

ECOLOLOCATION

*Protected Species Surveys for Development*

Ryton Organic Gardens Wolston Lane Ryton-on-Dunsmore Rugby Warwickshire CV8 3LG 02476 217727 ecolocation@gbae.co.uk

# Bat Assessment Report

for

Coventry Stadium  
Rugby Road  
Coventry  
CV8 3GJ

For

Brandon Estates Ltd.

(13<sup>th</sup> October 2017 - REVISION B)

2014-03(08)

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Report Author: Anna Swift, BSc MSc MCIEEM  
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## Summary

- An initial walkover survey for bats was carried out at Coventry Stadium in Coventry on the 24<sup>th</sup> April 2014 by licensed bat surveyor, Anna Swift, CLs18 (Survey level 2).
- The proposed development included the erection of a number of residential dwellings although a detailed site layout was not available at the time of writing the report.
- There were a number of potential access points for bats into all buildings within the site.
- Foraging opportunities for bats nearby was considered above average and a number of roosting bats were recorded within a 1km radius of the site.
- Buildings 1 and 6 had low bat potential. Buildings 2, 3 and 7 all had low-medium potential for crevice-dwelling bats. Building 5 had low-medium bat potential together with a possible bat dropping (species unknown) found stuck to the wall in the toilet area. Building 8 had a single brown long-eared bat dropping in its roof void 8c together with the possible feeding remains of this bat. Building 4 had medium potential for hibernating bats.
- Two bat activity surveys of all buildings (except 1 and 6) was undertaken between July and September 2014 for summer roosting activity. Bat activity across the southern and western areas of the site were low with no bats recorded near building 8, indicating that the one old bat dropping was most likely deposited by a single exploratory bat a few years ago and did not represent a contemporary roost. A common pipistrelle was considered to have possibly emerged from building 4, although its precise roosting location could not be confirmed. Four common pipistrelle bats were recorded roosting on top of the wall of the ladies toilets at building 5 and was considered likely to represent a satellite roost or small maternity roost.
- 1-2 checks for hibernating bats to be undertaken between January-February (at peak time for hibernating bats). If no evidence of bats is found, then it is not assumed that this can prove absence and a general design bat hibernacula is proposed within the undisturbed area of woodland. If evidence of hibernating bats is found, further works will be licensable and the bat hibernacula will be tailored to suit the specific bat species recorded.
- Appropriate bat mitigation is required for the roosting common pipistrelle at the site. Outline mitigation measures are provided at section 10.

## 1. Introduction

### Instructions

ECOLOCATION were appointed by Framptons on behalf of Bradon Estates Ltd to undertake a bat assessment of a number of buildings which were located within the grounds of Coventry stadium in Coventry.

### Purpose and Scope

The purpose of the survey and report was to assess the likelihood of presence or use of the buildings by bats to support a planning application for a residential development to be submitted to Rugby Borough Council.

The scope of the survey was to encompass the buildings and a reasonable amount of working space around them but to concentrate on the built structures.

No detailed proposals were available at the time of writing the report.

## 2. Legislation

The Wildlife and Countryside Act 1981 (WCA) protects bats and their roosts in England, Scotland and Wales. Some parts have been amended by the Countryside and Rights of Way Act 2000 (CROW) which applies only in England and Wales, and by the Nature Conservation (Scotland) Act 2004 which applies in Scotland.

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. The 1994 Regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law. The Regulations came into force on 30 October 1994.

The Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species', and the adaptation of planning and other controls for the protection of European Sites. All bats are listed as 'European protected species of animals'.

It is an offence for any person to:

- Deliberately capture, injure or kill a bat.
- Intentionally or recklessly disturb bats, where that disturbance may affect the ability of those bats to survive, breed, rear or nurture their young, or is likely to significantly affect the local distribution or abundance of any bat species, whether in a roost or not.
- Damage or destroy a place of shelter (roost) of a bat, be that a resting or breeding place.
- Possess a bat, whole or in part, alive or dead.
- Intentionally or recklessly obstruct access to a roost
- Sell or offer for sale or exchange whole or parts of bats, alive or dead.

## 3. The Site

The Site (grid ref: SP 40713 77299), indicated by the red line boundary below, was situated some 4.5km to the east of the city of Coventry in the West Midlands and included a large area for car parking together with a stadium used for greyhound racing and speedway and all of its associated buildings.



### Timing and Conditions

The site was visited on Thursday 24<sup>th</sup> April 2014 commencing at 13:30 hrs.

Parameter	Recorded Figure
Temperature	12°C
Cloud cover	60%
Precipitation	No rain
Wind speed (Beaufort Scale)	2 – Light breeze

### Buildings/Structures

For ease of reference, each building was given a number, indicated on the following map, and is described below in detail.



### **Building 1**

This building comprised two discrete areas 1a and 1b linked by the existing turnstiles. Each hangar building was at least two-storey high and neither had a separate roof void. They were steel-framed with a pitched roof of corrugated steel with roof lights and were, in part, clad with blockwork. Building 1a benefited from some deteriorating linen cloth stretched across the eaves creating a makeshift roof void (presumably to prevent pigeon, and the like, from nesting) whilst building 1b was fully vaulted, although this building did have some dividing walls creating separate cells and some areas of the building were, therefore, darker than others.

The turnstiles were open to their eastern elevation with a mono-pitch roof and a flat roof beyond this. Internally, a suspended ceiling was present beneath the flat roof, presumably resulting in a void between the ceiling tiles and the flat roof above of c0.5m high.



*Building 1a - eastern external elevation*



*Building 1a - internal*



*Building 1a and 1b -western external elevation*



*Building 1b - internal*



*Turnstiles between 1a and 1b*

### **Building 2**

This comprised the former turnstyle buildings, of which there were two: 2a and 2b. These were small single-storey structures, each with a separate roof void. 2a was timber clad whilst 2b was constructed in blockwork and both had a hipped roof finished with interlocking tiles. In 2a, the loft hatch was open but access to this area by the surveyor, was hindered by the presence of stored barrels, although a roof underlining of bituminous felt was visible and appeared to be torn in places. In 2b, the roof void was accessible and was of a traditional purlin and rafter construction but with an underfelt to the roof of black plastic. The height of the roof void was c1m from ceiling to ridgeboard.



*Building 2a - northern elevation*



*Building 2a - internal; access to loft hatch was hindered*



*Building 2b - southern elevation*



*Building 2b - roof space*

### ***Building 3***

This comprised a large single-storey building that was in use as holding kennels for greyhounds during the race days. It was constructed in blockwork and was partly timber-clad. Its shallow pitched roof appeared to be finished with bituminous felt and internally a suspended ceiling meant no access to any roof void for the surveyor. However, removal of a ceiling tile revealed wooden sarking to the underside of the roof and a maximum height of roof void of 0.4m.



*Building 3 - southern elevation*



*Building 3 - internal*



*Building 3 - sarking visible to underside of roof*

### **Building 4**

This comprised the main grandstand as well as the 'under stand'. The grandstand was an area of covered terraced steps with an enclosed glass viewing box area with a flat roof and walls of asbestos cement sheeting. The lean-to roof over all of this was supported by a steel frame and finished with corrugated sheeting. The 'under stand' area was located beneath the terraced steps and was an enclosed room (housing seating and places to eat). It was constructed in part brickwork and part blockwork and had a blockwork ceiling and no windows. To access the main grandstand there were steps leading into corridors at the western elevation of building 3. These corridors were constructed in brickwork but with a blockwork ceiling.



*Building 4 - western elevation and stairs leading to corridor*



*Building 3 - corridor and ceiling*



*Building 4 - eastern elevation showing terraced steps and under stand below*



*Building 4 - view of ceiling in the under stand*

### **Building 5**

This comprised the other covered terraced steps opposite the grandstand on the opposite side of the race track. A part timber and part steel-framed structure supported a lean-to roof of corrugated sheeting, whilst blockwork cells housed separate male and female toilets. A plasterboard ceiling was present on top of the blockwork (and below the lean-to roof over the terrace) over the cubicles such that no roof void was present in this area, although in the area adjacent to the toilets, no ceiling was present, although fascia boards were present against internal blockwork walls.



*Building 5 - viewed looking south*



*Building 5 - internal; ceiling in toilet cubicles*

### **Building 6**

This comprised an area of single storey, lean-to perspex and corrugated buildings with steel frames for cycle storage or similar.



*Building 6 - cycle storage*

### **Building 7**

This comprised an office unit and first aid station and was only accessible in part to the surveyor at the time of survey. It was constructed in solid brickwork with a flat corrugated roof and its roof height was greater in the central area of the building. Internally, there was a plasterboard ceiling with no accessible roof void. Any void was likely to only comprise the depth of the rafters.



*Building 7 - north elevation*



*Building 7 - internal*

### **Building 8**

This comprised three adjoining buildings more akin to dwellings and currently housed stored materials, motorcycle learning centre office and a bike shop. All buildings were constructed in solid brickwork with a pitched roof finished with diagonal felt tiles. Lean-to elements were present to building 8a (and housed a utility area) and internally there were plasterboard ceilings with no access to the small void above (likely to be no more than 0.3m high). Building 8a was the two-storey element that housed a sub-station and the learning to ride office on the ground floor. Whilst an upper floor was present, this was not accessible as there were no stairs and the sub-station was locked at the time of survey. It was not known whether the upper floor was open to the ridgeboard or whether there was a separate roof void present.

Building 8b housed a bike shop, again with no access to the upper floor/roof void, although the roof line of this building was subservient to Building 8a.

Building 8c was used as storage and access was gained via a loft hatch to the roof void above. The roof of this building was mono-pitched and timber rafters were present but with no wooden sarking or felt present to the underside of the roof. No insulation was present at ceiling level or between the rafters and the maximum headroom within the void was c1.6m where it joined building 8b.



*Building 8 - a, b, c from left to right*



*Building 8c - roof void*

## 4. Desktop Study

Prior to the ecological survey of the site, a desktop data gathering exercise was undertaken. The Nature On The Map website was accessed in order to assess the suitability of the surrounding landscape for foraging, commuting and roosting bats. Warwickshire Biological Records Centre were also contacted for bat records within a 1km radius of the site.

### Habitat connectivity

- Overall, the connectivity of this site was considered average with a rural landscape of agricultural land and woodland to the north, south and west and residential properties of the suburb of Binley Woods to the east.
- Immediately adjacent the site to the west was the A428 trunk road which may have created a barrier to the free movement of species from this direction.
- Adjacent the site to the north, beyond Gossett Lane, stretched New Close and Birchley Wood, both designated a Local Wildlife Site for their ancient woodland habitat. The habitats created by such woodlands may have provided good shelter and forage habitat for a number of species, particularly bats.
- The increased human influences, such as noise and light pollution, created by the site's current use and its close proximity to residential properties and the A428 to the west may have deterred number of species.



