



Land off Biddestone Lane, Yatton Keynell,
Chippenham, SN14 7BA

Bat Activity Survey



March 2025

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The flora and fauna detailed within this report are those noted during the field survey and from anecdotal evidence. It should not be viewed as a complete list of flora and fauna species that may frequent or exist on site at other times of the year.

Up to date standard methodologies have been used, which are accepted by National Resources Wales and other statutory conservation bodies. No responsibility will be accepted where these methodologies fail to identify all species on-site.

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Executive Summary

In April 2024, All Ecology was commissioned to undertake a Bat Activity Survey in relation to a proposed development at a site known as Land off Biddestone Lane, Yatton Keynell, Chippenham, SN14 7BA. The main part of the site consists of an arable field containing a pond with surrounding vegetation and the field is bound by hedgerows and trees. A small portion of the arable field to the south is also included within the site.

The proposals for the site are for a new housing development comprising 55 new dwellings with associated infrastructure and greenspace as well as attenuation basin and swale. A new access will be created off Biddestone Road. Landscape buffers to the boundary hedges will be retained around the development.

The automated and manual surveys recorded five confirmed species of bats: Common Pipistrelle, Soprano Pipistrelle, Serotine, Lesser Horseshoe and Noctule. One or more *Myotis* species was also recorded as well as a long-eared species, almost certainly Brown Long-eared.

Surveys found mainly pipistrelle foraging activity on site. A variety of other species were also recorded foraging on site although there were no unexpected findings and no important commuting routes or foraging areas were identified but the east and north boundary hedges had higher levels of activity compared to the south and west. Low numbers of Lesser Horseshoe bats were recorded during the survey; this species is known to be present in the local and wider area and no significant activity was recorded, but the presence of these species is notable.

The loss/changes to the habitats on site resulting from the proposed development have been addressed through habitat retention, enhancement and creation, and the requirement for a suitable lighting strategy to ensure that there is no detrimental effect on the favourable conservation status of the species recorded on site.

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1.0 Introduction

Background

- 1.1 In April 2024, All Ecology was commissioned to undertake a Bat Activity Survey in relation to a proposed development at a site known as Land off Biddestone Lane, Yatton Keynell, Chippenham, SN14 7BA. The main part of the site consists of an arable field containing a pond with surrounding vegetation and the field is bound by hedgerows and trees. A small portion of the arable field to the south is also included within the site. The site is immediately surrounded by the local village hall amenity ground to the northeast, arable field to the southwest, road with arable field beyond to the northwest and a field of scrub and grassland mosaic to the southeast. The site is located to the southwest of the small village of Yatton Keynell and the local area is a mosaic of arable and grass fields with connecting field boundary vegetation. There are also areas of woodland further to the west.
- 1.2 The proposals for the site are for a new housing development comprising 55 new dwellings with associated infrastructure and greenspace as well as attenuation basin and swale. A new access will be created off Biddestone Road. Landscape buffers to the boundary hedges will be retained around the development.
- 1.3 A Preliminary Ecological Appraisal of the site was carried out by All Ecology at the beginning of April 2024. The surveys found that the site provides potential bat foraging and commuting habitat along the field boundary hedgerows with bats likely to forage over field margins in association with the boundary habitats as well a pond and surrounding scrub. The hedges are to be retained; however, the majority of field habitats will be cleared and buildings will be erected and gardens created as well as a new access through the west boundary hedge. Therefore, further bat activity surveys are required to determine the impact to foraging and commuting bats. As the site hedgerows connect to a network of field boundary hedgerows in the wider area, they are deemed to have moderate suitability for bats.
- 1.4 In accordance with the Bat Conservation Trust – Bat Surveys for Professional Ecologists: Good Practice Guidelines 4th ed (Collins, 2023), habitats of moderate suitability for bats should be subject to one Night-time Bat Walkover (NBW) survey per season (spring – April/May, Summer – June/July/August and autumn – September/October) in appropriate weather conditions for bats. Automated/static bat detector surveys should collect data for a minimum of five consecutive nights per month (April to October) in appropriate (or the best available) weather for bats. Further NBW surveys may be required if these visits, or the results of static detector surveys, reveal activity of interest that requires more observation on site.

Objectives and Aim

- 1.5 The main objectives and aim of the survey were to establish the following:
 - Which bat species are utilising the sites.
 - Level of bat activity on site and presence of important feeding areas and flight corridors.
 - Which type of mitigation measures would need to be employed.

Site Location



Figure 1: Site location plan.



Figure 2: Aerial view of the site.

