



Bat Survey - Emergence and Activity Surveys

17 Kenilworth Avenue, Reading, Berkshire RG30 3DL

Andrew Hawkins

Status	Issue	Name	Date
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Final	2		13/06/17

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Executive summary

Arbtech Consulting Ltd. undertook a suite of emergence/re-entrance surveys at 17 Kenilworth Avenue, Reading, Berkshire RG30 3DL on 2nd May, 17th May and 10th June 2017. The aim of the assessment was to categorise the roosts in the loft and hanging tiles and to provide a current status on all survey features.

This includes providing evidence for species, numbers and levels of activity, to identify any entrance and egress points, and to gain an understanding of the activity of bats using the site in the local landscape

The development proposals are for an extension above the garage and a two storey extension at the rear. A planning application has been submitted to Reading Borough Council.

Recommendations

Survey feature	Recommendation
B1	EPSML will be required once planning has been granted. Mitigation required under EPSML: - Bat boxes erected on site prior to commencement of works. These will include the following: 2F Schwegler Bat Box 1FF Schwegler Bat Box Bat boxes should be positioned 3-5m above ground level facing in a south/south-westerly direction with a clear flight path to and from the entrance. The boxes can be erected on trees in the rear garden. - Pre-works inspection of the loft space immediately prior to the commencement of works. - Destructive search via soft stripping by hand under ecological supervision of the roof structure. - Any bats located during the pre-works inspection and destructive search will be carefully captured by hand and transported to an appropriate bat box by the License Named Ecologist or their Accredited Agent. - The access points into the loft will be retained and the loft can continue to be used by the brown long-eared bat. There will be no loss of roost therefore no permanent roosting provisions will need to be provided. - The roof will be lined with Type 1F Felt lining only. Scientific research has shown that Breathable Roof Membranes (BRMs) are harmful to bats with bats becoming entangled in loose fibres resulting in the death of bats. BRMs used in bat roosts can quickly become shredded by the bats claws resulting in a reduced lifespan of the product. There are currently no bat friendly BRM products on the market. For more information visit www.batsandbrms.co.uk.

	• Lighting will be controlled across the developed site. Research into the effects of artificial lighting on bats has shown that it can impact upon bat emergence times and lead to a reduced foraging time (particularly for the light sensitive Brown long-eared bat). As bats are faithful to their roost sites, often returning to the same site for many years, the impact of lighting on emergence times and in turn reduced foraging times can ultimately result in the roosts being abandoned. • Key areas of the site which are sensitive to artificial lighting are the eastern boundary with the railway line where bats are commuting and foraging. • The lighting on the developed site will be limited to the extended dwelling only. No lighting will be installed within the garden area, thereby maintaining the existing dark areas within the developed site for bats. • Low impact lighting strategies will be adopted from the guidance outlined in the Bat Conservation Trust “Bats and Lighting” publications: http://www.bats.org.uk/pages/bats_and_lighting.html • The lighting on the site will: - Use narrow spectrum light sources to lower the range of species affected by lighting - Use light sources that emit minimal ultra-violet light - Avoid white and blue wavelengths of the light spectrum to reduce insect attraction and where white light sources are required in order to manage the blue short wave length content they should be of a warm / neutral colour temperature <4,200 kelvin. - Not use bare bulbs and any light pointing upwards. The spread of light will be kept in line with or below the horizontal. • Light spill will be reduced via the use of low level lighting used in conjunction with hoods, cowls, louvers and shields. Lights will also be directional to ensure that light is directed to the intended areas only. • External lighting will be positioned below the eaves, be on PIR sensors that are sensitive to large objects only (so that they are not triggered by passing bats), and will be set to the shortest time duration to reduce the amount of time the lights are on. • Wall lights and security lights will be ‘dimable’ and set to the lowest light intensity settings. There are several products on the market that allow the control of the light intensity and the duration that the lights are on. All lighting on the developed site will make use of the most up to date technology available. All of the above will ensure that the bat roosts and bat boxes within the developed site will not be affected by any external lighting ensuring their long term use.
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For full justification of these recommendations, please go straight to section [4.0 Conclusions, Impacts and Recommendations](#). Otherwise, the full report starts below.

