

**Transect Activity Survey for Bats**

**Wingerworth, Chesterfield**

**June 2014**

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## Notice to Readers

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## Executive Summary

Absolute Ecology was commissioned to undertake a transect survey for bats to identify any important commuting or foraging routes at the site known as land off Derby Road, Wingerworth, Chesterfield, Derbyshire.

Three transect surveys were undertaken on the site between April and June, during which a low amount of activity was recorded. The majority of the activity was located along the western boundary hedgerow, where Common Pipistrelle, Soprano Pipistrelle and Brown Long-eared bats were identified commuting and foraging in low numbers. The site was found to provide low activity but, given the location, did provide optimal habitat.

A number of mitigation and habitat enhancements have been recommended in the form of lighting, hedgerow enhancements and tree planting: see section 5 'Recommendations and Mitigation'.

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## 1. Introduction

### 1.1. Site Description

Absolute Ecology was commissioned to undertake a transect survey for bats to identify any important commuting or foraging routes at a site known as land off Derby Road, Wingerworth, Chesterfield, Derbyshire.

### 1.2. Proposed Works

It is proposed that the site will be used for a residential development.

### 1.3. Best Practice Guidance

The scope of this survey has been determined in line with the proportional approach to ecological survey, assessment and subsequent recommendations for avoidance and mitigation of impacts, which is encouraged in the emerging 'BS 42020: Biodiversity – Code of practice for planning and development'. This report has been prepared with due consideration for various best-practice guidance and methodologies including those of the Chartered Institute of Ecology and Environmental Management (CIEEM, 2012), the emerging BS 42020, and the Bat Conservation Trust Best Practice Guidelines (Hundt, 2012).

### 1.4. Aims of the Survey

1.4.1 The aim of the transect surveys was to provide an ecological evaluation of the following species within the proposed application area:

**Table 1.** Aims of survey in relation to bats

Bats
<ul style="list-style-type: none"><li>Likely presence of important flight corridors, swarming locations and foraging habitats</li></ul>
<ul style="list-style-type: none"><li>General level of bat activity associated with the site</li></ul>
<ul style="list-style-type: none"><li>Which type of mitigation measures would need to be employed</li></ul>

1.4.2 Assessment also considers potential effects on valued ecological receptors (VERs) and zones of influence (Zol) during pre- and post-development, both onsite and offsite. The term Zone of Influence is used to describe the geographic extent of potential impacts of a proposed development. Should a likely significance of negative impacts be identified, further surveys, mitigation and enhancement measures will then be determined accordingly to prevent, offset or reduce the degree of impact that may occur should development commence.

## 2. Methods

### 2.1. Summary of Survey Methods

The aim of the transect survey is to obtain information on bat species using the habitats along the transect route, and to identify commuting routes and foraging areas used by these species along the proposed development. The transect route incorporated potential foraging and commuting routes such as adjacent woodland edge, hedgerows and field margins, which are features known to be important habitats for bats.

Two surveyors walked a transect around the fields alongside the hedgerows, stopping at pre-determined 'listening points' selected in order to sample each hedgerow and woodland boundary within the site. At each listening point, the surveyors recorded all bat passes for 10 to 15 minutes to allow comparison of activity across the site. Between listening points, surveyors recorded any other bats heard or seen as they walked the transect.

The activity survey was performed in accordance with the guidelines published by the Bat Conservation Trust guidelines (Hundt, 2012) for carrying out dusk and dawn activity surveys, in order to:

- Determine the presence/absence of species, i.e. the species present in a given area
- Determine the intensity of bat activity both spatially and temporally
- Determine the type of activity, most usually foraging (by feeding buzzes), commuting (by high directional pass rates), or mating (by mating social calls)
- Find roosts by tracking back bat flight paths or observing dawn flight activity at roosts.

Two surveyors walked the transect route, noting any observations of bats or bat calls detected, including the species, location and activity (e.g. foraging, commuting, emerging or entering a roost) and the time the bat was recorded. Bat ultrasound data was gathered using a number of heterodyne (Batbox Duet) and real-time recording devices (Wildlife Acoustics Echo Meter EM3, Pettersson Tranquillity Detector). Real-time recordings were subsequently analysed using Bat Explorer. Further equipment included a NVMT-1 2x24 night vision scope (Yukon: USA), a GPS eTrex Venture HC, hand-net, and a CB2 Clubman Deluxe high-power lamp with filter.