2.0 Legislation and Status

- 2.1 All species of bat are listed on Schedule 5 of The Wildlife and Countryside Act (1981) and as such receive protection under Section 9 of this Act. This has been amended several times, most recently by the Countryside and Rights of Way Act 2000, which added 'or recklessly' to Section 9(4) (a) and (b). In summary, it is a criminal offence to:
- Intentionally kill, injure or take a wild bat.
 - Be in possession of, or control, any live or dead wild bat or part of, or anything derived from a wild bat.
 - Intentionally or recklessly damage, destroy or obstruct access to any place that a wild bat uses for shelter or protection.
 - Intentionally or recklessly disturb any wild bat whilst it is occupying a structure or place that it uses for shelter or protection.
 - Transport for sale or exchange, or offer for sale or exchange, a live or dead bat or any part of a bat.
- 2.2 The Conservation of Habitats and Species Regulations 2010, consolidate all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994, in respect of England and Wales. It is an offence to possess, sell or offer or transport for sale any European species of bat or any part derived from such a species. These Regulations also remove the 'incidental result defence'. In other words, it is no longer a defence to show that the killing, capture or disturbance of a species covered by the Regulations or the destruction or damage of their breeding sites or resting places was the incidental and unavoidable result of a lawful activity. Natural England can grant European Protected Species (EPS) licenses in respect of development to permit activities that would otherwise be unlawful.
- 2.3 Under Section 40 of the Natural Environment and Rural Communities Act (2006) public bodies, including Local and Regional Planning Authorities have a duty to 'have regard' to the conservation of biodiversity in England when carrying out their normal functions, which includes consideration of planning applications. In compliance with Section 41 of the Act, the Secretary of State has published a list of species considered to be of principal importance for conserving biodiversity in England. This is known as The England Biodiversity List, all of which make up the UK BAP Priority Species. This list forms the basis of the UK Biodiversity Framework, and in England, Biodiversity 2020: A strategy for England's wildlife and ecosystem services (Defra, 2011). Regional Planning Bodies and Local Planning Authorities will use it to identify the species that should be afforded priority when applying the requirements of the National Planning Policy Framework (NPPF) to maintain, restore and enhance species and habitats.
- 2.4 Seven bat species are NERC Priority Species (JNCC, 2007). These are:
- Barbastelle *Barbastella barbastellus*
 - Bechstein's *Myotis bechsteinii*
 - Noctule *Nyctalus noctula*
 - Soprano Pipistrelle *Pipistrellus pygmaeus*
 - Brown Long-eared *Plecotus auritus*

- Greater Horseshoe *Rhinolophus ferrumequinum*
- Lesser Horseshoe *Rhinolophus hipposideros*

2.5 Greater Horseshoe, Lesser Horseshoe, Barbastelle and Bechstein's, are afforded greater protection under European legislation, being listed under Annex II of the EC Habitats Directive which lists species whose conservation requires the designation of Special Areas of Conservation (SACs).

3.0 Methodology

Personnel

- 3.1 The surveys were carried out by James Godbeer BSc Hons MCIEEM, an ecologist with over 17 years' experience working as a consultant, and experienced bat surveyors. James has extensive experience of managing environmental contracts, and particular experience in surveying, assessment and mitigation for rare and protected species. He has considerable knowledge of the development and planning process including Ecological Impact Assessments, sustainable ecological design and he has completed ecology chapters of Environmental Statements. James holds a number of Natural England protected species licences including bats (all species, all counties, Class Licence Registration No. 2015-12313-CLS-CLS), and Great Crested Newts (Class Licence Registration No. 2019-44282-CLS-CLS). He has successfully obtained European Protected Species mitigation licences for a number of bat species including Lesser Horseshoe, Greater Horseshoe, Serotine, Brown Long-eared, Common Pipistrelle and Natterer's bats, for a number of roost types including maternity and hibernation sites.

Field Survey

- 3.2 The surveys were carried out in accordance with the Bat Conservation Trust Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2023).
- 3.3 For the purposes of the survey, the habitats on site were classed as being of moderate quality and as such one NBW survey per season (spring, summer and autumn) was carried out in May, July and September. The size and nature of the site meant that it could be sufficiently covered by two surveyors walking two transects.
- 3.4 The NBW surveys began just before sunset and continued for two to three hours after sunset. The transects were walked at a steady pace but time taken to make notes was greater in areas where bat activity was higher meaning there was an inevitable increase in the amount of time taken in these areas.
- 3.5 Automated/static detectors were placed in two locations along each transect and data collected for five consecutive days recommended by the guidelines.
- 3.6 NBW surveys were undertaken on the 23rd May, 16th July, and 15th September 2024.

Table 1: Survey weather conditions and sunset times.

Date	Temperature (°C)	Sunset	Wind	Cloud Cover (%)
20/05/24 (dusk)	12-10	21:02	Light	80
22/07/24 (dusk)	17-15	21:10	Light	90
16/09/24 (dusk)	15-13	19:20	Light	10

3.7 Automated/static surveys took place from the:

- 22nd April to the 27th April 2024
- 20th May to the 25th May 2024
- 17th June to the 22nd June 2024
- 22nd July to the 27st July 2024
- 19th August to the 24th August 2024
- 16th September to the 21st September 2024
- 14th October to the 19th October 2024

Equipment

- 3.8 The surveyors were equipped with Echo Meter Touch 2 Pro bat detectors. Registrations were recorded on the devices and notes were made on species recorded, behaviour, time of registration, location and direction of flight where possible, including incidental observations from surrounding habitats. Where it was not possible to identify a bat species on site, audio recordings were later analysed using Wildlife Acoustics' Kaleidoscope software. Automated surveys were carried out with Song Meter Mini detectors. Data was analysed using Kaleidoscope using the automated analysis feature as well as manual checks to confirm accuracy.

