

# Bat and Bird Survey of Barn at Montrose, Henton, Somerset

Client Mr K Armstrong

Reference Y1101.003

Issue 3

Date 21 June 2023



**Crossman Associates**

Ecological Consultants  
Fire Engine House  
Oakhill, Bath BA3 5BJ  
01761 233414  
info@crossmanassociates.co.uk

[www.crossmanassociates.com](http://www.crossmanassociates.com)

# Non-technical Summary

## Background

Crossman Associates was commissioned by Mr and Mrs Armstrong to undertake a bat and bird survey of a barn at Montrose, Henton, Somerset.

Development proposals involve the conversion of the property into a residential dwelling.

## Methodology

The scoping survey was undertaken by Fairbrass Knowles, a fully licensed bat worker and experienced ecologist. The building was inspected both externally and internally for any evidence of bat / bird presence, such as droppings, food remains, staining or actual bats / birds.

Dawn re-entry surveys were undertaken in 2016, 2019 and 2023.

## Results

The barn possesses a range of abiotic bat roosting opportunities and is situated within a very rural location with adjacent features considered favourable for bats. The building is considered to possess low suitability for roosting bats.

Three dawn re-entry surveys undertaken in 2016, 2019 and 2023 confirms the likely absence of a bat roost.

## Recommendations

It is recommended that the following be undertaken as part of the development;

- A precautionary approach to development in relation to bats and birds
- Ecological enhancements to include bat and bird boxes.

# Contents

---

<b>NON-TECHNICAL SUMMARY</b>	<b>1</b>
<b>1. BACKGROUND</b>	<b>3</b>
SITE DESCRIPTION	3
LEGISLATION	4
<b>2. METHODOLOGY</b>	<b>5</b>
DESKTOP STUDY	5
<b>3. RESULTS</b>	<b>7</b>
DESKTOP STUDY	7
FIELD SURVEY	7
EVALUATION	17
<b>4. RECOMMENDATIONS</b>	<b>18</b>
BATS	18
SPECIES RECOMMENDATIONS	18
LANDSCAPE RECOMMENDATIONS	16
ECOLOGICAL ENHANCEMENTS (OPTIONAL)	19
<b>5. LIMITATIONS</b>	<b>22</b>
<b>6. REFERENCES</b>	<b>23</b>

# 1. Background

---

- 1.1. Crossman Associates was commissioned by Mr and Mrs Armstrong to undertake a bat and bird survey of a barn at Montrose, Henton, Somerset.
- 1.2. An initial survey was undertaken in 2016 and update surveys were undertaken in 2019 and 2023.
- 1.3. The objectives of the survey were to:
  - Make an assessment of the likely presence or absence of bats and birds
  - Identify any legislative or planning policy constraints relevant to the site
  - Determine the need for further surveys, compensation or mitigation

## Site Description

- 1.4. The building consists of a small stone barn that originally consisted of a single ground floor room with an upper hayloft forming a single upper room. Two later stone built extensions have been added to the building and include a fire place with a red brick chimney and a very small building housing a privy. The barn is constructed in a lean-to style up against the neighbouring property and has mono-pitch roof clad with clay pantiles.
- 1.5. The barn is located within the grounds of Montrose House, a private and detached property located just off the northern carriageway of the Wells Road, Henton, approximately 6 km west of the City of Wells (Ordnance Survey grid reference ST 490 454), refer to Figure 1 within Appendix I.
- 1.6. The immediate surroundings include the grounds of the residential dwelling which include mature gardens and an orchard to the north of the barn. To the east and west of the property lie further similar detached properties with large

gardens which line the northern and southern carriageway of the Wells Road which runs in an east-west direction.

- 1.7. The wider landscape is very rural and is dominated by areas of low intensity farmland characterised by small to medium sized pasture fields, divided by networks of managed and unmanaged hedgerows. There are no large areas of mixed woodland in the near environs however copses and traditional orchards are not uncommon within the agricultural landscape, and tend to merge into one another as well as linking into the adjacent hedgerow networks. The River Axe passes by in an east – west direction approximately 100 m north of the building.