### Nomenclature

The English name only of flora and fauna species is given in the main text of this report; however, scientific names are used for invertebrates where no English name is available. A list of all species recorded on site and those mentioned in the text but not necessarily occurring on site together with scientific names is given in *Appendix 1*. Vascular plants and Charophytes follow the nomenclature of The Botanical Society for the British Isles (BSBI) 2007 database (BSBI, 2008), with all other flora and fauna following the Nameserver facility of the National

Biodiversity Network Species Dictionary (<http://www.nhm.ac.uk/nbn/>), which is managed by the Natural History Museum.

## **2.2. Pre-Survey Data Search**

Ecological data searches supplied by Derbyshire Biological Record Centre (DBRC) were acquired to establish whether any notable protected bat or bird species have been recorded within a 2 km radius of the proposed development area. Furthermore, a desktop study of the area using online resources was undertaken independently to corroborate the current overview of the site and its importance in the landscape. A number of electronic sources were consulted, including [www.magic.gov.uk](http://www.magic.gov.uk), [www.naturalengland.org.uk](http://www.naturalengland.org.uk) and Google Earth.

## **2.3. Surveyor Information**

### **Surveyor 1**

Matthew Haydock – HND, ND, MIEEM, Natural England Bat Survey Class Licence CL18, Registration Number CLS01637. Matthew is an ecologist with four years' experience of environmental consultancy work. He holds a HND in Environmental Management with distinction. Matthew is an experienced bat surveyor with competency in activity surveys, dawn and dusk bat roost assessments, daytime surveys for bat field signs, assessments of trees as potential bat roosts and the production of reports providing advice on best practice, mitigation and compensation works relating to bats as may be required. Matthew holds a Natural England and Countryside Council for Wales licence, since 1997, to disturb bats for the purposes of science and education or conservation and has held Development Licences to permit development works affecting bats. Matthew has been an active bat group worker with the Staffordshire Bat Group since 1997, conducting various surveys throughout Staffordshire and Derbyshire. He also works alongside the Bat Conservation Trust with various projects such as the National Bat Monitoring Project, and is now a corporate member of the Bat Conservation Trust.

### **Surveyor 2**

Lucy Ashley has been assisting Absolute Ecology for nearly two years as a bat surveyor. She has gained competency in activity surveys, dawn and dusk bat roost assessments, daytime surveys for bat field signs, assessments of trees as potential bat roosts and the production of reports providing advice on best practice, mitigation and compensation works relating to bats as may be required.

## **2.4 Field Surveys**

### **2.4.1. Habitat Survey**

In 2013 a Preliminary Ecological Appraisal was conducted, which identified the following habitats: a large arable field with a species-poor gappy hedgerow, fencing boundaries and individual trees.

### **2.4.2. Transect Activity Surveys**

Bat ultrasound data was gathered using a number of heterodyne (Batbox Duet and SSF Bat2) and real-time recording devices (Wildlife Acoustics Echo Meter EM3, Elekon Batlogger). Real-time recordings were subsequently analysed using Bat Explorer software.

### 3. Results

#### 3.1. Pre-Survey Data Search

##### 3.1.1. Designated Sites

There are no designated sites within 2 km of the site.

##### 3.1.2. Protected Species.

Seven British bat species are currently given UK BAP (2007) Priority Species Status: eleven of the seventeen resident UK bat species occur in Derbyshire. Derbyshire Biological Records show two UK BAP species recorded within 2 km of the proposed application area.

**Table 2.** UKBAP bat species recorded within Derbyshire

UKBAP	Common name	Species	Within 2 km
<input checked="" type="checkbox"/>	Brown Long-eared bat	<i>Plecotus auritus</i>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Barbastelle bat	<i>Barbastella barbastellus</i>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Bechstein's bat	<i>Myotis bechsteinii</i>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Noctule	<i>Nyctalus noctula</i>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Greater Horseshoe bat	<i>Rhinolophus ferrumequinum</i>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Lesser Horseshoe bat	<i>Rhinolophus hipposideros</i>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	<input type="checkbox"/>
<input type="checkbox"/>	Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	<input checked="" type="checkbox"/>

#### 3.2. Field Surveys

##### 3.2.1. Habitat Description

The site comprises a large arable field with species-poor gappy hedgerow and fencing boundaries. The residential estates of Wingerworth lie immediately to the north and the remaining landscape comprises mixed agricultural fields, woodland and a pond.



**Figure 1.** Location map: aerial photograph of site (yellow pin)

### 3.2.2. Transect Activity Surveys

The site and surroundings provide potential foraging habitat for a number of bat species. The adjacent woodland and gardens could be used by foraging bats. The surrounding landscape comprises residential buildings and gardens and is likely to support a large number of bats, although hedgerows and residential gardens are all potential feeding and commuting areas for bats.