Assessment

3.9 The activity surveys are intended to give an indication of:

- Which bat species use the site.
- The intensity and distribution of bat activity.
- The type of activity such as foraging indicated by characteristic 'feeding buzzes' (attempts at prey capture), commuting, etc.
- Important feeding areas and commuting routes.

Limitations

- 3.10 Each survey visit only provides a 'snapshot' of the overall use by bats over a year. Multiple visits and automated surveys are carried out in order to increase the confidence in the overall assessment of the site but it is possible that larger numbers and other species of bats are utilising it than those recorded.
- 3.11 Long-eared and horseshoe bats were recorded on site. These species echolocate more quietly than other species of bats and can be difficult to pick up on bat detectors. They are also one of the latest bats to emerge and it is often not possible to observe them directly. It is therefore likely that numbers of long-eared bats present on site are greater than those recorded over the course of the surveys.

4.0 Results

Automated Activity Survey Results

- 4.1 During the automated surveys the following species and numbers of recordings were made on each of the detectors. The relative numbers of recordings do not provide a reliable comparison of activity between species due to call strength and other factors such as attenuation etc. See Plan 1 for location of the automatic detectors.

Table 2. Automated Detector 1 survey results.

Detector 1 – North	Dates (2024)						
Species	22 – 27 April	20 – 25 May	17 - 22 June	22 - 27 July	19 - 24 August	16 - 21 September	14 - 19 October
Brown Long-eared	0	3	1	4	0	0	0
Common Pipistrelle	107	126	199	388	277	98	27
Lesser Horseshoe	1	2	4	4	5	1	0
Myotis sp.	3	11	21	18	12	15	4
Noctule	32	87	111	113	153	67	19
Serotine	0	3	8	11	6	3	4
Soprano Pipistrelle	16	24	31	37	9	6	5
Not identifiable	18	34	40	67	51	21	6

Detector 1 - North

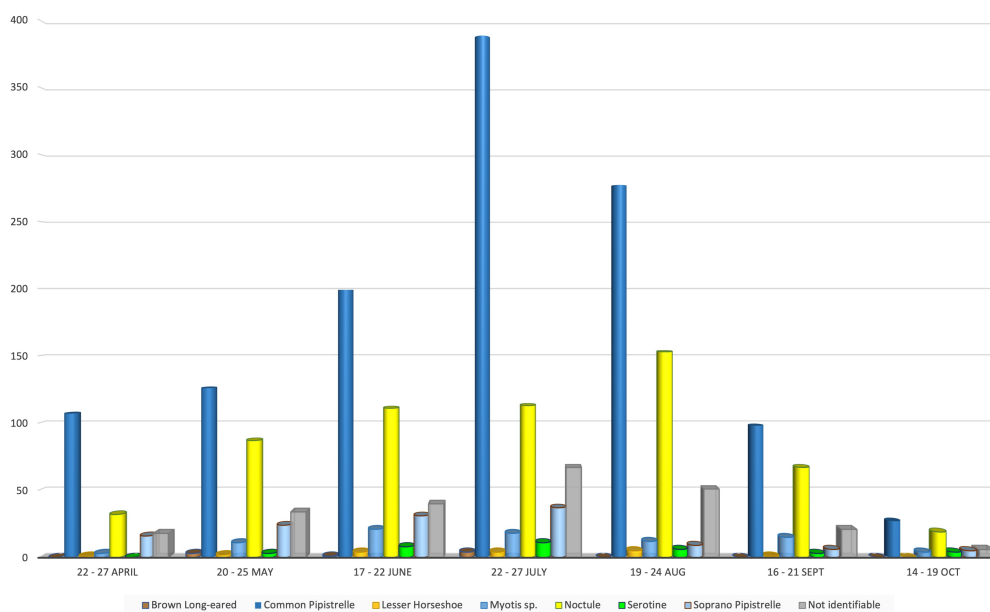


Figure 3: Automated Detector 1 – Survey Results.

Table 3. Automated Detector 2 survey results.

Detector 2 – East	Dates (2024)						
Species	22 – 27 April	20 – 25 May	17 - 22 June	22 - 27 July	19 - 24 August	16 - 21 September	14 - 19 October
Brown Long-eared	0	4	3	7	2	0	0
Common Pipistrelle	111	134	178	290	299	102	32
Lesser Horseshoe	0	4	6	6	4	1	0
Myotis sp.	5	14	26	21	14	18	5
Noctule	35	99	108	122	133	73	25
Serotine	1	2	4	5	5	3	0
Soprano Pipistrelle	16	19	24	29	7	7	1
Not identifiable	16	31	25	45	39	25	8