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1.0 Introduction and Context

1.1 Background

Arbtech were commissioned by Andrew Hawkins to undertake a suite of emergence/re-entrance surveys at 17 Kenilworth Avenue, Reading, Berkshire RG30 3DL. The assessment is informed by the Bat Conservation Trust publication *Bat Surveys for Professional Ecologists – Good Practice Guidelines* (Collins, J. (Ed.) 2016).

These surveys were completed following recommendations made in the Preliminary Roost Assessment Survey report (Arbtech Consulting Ltd. October 2016)

1.2 Site Context

The site is located at National Grid Reference SU 6994 7242, and has an area of approximately 0.05ha. There is one building assessed within the site boundary.

1.3 Scope of the report

This report provides a description of the bat activity observed and recorded during each survey. The aim of the assessment was to characterise any roosts present including species, numbers and access points, roosting locations, timing of use and type of roost, and to gain an understanding of how bats use the site.

Robust data has been collected, following good practice guidelines, to inform an assessment of the potential impacts of the proposed development on bats, and inform mitigation and enhancement. This report provides information on constraints to the proposals as a result of roosting bats, and summarises any mitigation required to achieve planning permission, and statutory consent to comply with wildlife legislation.

To achieve the aims of the assessment, the following steps have been taken:

- A desk study has been carried out, including a request for information from the local bat group - please refer to the Preliminary Roost Assessment Survey report (Arbtech, 2016)
- A field survey has been undertaken, including an external survey and internal inspection.
- An outline of likely impacts on any known roosts has been provided, based on current development proposals.
- Recommendations for further survey and assessment have been made, along with advice on European Protected Species Mitigation Licensing if appropriate.

A survey plan is presented in Appendix 1 showing the location of each surveyor and the bat activity observed and recorded during each survey, the proposed plan is included in Appendix 2 (where available), and a summary of relevant legislation can be found in the Appendix 3.

1.4 Project Description

This report is prepared in support of a planning application for an extension above the garage and two storey extension to the rear. A planning application has been submitted to Reading Borough Council. The proposed site plan is included in Appendix 2 (where available).

2.0 Methodology

2.1 Desk Study methodology

Existing bat records relating to the site and a surrounding 2km radius (the study area) are required to conform to national guidelines and these have been obtained from Berkshire and South Buckinghamshire Bat Group (BSBBG). A review of the landscape structure using aerial images from Google Earth and OS maps, and designated sites, habitat and granted EPSL records held on Magic.gov.uk was completed to inform the PRA. Please refer to the Preliminary Roost Assessment Survey report (Arbtech, October 2016).

2.2 Site Survey methodology

The survey methods were informed by the Preliminary Roost Assessment Survey completed by Arbtech Consulting Ltd (October 2016). This survey identified the following survey requirements in line with best practice:

B1 – confirmed roost: approx. 50 droppings in the loft assessed as likely to be a small non breeding roost of brown long-eared bats. Two pipistrelle type droppings were found stuck to the window frame below hanging tiles suggesting a roost in the gaps behind the clay hanging tiles on the front bay window.

The surveys involved surveyors positioned around the building ensuring that all elevations and roof sections could be clearly observed. Particular attention was paid to the areas of the building identified as providing suitable access points to bat roosts. The location of each surveyor during each survey is shown in Appendix 1. Each surveyor was assigned an area of the building to observe for the duration of the survey. Surveyors used Heterodyne and Frequency Division bat detectors, and Wildlife Acoustics EM3+ and Echo Meter Touch detectors connected to iPads. Bat echolocation calls recorded during the surveys were analysed using Wildlife Acoustics sound analysis software Kaleidoscope V3.1.7 when required. That is, the Echo Meter Touch includes an Auto ID bat species, however this is not 100% accurate and further post-survey sound analysis is often required to confirm species misidentified by the Auto ID software during the survey. Surveyors also used survey record sheets, pens/pencils, head torches for recording all activity observed during the surveys including foraging and commuting behaviour as well as emergence/re-entries by bats. Surveyors equipped with night vision binoculars and/or thermal imaging equipment are identified by “NV” or “ThIm” in Table 7. All surveyors had hand held radios for communication between surveyors to assist with confirming obscure bat activity e.g. a bat emergence or a bat passing over the building.