## Data Search

A search to Warwickshire Biological Records Centre produced evidence of one probable indeterminate bat roost and one record for indeterminate bat within the village of Brandon to the south in 2008 and in 1997. The records centre also produced evidence of two indeterminate bats within Binley Wood to the west.

## 5. Walkover Survey and Analysis

An initial walkover of the site indicated a reasonable number of access points that were available to bats on the buildings. Such access points are illustrated by the photographs below (but are not a comprehensive list) and, in turn, the suitability of each building for bats is discussed.

### *Building 1*

Bats could potentially have gained access anywhere at eaves level as there was a significant gap between the lip of the roof and the walls as indicated by the photograph below. Once inside the building, the steel frame was unlikely to lend itself well to roosting bats as its surface is too smooth to cling to, whilst the corrugated sheet metal roof would likely heat and cool quickly and would not offer a stable temperature for roosting bats. Roosting opportunities were considered to be limited to the tops of the blockwork walls. Likelihood of roosting bats in this building was LOW.



*Building 1 - typical access point for bats*

### *Building 2*

Typical access into either building 2a or 2b was via occasional gaps under tiles or at the eaves, as illustrated by the photographs below. It is likely that this could gain crevice-dwelling bats access into the area between the tiles and the lining or perhaps on top of the ridgeboard. From here, if bats could access the roof void via a gap in the lining then there were opportunities to roost between the ridgeboard and the rafters as well as on top of the gable wall. The construction of the roof was suitable either for small, crevice-dwelling bats such as pipistrelle or for slightly larger void-seeking bats such as brown long-eared; however, this was tempered by the fact that these buildings were single-storey and were surrounded by hardstanding, which is likely to reduce the overall likelihood of roosting in these buildings to LOW-MEDIUM.



*Building 2a - typical access point for bats*



*Building 2b - typical access point for bats*

### **Building 3**

Typical access into this building was at damaged soffits or behind fascias, as illustrated by the photographs below. It is likely that this could gain crevice-dwelling bats access into small gaps within the soffit or behind the fascia board (both areas favoured by pipistrelle). It may also be possible to access the roof void from these areas, however this was so small and had such a shallow pitch that it could only be suitable for use by pipistrelle (or similar) and was unsuitable for use by void-seeking bats such as brown long-eared. Overall the likelihood of roosting in this building was LOW-MEDIUM for crevice-dwelling bats only.



*Building 3 - typical access points for bats at soffit and fascia*

### **Building 4**

Typical access into this building was present via the open stairways which provided access for bats to roost between the gaps in the ceilings and possibly into any void that may have been present at ceiling level. As these corridors were shaded by the rest of the grandstand, it was more likely that these areas could be used by roosting bats during the winter months, as a hibernation site. This potential was considered to be MEDIUM, given the presence of the ancient woodland nearby which is likely to support summer roosts of bats and represent a significant foraging resource in the locality. Ceilings such as this, were present above corridors, in the 'under stand' area and within storage cells at ground level adjacent to stairways on the western elevation - and access for bats, was possible into all of these areas, as illustrated by the photographs below.



*Building 4 - typical access for bats via open stairway*



*Building 4 - ceiling providing roosting opportunities for bats*



*Building 4 - winter bat roosting opportunity in ceiling*



*Building 4 - sub-optimal roof structure of grandstand*

The main roof of the grandstand had a similar construction as Building 1 and in this area only, bat roosting was considered to be LOW.

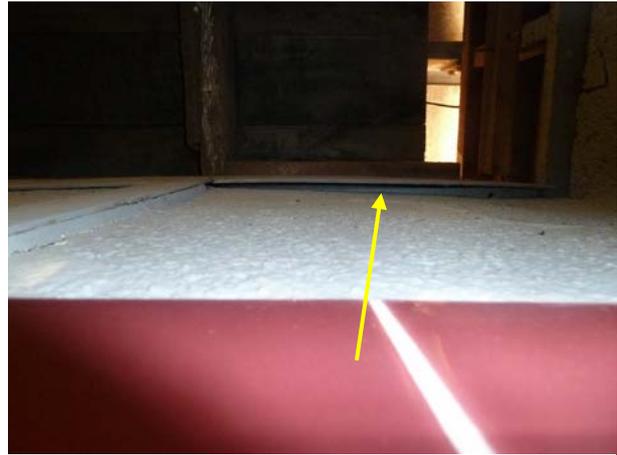
### **Building 5**

The roof structure of this building was the same as the grandstand resulting in LOW potential for roosting bats, despite unhindered access.

There were blockwork cells creating separate male and female toilets, which were freely accessible to bats. Roosting opportunities were present on top of blockwork walls where a ceiling was present or possibly behind the fascia board on the blockwork - such areas favoured by pipistrelle bats. Typically such a building would offer only low potential for roosting bats but as this building is adjacent to a line of trees and some cover, this is elevated to LOW-MEDIUM potential for roosting bats.



*Building 5 - roosting opportunity in ceiling/on top of blockwork wall*



*Building 5 - roosting opportunity behind fascia board*

#### **Building 6**

The open sided nature of this building together with the unsuitable roof structure of perspex sheeting would result in conditions that were too light and draughty to support roosting bats and the likelihood of this is considered to be LOW.

#### **Building 7**

Typical access into this building was via gaps at the eaves where the corrugated metal roof sheets slightly overhung the walls. The construction of the roof did not lend itself to sustained roosting by bats (likely due to fluctuations in temperature) although roosting opportunities may have been present for crevice-dwelling bats on top of the walls or in the depth of the ceiling joists. Overall, the likelihood of roosting in this building was LOW-MEDIUM for crevice-dwelling bats only.



*Building 7 - typical access points for bats*

**Building 8**

Typical access into this building was via gaps at the eaves where there were gaps at brickwork, via gaps at gable verges where mortar had spalled as well as under ridge tiles, as illustrated by the photos below. Access into roof spaces of all three voids of building 8 appeared possible for bats, although the construction of the roofs of sections a and b of this building was unknown. Nevertheless, assuming a ceiling at eaves height and an uncluttered void (as such buildings appear to be constructed pre 1980's), it was likely that such roof spaces were suitable for use by crevice-dwelling and void-seeking bats. The roof void of 8c was accessed and whilst its roof was only monopitch and the resultant headroom was limited in places, it still appeared suitable for both types of bats with roosting opportunities at timber junctions and on top of the wall where it joins 8b. Overall, the likelihood of bats roosting in this building group was MEDIUM.



*Building 8 - typical access points for bats*



## 6. Intrusive Survey and Results

An intrusive investigation of the buildings was undertaken by Anna Swift, Natural England Bat Licence No. CLS01296 (Bat Survey Level 2) using Petzl Tikka Plus 2 headtorch, Clulite 'CB2' 0.5 and 1 million candle power lamp and 'SeeSnake' Micro Endoscope.

A search for the following was undertaken both internally and externally of the buildings, where possible:

- **Live or dead bats** - live bats could be freely hanging from the roof or tucked away in a crevice (depending on the bat species)
- **Droppings** - bat droppings will crumble when rubbed between your fingers (unlike those of small rodents such as mice and voles, which are typically hard and solid). Also bat droppings are often found in places where rodent droppings are not, such as stuck to walls or caught in cobwebs
- **Feeding remains** - these typically include the discarded wings of butterflies (such as peacock and tortoiseshell) and moth (such as noctuid species). An accumulation of such wings may be present under a well-used feeding perch and would often indicate the presence of brown long-eared or horseshoe bats, which typically leave such remains
- **Absence of cobwebs** - a roof void that is free of cobwebs could indicate animals, such as bats or even birds flying around in this space
- **Oil staining** - the fur of bats may leave an oily residue on areas around a well-used access point to a roost
- **Daytime vocalisations** - these are often heard at bat maternity roosts, especially during periods of warm weather
- **Smell** - some bat species, such as soprano pipistrelle or Noctule have an identifiable smell
- **Tracks in dust** - some bats have been known to take off from their perch in a roof void then land on the ceiling and crawl to the eaves or a similar area where their access point is located. If the ceiling of the roof void is dusty then bat tracks may be visible although this evidence would need to be corroborated by an additional positive sign from one of those listed above
- **Scratching** - scratch marks produced by the claws of many bats may be apparent close to the access point for a well-used roost, although these are often more readily identifiable on trees rather than in buildings. Again, this evidence would need to be corroborated by an additional positive sign from one of those listed above.

### Buildings 1, 2, 3, 4, 6 and 7

No bat evidence was recorded internally or externally of these buildings.

### Limitations

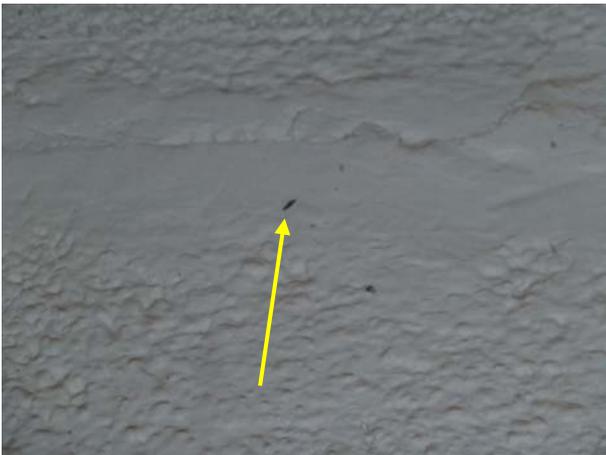
Access to the roof void of building 2a was not possible due to the presence of stored items blocking access to the loft hatch, any bat evidence from bats using possible roosts in winter within building 4 would not likely be visible at this time of year and building 7 was also not fully accessed. Therefore, there remains low-medium potential for crevice-dwelling bats to be using building 2 or building 7, whilst there remains potential for hibernating bats to be roosting within the ceilings of building 4. It should also be noted that the ceilings of building 4 were extensive and it is highly unlikely that they could be fully searched for evidence of roosting bats without a destructive search. Consequently, it will be assumed that building 4 is in use by hibernating bats and appropriate mitigation will be required should there be any impact to this building.

An inactive bird nest from an indeterminate bird species was recorded between the sheeting and brickwork wall of building 4. No birds were seen in the vicinity of this nest during the survey.

### Buildings 5 and 8

A close inspection of the toilet areas within building 5 revealed a possible bat dropping stuck to one of the inside blockwork walls below the gap at the fascia board. This droppings crumbled to the touch and it was not possible to send it for DNA analysis.

