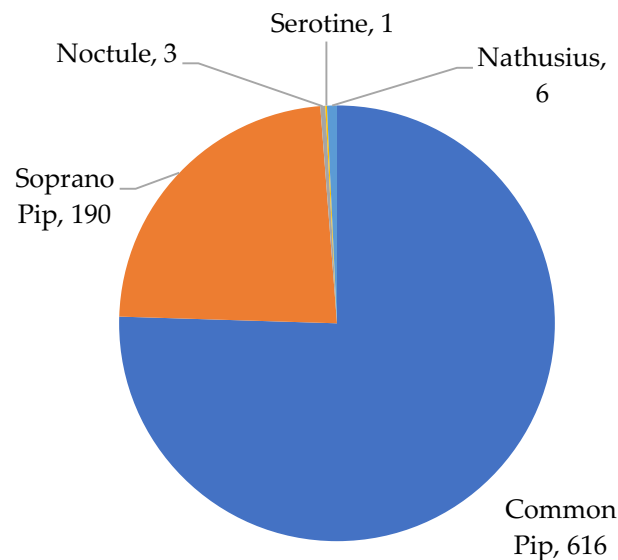


Figure 3: Total number of bat calls per species found across the site from the 17th to the 21st May 2018 combing all Anabat data

Summer

- 3.7 The second survey was undertaken on the 23rd July 2018. The temperature was 23°C at the start, with no wind or cloud present. The transect began at 21.00 at sunset.
- 3.8 Bat activity was very low across the western blue transect. The first bat heard was a soprano pipistrelle at 21.45 along the north western edge, followed by three more passes along this treeline from 21.50. Common pipistrelles were heard at 21.59 close to the

caravans and in the southwest corner by the road at 22.15. A total of six bat passes were heard along this route.

3.9 Activity was considered to be slightly higher along the boundaries of the eastern yellow route. Occasional soprano and common pipistrelles passes were heard steadily from 21.35. Eight passes were heard along the western railway line from 21.41 to 21.55. a low number were heard along the allotment edge. No bats were noted along the public footpath however and only a single soprano pipistrelle pass was noted at 22.13 on the northern side of the transect.

3.10 Anabat data across the site in July has been summarised in Figure 5 below. The dominant species are once again pipistrelle species, with occasional passes from other species. The highest activity was considered to be along the western railway line with an average of 60 calls per evening. Full details of data recorded on site can be found in appendix 1.

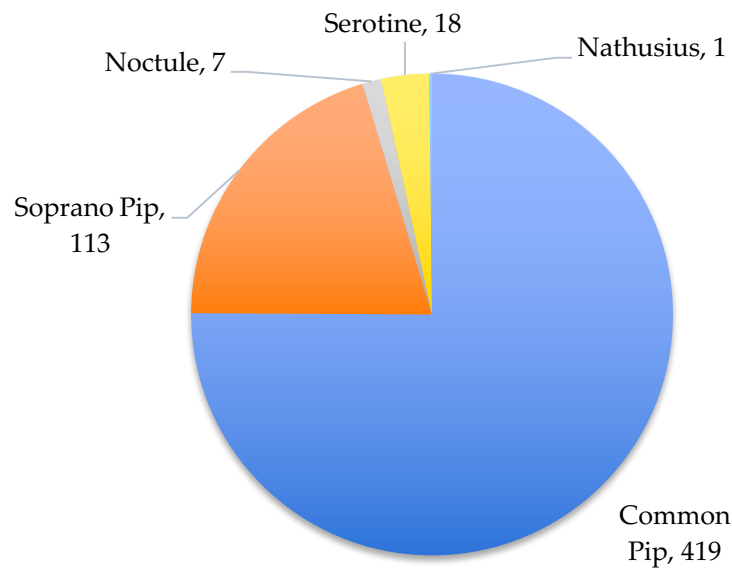


Figure 4: Total number of bat passes per species found across the site from 24th to the 28th July combining all Anabat data