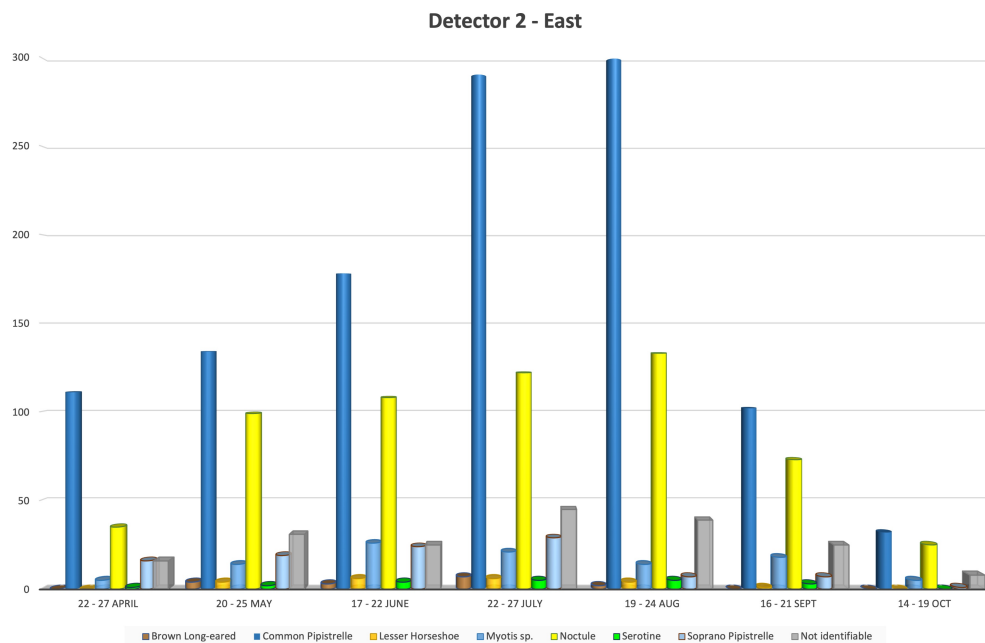


Figure 4: Automated Detector 2 – Survey Results.

Table 4. Automated Detector 3 survey results.

Detector 3 - South	Dates (2024)						
Species	22 – 27 April	20 – 25 May	17 - 22 June	22 - 27 July	19 - 24 August	16 - 21 September	14 - 19 October
Brown Long-eared	0	0	0	0	0	0	0
Common Pipistrelle	43	75	98	188	144	45	19
Lesser Horseshoe	0	0	0	0	0	0	0
Myotis sp.	0	3	7	10	12	4	0
Noctule	29	73	92	84	64	59	8
Serotine	0	0	0	0	0	0	0
Soprano Pipistrelle	3	7	9	18	5	2	0
Not identifiable	11	23	29	33	28	10	3

Detector 3 - South

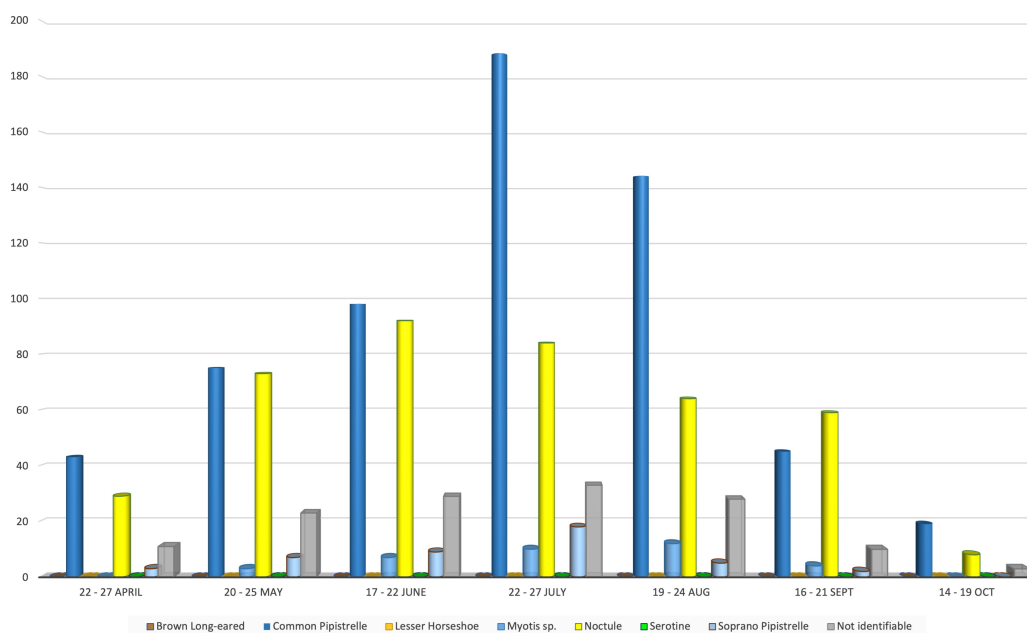


Figure 5: Automated Detector 3 – Survey Results.

Table 5. Automated Detector 4 survey results.