## Legislation

- 1.8. In the UK all species of bats are protected under the Wildlife and Countryside Act (1981) as amended and the Conservation of Habitats and Species (Amendment) Regulations. Under this legislation it is a strict liability offence to injure or destroy a bat or to disturb damage or destroy the resting place of a bat. Under this legislation the UK is obliged to fully take into account bats within the planning process and the level of bat activity on-site must be fully assessed prior to the assessment the planning application.
- 1.9. In Britain all wild birds are granted legal protection under the Wildlife & Countryside Act (1981) (as amended). This legislation protects the birds, their eggs and nests whilst being built or in use.

## 2. Methodology

---

### Desktop Study

#### *Data search*

- 2.1. The MAGIC website was accessed to gain information on any statutory site designations within 4 km of the site that are designated for bats.

#### *National Planning Policy*

- 2.2. National Planning Policy has been reviewed for policies that relate to nature conservation relevant to the site.

### Field Survey

#### *Bat scoping survey*

- 2.3. The building was methodically inspected internally and externally for any evidence of roosting bats, including actual bats, droppings, urine staining and evidence of feeding activity such as discarded insect wings and cases.
- 2.4. The building was also assessed for its suitability to support roosting bats by considering several factors including whether bats can access internal and external voids within the building and whether these voids provide adequate protection and shelter for roosting bats. If the building is not confirmed as a roost, it is assessed from High to Negligible Suitability as follows;
  - **High Suitability** – many roosting opportunities. Buildings tend to be old, large and rural
  - **Moderate Suitability** – some roosting opportunities. Building tend to be old, rural with some recent maintenance

- **Low Suitability** – few roosting opportunities. Buildings tend to be modern, urban and well maintained
- **Negligible Suitability** – insignificant roosting opportunities. Buildings tend to be small, modern, urban and very well maintained.

*Dawn re-entry /activity surveys*

- 2.5. Dawn re-entry surveys have been conducted on 25 May 2016, 27 August 2019 and 16 June 2023. One surveyor attended the survey and was positioned so that all aspects of the building suitable for roosting bats could be observed. The surveys were undertaken during suitable weather conditions. The surveys commenced 1.5 hours before sunrise and continued until sunrise. All general bat activity on site was noted.
- 2.6. Batbox Duet bat, Peersonic and EMT bats detectors were used together with visual observations on flight patterns and feeding behaviour to aid identification to species level.

*Birds*

- 2.7. The buildings were also inspected for the presence of birds including house sparrow *Passer domesticus* and barn swallow *Hirundo rustica*. The building was checked for field signs including nesting material, accumulations of droppings and/or pellets.

## 3. Results

---

### Desktop Study

#### *Data Search*

- 3.1. The MAGIC website informed that there are no statutory sites within 4 km of the site designated for bats.

#### *Planning Policy*

- 3.2. National policy guidance is provided by National Planning Policy Framework (NPPF), which sets out the Government' planning policies for England and how they should be applied to planning applications;

#### Conserving and enhancing the natural environment

Planning decisions should contribute to and enhance the natural and local environment by:

- a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
- b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
- c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
- d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

### Habitats and Biodiversity

When determining planning applications, local planning authorities should apply the following principles:

- a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
- c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons, and a suitable compensation strategy exists; and

- d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

## Field Survey

### *Bat scoping survey*

- 3.3. Survey work was undertaken by Fairbrass Knowles an experienced ecologist and fully licensed bat worker and initially took place on 25 April 2016. Update visits were undertaken on 22 August 2019 & 16 June 2023. The building was fully accessible.
- 3.4. The external and internal conditions of the buildings are described in the table below and photographic reference can be found within Appendix II.

Building	Feature	Feature Description	Bat suitability
<b>Stone barn</b>	Overview	<p>A small stone two storey lean-to style barn constructed up against a neighbouring property. The main building consists of a one up, one down layout with a mono pitch roof. Two small stone lean-to extensions occupy the northern and southern elevations and also have mono pitch roofs.</p> <p>The entire barn measures approximately 10 x 5 m and has until very recently been in use as a wood working workshop.</p>	Low Suitability ☒
	Exterior	<p>The exterior supporting walls are constructed from approximately 450 mm solid random rubble stone work, which generally is sound, however a number of small but significant cracks and holes are present on all elevations and lead into hidden cavities. The northern elevation of the main barn has approximately 20 % of the stonework encroached by a light growth of ivy <i>Hedera helix</i>.</p> <p>Two non-opening windows occupy the lower eastern elevation of the main building; glass panes are intact, however the timber work including the wooden lintels have shrunk back and rotted in</p>	