Within the roof void of building 8c (with the monopitch roof) a single bat dropping, which appeared to have been deposited no more recently than the past 12 months, was noted on the floor of the roof void below a rafter together with a discarded butterfly wing (the latter could be evidence of spider activity or perhaps food remains from a brown long-eared bat).



*Building 5 - possible bat dropping stuck to wall within the toilet area*



*Building 8c - discarded butterfly wing within the roof void*

### DNA analysis

The bat dropping from building 8c was sent off for DNA analysis. The results returned a maximum likelihood of brown long-eared (see certificate on the following page).

### Limitations

The remaining roof voids of building 8 were not accessible to the surveyor at the time of survey, yet they appeared to offer medium potential for crevice-dwelling and void-seeking bats. Areas on top of the walls in the toilets at building 5 could also not be fully inspected.

## 7. Bat Activity Surveys

### First Bat Emergence Survey

A post-dusk emergence survey was undertaken on 17<sup>th</sup> August 2014 by seven suitably experienced surveyors, led by Anna Swift, stationed as indicated on the following aerial image. Timings of surveys and weather conditions are recorded in the table below.

<b>Dusk Bat Emergence Survey – 17/07/2014</b>				
<b>Sunset : 21:20hrs</b>				
Survey Start Time: 21:05hrs		Survey End Time: 22:50hrs		
	<b>Temperature</b>	<b>Wind (Beaufort scale)</b>	<b>Cloud cover</b>	<b>Precipitation</b>
Start	22°C	2	30%	None
End	18.5°C	2	30%	None

#### Surveyor 1

Using Pettersson D240x time expansion detection recording to Roland Edirol R-09 digital device in .wav format plus heterodyne channel to headphones.

#### Surveyor 2

Using BatBox Duet heterodyne detector to headphones.

#### Surveyor 3

Using Magenta Bat 5 heterodyne detector to headphones.

#### Surveyor 4

Using Magenta Bat 5 heterodyne detector to headphones.

#### Surveyor 5

Using Pettersson D240x time expansion detection recording to Roland Edirol R-09 digital device in .wav format plus heterodyne channel to headphones.

#### Surveyor 6

Using Pettersson D230 heterodyne detector to headphones.

#### Surveyor 7

Using Magenta Bat 5 heterodyne detector to headphones.

### Camera

Two Sony Handycams were used during this survey. One was placed to focus at the southern elevation of building 7 where potential bat access points had been identified during the initial inspection and the other was placed to focus at the western elevation of building 3 (which the surveyor could not view). At 21.20hrs the cameras were set to record in night vision mode for 60 minutes.

### Static bat detector

A static bat detector (Wildlife Acoustics SM2 - records all frequencies and is triggered in 1 sec intervals each time it detects a sound emitted above 16kHz) in frequency division mode was placed adjacent to building 2, at height, to coincide with the start of the survey at 21:05 hrs. This was placed to record all bat activity within the vicinity and particularly to note any bat activity between building 8 and along building 4. The results of the static bat detector were used to confirm and consolidate the corresponding bat activity results of the camera and nearby surveyors, as well as detecting any additional bat species in the vicinity, as the microphone of a SM2 is omnidirectional and has a good range of detection at large distances, sometimes up to 30m.

**Please refer to the inserts overleaf for the results.**

DUSK - 17/07/14 Coventry Stadium

Timestamp	Surveyor ID	Bat species	Activity	Comments/additional info	If you have drawn on the map please select the next sequential (alphabetic) reference	Identification method	Sound recording number
17/07/2014 21:24:42	Surveyor 4 BD	Noctule	Commute/pass			Bat detector	
17/07/2014 21:24:48	Surveyor 3 CB	Noctule	Commute/pass		A	Bat detector, Visual observation	
17/07/2014 21:28:41	Surveyor 5 BG	Noctule	Commute/pass			Bat detector	
17/07/2014 21:29:03	Surveyor 4 BD	Noctule	Foraging	In woodland behind me		Bat detector	
17/07/2014 21:52:22	Surveyor 4 BD	Common pipistrelle	Commute/pass			Bat detector	
17/07/2014 22:02:28	Surveyor 5 BG	Myotis sp.	Commute/pass			Bat detector	
17/07/2014 22:06:59	Surveyor 7 SB	Indet. pipistrelle	Foraging, Commute/pass	Appeared to fly from the east over head, circle and fly back where it came from. Not sure of sp. but probably soprano pip as quieter than expected at such a short distance at freq45	A	Bat detector, Visual observation	
17/07/2014 22:09:08	Surveyor 7 SB	BLE	Commute/pass			Bat detector	
17/07/2014 22:09:25	Surveyor 3 CB	Noctule	Commute/pass		B	Bat detector, Visual observation	
17/07/2014 22:10:47	Surveyor 5 BG	Common pipistrelle	Commute/pass			Bat detector	
17/07/2014 22:10:57	Surveyor 4 BD	BLE	Commute/pass			Bat detector	
17/07/2014 22:11:36	Surveyor 5 BG	Common pipistrelle	Commute/pass		A	Bat detector, Visual observation	
17/07/2014 22:12:00	Surveyor 7 SB	BLE	Commute/pass	Flew north to south-east	B	Bat detector, Visual observation	
17/07/2014 22:12:17	Surveyor 4 BD	BLE	Commute/pass			Bat detector, Visual observation	
17/07/2014 22:12:18	Surveyor 5 BG	Common pipistrelle	Foraging			Bat detector	

DUSK - 17/07/14 Coventry Stadium

Timestamp	Surveyor ID	Bat species	Activity	Comments/additional info	If you have drawn on the map please select the next sequential (alphabetic) reference	Identification method	Sound recording number
17/07/2014 22:12:38	Surveyor 1 AS	Common pipistrelle	Commute/pass	Brief		Bat detector	
17/07/2014 22:13:23	Surveyor 5 BG	Common pipistrelle	Commute/pass			Bat detector	
17/07/2014 22:15:17	Surveyor 7 SB	BLE	Foraging	Feeding buzz above me then flew off south east	C	Bat detector, Visual observation	
17/07/2014 22:15:20	Surveyor 5 BG	Common pipistrelle	Foraging			Bat detector	
17/07/2014 22:15:25	Surveyor 4 BD	Indet. pipistrelle	Foraging			Bat detector, Visual observation	
17/07/2014 22:15:49	Surveyor 3 CB	Common pipistrelle	Commute/pass		C	Bat detector, Visual observation	
17/07/2014 22:16:50	Surveyor 4 BD	BLE	Foraging, Commute/pass			Bat detector, Visual observation	
17/07/2014 22:18:16	Surveyor 5 BG	Common pipistrelle	Foraging			Bat detector	
17/07/2014 22:19:11	Surveyor 4 BD	Common pipistrelle	Foraging			Bat detector, Visual observation	
17/07/2014 22:19:08	Surveyor 4 BD	Common pipistrelle	Foraging			Bat detector, Visual observation	
17/07/2014 22:19:47	Surveyor 3 CB	Common pipistrelle	Commute/pass	Distant		Bat detector	
17/07/2014 22:19:48	Surveyor 3 CB	Common pipistrelle	Commute/pass	Distant		Bat detector	
17/07/2014 22:21:26	Surveyor 4 BD	Common pipistrelle	Foraging			Bat detector, Visual observation	
17/07/2014 22:21:26	Surveyor 7 SB	Indet. pipistrelle	Commute/pass	Flew north to south east	D	Bat detector, Visual observation	
17/07/2014 22:23:27	Surveyor 4 BD	Common pipistrelle	Foraging			Bat detector	
17/07/2014 22:23:55	Surveyor 3 CB	Common pipistrelle	Commute/pass	X2		Bat detector	
17/07/2014 22:24:20	Surveyor 3 CB	Common pipistrelle	Commute/pass	X2		Bat detector	
17/07/2014 22:24:32	Surveyor 4 BD	Common pipistrelle, Indet. pipistrelle, Indeterminate bat	Foraging			Bat detector	