Detector 4 - West	Dates (2024)						
Species	22 – 27 April	20 – 25 May	17 - 22 June	22 - 27 July	19 - 24 August	16 - 21 September	14 - 19 October
Brown Long-eared	0	0	0	0	0	0	0
Common Pipistrelle	57	62	77	160	122	51	24
Lesser Horseshoe	0	0	0	0	0	0	0
Myotis sp.	3	5	5	17	11	7	3
Noctule	22	67	81	69	61	47	4
Serotine	0	0	0	0	0	0	0
Soprano Pipistrelle	0	2	4	11	6	4	0
Not identifiable	13	19	21	23	14	12	5

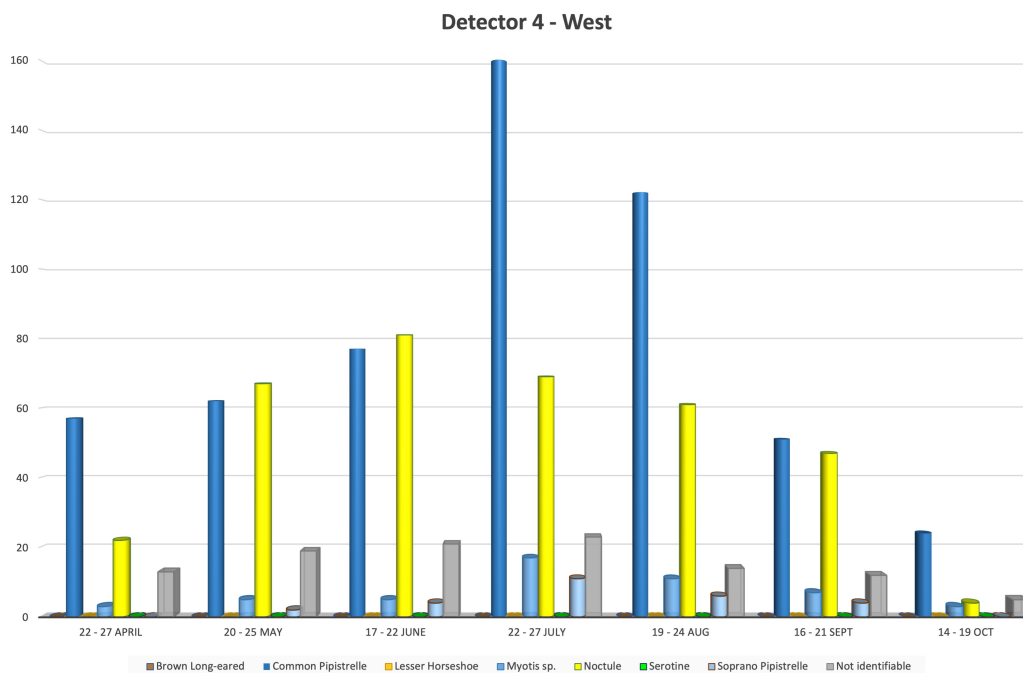


Figure 6: Automated Detector 4 – Survey Results.

Manual Activity Surveys

- 4.2 The following species were recorded along the northeast and southwest transects over the course of the manual activity surveys. See Plan 1 for transect locations and relative distribution of activity.

Table 6. North/East transect survey results.

North/East Transect	Dates (2024)		
Species	20 th May	22 nd July	16 th September
Brown Long-eared	0	2	0
Common Pipistrelle	24	42	29
Lesser Horseshoe	2	3	0
<i>Myotis</i> sp.	9	8	11
Noctule	6	9	7
Serotine	3	2	1
Soprano Pipistrelle	5	7	5
Not identifiable	6	10	7

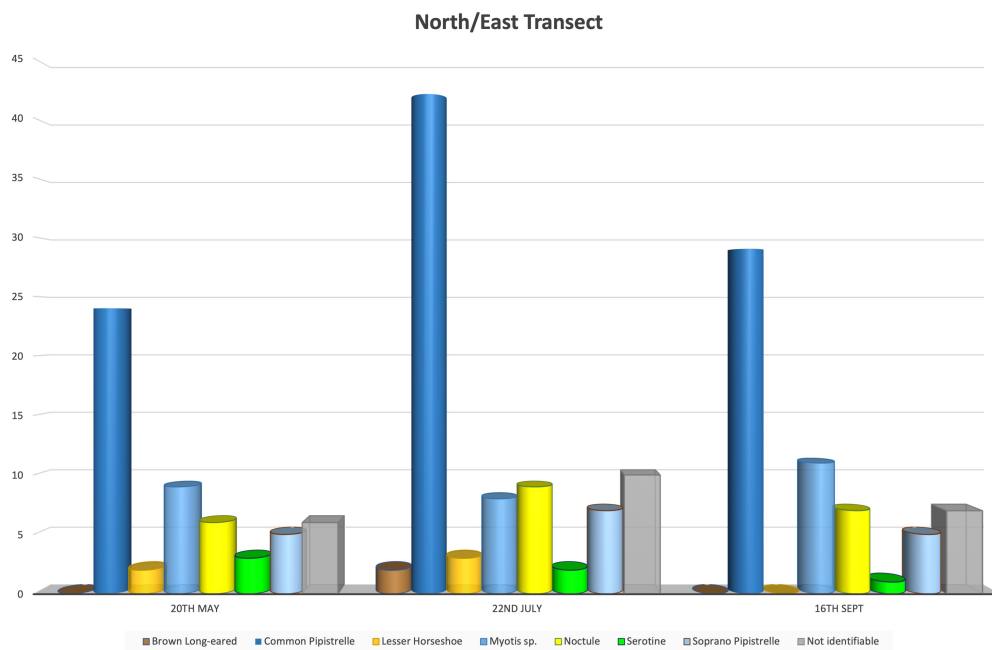


Figure 7: North/East Transect – Survey Results.