In accordance with the latest bat survey guidelines (Collins, J. 2016) dusk emergence surveys commenced 15 minutes before sunset and continued for 1½ - 2 hours after sunset – depending upon bat activity and surveyor visibility. Dawn re-entry surveys commenced 2 hours before sunrise and continued until 15 minutes after sunrise.

Surveys were completed during optimal weather conditions i.e. when temperatures were above 10°C, with no rain or strong winds, as these environmental variables can impact upon bat emergence and foraging behaviour.

2.3 Surveyors

The lead surveyor is Natalie Evans, Bat Licence England: 2016-11257-CLS-CLS and was assisted by 1 other surveyor over the three visits, all with several years of bat survey experience. The designated position of each surveyor during each survey is detailed in the tables in Section 3.6 below, and shown on the plan in Appendix 1.

2.4 Survey Timings and Weather Conditions

The dates and times of each survey are presented in Table 1, along with sunset/sunrise times as applicable and the weather conditions at the start and end of each survey.

Table 1: Survey schedule and weather conditions

Reference	Survey date	Survey Start and End Times Sunset/sunrise time	Weather Conditions Start	Weather Conditions END
B1	02/05/17	20:00 – 22:00 Sunset: 20:28	Temp: 14.6°C Humidity: 60.3% Cloud Cover: 100% Wind: 7mph Rain: None	Temp: 12.1°C Humidity: 73.5% Cloud Cover: 100% Wind: 12mph Rain: None
B1	17/05/17	03:10 – 05:25 Sunrise: 05:10	Temp: 15.2°C Humidity: 92% Cloud Cover: 100% Wind: 4mph Rain: None	Temp: 15°C Humidity: 97% Cloud Cover: 100% Wind: 3mph Rain: None
B1	10/06/17	21:00 – 23:00 Sunset: 21:17	Temp: 19°C Humidity: 71.4% Cloud Cover: 60% Wind: 6mph Rain: None	Temp: 17.5°C Humidity: 83.1% Cloud Cover: 30% Wind: 7mph Rain: None

2.5 Limitations – evaluation of the methodology

These surveys follow best practice guidance to confirm presence/absence of roosting bats and where present, characterise the roost. However, this information is collected at finite dates and times, and provides an indication of the conditions on site only. The use of the building and the site as a whole by bats, at all times cannot be established based on this information.

There were no specific limitations to the survey.

3.0 Results and Evaluation

3.6 Survey Results

The results of each survey are provided in the tables below.

Table 2: Survey results – Dusk Emergence Survey

Date		02/05/17
Start and End Times		20:00 – 22:00 Sunset: 20:28
Surveyor (position) As shown in Appendix 1		Natalie Evans - Natural England Bat Licence Number: 2015-11257-CLS-CLS (Position 1 – observing the south and west elevation and roof structure of B1) Jonathan Kewell – two years survey experience (Position 2 – observing the east elevation and roof structure of B1)
Building Reference	Surveyor Position	Notes/observations:
B1	1	A pipistrelle-type dropping was noted on the external bay window below the hanging tiles. A noctule <i>Nyctalus noctula</i> was heard at 20:42, then seen travelling north west to south east towards the railway line at 20:43. No other bat activity was recorded.
B1	2	From 20:41 until 21:21 there was constant activity from common pipistrelles <i>Pipistrellus pipistrellus</i> commuting north to south along the railway line and adjacent gardens. Approx. 87 bats were counted. Anecdotal evidence suggests that there is a significant roosting site under an old railway bridge to the north of the site so bats may have emerged from there.

Table 3: Survey results – Dawn Re-entry Survey

Date		17/05/17
Start and End Times		03:10 – 05:25 Sunrise: 05:10
Surveyor (position) As shown in Appendix 1		Toby Bowman – three years survey experience (Position 1 – observing the south and west elevation and roof structure of B1) Joseph Slade – three years survey experience (Position 2 – observing the east elevation and roof structure of B1)
Building Reference	Surveyor Position	Notes/observations:
B1	1	Soprano pipistrelle <i>Pipistrellus pygmaeus</i> passed unseen at 04:07. <i>Soprano pipistrelle re-entry into the hanging tiles lower down on the front bay window at 04:45.</i> See photograph below for location. 
B1	2	Regular common and soprano pipistrelle passes commuting along the railway line to the east from 03:55. A noctule passed in the distance at 05:00.