Autumn

- 3.11 The third activity transect was conducted at dusk on the 4th September 2018. Sunset was at 19.37. The starting temperature was 17 degrees. There was a light wind and light intermittent drizzle throughout the survey period.
- 3.12 Throughout the survey from 20.00 onwards, occasional common and soprano pipistrelles were recorded along the boundaries of the western blue transect. In total seven common pipistrelle passes were noted, with five soprano pipistrelle passes. Foraging activity was noted along the northern edge and along the railway line. No other bat species were recorded using this transect route.
- 3.13 Along the eastern yellow transect route there were fewer passes. The first bat was at 20.01 and was a common pipistrelle along the railway line. Bat activity was found mainly along the allotment edge and along the public footpath with five passes from a common pipistrelle and two passes from a soprano. Constant common pipistrelle foraging activity was noted along the public footpath from 20.22 to 20.44. A single Nathusius pipistrelle pass was noted by Pump Lane at 20.55. No other bats were recorded during this survey.
- 3.14 The dominant species found across the data collected from the Anabats were common and soprano pipistrelles. The spread was more even across the two species in this season. This month also saw a higher number of noctule passes. September showed the lowest level of bat activity across the Anabats from the previous seasons this year.

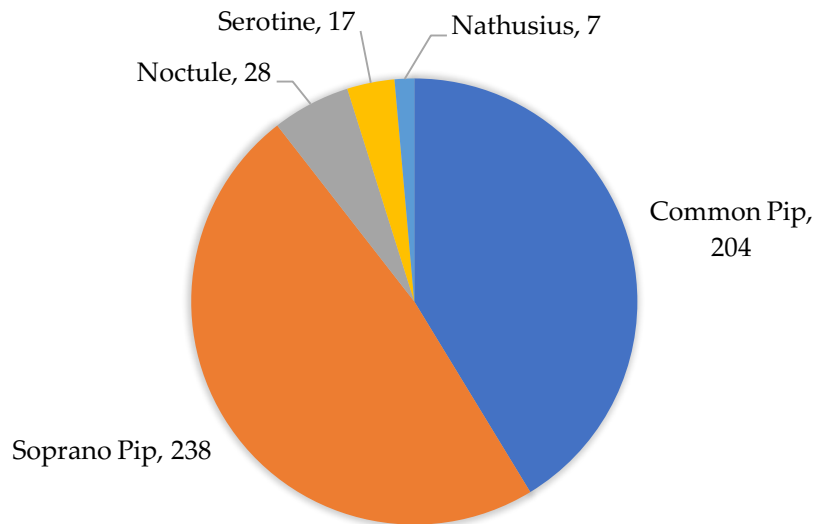


Figure 5: Total number of bat passes per species found across the site from 5th to the 9th September 2018 combining all Anabat data

4.0 Discussion

Bat Species and Activity

4.1 Across each month, activity was considered to be low during the transect surveys, and the Anabats revealed a similar trend across the site as a whole. Activity across the site was lowest in September, however was considered generally low across all seasons. Activity was dominated by soprano and common pipistrelles during the seasonal transects.

4.2 All UK bat species are strictly protected by European and UK legislation bats will need to be considered with regard to the design of the development.

Transects

- 4.3 Key areas of habitat used by foraging and commuting bats were identified during the transect surveys. The areas of concentrated activity were found to be along the western railway line edge, the central southern public footpath and habitat around the edges of the allotments and woodland to the south (see Figure 6).
- 4.4 Most edges of the orchard site were bound by native treelines and hedgerows and were found to support at least some level of bat activity, although most could only be said to be one or two single passes. These green linkages create areas of connective habitat around the edges of the surrounding residential development however and provide important linear features for commuting bats from potential nearby roosting site.
- 4.5 Very little activity was recorded along Pump Lane and the residential houses at Russet Farm. The centre of the site, whilst highly vegetated with the orchard habitat is considered to provide little opportunity for foraging due to the likely use of insecticides on the apples.
- 4.6 The transects did not cover part of the eastern half of the site, to the north of the public footpath. Original plans showed this area to be retained as orchard and therefore any foraging habitat and commuting routes would remain relatively unaffected by the development. If plans change, this area may need to be covered by further transects.