Table 7. South/West transect survey results.

South/West Transect	Dates (2024)		
Species	20 th May	22 nd July	16 th September
Brown Long-eared	0	0	0
Common Pipistrelle	27	37	24
Lesser Horseshoe	0	2	1
<i>Myotis</i> sp.	7	7	14
Noctule	5	8	4
Serotine	1	0	0
Soprano Pipistrelle	2	4	2
Not identifiable	4	7	5

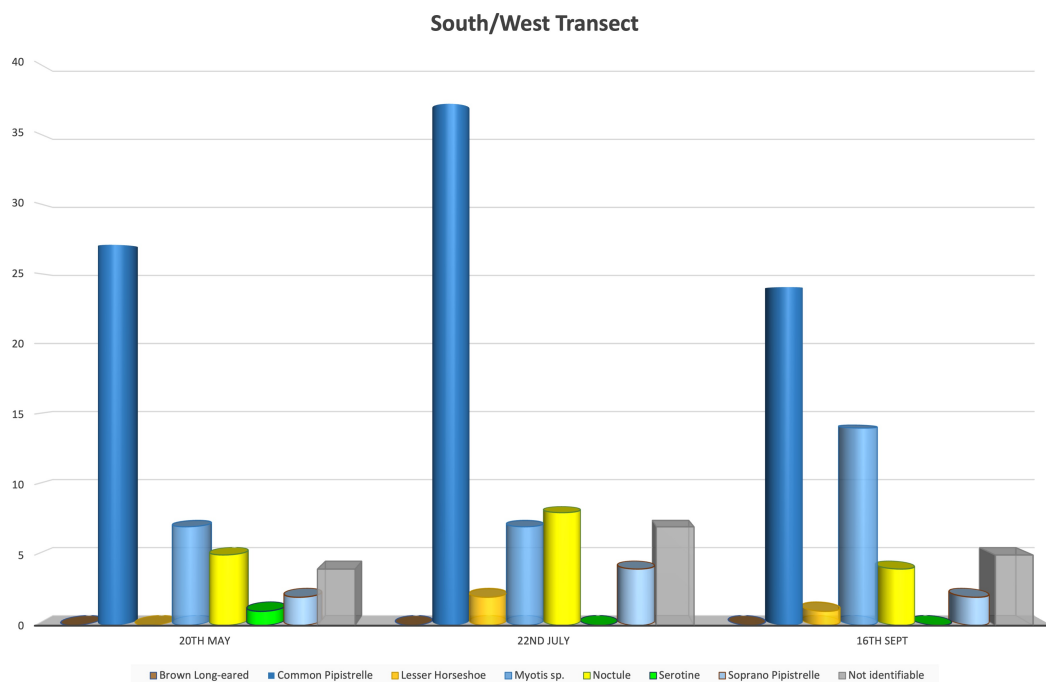


Figure 8: South/West Transect – Survey Results.

Table 8: Time of first/last activity by species recorded.

Dates (2024)	Time of first recording after sunset (minutes)						
	Brown Long-eared	Common Pipistrelle	Lesser Horseshoe	Myotis sp.	Noctule	Serotine	Soprano Pipistrelle
20 th May	-	15	-	47	5	72	49
22 nd July	67	22	58	59	11	39	55
16 th Sept	-	9	78	50	8	33	19

4.4 Refer to Plan 1 for a graphical representation of the results.

5.0 Evaluation

Activity Surveys

- 5.1 The automated and manual surveys recorded five confirmed species of bats: Common Pipistrelle, Soprano Pipistrelle, Serotine, Noctule and Lesser Horseshoe bats. One or more *Myotis* species were also recorded as well as long-eared species. It is not possible to differentiate the two species of long-eared bat found in Britain with the use of detectors but based on the known distribution of these species it is highly likely that the individuals recorded were the more common Brown Long-eared bat, rather than the rare Grey Long-eared bat, which has a limited distribution confined to southern England.
- 5.2 Pipistrelle bats were the most frequently recorded species on site with Soprano Pipistrelles recorded sporadically. There was no notable activity recorded during the manual surveys, important foraging areas, commuting routes etc., but regular foraging was recorded along the majority boundary hedges, more-so on the north and east boundaries. The earliest recording was that of a Soprano Pipistrelle made at 19 minutes after sunset during the September survey with the earliest Common Pipistrelle recorded 9 minutes after sunset, also during the September NBW.
- 5.3 Pipistrelle bats are the most common species of bat in the UK with widespread distributions, most commonly found in England and Wales; Common and Soprano Pipistrelle bats exploit a wide range of habitats (BCT, 2010, 2010a). Soprano Pipistrelles are a NERC Priority Species. The levels of activity on site were not unexpected and the surveys indicate all of the boundary hedges are used to some extent with higher activity recorded along the north and eastern boundaries. The southern boundary was less vegetated and the west boundary was a low hedge; pipistrelle activity associated with these boundaries was that of limited foraging activity over the field.
- 5.4 All other species associated with the site were recorded in small numbers. A maximum total of 26 recordings of *Myotis* sp. were recorded by the static detector deployed on the east boundary of the site during the automated survey in June. Distribution of *Myotis* species is variable and species dependant. Daubenton's are found throughout the UK; Natterer's are also found across the UK, except northern Scotland, wherever there is suitable woodland; Whiskered/Brandt's bats are found throughout England, Wales, southern Scotland and parts of Northern Ireland although little is known about their individual distributions; Alcahloe bats have only been identified relatively recently due to their similarity to Whiskered/Brandt's and little is known about their distribution. Bechstein's have a limited distribution, only found in southern England, Shropshire and occasionally in Wales. These species typically forage and commute throughout the following habitats during the summer months (BCT, 2010b, 2010c, 2010d, 2010e, 2010f);
- Daubenton's – Hunts close to the surface of slow-moving or calm water. Will also forage in trees or along woodland rides, especially if these are associated with water.
 - Natterer's – Hunts in tree canopies or close to foliage and by edges of water although at a higher level than Daubenton's bat.
 - Whiskered/Brandt's (Alcahloe also similar) – Whiskered bats forage in a wide range of habitats including parkland, woodlands, flowing water and suburban gardens. Brandt's bat forage more in woodlands and close to water bodies.