		<p>places revealing gaps and cracks. A timber door is also present on this elevation and fits loosely within the timber frame.</p> <p>A further window is present on the southern extension and has a pane of glass missing. A timber door accesses the single room and is old and loose fitting within the timber frame.</p> <p>The small extension acting as the privy and built on to the northern elevation has a single doorway which is permanently open.</p>	
	<p>Interior</p>	<p>The Main barn and two extensions are not connected by any internal doorways.</p> <p>The main barn has a single ground floor room with a flagstone floor. Interior walls are of bare natural stone, which is generally in good order, however some small but significant holes and cracks are present, particularly at points where the floor joists that support the upper floor are socketed into the supporting walls.</p> <p>The first floor has a timber planked floor and the stone work walls have the remains of a plaster / lime wash finish. The timber beams that support the roof are exposed and lathe and plaster</p>	

		<p>'torching' is present as the sarking layer beneath the roof tiles. The torching is original and has deteriorated whereby plaster infill has fallen away providing multiple holes that lead into hidden cavities that exist beneath the underside of the roof tiles. Other hidden cavities are present along the gable ends; where the roof passes over the top course of masonry; here the voids measure the width of the walls; approximately 450 mm.</p> <p>The small extension located on the southern elevation consists of one small room with a fire place and chimney base. Stonework is exposed and generally in good order.</p> <p>The extension located on the northern elevation and acting as the privy is in poor condition; The roof has collapsed in creating a very exposed interior.</p>	
	Roof	<p>The roof of the main barn and southern extension are clad with clay pan tiles, and these are all present, a few have become misaligned, but overall the building is being kept water tight. Numerous gaps exist throughout the roof that leads into hidden voids that are created by the top side of the sarking felt and the underneath of the roof tiles. This is normal for handmade clay Pan</p>	

		<p>and Roman style tiles.</p> <p>The roof of the privy is in a very poor state and has partially collapsed in. What remains is clad also with clay pan tiles.</p> <p><u>Up-date 16 June 2023</u></p> <p>The roof is now completely absent.</p>	
--	--	--	--

*Bat activity survey*

- 3.5. The property has been assessed to offer **Low Suitability** for roosting bats. Therefore, in line with survey guidance (2016), one dawn re-entry survey was undertaken on the morning of 25 May 2016, an update survey was undertaken on 27 August 2019 and a further survey was undertaken on 16 June 2023.
  
- 3.6. The tables below details the results of the surveys.

Table 2; Bat emergence table

Date	25/05/2016	27/8/2019	16/6/2023
<b>Survey Conditions</b>	Cloud 25% Dry Wind level 1 Start temp 10 <sup>0</sup> C End temp 09 <sup>0</sup> C Sunrise 05.15	Cloud 25% Dry Wind level 1 Start temp 10 <sup>0</sup> C End temp 09 <sup>0</sup> C Sunrise 06.15	Cloud 25% Dry Wind level 1 Start temp 13 <sup>0</sup> C End temp 14 <sup>0</sup> C Sunrise 04:56
Re-entry survey	No bat re-entry	No bat re-entry	No bat re-entry
General bat activity. Non emergence	No bat activity recorded within the vicinity of the building.	Two common pipistrelle passes in garden to north of building.	<u>03:35 – 04:25</u> Soprano pipistrelle bat <i>Pipistrellus pygmaeus</i> Up to 2 number common pipistrelle bats recorded foraging in the garden of the dwelling. Common pipistrelle <i>Pipistrellus pipistrellus</i>

Old barn, Montrose,  
Henton, Somerset



			<p><u>04:20</u></p> <p>1 number foraging pass made by a single bat.</p>
--	--	--	---

### *Birds*

- 3.7. No birds or bird nesting activity was recorded in any aspect of the building.