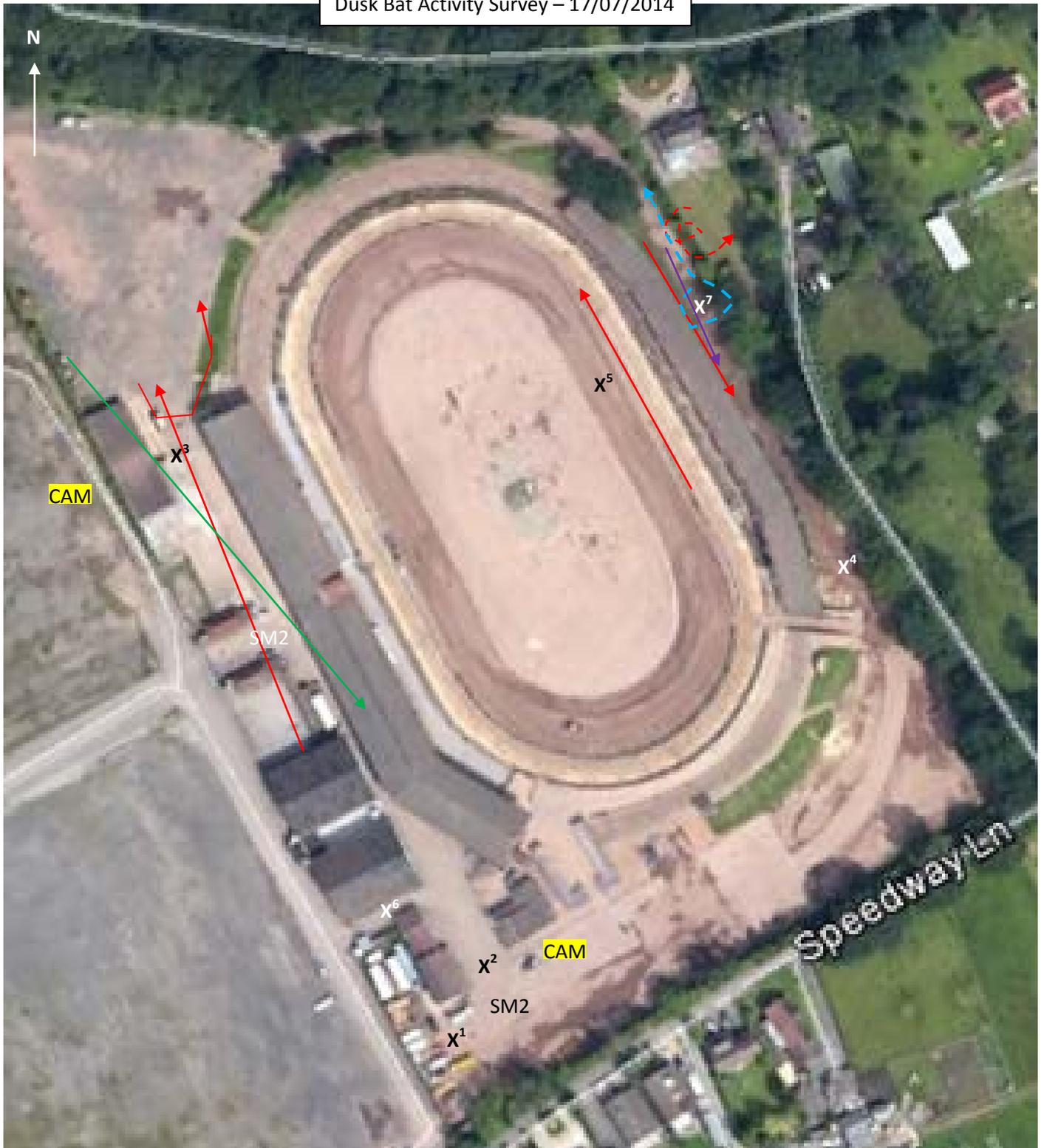
DUSK - 17/07/14 Coventry Stadium

Timestamp	Surveyor ID	Bat species	Activity	Comments/additional info	If you have drawn on the map please select the next sequential (alphabetic) reference	Identification method	Sound recording number
17/07/2014 22:25:59	Surveyor 5 BG	Common pipistrelle	Foraging, Commute/pass			Bat detector	
17/07/2014 22:26:38	Surveyor 3 CB	Common pipistrelle	Commute/pass		D	Bat detector, Visual observation	
17/07/2014 22:29:30	Surveyor 5 BG	Indeterminate bat	Commute/pass			Bat detector	
17/07/2014 22:31:26	Surveyor 4 BD	Indet. pipistrelle	Foraging			Bat detector, Visual observation	
17/07/2014 22:31:38	Surveyor 3 CB	Common pipistrelle	Commute/pass	Multiple passes, quiet		Bat detector	
17/07/2014 22:32:55	Surveyor 7 SB	BLE	Commute/pass	Flew south to north	E	Bat detector, Visual observation	
17/07/2014 22:33:46	Surveyor 7 SB	BLE	Commute/pass			Bat detector	
17/07/2014 22:33:49	Surveyor 4 BD	Indet. pipistrelle	Foraging			Bat detector	
17/07/2014 22:34:39	Surveyor 3 CB	Common pipistrelle	Commute/pass	Multiple passes		Bat detector	
17/07/2014 22:35:14	Surveyor 4 BD	BLE	Foraging			Bat detector	
17/07/2014 22:38:11	Surveyor 5 BG	Myotis sp.	Commute/pass			Bat detector	
17/07/2014 22:39:15	Surveyor 4 BD	Common pipistrelle	Commute/pass			Bat detector	
17/07/2014 22:39:29	Surveyor 4 BD	Common pipistrelle	Commute/pass			Bat detector	
17/07/2014 22:40:12	Surveyor 4 BD	Soprano pipistrelle	Foraging			Bat detector	
17/07/2014 22:40:30	Surveyor 3 CB	Noctule	Commute/pass	X2 passes		Bat detector	
17/07/2014 22:41:00	Surveyor 3 CB	Myotis sp.	Commute/pass			Bat detector	
17/07/2014 22:41:02	Surveyor 3 CB	Myotis sp.	Commute/pass			Bat detector	
17/07/2014 22:41:34	Surveyor 5 BG	Indeterminate bat	Commute/pass			Bat detector	

DUSK - 17/07/14 Coventry Stadium

Timestamp	Surveyor ID	Bat species	Activity	Comments/additional info	If you have drawn on the map please select the next sequential (alphabetic) reference	Identification method	Sound recording number
17/07/2014 22:41:45	Surveyor 7 SB	Indeterminate bat	Commute/pass	Sounds like miotis but didn't hear for too long. Could have been a pip in cluttered environment.		Bat detector	
17/07/2014 22:44:02	Surveyor 4 BD	BLE	Foraging			Bat detector	
17/07/2014 22:46:16	Surveyor 7 SB	Indeterminate bat	Foraging, Commute/pass	Again sounded like miotis but short sections sounded more like pip. Foraging overhead before flying north	F	Bat detector, Visual observation	
17/07/2014 22:47:52	Surveyor 5 BG	Myotis sp.	Commute/pass			Bat detector	
17/07/2014 22:49:22	Surveyor 3 CB	Common pipistrelle	Foraging			Bat detector	
17/07/2014 22:49:41	Surveyor 3 CB	Noctule	Commute/pass			Bat detector	
17/07/2014 22:49:58	Surveyor 5 BG	Myotis sp.	Commute/pass			Bat detector	
17/07/2014 22:50:26	Surveyor 7 SB	Myotis sp.	Commute/pass			Bat detector	
17/07/2014 22:51:07	Surveyor 4 BD	Indet. pipistrelle	Commute/pass, Possible entry			Bat detector	

Dusk Bat Activity Survey – 17/07/2014



KEY

- |                      |                    |            |                  |            |                     |
|----------------------|--------------------|------------|------------------|------------|---------------------|
| <b>X<sup>1</sup></b> | Surveyor location  | <b>CAM</b> | Camera location  | <b>SM2</b> | Static bat detector |
|                      | Common pipistrelle |            | Brown long-eared |            | Noctule             |
|                      | Indt. pipistrelle  |            | Indt. bat        |            |                     |

**Bat Entry Survey - building 5 only**

A pre-dawn entry survey of building 5 was undertaken on 8<sup>th</sup> August 2014 by three suitably experienced surveyors, led by Anna Swift, stationed as indicated on the following aerial image. Timings of surveys and weather conditions are recorded in the table below.

<b>Pre-dawn Bat Entry Survey – 08/08/2014</b>				
<b>Sunrise : 05:37hrs</b>				
Survey Start Time: 04:05hrs		Survey End Time: 05:45hrs		
	<b>Temperature</b>	<b>Wind (Beaufort scale)</b>	<b>Cloud cover</b>	<b>Precipitation</b>
Start	14.6°C	1	90%	None
End	13.8°C	1	90%	None

Surveyor 1

Using Pettersson D240x time expansion detection recording to Roland Edirol R-09 digital device in .wav format plus heterodyne channel to headphones.

Surveyor 2

Using Pettersson D230 heterodyne detector to headphones.

Surveyor 3

Using Magenta Bat 5 heterodyne detector to headphones.

Static bat detector

A static bat detector (Wildlife Acoustics SM2 - records all frequencies and is triggered in 1 sec intervals each time it detects a sound emitted above 16kHz) in frequency division mode was placed halfway along the western elevation of building 5 to coincide with the start of the survey at 04:07 hrs, recording all bat activity within the vicinity. The results of the static bat detector were used to confirm and consolidate the corresponding bat activity results of the nearby surveyor, as well as detecting any additional bat species in the vicinity, as the microphone of a SM2 is omnidirectional and has a good range of detection at large distances, sometimes up to 30m.

**Please refer to the following inserts for the results.**

## DAWN Bat Survey 08/08/14 Coventry Stadium

Timestamp	Surveyor ID	Bat species	Activity	Comments/additional info	If you have drawn on the map please select the next sequential (alphabetic) reference	Identification method	Sound recording number
08/08/2014 04:02:21	Surveyor 1 AS	Common pipistrelle	Commute/pass			Bat detector	
08/08/2014 04:06:17	Surveyor 1 AS	Common pipistrelle	Commute/pass			Bat detector	
08/08/2014 04:08:30	Surveyor 3 ER	Common pipistrelle	Commute/pass			Bat detector	
08/08/2014 04:11:27	Surveyor 2 BG	Common pipistrelle	Foraging, Commute/pass			Bat detector	
08/08/2014 04:12:42	Surveyor 1 AS	Common pipistrelle	Commute/pass	Social calling	A	Bat detector, Visual Observation	
08/08/2014 04:13:24	Surveyor 3 ER	Common pipistrelle	Commute/pass			Bat detector	
08/08/2014 04:15:16	Surveyor 3 ER	Indet. pipistrelle	Commute/pass			Bat detector	
08/08/2014 04:17:29	Surveyor 1 AS	Common pipistrelle	Commute/pass		B	Bat detector, Visual Observation	
08/08/2014 04:18:38	Surveyor 2 BG	Myotis sp.	Commute/pass			Bat detector	
08/08/2014 04:19:15	Surveyor 1 AS	Common pipistrelle	Foraging			Bat detector	
08/08/2014 04:22:00	Surveyor 2 BG	Common pipistrelle	Commute/pass	Repeatedly		Bat detector	
08/08/2014 04:22:18	Surveyor 1 AS	Common pipistrelle	Foraging	Social calling		Bat detector	
08/08/2014 04:23:45	Surveyor 3 ER	Indeterminate bat	Commute/pass			Bat detector	
08/08/2014 04:25:24	Surveyor 3 ER	Common pipistrelle	Commute/pass			Bat detector	
08/08/2014 04:28:02	Surveyor 1 AS	Common pipistrelle	Commute/pass		A	Bat detector, Visual Observation	
08/08/2014 04:28:37	Surveyor 1 AS	BLE	Commute/pass	through doorway	C	Bat detector, Visual Observation	
08/08/2014 04:29:44	Surveyor 1 AS	Myotis sp.	Commute/pass			Bat detector	
08/08/2014 04:30:56	Surveyor 3 ER	Indet. pipistrelle	Commute/pass			Bat detector	
08/08/2014 04:32:49	Surveyor 1 AS	Myotis sp.	Commute/pass	Possible Natterer's	A	Bat detector	