- Bechstein's – Forages in areas of closed-canopy woodland close to water. It will also forage along overgrown hedgerows and tree lines.
- 5.5 Taking into account the distributions and above preferred foraging and commuting habitats, any of the six *Myotis* species could utilise the site but the most likely species based on the habitats present is Whiskered. There are variations in the calls of *Myotis* bats but they are often very similar and dependent on the types of habitats being used. Calls within or close to cover and other cluttered environments can be particularly difficult to differentiate; sound analysis of the calls was inconclusive. The level of activity was not unexpected and overall, it is likely that this site is of low conservation significance for these species.
- 5.6 Serotines were recorded occasionally over the course of the automated surveys and only on rare occasions during the manual surveys. Serotine bats are found in a wide range of habitats. They tend to fly at about tree-top height (to about 10 m) often close to vegetation. They are one of the less common species and their distribution is restricted to southern England and South Wales (BCT, 2010g). Activity recorded during the manual surveys was along the north boundaries with occasional commuting/foraging passes along the boundary hedge from west to east. The automated detectors were consistent with this observation and the recordings made were indicative of low levels of foraging. Overall, it is likely that this site is of low conservation significance for this species but the boundary hedges do provide regularly used foraging habitats.
- 5.7 A small number of recordings of long-eared bats were made over the course of the manual surveys, with activity taking place along east boundary hedge. The recordings made during the manual transect surveys were indicative of low levels of foraging. Brown Long-eared bats are one of the most common bat species in England, Britain and the UK. Their distribution extends across the UK wherever there is suitable habitat (BCT, 2010h); they are listed as a NERC Priority Species. The Grey Long-eared bat is a southern European Species with a distribution that extends to south England where it is very rare and restricted to a few colonies in Sussex, Hampshire, the Isle of Wight, Dorset, Devon and Somerset (BCT, 2010i). They tend to forage meadows, grasslands and forest edges. It is not possible to distinguish between these species with sound analysis although it is highly likely that individuals recorded on site were the common Brown Long-eared bat. Although long-eared bats are more difficult to detect and it is highly likely that it was under recorded, it can be reasonably concluded that it is the boundary vegetation that are most important habitats for this species and activity appeared to be that of foraging only. Overall, it is likely that this site is of low conservation significance for this species but the boundary vegetation does provide foraging habitats.
- 5.8 Noctule bats were recorded over the course of the surveys with bats observed foraging overhead. Due to the loud calls of this species recordings are likely to have been the same bat or bats picked up by multiple detectors due to their loud calls. Recordings are likely to have been made of individuals foraging over the site as well in the surrounding areas. Noctules tend to feed over habitats rich in invertebrate fauna such as permanent pasture, woodland edge and hedgerows. It is still a relatively widespread species in much of England, Wales and to southwest Scotland, but has become scarce in some areas of intensive agriculture (BCT, 2010j). The number of registrations of this species is not considered to be notable and although the site may be a source of invertebrates for this species, it is intensively farmed arable land that is unlikely to provide a significant resource and the Noctule's habit of foraging overhead means the site is likely to be of low conservation significance for this species.

- 5.9 Lesser Horseshoe bats were recorded during both the manual transect surveys and automated survey periods. Horseshoe bats are known to be present in the local and wider area. The Lesser Horseshoe bat is one of the smallest British species being also rare in the British Isles and confined to Wales, western England and Western Ireland (BCT, 2010k). Horseshoe bats are known to forage in sheltered areas close to vegetation and rarely fly more than five metres above the ground. These species are sensitive to disturbance, particularly lighting of foraging habitats. Recordings of horseshoe bats on the site was limited to very low numbers of foraging bats and no important commuting routes were identified. Habitats on the site are dominated by low value arable and considered sub-optimal for Lesser Horseshoe bat foraging in isolation. Mature hedges with tree along the north and east boundaries provide more suitable habitat and this is where the activity was concentrated. The site is likely to be of low conservation significance for this species; however, their presence is notable and further consideration, particularly of lighting, is required.