## Evaluation

### *Bats*

- 3.8. During the scoping survey no droppings, staining, feeding remains or actual bats were observed.
- 3.9. The barn has been identified as possessing a range of abiotic bat roosting opportunities, which include hidden voids that are present on both the exterior and interior stone walls, hidden voids beneath roof tiles and along the tops of internal walls where the roof passes over.
- 3.10. These identified areas are considered suitable in providing crevice dwelling bats with roosting opportunities and the complexity and inaccessibility of these voids make it impossible to fully rule out the presence of bats within the buildings on a daytime scoping survey alone.
- 3.11. The buildings proximity to suitable bat foraging habitats increases the component value of the building in relation to bats. The fact that until recently the building was in regular use as a wood working workshop and was thus subject to regular noise and disturbance reduces slightly the likelihood of a bat roost being present. Taking all factors into consideration the building was considered to provide bats with **Low Roosting Suitability**, therefore, in line with survey guidance published by the Bat Conservation Trust (2016) one bat dawn re-entry survey was undertaken.
- 3.12. **During the three number bat re-entry surveys, no bats were recorded either exiting or entering the building. The building is not considered to be functioning as a bat roost.**

## 4. Recommendations

---

- 4.1. The recommendations in the paragraphs below should be followed to help ensure that wildlife and important ecological features are protected during the course of works. Recommendations also set out mitigation measures to minimise harm where this cannot be avoided and provide compensation measures to allow the proposals to meet current legislative and planning policy objectives.
- 4.2. The Natural Environment and Rural Communities (NERC) Act (2006) states that a public authority must 'in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity; Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat'.
- 4.3. Under the Government's National Planning Policy Framework (NPPF, 2021) opportunities to incorporate biodiversity in and around developments should be encouraged.

### Bats

#### *Species recommendations*

- 4.4. Due to the lack of evidence of roosting bats within any aspect of the buildings on site it is not considered necessary or beneficial to undertake any further survey work.
- 4.5. Due to the rural setting of the building and the transitory nature of bats, there is a small possibility that bats could be encountered during demolition works; therefore, all works must proceed under a cautionary approach. Tiles and roof panels will be removed in a vertical rather than horizontal sliding motion. Soffits and masonry will be dismantled using a 'soft' approach taking care with cavity walls where present. All site workers will be vigilant at all times and in the very unlikely event that a bat is found then works must stop immediately and advice

should be sought from Crossman Associates or Natural England (telephone number 0300 0603900).

### Lighting

- 4.6. The site is located within a rural setting with habitats surrounding the site that are considered favourable to bats. Exterior lighting should take into account the presence of bats and other nocturnal wildlife and consist of modern LED units. Lighting should be directional / cowed and avoid over illumination of the garden and neighbouring gardens.
- 4.7. An information sheet describing lighting can be found within Appendix III information sheets.

### *Birds*

- 4.8. Prior to roofing works, a thorough check for nesting birds should be carried out. Should any active bird's nests be present, works should take reasonable precautions to avoid disturbing them until all birds have fully fledged.

### Ecological enhancements

- 4.9. Under the Government's National Planning Policy Framework (NPPF) opportunities to incorporate biodiversity in and around developments are encouraged. There is an opportunity during the development works to enhance the ecological value of the site relatively inexpensively for both bats and birds.

### *Bats*

- 4.10. It is recommended that a Habitat bat box (type 001) is incorporated within the exterior of the masonry of the new extension. This model is designed for a variety of bat species and has good thermal properties making it suitable as both a maternity roost and hibernation roost. A variety of facings can be fitted to suit any existing brick, wood, stonework or rendered finish, making the box unobtrusive and aesthetically pleasing.

- 4.11. Apart from the front entrance of the 001, the box is fully sealed preventing bats from gaining entry to any interior part of the house. The boxes should be sited approximately 3 m – 4 m high on exterior gable ends / walls. The box should ideally be sited in such a location that bats are able to access into suitable habitat and away from exterior lighting. The boxes are self-cleaning and require no further maintenance.
- 4.12. It is recommended that the final siting of the bat box is done in consultation with a suitably qualified ecologist.
- 4.13. An information sheet on this type of bat roosting box is provided under Appendix III; information sheets.

### *Birds*

#### House sparrow

- 4.14. New nesting opportunities should be provided for the local bird population with a particular emphasis on house sparrows (which have suffered significant decline) and it is recommended that 2 number sparrow terrace nest boxes are fitted.
- 4.15. Sparrow nest boxes are ideally fitted below eaves and away from windows and doors. Suitable models include the Schwegler 1SP and a model produced by Vivara, both are suitable for surface mounting as well as integral mounting. Both models are strong, durable, long lasting and available in brown or stone colour.
- 4.16. An information sheet on integral bird nesting boxes is included in Appendix III.
- 4.17. Sparrow nest boxes are available from [www.wildlifeservices.co.uk](http://www.wildlifeservices.co.uk) or [www.habibat.co.uk](http://www.habibat.co.uk) among other providers.
- 4.18. Nest boxes are best fitted on a north or east elevation and away from windows and doors, however it is recommended that the final siting of the bird box is done in consultation with a suitably qualified ecologist.