At least three species of bat were recorded during the activity surveys, with the highest levels of activity concentrated along the hedgerows and tree lines along the western site boundary. The relative abundance and relevant activity observations for these species are summarised below in Tables 4

## Activity Surveys

**Table 3.** Environmental variables

Environmental Variable	Dusk emergent	Dusk emergent	Dawn re-entry
Temp Start	9.3°C	10.4°C	9.8°C
Temp Finish	7.6 °C	9.6°C	10.2°C
Humidity Start	90%	87%	87%
Humidity Finish	85%	92%	87%
Cloud Cover Start	50%	60%	50%
Cloud Cover Finish	50%	60%	50%
Wind Speed Average	2 mph	4 mph	2 mph
Precipitation	Dry	Dry	Dry

## Activity survey results summary

**All surveys were conducted 15 minutes before dawn/dusk and 2+ hours after.**

**Table 4.** Dusk activity survey 8<sup>th</sup> April 2014 (see Appendix 1)

Sunset: 20:01

Target Note	Time	Species / Numbers	Behaviour	Notes
3	20:55	Common Pipistrelle	Commuting	Short pass
3	20:57	Common Pipistrelle	Commuting	Short pass
3	21:01	Soprano Pipistrelle	Commuting	Very short pass
4	21:25	Brown Long-eared	Commuting	Short pass
4	21:28	Common Pipistrelle	Commuting/foraging	Short pass
5	21:36	Brown Long-eared	Foraging	Short pass

**Table 5.** Dusk activity survey 8<sup>th</sup> May 2014 (see Appendix 1)

Sunset: 20:21

Target Note	Time	Species / Numbers	Behaviour	Notes
2	21:27	Pipistrelle Common	Commuting	Short pass
2	21:32	Soprano Pipistrelle	Commuting	Short pass
3	21:38	Pipistrelle Common	Commuting	Short pass
3	21:42	Pipistrelle Common	Commuting	Short pass
3	21:55	Pipistrelle Common	Commuting & foraging	Short pass
3	21:57	Pipistrelle Common	Commuting	Short pass
3	21:58	Brown Long-eared	Commuting	Short pass
3	21:59	Soprano Pipistrelle	Commuting & foraging	Short pass
4	22:06	Soprano Pipistrelle	Commuting	Short pass
4	22:21	Soprano Pipistrelle	Commuting & foraging	Short pass
4	21:23	Pipistrelle Common	Commuting & foraging	Short pass
5	22:25	Soprano Pipistrelle	Commuting	Short pass
5	22:27	Brown Long-eared	Commuting	Short pass
5	22:48	Soprano Pipistrelle	Commuting	Short pass

**Table 6.** Dawn activity survey 7<sup>th</sup> June 2014 (see Appendix 1)

Sunrise: 04:40

Target Note	Time	Species / Numbers	Behaviour	Notes
3	04:45	Soprano Pipistrelle	Commuting	Short Pass
3	04:47	Common Pipistrelle	Commuting	Very short pass
5	05:23	Soprano Pipistrelle	Commuting	Short Pass
5	05:27	Soprano Pipistrelle	Commuting	Short Pass

*\*N.B. Pipistrelle species noted when bat is echolocating between 48 KhZ and 52 KhZ, which is the frequency that Common Pipistrelles and Soprano Pipistrelles overlap and cannot always be distinguished.*

## **4. Assessment**

### **4.1. Constraints on Survey Information**

No constraints were identified during the transect surveys.

### **4.2. Constraints on Equipment Used**

No constraints were identified during the transect surveys.

### **4.3. Potential Impacts of Development**

#### **4.3.1. Designated Sites**

There are no designated sites adjacent to the site or within a 2 km radius, and therefore no impacts would occur.

#### **4.3.2. Foraging and Commuting Habitat**

The site is to be cleared to make way for a residential housing development. The majority of boundary features will be retained, although the hedgerow will possibly be breached to create an access road. Artificial lighting will also be incorporated across the site. The following potential impacts have therefore been identified: disturbance, via lighting, to suitable foraging and commuting habitats comprising tree lines and hedgerows around the site boundary and which are of ecological importance within the immediate Zone of Influence for Brown Long-eared bats. (Pipistrelle species tend to be more light-tolerant, hence lighting disturbance would not have such an impact).