Figure 6: Significant areas of habitat on site identified for commuting and foraging bats

Anabat Data

- 4.7 Remote recorders in the form of Anabat Express bat detectors were deployed for a series of consecutive nights each season in May, July and September. The positions of the Anabats were chosen to give a good representation of activity on the edges of the site and within the centre. These give a good indicator of the overall level of use on site by bat species.
- 4.8 Activity was dominated (66%) by common pipistrelles on all three Anabat locations with over 600 calls recorded in May alone (see Appendix 1 for full detailed data tables). Soprano pipistrelles were also fairly dominant with 100-200 calls recorded each season (over the five recording days).
- 4.9 Also present on site are noctules, serotines and Nathusius pipistrelles. These bats were recorded in low numbers across all three locations, making up a total of only 5% of all bat

calls recorded on site. These species appear to use the site to commute across on an infrequent basis.

- 4.10 Diversity of bat species using the site is considered to be low, reflecting the position of the site adjacent to residential developments and the main landuse of the site being agricultural (with the likely use of insecticides reduces food sources). Supporting this theory, the central poplar treeline Anabat recorded the least level of activity. This is likely due to the poor foraging opportunities the orchard habitat affords, whilst the native treelines and hedgerows along the western railway line create a 'natural' green corridor providing food for invertebrates and in turn bats.

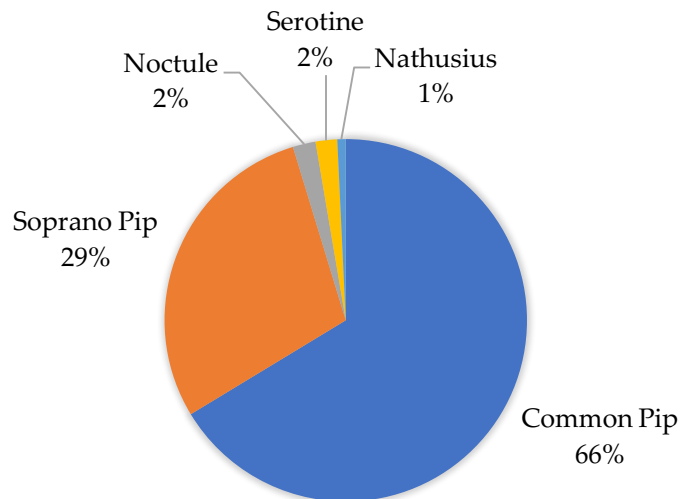


Figure 7: Percentage of calls per species recorded on site across three seasons in 2018

Recommendations and Enhancements

- 4.11 The exact plans for the site are yet to be finalised. The outline proposals include the construction of a residential development within the redline boundary, with associated

infrastructure, a school and fields and a retirement village. It is understood that the design of the site focuses along Pump Land and the western edge of the site, south of the public footpath.