Old barn, Montrose,  
Henton, Somerset



## 5. Limitations

---

- 5.1. This report records wildlife found during the survey and anecdotal evidence of sightings. It does not record any plants or animals that may appear at other times of the year and were therefore not evident at the time of visit.
- 5.2. This report represents a preliminary assessment only. Recommendations and conclusions are subject to change should further findings significantly differ from those collected from the survey efforts to date.
- 5.3. The advice contained in this report relate primarily to factual survey results and general guidance only. On all legal matters you are advised to take legal advice.

## 6. References

---

**Bat Conservation Trust (BCT)** *Bats and Lighting in the UK* BCT

**HMSO (1981)** *Wildlife and Countryside Act 1981 (and subsequent amendments)*. HMSO

**HMSO (1995)** *Biodiversity*. The UK Steering Group Report

**Joint Nature Conservation Committee (JNCC)** *Common Standards Monitoring Guidance for Reptiles and Amphibians* (2004) JNCC

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

**Mitchell-Jones, A.J , & McLeish A.P. (2012)** *The Bat Worker's Manual* (4<sup>th</sup> Edition)

**Multi-Agency Geographical Information for the Countryside (MAGIC)**

**Website** at [www.magic.gov.uk](http://www.magic.gov.uk)

**Stace, C. (1997)** *New Flora of the British Isles 2<sup>nd</sup> Edition*. Cambridge University Press

**TSO (2012)** *National Planning Policy Framework*. TSO

**TSO (2006)** *Natural Environment and Rural Communities Act* TSO



# Appendix I – Site Figures

---



**crossman**  
ASSOCIATES



01761 233414  
info@crossmanassociates.co.uk  
www.crossmanassociates.co.uk



Site location



Client Mr and Mrs Armstrong  
Title Site location  
Site Barn at Montrose, Henton  
Figure 1  
Date 26 April 2016  
Scale Indicitive



Appendix II – Site Photographs



## Photographs 1- 3



Photograph 1:

Eastern elevation



Photograph 2:

Southern elevation



Photograph 3:

Cavities surrounding timber lintel on groundfloor window; eastern elevation

## Photographs 4 - 6



Photograph 4:

Main ground floor room



Photograph 5:

First floor



Photograph 6:

Torcing in use as the sarking layer beneath roof tiles



## Appendix III – Information Sheets

---

Bat roosting potential	Criteria	Survey requirements to prove likely absence <sup>1</sup>
Negligible	No features or locations presenting roosting opportunities apparent. Building, structure or tree considered unlikely to be used by roosting bats, although occasional or transient use can rarely be entirely ruled out	No further survey work required
Low	Few features or locations within building, structure or tree with the potential to support roosting bats, although quality of these features limited by size, aspect or internal micro-climate. Although not directly assessed by these criteria, the chances of significant roost types (maternity or hibernation) is not considered likely	One activity survey
Medium	Some features/locations within building, structure or tree with the potential to be used by roosting bats. Although not directly assessed by these criteria, the chances of significant roost types (maternity or hibernation) is considered possible	Two activity surveys
High	Several features/locations within building, structure or tree with the potential to support roosting bats. Combination of size, aspect and internal micro-climate within these locations make them very suitable for roosting bats. Although not directly assessed by these criteria, the chance of significant roost types (maternity or hibernation) is considered possible	Three activity surveys

---

<sup>1</sup> Survey requirements are taken from the Bat Conservation Trust Good Practice Guideline (2012), which is the recognised industry standard guidance used by local planning authorities and other statutory consultees.

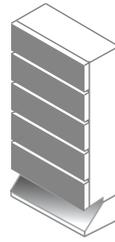
# Bat Tubes

BUILT-IN HABITATS N° 004

## Woodcrete Bat Tubes

We recommend the use of woodcrete-type bat tubes that are manufactured by Habibat or Schwegler. These are a well known brands so are always accepted as a compensation measure for planning applications and Natural England Licence applications. The tubes also have a low visual impact on the development because they can be built into the exterior wall and then rendered or painted, or in the case of the Habibat, faced with brick or stone.