Table 4: Survey results – Dusk Emergence Survey

Date		10/06/17
Start and End Times		21:00 – 23:00 Sunset: 21:17
Surveyor (position) As shown in Appendix 1		Natalie Evans - Natural England Bat Licence Number: 2015-11257-CLS-CLS (Position 1 – observing the south and west elevation and roof structure of B1) Jonathan Kewell – two years survey experience (Position 2 – observing the east elevation and roof structure of B1)
Building Reference	Surveyor Position	Notes/observations:
B1	1	Internal inspection of the loft prior to the start of the survey showed recent bat droppings indicating the loft is still in use. The low number of droppings suggests the loft is still used on an occasional basis by a single brown long-eared bat (confirmed by DNA analysis). Three pipistrelle bat droppings were found externally on the ground floor bay window beneath the hanging tiles indicating recent use of the hanging tiles as a roost by the soprano pipistrelle. A soprano pipistrelle passed unseen at 21:37. Noctules passed high overhead west to east at 21:39 and then feeding overhead from 21:43 until 21:45 before heading east.
B1	2	A soprano pipistrelle passed unseen at 21:36. Noctule passed unseen at 21:41. Two soprano pipistrelles constant feeding and passing around the railway line to the east from 21:41 until 22:05 when one departed and the other continued to pass regularly. Noctule pass unseen at 21:43. Brown long-eared <i>Plecotus auritus</i> passes around the railway line to the east at 22:10, 22:11 and 22:16.

4.0 Conclusions, Impacts and Recommendations

4.1 Informative guidelines

The surveys undertaken to date in and around B1 provide sufficient information to inform a European Protected Species Mitigation Licence (EPSML). An EPSML will be required to enable the proposed works to be lawfully undertaken, whilst ensuring the favourable conservation status of the species concerned in their natural range; detailed mitigation will be described in the EPSML Method Statement.

Natural England's European Protected Species Guidance: How to get a licence states:

"In order to obtain a licence to allow for the capture of EPS, damage or destruction of breeding sites, etc., in advance of any otherwise legitimate activity which may impact on the favourable conservation status of the EPS concerned, you ... must demonstrate that the damage will be adequately compensated for to satisfy Regulation 53(9)(b)"..... "Current Natural England advice is that there should be no net loss in the local population status of the species concerned, taking into account factors such as population size, viability and connectivity. Hence, when it is unavoidable that an activity will affect an EPS population, the mitigation should aim to maintain a population of equivalent status on or near the original site."

Appropriate justification for this assessment is provided in Section 3 and Tables 1 and 2 of this report.

4.2 Evaluation

Taking the desk based assessment and site survey results into account, the following recommendations are reached for each site survey feature.

Table 5: Evaluation of buildings on site

Ref	Survey assessment conclusions (Type of bat roost present)	Foreseen impacts	Recommendations / Mitigation	Enhancements The Local Planning Authority has a duty to ask for enhancements under the NPPF and circular 06/2005: Biodiversity and Geological Conservation. Para.99
B1/	Occasional day roost of brown long-eared and soprano pipistrelle bats.	As the proposed development involves building into the roof structures to extend to the south and east, the brown long-eared roost in the loft will be modified and disturbed. There will be disturbance of the soprano pipistrelle roost in the hanging tiles on the bay window. Any bats present during the works could be injured or killed.	EPSML will be required once planning has been granted. Mitigation required under EPSML: - Bat boxes erected on site prior to commencement of works. These will include the following: 2F Schwegler Bat Box 1FF Schwegler Bat Box Bat boxes should be positioned 3-5m above ground level facing in a south/south-westerly direction with a clear flight path to and from the entrance. The boxes can be erected on trees in the rear garden. - Pre-works inspection of the loft space immediately prior to the commencement of works. - Destructive search via soft stripping by hand under ecological supervision of the roof structure. - Any bats located during the pre-works inspection and destructive search will be carefully captured by hand and transported to an appropriate bat box by the License Named Ecologist or their Accredited Agent.	The mitigation/compensation detailed for the EPSML provides sufficient enhancements of the developed site for bats.