Site Status Assessment

- 5.10 The results of the survey show that activity was recorded around the majority of the boundary vegetation as would be expected. Although no important commuting routes were identified the results show that the boundary habitats are utilised for foraging by a number of species including common species and more notable species such as horseshoe bat species and Serotine, although locally Lesser Horseshoe bats and Serotine are a relatively common species. The sheltered conditions along the hedges and trees, the north and east boundaries in particular, make these dark undisturbed linear features that provide habitat for bats as well as providing connecting habitat between foraging habitats and roosting sites. The field itself, which is arable land, is not important to bats except at the peripheries where it is associated with the boundary vegetation.

6.0 Impacts and Recommendations

Impacts

- 6.1 The proposals for the site are for a new housing development comprising 55 new dwellings with associated infrastructure and greenspace as well as attenuation basin and swale. A new access will be created off Biddestone Road. Landscape buffers to the boundary hedges will be retained around the development.
- 6.2 The proposed development will result in the permanent loss of the main field and part of the field to the south, currently arable farmland. The following impacts and potential impacts in relation to bats have been identified.
- Direct permanent loss of 4.1 ha of the main field, currently farmed for winter cereal crops. Negligible impact.
 - Direct permanent loss of 0.15 ha of the south field, currently farmed for winter cereal crops. Negligible impact.
 - Creation of the new site access through the existing west boundary hedge in substitute for the existing access. Low impact.
 - Temporary and permanent disruption of areas of bat foraging habitat on the retained boundary habitats through unsympathetic use of lighting. Potential high adverse impact depending on species.

Further Surveys

- 6.3 No further surveys are required at this time. Sufficient surveys have been carried out to satisfy the survey effort specified by the current bat survey guidelines and repeat surveys would not be required unless the proposals are delayed by at least two years or more.

Mitigation

- 6.4 In order to mitigate the above impacts a number of measures are to be taken and have been included in the landscape proposals for the site.

Habitat Loss

- 6.5 The development will result in significant modifications of the habitats on site including the permanent loss of all the arable land, to be replaced by buildings, hard standing and new gardens but boundary buffers to the hedgerows, which will be retained, will replace arable with minimal field margins, with species-rich grassland.
- 6.6 As the existing boundary habitats would be retained, these will continue to provide foraging and commuting habitats for bats along the boundaries. Grassland enhancement which will create species-rich wildflower grassland, will increase invertebrate interest and further enhance foraging opportunities. Provided the detailed lighting strategy described below is implemented, there would be no barriers to bat movements, and new gardens would also provide foraging habitats for common species.

Lighting

- 6.7 The proposed landscape plan will mitigate any habitat loss but this will only be effective if a suitable lighting strategy is put in place. Lighting of boundary hedgerows must be avoided. No important commuting routes were identified and activity was mainly that of pipistrelles which are light tolerant species; however, foraging by horseshoe and long-eared bats was recorded and these species are particularly susceptible to disturbance from lighting. External lighting should be kept to minimum in line with current best practice and should not exceed minimum requirements. It should include the use of column lighting or down lighters, with full cut-off directional shielding to ensure that lighting is directed only where required and light spill into adjacent areas and skyglow is minimized. Where lighting is required, measures should include the use highly directional warm white LED lighting, an example being down spots at 2.5 m high using warm white (2700 K or lower) 8W LED lamps, 550 lumens, 35 degree beam angle. These could be individually activated by PIR sensors on a 1 minute cut off to further reduce their impacts. These will assist in lighting only the areas where lighting is required and minimising light spill either directly or through reflected light. A lighting strategy will be produced to show that no boundary habitats are subject to lighting with light levels at hedgerows maintained at or below 0.2 lux on the horizontal plane, and at or below 0.4 lux on the vertical plane.

Roosting Bats

- 6.8 The proposed development provides further opportunity to enhance the site for roosting bats such as crevice dwelling species that dominated activity recorded on site. There are many ways that the buildings could be enhanced for crevice-dwelling bat species without any significant design considerations. Bat panels such as Schwegler Bat Access Panel 1FE, or bat tubes such as the Schwegler 1FR Bat Tube can be incorporated into the building exteriors with little visual impact, or roosts such as the Schwegler Bat Roost 1FQ can be erected after building completion. Bats are very particular about the internal conditions of bat boxes, so by providing several bat boxes with different aspects creates differences in temperature, humidity etc. thereby increasing the chance of colonisation.

Post-development Management and Monitoring

- 6.9 The proposed management of the majority of the habitats on site will likely be that of typical residential gardens. However, the open space will be included in the landscape management plan along with the hedges. There is unlikely to be any requirement for monitoring provided the mitigation strategy with regards to lighting and habitat creation is implemented.

Conclusion

- 6.10 It is clear that any development of the site will result in the loss or modification of the habitats on site and the focus of the mitigation has been to ensure that the integrity of the retained boundary corridors are maintained and enhanced, not just for bats but for wildlife in general, as well as providing new habitats to enhance these areas to ensure that there is no overall reduction in the quality of habitat on site to maintain the conservation status of the species recorded on site. The ability of bats to forage is not expected to be compromised and the provision of a number of new roosting features would be regarded as being a significant enhancement of the site.

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8.0 Plans

Survey Results