DAWN Bat Survey 08/08/14 Coventry Stadium

Timestamp	Surveyor ID	Bat species	Activity	Comments/additional info	If you have drawn on the map please select the next sequential (alphabetic) reference	Identification method	Sound recording number
08/08/2014 04:36:10	Surveyor 1 AS	Common pipistrelle	Foraging		A	Bat detector, Visual Observation	
08/08/2014 04:38:21	Surveyor 1 AS	BLE	Commute/pass			Bat detector	
08/08/2014 04:41:11	Surveyor 1 AS	Common pipistrelle	Foraging		reverse A	Bat detector, Visual Observation	
08/08/2014 04:42:27	Surveyor 3 ER	Common pipistrelle	Commute/pass			Bat detector	
08/08/2014 04:42:43	Surveyor 1 AS	Indet. bat	Possible entry	Quiet, through doorway	C	Bat detector, Visual Observation	
08/08/2014 04:44:07	Surveyor 1 AS	BLE	Commute/pass	x 2, possible swarm around oak tree just outside site boundary	D	Bat detector, Visual Observation	
08/08/2014 04:50:52	Surveyor 1 AS	Common pipistrelle	Commute/pass		A	Bat detector, Visual Observation	
08/08/2014 04:51:33	Surveyor 1 AS	Noctule	Commute/pass			Bat detector	
08/08/2014 04:52:44	Surveyor 2 BG	Noctule	Commute/pass			Bat detector	
08/08/2014 04:52:56	Surveyor 3 ER	Common pipistrelle	Foraging			Bat detector	
08/08/2014 04:57:42	Surveyor 3 ER	Indeterminate bat	Possible entry			Visual observation	
08/08/2014 05:02:01	Surveyor 3 ER	Indeterminate bat	Commute/pass			Visual observation	
08/08/2014 05:04:10	Surveyor 1 AS	Common pipistrelle	Foraging		reverse A	Bat detector, Visual Observation	
08/08/2014 05:06:30	Surveyor 3 ER	Indeterminate bat	Commute/pass			Visual observation	
08/08/2014 05:08:47	Surveyor 1 AS	Indeterminate bat	Possible entry	through doorway and back a couple of times then disappeared; small bat	C	Bat detector, Visual Observation	
08/08/2014 05:14:39	Surveyor 3 ER	Indeterminate bat	Commute/pass		A	Visual observation	

DAWN Bat Survey 08/08/14 Coventry Stadium

Timestamp	Surveyor ID	Bat species	Activity	Comments/additional info	If you have drawn on the map please select the next sequential (alphabetic) reference	Identification method	Sound recording number
08/08/2014 05:45:15	Surveyor 2 BG	Indeterminate bat	Emergence	x3. Emerged from ladies toilet, roosting location above wall and around doorway		Bat detector	

DAWN Bat Survey Results Map – Coventry Stadium – 08/08/14



## Second Bat Emergence Survey

A post-dusk emergence survey was undertaken on 2<sup>nd</sup> September 2014 by three suitably experienced surveyors, led by Casey Griffin, stationed as indicated on the following aerial image. Timings of surveys and weather conditions are recorded in the table below.

<b>Dusk Bat Emergence Survey – 02/09/2014</b>				
<b>Sunset : 19:53hrs</b>				
Survey Start Time: 19:40hrs		Survey End Time: 21:20hrs		
	<b>Temperature</b>	<b>Wind (Beaufort scale)</b>	<b>Cloud cover</b>	<b>Precipitation</b>
Start	16.7°C	0	10%	None
End	15.1°C	1	30%	None

### Surveyor 1

Using Pettersson D240x time expansion detection recording to Roland Edirol R-09 digital device in .wav format plus heterodyne channel to headphones.

### Surveyor 2

Using Pettersson D230 heterodyne detector to headphones.

### Surveyor 3

Using Magenta Bat 5 heterodyne detector to headphones.

### Camera

Two Sony Handycams were used during this survey. One was placed to focus at the western elevation of building 8 where potential bat access points had been identified during the initial inspection and the other was placed to focus at the western elevation of building 3 (which the surveyor could not view). At 20.00hrs the cameras were set to record in night vision mode for 60 minutes.

### Static bat detector

A static bat detector (Wildlife Acoustics SM2 - records all frequencies and is triggered in 1 sec intervals each time it detects a sound emitted above 16kHz) in frequency division mode was placed adjacent to building 2, at height, to coincide with the start of the survey at 19:40 hrs. This was placed to record all bat activity within the vicinity and particularly to note any bat activity between building 8 and along building 4. A second static bat detector was placed at the southern elevation of building 8 to record any bats in the vicinity. The results of the static bat detectors were used to confirm and consolidate the corresponding bat activity results of the camera and nearby surveyors, as well as detecting any additional bat species in the vicinity, as the microphone of a SM2 is omnidirectional and has a good range of detection at large distances, sometimes up to 30m.

**Please refer to the following inserts for the results.**

DUSK Bat Survey 02/09/14 Coventry Stadium

Timestamp	Surveyor ID	Bat species	Activity	Comments/additional info	If you have drawn on the map please select the next sequential (alphabetic) reference	Identification method	Sound recording number
02/09/2014 20:00:43	Surveyor 2 CB	Common pipistrelle	Possible emergence	From under stadium overhang	A	Bat detector, Visual observation	
02/09/2014 20:22:24	Surveyor 2 CB	Noctule	Commute/pass		B	Bat detector, Visual observation	
02/09/2014 20:23:05	Surveyor 1 CG	Noctule	Commute/pass			Bat detector	
02/09/2014 20:48:45	Surveyor 2 CB	Common pipistrelle	Commute/pass			Bat detector	
02/09/2014 20:58:23	Surveyor 2 CB	Indeterminate bat	Commute/pass	Audible chirp-like calls & bubbly sound ~27khz ...?		Bat detector	

Dusk Bat Activity Survey – 02/09/2014



KEY

- |                      |                    |                |                    |                  |                     |
|----------------------|--------------------|----------------|--------------------|------------------|---------------------|
| <b>X<sup>1</sup></b> | Surveyor location  | <b>CAM</b>     | Camera location    | <b>SM2</b>       | Static bat detector |
| <b>E?</b>            | Possible emergence | <b>→</b> (red) | Common pipistrelle | <b>→</b> (green) | Noctule             |

#### First dusk emergence survey summary (all buildings)

During the dusk emergence survey on 17<sup>th</sup> July 2014, despite appropriate weather conditions and timing of the survey, no bat passes were detected by any of the surveyors around building 8. The camera located on building 7 detected one bat pass some 42 minutes after sunset but this bat did not emerge from the building. The camera on the western elevation of building 3 detected a total of three bat passes from 35-61 minutes after sunset, but none of these bats emerged from the building, instead they were flying close to the tree-lined fenced boundary north-west of building 3. Indeed, the surveyor positioned at building 3 recorded a good amount of bat activity along the northern boundary of the site along the woodland edge including passes by common pipistrelle and a *Myotis* species.

Much more bat activity was detected around building 5 and along the eastern boundary including numerous passes by common pipistrelle and brown long-eared bat but none of these bats were seen to emerge from the building.

#### Dawn entry survey summary (building 5 only)

During the dawn entry survey on 8<sup>th</sup> August 2014, much bat activity was noted along the eastern tree-lined boundary with foraging common pipistrelle and brown long-eared bat noted for much of the survey. Occasional passes by a brown long-eared bat and by common pipistrelle (through a doorway into the grandstand) were noted by surveyor 1, but then these bats were not seen again. It was possible that the common pipistrelle had entered the building. The other surveyors had occasional bat passes but no bats were seen to enter the building.

At the end of the survey, Anna Swift investigated the doorway where a common pipistrelle had been noted and a single common pipistrelle flew out from on top of the wall where it had been roosting. The same surveyor then entered the ladies toilet block adjacent to this doorway and under the grandstand and three further common pipistrelle were seen to fly out of this area. A closer inspection of the area where the bats had been disturbed revealed a small amount of fresh bat droppings stuck to the inside wall of the ladies toilet block. It appeared that the bats were roosting on top of the blockwork wall in a gap between the wall and the roof covering and that a total of four individuals were roosting there at the time of survey. The surveyor quickly retreated to minimise disturbance once a bat dropping had been collected from this area. DNA testing of the bat dropping revealed a maximum likelihood of common pipistrelle *Pipistrellus pipistrellus* which confirmed the results of the dawn activity survey.

#### Second dusk emergence survey summary (buildings 2, 3, 4 and 8)

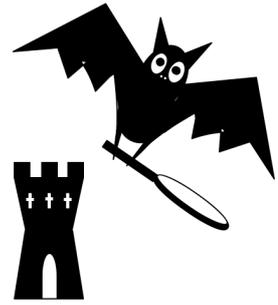
During the second dusk emergence survey at the site, a single common pipistrelle was considered likely to have emerged from building 4. Whilst the bat appeared from the eastern side of the grandstand and the surveyor could not see exactly where the bat had come from, there remained the possibility that the bat could have emerged from building 5 and flown across the track and close to building 4. The bat did not arrive from the south as it was not detected by the other surveyors or by the static bat detectors. The bat was noted some 20 minutes after sunset and this is well within the typical emergence time for this species.

No bat passes were detected by either of the camcorders.

No bat activity whatsoever was detected around building 8 with only occasional bat passes by Noctule and common pipistrelle heard along the northern boundary of the site.

#### Summary

In summary, four common pipistrelle were recorded roosting on top of a wall within the ladies toilet block at building 5 with 1 common pipistrelle probably roosting in building 4. No bats were considered to be roosting in buildings 1, 3, 6, 7 or 8 at the time of the surveys. It should be noted, however, that there remains medium potential for bats to hibernate within building 4 and this is accounted for in section 10 below.



26<sup>th</sup> August 2014

Re: Bat Identification Results for Rebecca, Ecolocation.

Your ref: Brandon

Bat job number 003997 received 11/08/2014

Sample labelled: Ladies Toilet

PCR amplification successful. DNA sequence:

CCAAAATTTTCATCATGCTGAAATGTTTGATGGAGCTGGTAGATCAATGAATGAGTTAT  
TGATGATTTTGATCAGGGGGTGGGATTTTCGAATGTTTGTCAT

Phylogenetic analysis identification: *Pipistrellus pipistrellus*

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

Best regards,

Robin Allaby  
Associate Professor.

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.

**Dr Robin Allaby**

School of Life Sciences,  
Gibbet Hill Campus,  
University of Warwick,  
Coventry CV4 7AL  
Tel: 02476575059  
Fax: 02476574500  
Email: [r.g.allaby@warwick.ac.uk](mailto:r.g.allaby@warwick.ac.uk)

## 8. Survey Conclusions

The results of the initial bat assessment of the buildings indicated low-medium potential for bats across all the buildings at the site. Evidence of brown long-eared bat was recorded in building 8 together with a possible bat dropping in building 5 (species unknown). Buildings 2, 3, 7 and to a lesser extent, building 4, and the remaining areas of building 8 all appeared to offer additional summer bat roosting opportunities but could not be fully investigated by the surveyor at the time of survey.

Bat activity surveys at the site between July and September 2014 revealed a satellite/small maternity roost of common pipistrelle on top of the blockwork wall in the ladies toilet at building 5 and a single common pipistrelle was also considered likely to have emerged from either building 4 or building 5 during the September survey. The single bat dropping that was recorded in building 8 was not considered likely to represent a contemporary roost given an absolute lack of any bat activity within the vicinity of building 8 throughout the bat activity surveys, and instead was likely to have been deposited by a single exploratory bat that had used the building just once. As the buildings within the site are to be demolished, suitable mitigation for a small maternity roost of common pipistrelle is outlined within section 10 to demonstrate that appropriate bat mitigation can be readily accommodated within the site.