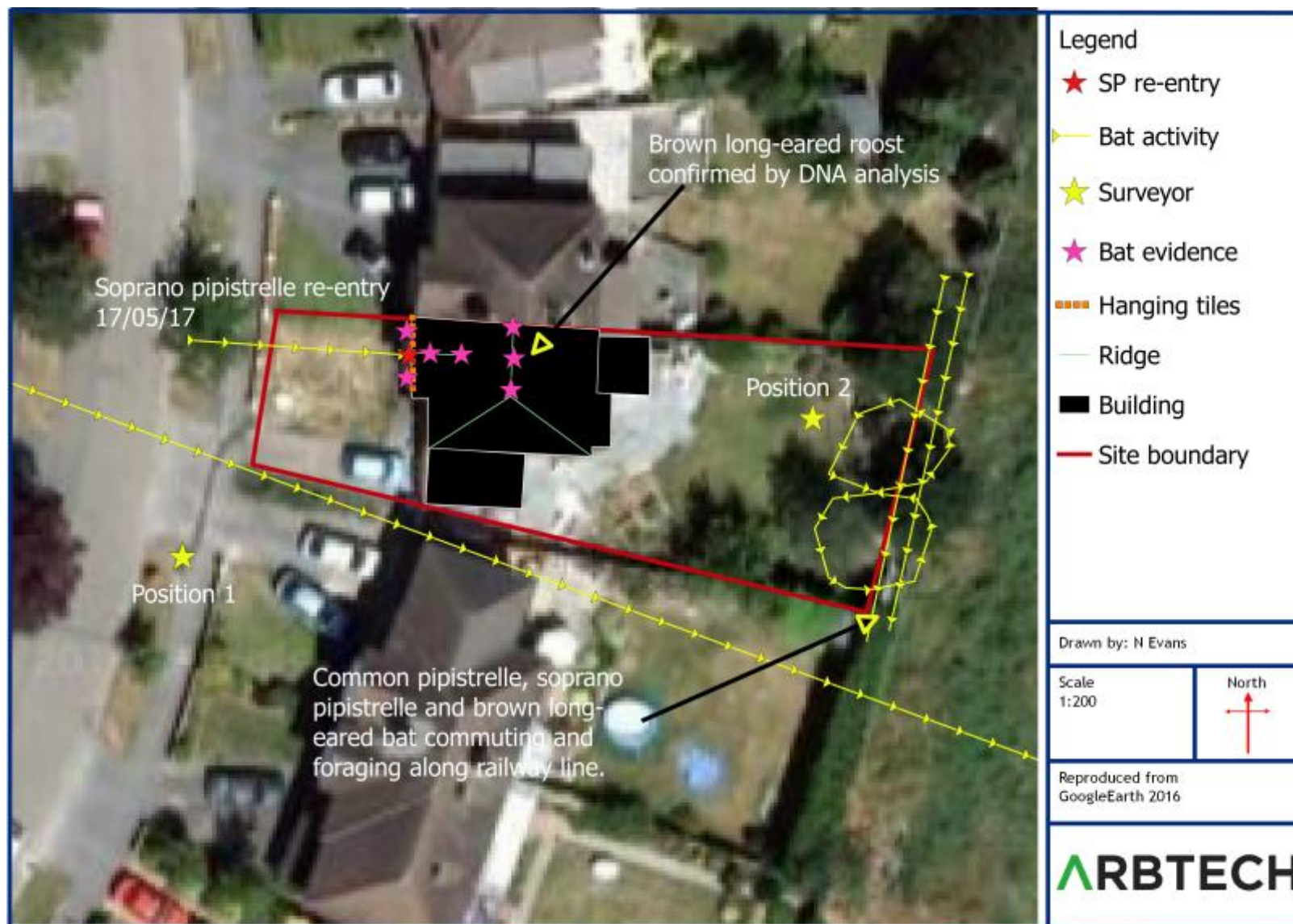
			• The access points into the loft will be retained and the loft can continue to be used by the brown long-eared bat. There will be no loss of roost therefore no permanent roosting provisions will need to be provided. • The roof will be lined with Type 1F Felt lining only. Scientific research has shown that Breathable Roof Membranes (BRMs) are harmful to bats with bats becoming entangled in loose fibres resulting in the death of bats. BRMs used in bat roosts can quickly become shredded by the bats claws resulting in a reduced lifespan of the product. There are currently no bat friendly BRM products on the market. For more information visit www.batsandbrms.co.uk. • Lighting will be controlled across the developed site. Research into the effects of artificial lighting on bats has shown that it can impact upon bat emergence times and lead to a reduced foraging time (particularly for the light sensitive Brown long-eared bat). As bats are faithful to their roost sites, often returning to the same site for many years, the impact of lighting on emergence times and in turn reduced foraging times can ultimately result in the roosts being abandoned. • Key areas of the site which are sensitive to artificial lighting are the eastern boundary with the railway line where bats are commuting and foraging. • The lighting on the developed site will be limited to the extended dwelling only. No lighting will be installed within the garden area, thereby maintaining the existing dark areas within the developed site for bats. • Low impact lighting strategies will be adopted from the guidance outlined in the Bat Conservation Trust “Bats and Lighting” publications: http://www.bats.org.uk/pages/bats_and_lighting.html • The lighting on the site will: - Use narrow spectrum light sources to lower the range of species affected by lighting	