### **4.4. Legislation and Policy Guidance**

Unlike many smaller mammals, bats have low fecundity with a long and complex life cycle, which is played out over a large spatial landscape. Bats show a strong fidelity to different types of roosts throughout their annual cycle i.e. hibernacula, maternity, bachelor, satellite roosts and feeding perches. Linear features within the landscape such as hedgerows and tree lines are often used by bats for commuting, predator avoidance and foraging. Bats are highly social animals and loss of a single habitat alone can have a serious impact on populations. The status of many bat populations is tentative, being based on relatively few records and are highly susceptible to habitat loss and fragmentation. As such bats are given protected consideration within the following legislation and policy guidelines:

**Policy guidelines**

<b>PAS 2010</b>	The published 'PAS 2010' 'Planning to halt the loss of biodiversity' which is the government's new policy aimed at all authorities and developers involved in the planning process in the UK to halt biodiversity decline by 2010 and deliver net biodiversity gains as part of the green infrastructure provisions.
<b>National Planning Policy Framework, Section 11:</b>	The recently published framework in 2012, replaces the previous Planning Policy Statement 9. Section 11: Conserving and enhancing the natural environment, reaffirms the Governments commitment to maintaining green belt protections and preventing urban sprawl, retains the protection of designated sites and preserves wildlife, aims to improve the quality of the natural environment, and halt declines in species and habitats, protects and enhances biodiversity and promotes wildlife corridors.
<b>Article 10 of the EC Habitats Directive:</b>	The published Article requires government to develop features such as 'stepping stones' on the landscape, such as clusters of ponds, tracts of rough grassland or scrubland and vegetated railway line embankments.
<b>Wildlife and Countryside Act 1981:</b>	All species of bat are fully protected under the Wildlife and Countryside Act 1981, the European Conservation (Natural Habitats etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000. This legislation makes it illegal to possess or control any live or dead specimens, to damage, destroy or obstruct access to any structure or place used for shelter, protection or breeding, and to intentionally disturb a bat while it is occupying a structure or place which it uses for that purpose.
<b>Conservation of Habitats and Species Regulations (2010)</b>	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) licences in respect of development to permit activities that would otherwise be unlawful.
<b>Natural Environment and Rural Communities Act (2006)</b>	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. Regional Planning Bodies and Local Planning Authorities will use it to identify the species that should be afforded priority to maintain, restore and enhance species and habitats.
<b>Bird legislation</b>	Most resident nesting birds are protected under the Wildlife and Countryside Act 1981, which protects birds, nests, eggs and nestling's. Some rarer species, such as barn owls, are afforded extra protection.

**Please note:** If bat species are present at the site, the purpose of this report will only summarize the potential requirements for a bat mitigation package or project. A separate mitigation report or project will include the necessary compensation measures to maintain the conservation status of a European Protected Species.



## 5. Recommendations and Mitigation

### 5.1. Further Surveys

As sufficient information has been recorded and analysed it would not be required to carry out further surveys, though if planning is delayed by two years, further surveys would be required.

### 5.2. Mitigation Measures

#### 5.2.1 Proposed Mitigation for Foraging and Commuting Habitat

Any landscaping relating to the proposed development should also take into consideration bats and other wildlife and it is recommended that the creation or enhancing of existing hedgerows, using only native tree and shrub species, is implemented, particularly along the hedgerow to the west which is gappy and where most of the bat activity was identified. In particular, no plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 should be planted during the landscaping of this development. For further details of Schedule 9 plants, visit the Defra website: [www.defra.gov.uk/wildlife-pets/non-native](http://www.defra.gov.uk/wildlife-pets/non-native). Standing trees should be retained where possible, and any new planting should contain native species of trees.

**Table 8.** List of native tree species

	Species	Planting Time
Native Tree Species	Ash ( <i>Fraxinus excelsior</i> )	January/February
	Aspen ( <i>Populus tremula</i> )	January/February
	Field maple ( <i>Acer campestre</i> )	January/February
	Bird Cherry ( <i>Prunus padus</i> )	January/February
	English Elm ( <i>Ulmus minor</i> var <i>vulgaris</i> )	January/February
	Oak ( <i>Quercus robur</i> )	January/February

Smaller scale plantings that will be included within the landscape planting design should endeavour to resemble niche habitats. For example, native ferns and other plants that thrive in low light (e.g. Ivy, Holly, and a variety of grasses and mosses) can be used. Species should be chosen according to moisture and sunlight availability, but also with regard to their wildlife value. Many grasses will offer cover and breeding places for invertebrates as well as food for some birds. More open but sheltered areas around the Wingerworth site are particularly suitable for colourful plants that thrive in full sun. These can function as bee and butterfly gardens, supplying a rich source of nectar from spring to autumn. Shrubs such as Buddleia, Broom *Cytisus scoparius*, Lavender *Lavendula* sp. and Gorse *Ulex europaeus*, and herbs such as Willowherb *Epilobium* sp., Michaelmas Daisy *Aster* sp., Soapwort, Mullein *Verbascum* sp. and Thyme *Thymus vulgaris* all enjoy a sunny position and provide significant nectaring resources for invertebrates.