Building 4 appeared, at the time of the initial bat inspection, unlikely to support summer roosts of bats as the potential roosting areas were largely in shade but this building was considered to offer medium hibernation roost opportunities for bats during the winter months. Due to the potential extent of the cavities within the ceilings, it is not considered possible to carry out hibernation checks of the building with any degree of confidence, although a check for bats in winter is recommended, it should be noted that an absence of bat evidence at this time would not necessarily represent an absence of bats. As such, it is assumed that such a building could house hibernating bats and a replacement hibernation building is recommended to be erected within the shaded woodland area. Further details and sensitive working practices are described in the sections below.

Incidental use of building 4 by an unknown bird species was recorded during the walkover survey. It is noted that there is a good potential for nesting birds to make use of most buildings at the site and sensitive working practices in this regard are outlined in the section below.

## 9. Obligations and Recommendations

The National Planning Policy Framework paragraph 117 states that "To minimise impacts on biodiversity and geodiversity, planning policies should...promote the preservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species populations". In order to ensure no net loss of biodiversity in accordance with NPPF & Circular 06/2005 recommendations are made below:

### Bats

- Bats are highly mobile and when not in hibernation can occupy a building overnight. It is essential therefore that due vigilance be maintained before and during any works to ensure their protection. The lack of evidence of more significant roosting at this stage does not constitute confirmation that this is not taking place intermittently or may not take place in the future.
- Following completion of the surveys, as a satellite/small maternity roost of 4 common pipistrelle and a summer roost for a single common pipistrelle were recorded roosting in building 5 and possibly in building 4, appropriate mitigation for bats will need to be accommodated within any forthcoming scheme. Outline details of how this can best be achieved are provided in section 10.
- It should also be noted that in order to demolish the buildings with bat roosts, a **mitigation licence** must first be sought **from Natural England** in order that any such disturbing works are undertaken

legally. Such a licence can only be applied for once planning permission is granted and any bat-related conditions have been discharged. The licence application must also be supported by bat activity survey data from the most recent bat season (May-August).

- Following completion of the survey, as there is the potential for hibernating bats within building 4, it is recommended that **1-2 checks between January and February** (typical time of peak hibernation numbers) are undertaken using the most appropriate methodology whilst minimising disturbance. Appropriate methodology may include use of static bat detectors or detailed investigations with a torch or endoscope. The results of this further check, if positive, would inform the detail of the bat hibernacula as well as a possible licence application to Natural England, but should no evidence of bats be noted, this does not equate to an absence of bats and the bat hibernacula as designed for general use by bats (see overleaf), should be erected prior to any disturbing works to building 4.

### Birds

- ❖ Whilst no evidence of active bird nests was recorded during the survey on 24th April 2014, there remains a good potential for birds to access all buildings and nest at the junctions of purlins and rafters, on top of gables or perhaps at eaves or doorway lintels. The majority of species of nesting bird are protected under the Wildlife & Countryside Act 1981 and as amended by the Countryside & Rights of Way Act 2000. The site should therefore be surveyed for nesting birds prior to commencement of works by a person competent to do so and due vigilance also be maintained during construction to ensure that no breeding birds are disturbed during the construction process should nesting commence thereafter. Birds typically nest between March-September inclusive though some species will nest at any time of year. If evidence of nesting birds is found, no works should be undertaken that may cause disturbance until after all the chicks have fledged.

### Other

- ❖ Should any protected species be discovered before or during the works, *ECOLOLOCATION* or the local office of Natural England should be contacted for advice.

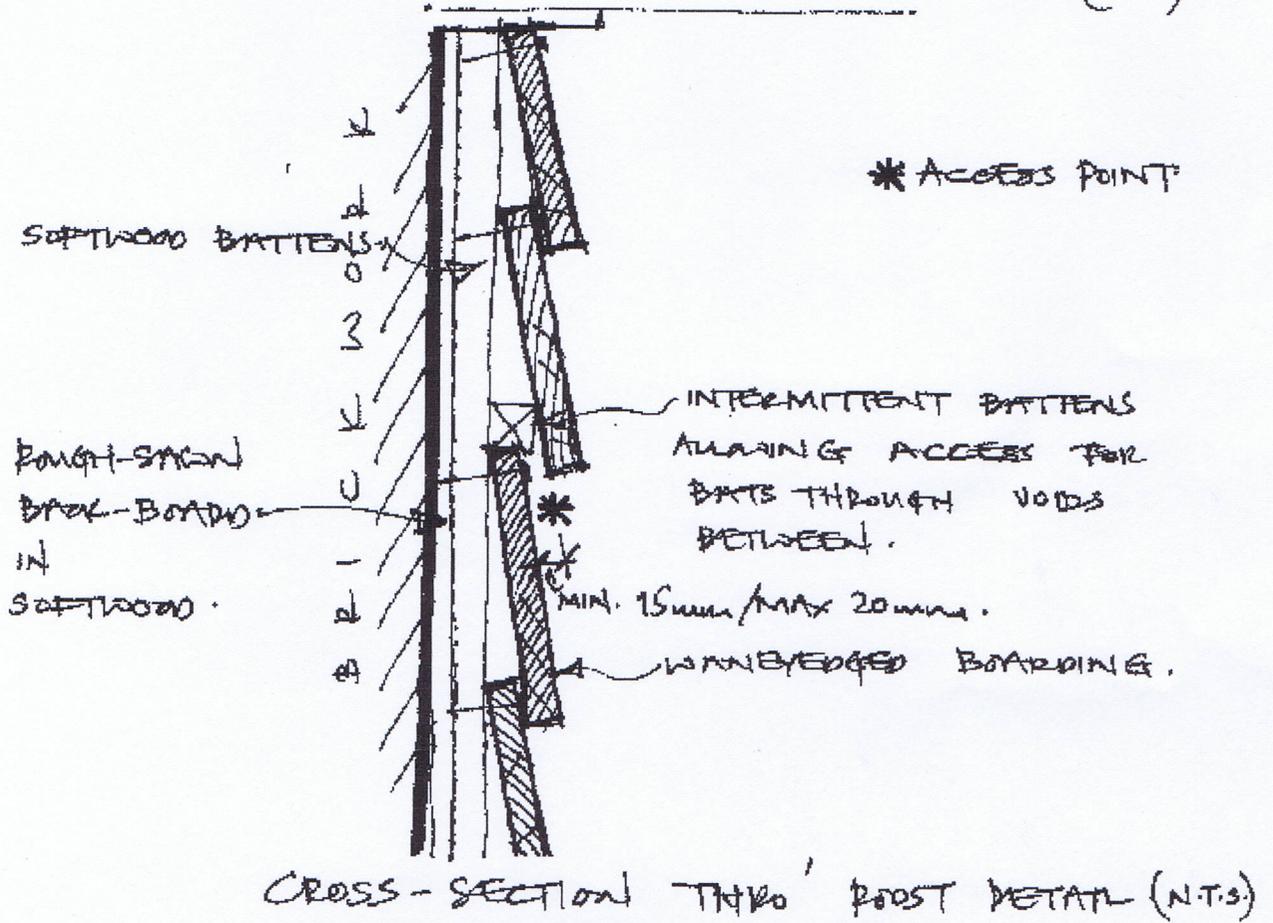
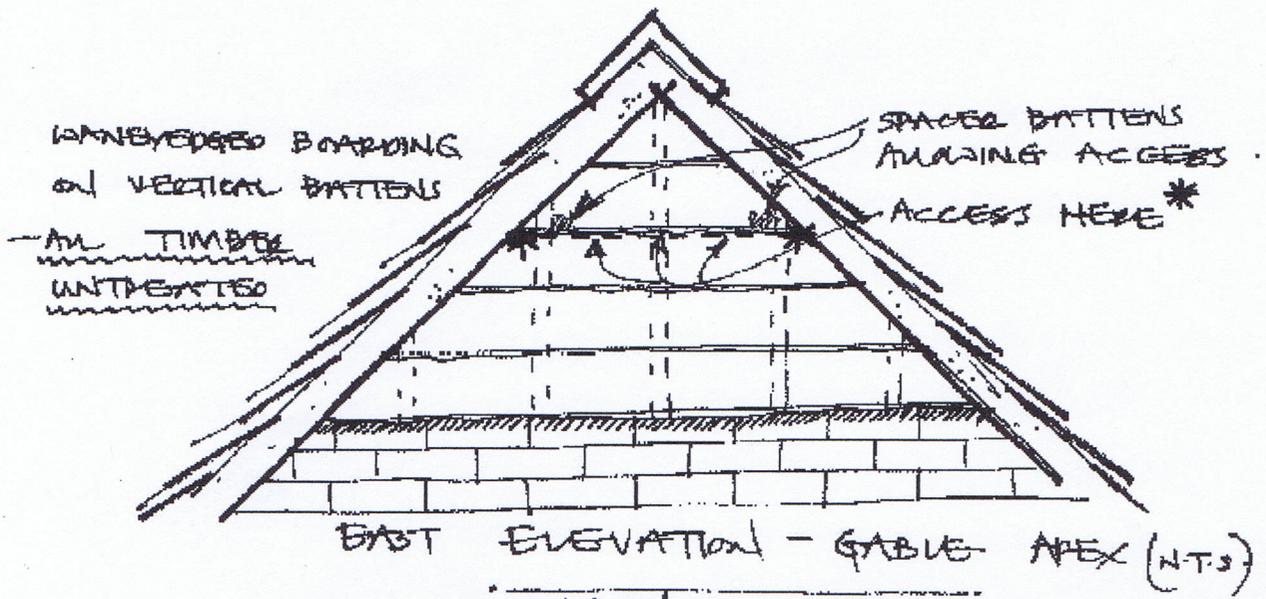
## 10. Mitigation and enhancement

### *Common pipistrelle - satellite/small maternity roost and summer roost*

A satellite/small maternity roost of four bats and a possible summer roost of a single bat (all common pipistrelle) were recorded in buildings 5 and possibly in building 4, respectively. As the demolition of the buildings within the site will destroy such roosts, it is the principal of any mitigation scheme to time the works to avoid the most sensitive time of the year, to dismantle any buildings with possible bat roosts in with care, and to provide suitable replacement roost opportunities within the site in order to maintain the favourable conservation status of bats in the area. Mitigation for such bats could be achieved within the scheme as outlined below:

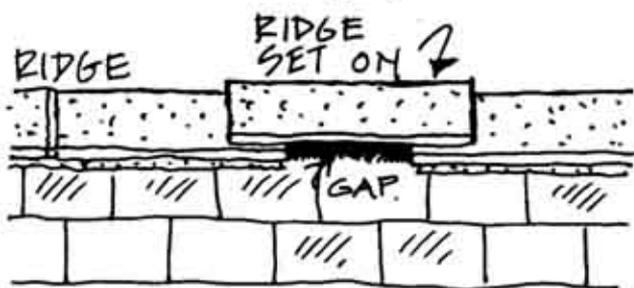
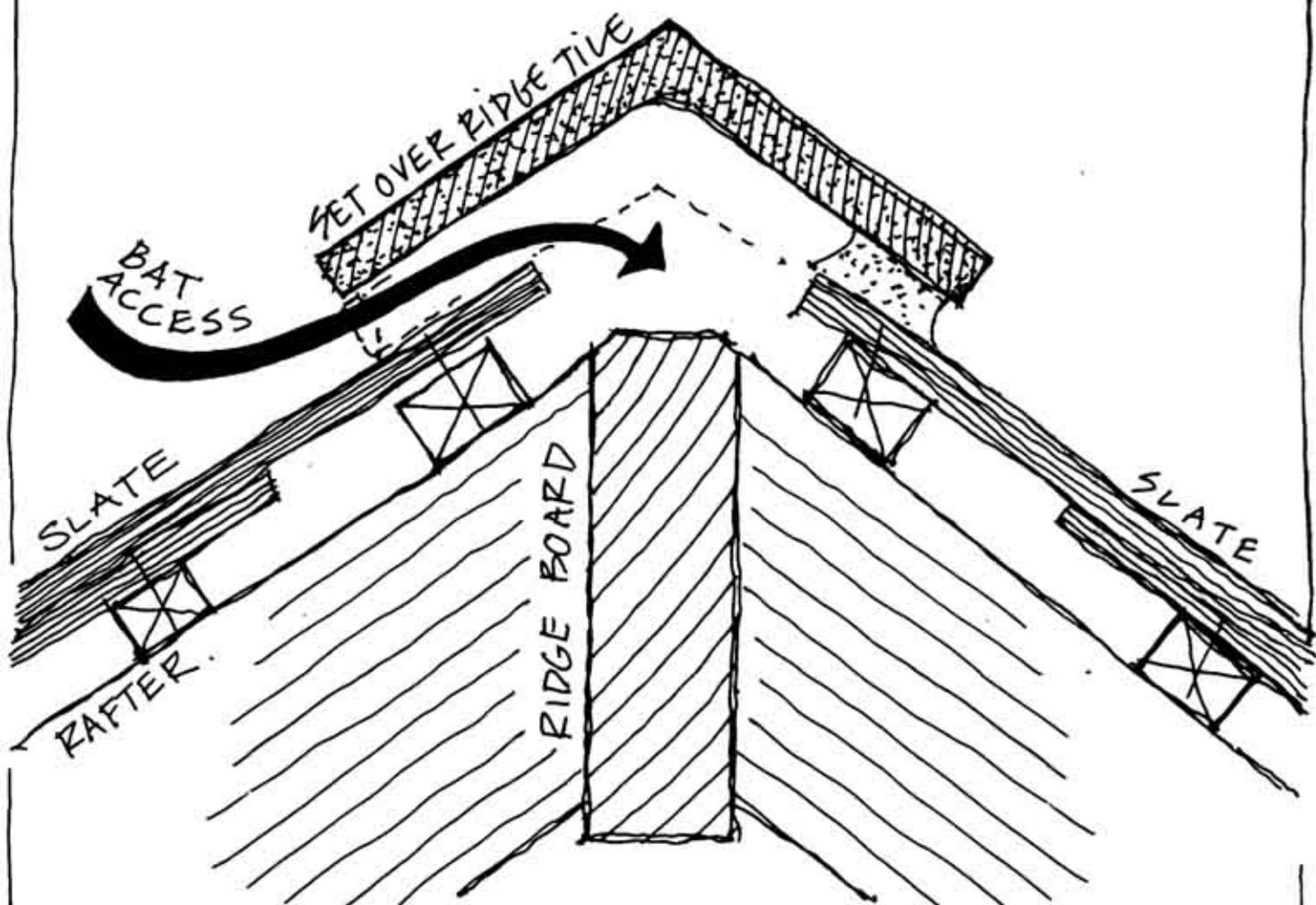
- ❖ A **mitigation licence application in respect of bats roosting in buildings 4 and 5** must be made to Natural England and be in place prior to any disturbing works to these buildings. Such a licence application must also be supported by a walkover visit within 3 months of the application together with bat activity surveys from the most recent active season (i.e. the preceding May-August period).
- ❖ **Building 5** - sensitive timing of works (avoiding the maternity season of May-August as the roost could be a small maternity roost); **Building 4** - sensitive timing of works to avoid the hibernation season (see below) but no need to avoid the maternity season as at most there has only been one confirmed bat roosting in this building during the summer months.
- ❖ Any disturbing works to the roof, walls or gable ends of buildings **4, 5 and 8** to be undertaken under the supervision of a licensed ecologist. *NB: Whilst building 8 is not considered to be a contemporary bat roost and will not need to be covered by the bat licence, it is still prudent to undertake sensitive working practices to this building.*
- ❖ Replacement roosting opportunities for common pipistrelle to include the addition of timber cladding to the south-facing gable of a garage as well as the potential for access to the area under a ridge tile and on top of the ridgeboard.
- ❖ There is ample scope at the site to ensure that such replacement roosting opportunities could be made available for use prior to any demolition of buildings 4 or 5 to ensure continued available roosting opportunities at the site for bats.
- ❖ Any bats that are discovered during the watching briefs on buildings 4 and 5 can be captured by the licensed ecologist and transported to the replacement roost.
- ❖ Should any bats be discovered roosting in building 8, works must cease whilst Natural England are contacted for advice on how best to proceed.
- ❖ Enhancements for bats could include the provision of a bat loft above a detached garage, close to the northern or eastern boundary where brown long-eared bats were recorded foraging. The bat loft should measure at least 5m x 4m footprint and have a ceiling to apex headroom of at least 2m with an overall building height of 4m or greater. The bat loft should be a traditional cut roof construction with a bituminous lining. It could be within a car port, a part of a roof void in a new dwelling or could be a separate standalone building. It should be located close to vegetation but must not be shaded by the sun; preferably, its gable should be south-facing to allow bats to roost in this area and gain the full benefit of the heat from the sunshine. In addition to this, integrated bat boxes could be included within the southern gables of some of the proposed housing. These should be located on dwellings close to woodland or the proposed SUDS or green space.
- ❖ In terms of landscaping, the map below indicates areas of green space that have been recommended by *ECOLOLOCATION* in respect of reptile mitigation at the site (see separate *ECOLOLOCATION* Reptile report for Brandon Stadium - December 2014). The proposed SUDS together with replacement tree planting in the woodland area along the northern boundary and the proposed wildflower meadow adjacent to this will offer significant enhancements for foraging bats at the site.

TIMBER CLADDING ROOST DETAIL FOR CREVICE-DWELLING BATS



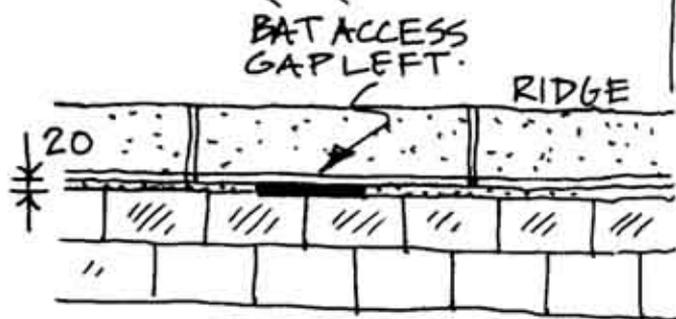
ROOST DESIGN DETAILS.

# RIDGE TILE ACCESS DETAIL 4A



~ OPTION A ~

ROOF RIDGE SET ON TOP OF GENERAL RIDGE TILES TO FORM BAT ACCESS GAP.