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			- Use light sources that emit minimal ultra-violet light - Avoid white and blue wavelengths of the light spectrum to reduce insect attraction and where white light sources are required in order to manage the blue short wave length content they should be of a warm / neutral colour temperature <4,200 kelvin. - Not use bare bulbs and any light pointing upwards. The spread of light will be kept in line with or below the horizontal. • Light spill will be reduced via the use of low level lighting used in conjunction with hoods, cowls, louvers and shields. Lights will also be directional to ensure that light is directed to the intended areas only. • External lighting will be positioned below the eaves, be on PIR sensors that are sensitive to large objects only (so that they are not triggered by passing bats), and will be set to the shortest time duration to reduce the amount of time the lights are on. • Wall lights and security lights will be 'dimmable' and set to the lowest light intensity settings. There are several products on the market that allow the control of the light intensity and the duration that the lights are on. All lighting on the developed site will make use of the most up to date technology available. All of the above will ensure that the bat roosts and bat boxes within the developed site will not be affected by any external lighting ensuring their long term use.	
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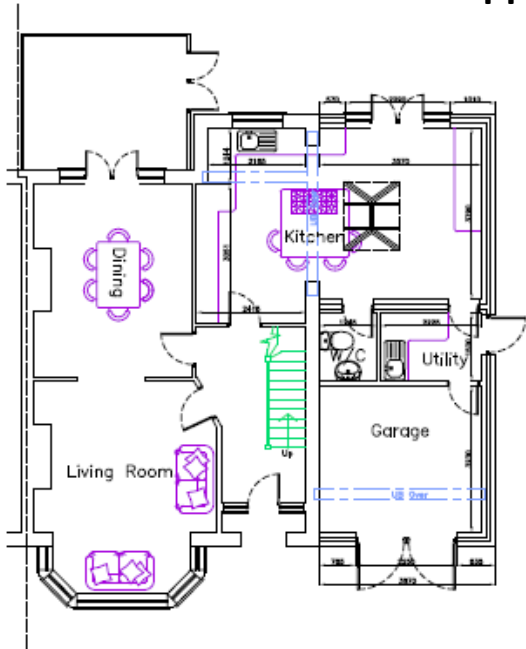
5.0 Bibliography