- 4.12 Activity across the site was considered to be low, with the majority of the activity occurring along the boundaries of the site and the central footpath. The initial masterplan includes the retention and enhancement of many key connective habitat linkages across the site and it recommended that when plans are finalised, all treelines are retained. Specific mitigation for bats is recommended to be included within the design to enhance the site for foraging and commuting species, both along the boundaries and across the centre.
- 4.13 Maintaining and enhancing all existing boundary features, but specifically the boundary features along the western edge, southern edge around the allotments and along the public footpath would be considered an appropriate strategy to ensure that bats would not be adversely effected by the proposals.
- 4.14 Much of the habitat to be lost is commercial orchard and provides limited opportunities for foraging bats. It is considered that the use of enhanced planting and hedgerow creation within the site, between residential plots or between residencies and the proposed school would enhance habitats within the redline boundary for foraging bats, as well as other species.
- 4.15 Trees provide foraging opportunities for bats through provision of insect prey, as such it is recommended a number of the following native tree species are planted across the site post-development along retained hedgerows and boundary treelines, between sections of the site and along the newly created roads:
- Oak (*Quercus robur*)
 - Rowan (*Sorbus aucuparia*)
 - Elder (*Sambucus nigra*)
 - Goat willow (*Salix caprea*)
 - Hazel (*Corylus avellana*)

- Hornbeam (*Carpinus betulus*)
- Common alder (*Alnus glutinosa*)

4.16 As a number of bat species make infrequent use of the boundary features on site, it is recommended that light should be directed away from these features, maintaining these as 'dark corridors'. The central public footpath currently experiences no lighting and this is recommended to be maintained in this state. New proposed roads running through the site are recommended to have low levels of lighting.

4.17 The Bat Conservation Trust advises the following which should be considered as part of the proposals:

- The impact on bats can be minimised by the use of low-pressure sodium lamps or high-pressure sodium instead of mercury or metal halide lamps where glass glazing is preferred due to its uv filtration characteristics. Lighting should be directed to where it is needed and light spillage avoided.
- This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only. Planting can also be used as a barrier or manmade features that are required within the build can be positioned so as to form a barrier.

4.18 Bat boxes can be erected on the existing mature trees on the edges of the site with clear flight paths along the boundaries. This will enhance the local bat population and provide roosting opportunities. Recommended boxes include:

- Schwegler 2F Bat Box – These boxes are attractive to small bats such as pipistrelles and long-eared bats and can be hung on trees (Figure 8).
- Schwegler 2FN Bat Box – This is slightly larger than the 2F and provides opportunities for the larger bats such as noctules. These should be hung on mature trees.
- Schwegler 1FD Bat Box - This box has been designed specifically for smaller bats and provides opportunities as a maternity roost (Figure 8).



Figure 8: Schwegler 2F (left) and 1FD (right) bat boxes

- 4.19 Incorporating specially designed bat boxes into the design can enhance the habitat on site for bats. Suitable bat boxes include a variety of wooden bat boxes, such as an improved cavity box, a double chamber bat box and other wood based varieties. Schwegler boxes have been recommended as these are long-lasting and require no maintenance.
- 4.20 It is also recommended that Schwegler 2FR Bat Tubes are included along with the construction of any new developments. The 2FR is suitable for bat species that inhabit buildings, such as the common and soprano pipistrelle which formed the majority of the bats recorded on site. They are unobtrusive and can fit flush into masonry of a wall during the construction phase. It is recommended that six of these be placed on the walls of houses close to the central and northern boundary line, preferably on unlit south or west facing walls.
- 4.21 Gardens and similar green spaces in developed areas can provide suitable foraging habitat for bats, in particular for pipistrelle species. It is recommended that post development gardens and amenity grasslands/fields on site are planted with wildflower species. Of particular benefit to bats are night-flowering species that attract night-flying invertebrate prey. The following native species are considered suitable:
- Nottingham catchfly (*Silene nutans*)
 - Night-flowering catchfly (*Silene noctiflora*)

- Bladder campion (*Silene vulgaris*)
- Soapwort (*Saponaria officinalis*)
- Wild marjoram (*Orignaum vulgare*)
- Borage (*Borago officinalis*)
- Yarrow (*Achillea millefolium*)
- Primrose (*Primula vulgaris*)
- Corn marigold (*Glebionis segetum*)
- Perforate St John's-wort (*Hypercium perforatum*)
- Wood forget-me-not (*Myosotis sylvatica*)
- Ox-eye daisy (*Leucantheum vulgare*)
- Corncockle (*Agrostemma githago*)
- Cornflower (*Centaurea cyanus*)