## Recommended bat tubes

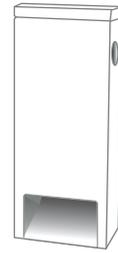


### Habibat

The great advantage of the Habibat box is that it can be faced with brick, stone or render, so that it blends in and doesn't alter the aesthetic of the build.

### Specifications

Height	44 cm
Width	21 cm
Depth	10 cm
Weight	7 kg



### Schwegler 1FR & 2FR

There are two similar designs that we use regularly. The 1FR is designed to be used singularly whereas the 2FR has transverse connecting holes (model shown) that allow tubes to be connected together.

### Specifications

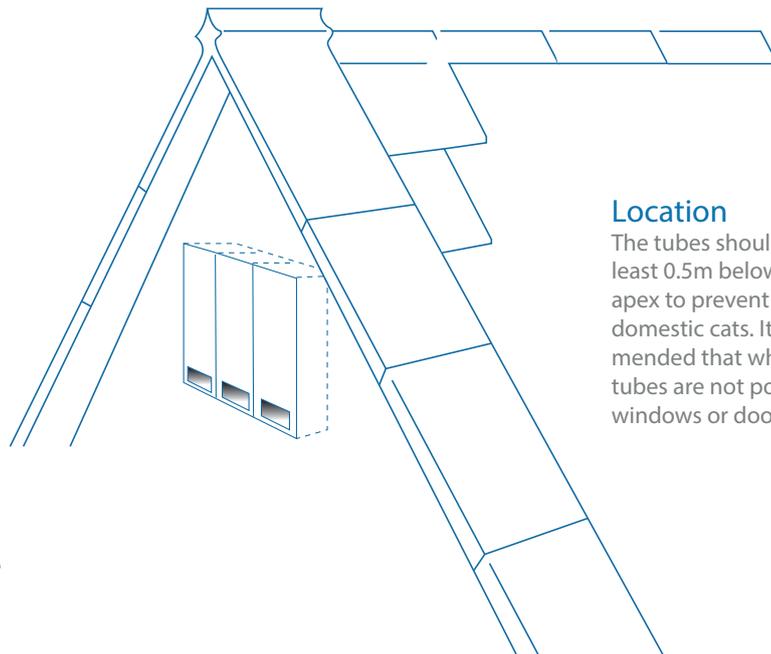
Height	47.5 cm
Width	20 cm
Depth	12.5 cm
Weight	9.8 kg

## How Many to Install

The number of bat tubes to install is dependent on the level of compensation or mitigation that is required. Typically one tube is recommended on sites where there are low number of bats and multiple groups of tubes are recommended on sites of high ecological significance.

## Installation

The tubes should be built into the exterior wall of the building, typically at the gable apex. The tubes should be installed flush with the surrounding wall and can then be rendered or painted with breathable paint if required.



## Location

The tubes should be positioned at least 0.5m below the eave or gable apex to prevent predation by domestic cats. It is also recommended that where practical, the tubes are not positioned above windows or doors.

## Bat Tubes

Bat tubes are an excellent way to provide discreet and low impact roosting opportunities for certain species of bats that tend to occupy crevices within buildings. They are relatively compact and can be installed flush or beneath a rendered surface and can be painted with an air permeable paint if required.