- Collins, J. (ed.) (2012). Bat Surveys for Professional Ecologists —Good Practice Guidelines, 3rd edition, Bat Conservation Trust, London.
- Garland & Markham (2008) Is important bat foraging and commuting habitat legally protected?
- Mitchell-Jones, A.J. (2004). Bat Mitigation Guidelines. English Nature, Peterborough.

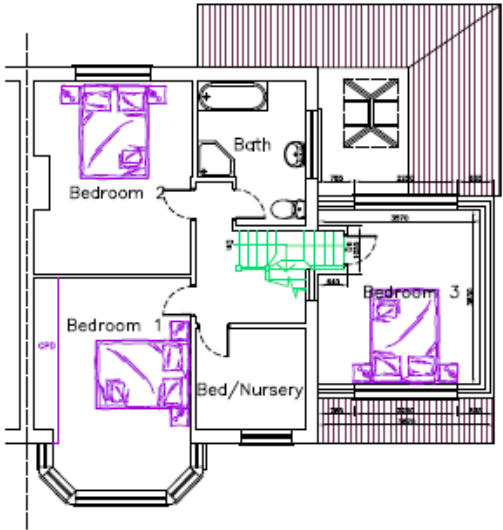
Appendix 1: Survey Plan



Appendix 2: Proposed Site Plan



Proposed Ground Floor



Proposed First Floor



Appendix 3: Legislation and Planning Policy related to bats

LEGAL PROTECTION

All species of bat are fully protected under The Conservation of Habitats and Species Regulations 2010 (as amended) through their inclusion on Schedule 2.

Regulation 41 prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species (e.g. all bats)
- Deliberate disturbance of bat species as:
 - a) to impair their ability:
 - (i) to survive, breed, or reproduce, or to rear or nurture young
 - (ii) to hibernate or migrate
 - b) to affect significantly the local distribution or abundance of the species
- Damage or destruction of a breeding site or resting place

Bats are also protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5. Under this Act, they are additionally protected from:

- Intentional or reckless disturbance (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection
- Selling, offering or exposing for sale, possession or transporting for purpose of sale

Effect on development works:

A European Protected Species Mitigation (EPSM) Licence issued by the relevant statutory authority (e.g. Natural England) will be required for works likely to affect a bat roost or for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate). The licence is to allow derogation from the relevant legislation but also to enable appropriate mitigation measures to be put in place and their efficiency/success to be monitored.

The legislation may also be interpreted such that, in certain circumstances, important foraging areas and/or commuting routes can be regarded as being afforded *de facto* protection, for example, where it can be proven that the continued usage of such areas is crucial to maintaining the integrity and long-term viability of a bat roost (Garland & Markham, 2008)

NATIONAL PLANNING POLICY (ENGLAND)

National Planning Policy Framework

The National Planning Policy Framework promotes sustainable development. The Framework specifies the need for protection of designated sites and priority habitats and species. An emphasis is also made on the need for ecological infrastructure through protection, restoration and re-creation. The protection and recovery of priority species (considered likely to be those listed as UK Biodiversity Action Plan priority species) is also listed as a requirement of planning policy.

In determining a planning application, planning authorities should aim to conserve and enhance biodiversity by ensuring that: designated sites are protected from harm; there is appropriate mitigation or compensation where significant harm cannot be avoided; opportunities to incorporate biodiversity in and around developments are encouraged; and planning permission is refused for development resulting in the loss or deterioration of irreplaceable habitats including aged or veteran trees and also ancient woodland.

The Natural Environment and Rural Communities Act 2006 and the Biodiversity Duty

Section 40 of the Natural Environment and Rural Communities (NERC) Act, 2006, requires all public bodies to have regard to biodiversity conservation when carrying out their functions. This is commonly referred to as the 'biodiversity duty'.

Section 41 of the Act (Section 42 in Wales) requires the Secretary of State to publish a list of habitats and species which are of 'principal importance for the conservation of biodiversity.' This list is intended to assist decision makers such as public bodies in implementing their duty under Section 40 of the Act. Under the Act these habitats and species are regarded as a material consideration in determining planning applications. A developer must show that their protection has been adequately addressed within a development proposal.

Appendix 4: DNA Results



8 June 2017

Re: Bat Identification Results for Natalie Evans, Arbtech Consulting Ltd

Bat job number 9601, received 26 May 2017

Sample labelled: 17 Kenilworth Avenue

PCR amplification successful. DNA sequence:

ATGACCAACATTGAAAGTCCCACCCTCTCATAAAAATTATCAATGACTCATTATTG
ACTTACCTGCTCCCTCAAATATTTTCATCATGATGAACTTTGGATCTCTTCTAGGCA

Phylogenetic analysis identification: *Plecotus auritus*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

Professor Robin Allaby

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