The use of climbing plants to enhance the design and aesthetic elements is generally an accepted practice. The process of allowing and encouraging plants to grow on and up walls

allows the natural environment to be extended within the site. From an ecological perspective, green walls will provide resting and feeding places for birds, invertebrates and small mammals. Climbers provide nesting habitats for birds such as Wrens, Blackbirds, Song Thrushes and House Sparrows. Species such as Cotoneaster, Ivy, Climbing Roses and Honeysuckles are all important fruit resources for birds. Equally, climbing plants such as Virginia Creeper and Ivy form important habitats for invertebrates. Although native species are more likely to attract wildlife, some exotic species are also effective in this respect. Within the site grounds it may be more productive to use a combination of native and exotic species to maximise the range of annual and perennial, deciduous and evergreen foliage, and flowering, climbing and creeping species. This latter plant type provides a selection of plants suitable for green walls. The aspect of a climbing plant on a wall can have significant ancillary effects, such as insulation and moisture retention. For example, north-facing walls are more suitable for supporting native herbs and a wider range of plants. This is due to the higher moisture regime.

## Bat Boxes

The development will incorporate a total of twelve bat boxes: where possible, developments should include small access points suitable for bat access and/or wall-mounted bat boxes ('1FQ' style bat boxes), positioned onto the new housing. Further information about providing access for roosting bats can be found on the Bat Conservation Trust website at [http://www.bats.org.uk/pages/new\\_build.html](http://www.bats.org.uk/pages/new_build.html). It is recommended that bat boxes, such as the Schwegler 1WQ, are installed onto a selection of housing in a south-facing position, with six Schwegler 2F boxes attached to existing mature trees within the woodland. The installed bat boxes will be sited at least 7–8 metres above the ground.

- Six Schwegler 1WQ bat boxes will be installed to provide summer and hibernation opportunities, and six Schwegler 2F bat boxes will be installed for regular and mixed use.
- Boxes will not be placed in an overly exposed position on the new builds. Crucially, the box entrances should face south-west to south-east.
- Checks for droppings or observations at dusk during the summer for emerging bats will indicate if they are being used.
- If a box is not used after two years, it will be relocated to an alternative situation.
- Once discovered, a bat roost is protected by law and must not be disturbed.
- It is envisaged that bat box monitoring should be undertaken by the site owners who will require a licensed bat worker to inspect the boxes in order to conform with current guidance and legislation.

**Table 8.** Bat boxes to be incorporated into the Wingerworth development

Bat boxes	Type and Quantity	Location
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	<b>6 x 1FQ Bat Box</b>	The 1 FQ Bat Roost is ideal for all types of bats that inhabit buildings. Its shape and design make it equally attractive to bats as a roost or nursery, and it is also very attractive to the human eye, which is an important consideration.
	<b>6 x 2F Bat Box</b>	This can be hung from a tree branch near the trunk, or fixed to a trunk. The 2F is the most popular general purpose box, and is particularly attractive to the smaller British bats. It has a simple design with a narrow entrance slit on the front.

Any lighting design around the new development should be considered at an early stage. Light spill can affect the foraging and commuting strategy of many species and should be avoided onto nearby trees and hedges/shrubs, and should not exceed 200 lumens (150 watts). Any security lighting should be on a timer setting and faced down to prevent spillage onto nearby habitats. The height of any lighting columns around the development should not exceed eight metres to reduce further any ecological impact of light pollution. Low-pressure sodium lamps (SOX) fitted with hoods are recommended to direct light below the horizontal plane to minimise upward light spill.

## 6. Summary

Three transect surveys were conducted on the site between April and June, during which a low amount of activity was recorded. The majority of activity was located along the western boundary hedgerow, and Common Pipistrelle, Soprano Pipistrelle and Brown Long-eared bats were identified commuting and foraging in low numbers. The site was found to provide low activity but, given the location, provided optimal habitat. It is considered that by creating habitat within the landscaping design by incorporating native plants and trees that are attractive to insects, enhancing the hedgerows and implementing the lighting plan, the site could be made more favourable towards commuting and foraging bats.

## 7. References

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## Appendix 1 Bat Transect routes



April 8<sup>th</sup> 2014:  
Dusk Transect

# Transect Activity Survey for Bats



May 8<sup>th</sup> 2014: Dusk Transect

# Transect Activity Survey for Bats



June 7<sup>th</sup> 2014: Dawn Transect

## Appendix 2 Photographs



Plate 1: listening points 1–2 on eastern boundary