  
**crossman**  
ASSOCIATES

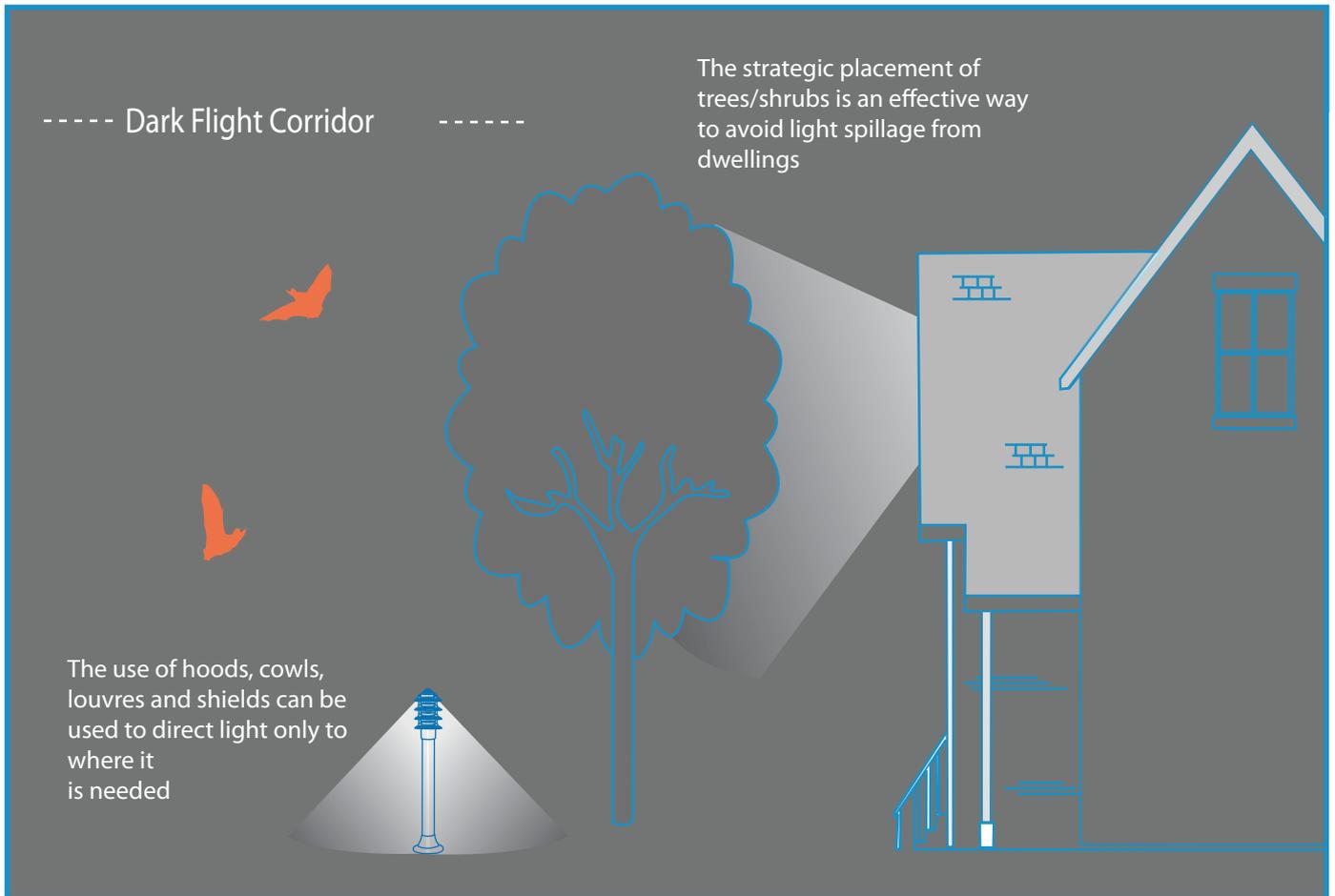
Written by Alex Crossman

01761 233414

hello@crossmanassociates.co.uk  
Fire Engine House, Oakhill, Bath, BA3 5BJ

# Sensitive Lighting for Bats

MITIGATION GUIDELINE N° 001



## Lamp Type

The impact of light on bats can be minimised by the use of low/high pressure sodium lamps.

## Lighting Column

The height of lighting columns should be kept as low as possible to reduce the impact of light spill. For example, when designing lighting for pedestrian walkways, use short bollard lights that produce a low level light (as low as 3 lux) directed downwards.

## Light Mapping

Mapping the light spill of a lighting scheme using computer software can prove essential in designing schemes that are fit for purpose, that minimise energy costs and create dark flight corridors and foraging areas for bats.

## Light Levels

Proposed light levels within landscape plans should be as low as possible. If lighting is not needed, don't light.

## Timing of Lighting

The times at when lighting is left on should be limited where possible. The use of movement sensors and timers for lights is useful for saving energy and reducing the amount of time a light is left on.

## Impacts of Light on Bats

As nocturnal mammals, light causes disturbance to bats and many species will actively avoid lit areas. The illumination of bat roosts can delay bats emerging and thus shorten their foraging time and may eventually lead to bats abandoning their roost. The illumination of foraging or commuting areas may also lead to an increase in the rate of predation of bats by predators.

  
**crossman**  
ASSOCIATES

Written by James Tristram

01761 233414

hello@crossmanassociates.co.uk

Fire Engine House, Oakhill, Bath, BA3 5BJ