5.0 Conclusions

- 5.1 Relatively low bat activity was recorded during seasonal transect surveys across the site at Pump and Bloors Farm, Rainham, across 2018. Key areas of habitat used by bats were identified along the western railway edge and the central footpath and around the southern allotments.
- 5.2 Remote recording devices were set up across the site to gain a picture of bat activity across the different areas and habitats on site. The devices recorded for five consecutive nights in May, July and September. The data collected revealed a small range of species using the site with common and soprano pipistrelles dominating the activity as well as occasional passes from other species including serotine and noctule bats.
- 5.3 The results of all surveys suggest the site is largely used by common bat species and the treelines and hedgerows along the boundaries of the site, with very little activity occurring within the centre of the site.

5.4 The final masterplan should retain all boundary features of the site as well as the connective habitat running across the site including the public footpath corridor. These key commuting routes are highly recommended to be retained as darkened corridors with minimal lighting installation. Planting enhancements have been recommended inside the site to increase commuting routes across the site. Designs should include green infrastructure and sensitive lighting to ensure that the favourable conservation status of bats in the local area are not affected by proposals, recommendations to achieve this are included within this report.

6.0 References

Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*. English Nature, Peterborough.

Bat Conservation Trust (2016). *Bat Surveys – Good Practice Guidelines Third Edition*. Bat Conservation Trust, London.

Appendix 1: Anabat data collected at Pump and Bloors Farm in 2018

Table 1: Anabat data for 24th to the 28th May 2018

Anabat location	Date	Common Pip	Soprano Pip	Noctule	Serotine	Nathusius
Western edge/railway line	17/05/2018	35	5			
	18/05/2018	30	9	3		
	19/05/2018	39	16			2
	20/05/2018	82	21			
	21/05/2018	110	43			
Central poplar treeline	17/05/2018	27	21			
	18/05/2018	14	7			
	19/05/2018	29	3			
	20/05/2018	13	3			
	21/05/2018	37	6			
Public footpath south section	17/05/2018	41	16			2
	18/05/2018	12	3			2
	19/05/2018	16	6		1	
	20/05/2018	100	21			
	21/05/2018	31	10			

Table 2: Anabat data for 24th to the 28th July 2018

Anabat location	Date	Common Pip	Soprano Pip	Noctule	Serotine	Nathusius
Western edge/railway line	24/07/2018	66	10			1
	25/07/2018	47	8			1
	26/07/2018	32	11			3
	27/07/2018	54	8			2
	28/07/2018	45	14	2		1
Central poplar treeline	24/07/2018	12	2			1
	25/07/2018	17	3	2		1
	26/07/2018	22	6			
	27/07/2018	15	7			
	28/07/2018	10	5			
Public footpath south section	24/07/2018	5	10			2
	25/07/2018	14	6	1		1
	26/07/2018	18	7	2		5
	27/07/2018	57	7			1
	28/07/2018	5	9			

Table 3: Anabat data for the 5th to the 9th September 2018

Anabat location	Date	Common Pip	Soprano Pip	Noctule	Serotine	Nathusius
Western edge/railway line	05/09/2018	11	13	2	2	1
	06/09/2018	19	12	4	1	2
	07/09/2018	24	11	0	0	1
	08/09/2018	30	22	3	3	0
	09/09/2018	54	15	3	3	1
Central poplar treeline	05/09/2018	7	6	2	0	1
	06/09/2018	2	15	2	0	0
	07/09/2018	3	15	0	0	0
	08/09/2018	6	4	1	3	1
	09/09/2018	9	13	4	1	0
Public footpath south section	05/09/2018	15	9	3	2	0
	06/09/2018	4	45	2	0	0
	07/09/2018	13	28	0	1	0
	08/09/2018	4	15	0	1	0
	09/09/2018	3	15	2	0	0

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