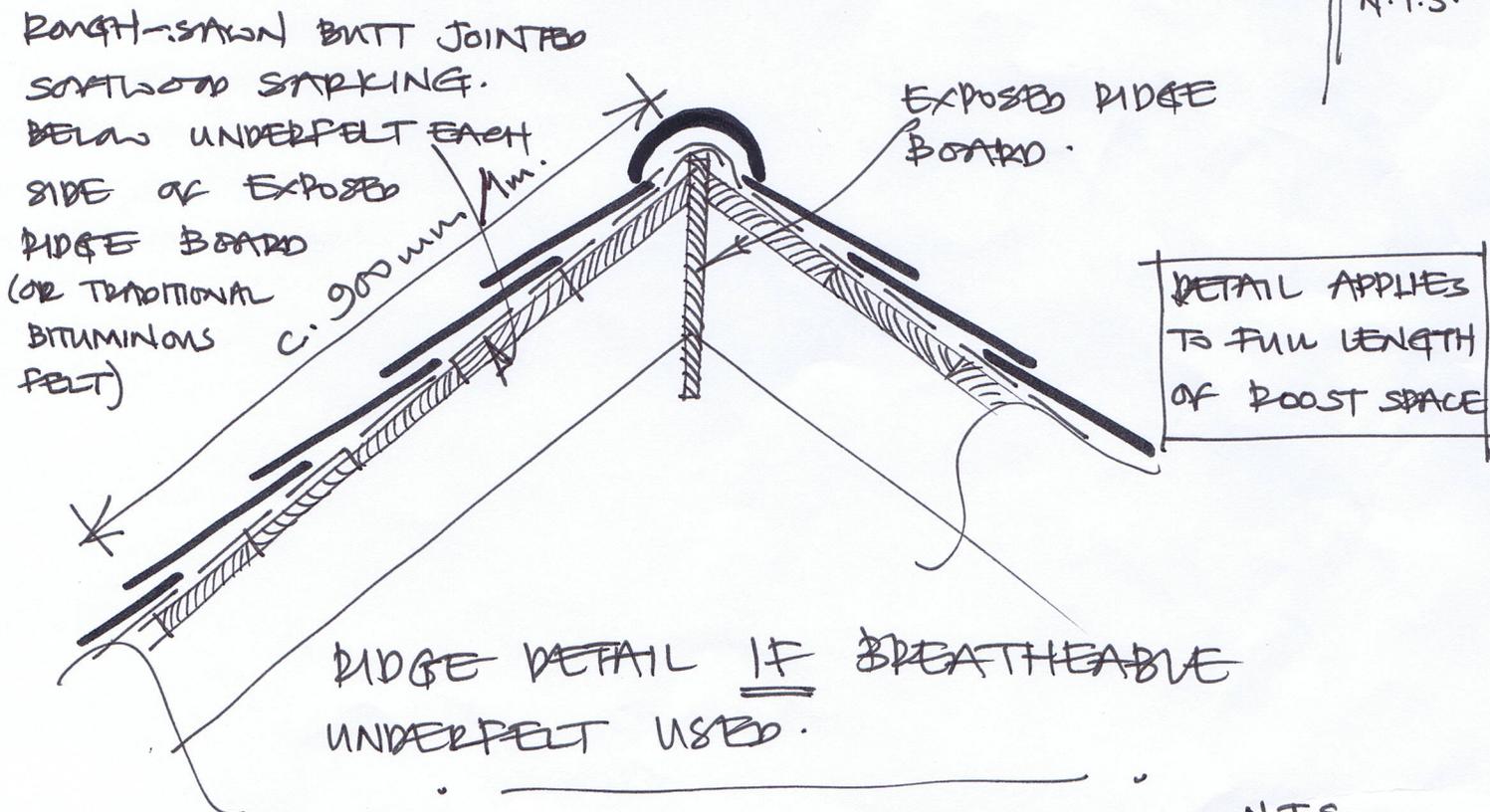
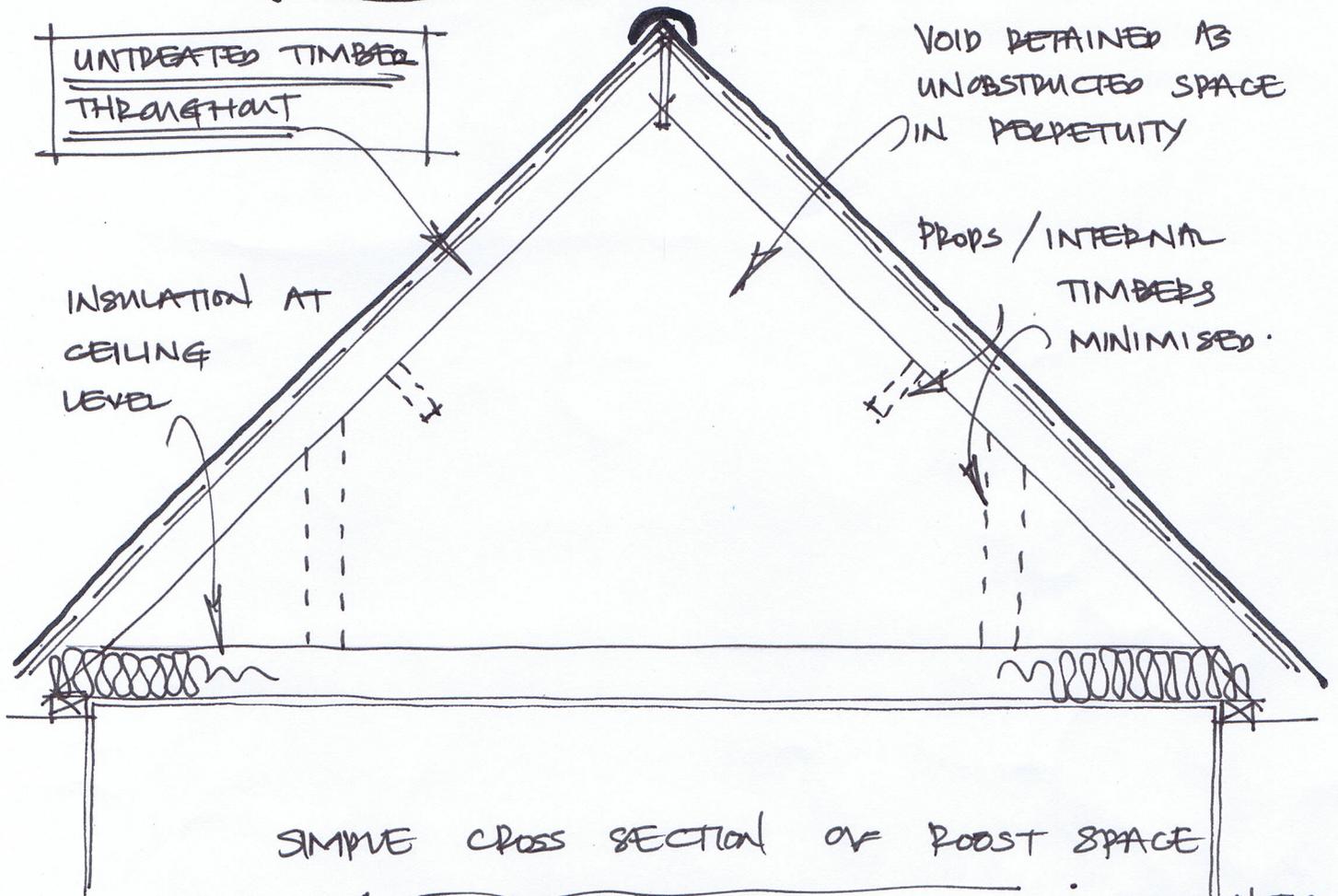


~ OPTION B ~

MAINTAIN 20MM MORTAR GAP. & LEAVE A SECTION OUT.

# BROWN LONG-EARED BAT

## ~ ROOST DETAILS



*Possible winter roosts*

Building 4 has **medium potential** to support **hibernating bats** and it is anticipated that a winter hibernation check of the building for bats will not be able to access all areas and cannot rule out the presence of bats at this time. If of course, evidence of hibernating bats is discovered, the works would be licensable and the bat hibernacula design below would be tweaked to suit a specific bat species. At this stage, however, it is appropriate to indicate how mitigation or compensation for hibernating bats (species unknown) could be achieved within the scheme and this is outlined below:

- ❖ The loss of hibernation opportunities for roosting bats can be mitigated for via the provision of a dedicated bat hibernacula, the location of which is suggested within the woodland strip to be unaffected by the proposed development. The precise location of this would be agreed with the arboriculturalist to minimise any damage to significant trees, but is specifically suggested to be located here as it would be shaded on all sides by trees ensuring that it does not receive direct sunlight which could result in the internal temperature of the hibernacula being too warm. The bat hibernacula should take the form of a structure of minimum footprint 5m x 5m with thick walls of brick or stone that are enclosed (although access for bats could be provided via a grille opening on a door that was only accessible to a licensed bat worker for monitoring purposes). The building would be enclosed (i.e. not open-sided) and it would need no separate loft space as crevices would be created on the ground floor of the hibernacula within the walls or perhaps via the addition of Norfolk bat bricks (suitable for use by hibernating bats) - see overleaf. The roof of the hibernacula should be of a design that would allow for a range of temperature levels within the building between 0°C and 10°C and to encourage humidity levels to be high (around 90% is ideal). A bare earth floor and locating the hibernacula partially underground will all help to achieve this.

See Norfolk Bat Group info sheet on bat hibernacula and Norfolk bat bricks

# THE NORFOLK BAT BRICK

## A BRIEF DESCRIPTION AND GUIDE TO A BAT CONSERVATION AID

### The Bats

There are sixteen resident species of bat in Britain of which thirteen have been found in East Anglia in recent years. Of these, six species prefer damp undisturbed underground (or at least semi-underground) sites in which to hibernate, for at least part of the winter.



A protective grill positioned over a bat cave



### Hibernation

All British Bats have to hibernate during the winter months when there are no flying insects for them to feed upon. Species like Daubenton will start to sleep from about mid-September until mid-March or later, depending on the prevailing weather conditions. To achieve this sound sleep enabling survival until the spring they typically require:

■ Darkness, with little or no disturbance

■ High humidity - over 90% for most species

### Suitable Structures

Many kinds of underground or semi-underground sites may be used by bats, including natural caves, cellars, ice-houses, brick and lime kilns, disused railway tunnels, old army buildings and a whole range of natural and man-made tunnels of many different kinds.

■ A steady temperature, above freezing, but below ten degrees C. with a gradient, or range of temperatures

■ Freedom from potential predators

■ Crevices to hide in (that's where our Norfolk Bat Bricks fit in!)

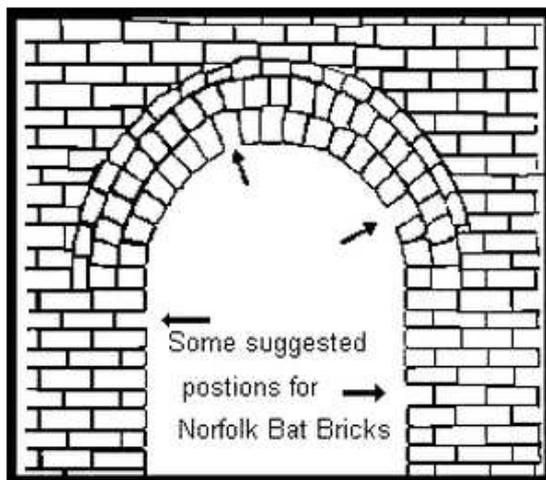
### Why "Bat Bricks"?

During research on hibernating bats in East Anglia during the 1980s it was observed that some underground sites seemed environmentally suitable, but lacked cracks and crevices conducive to hibernating bats. The installation of some experimentally designed brick crevices in two sites during the autumn of 1984 quickly produced results. Development has continued in order to find the best combination of materials and aperture size.



A Norfolk Bat Brick with single Daubenton hibernating inside

### Suggested Placement Points



### Installation

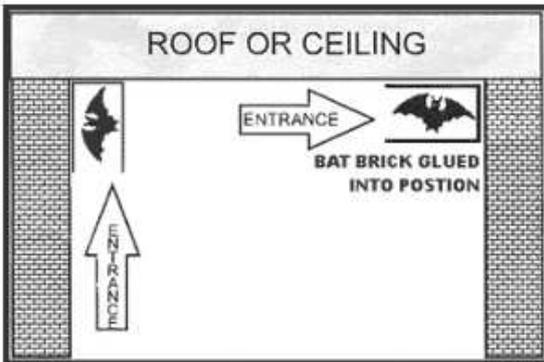
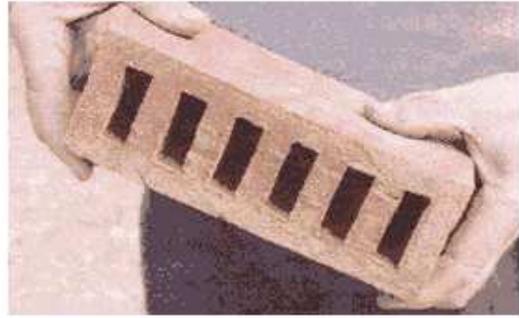
These bricks would typically be used to replace an existing perhaps crumbling brick in a brick-built vaulted tunnel. The old brick should be carefully removed using a grinder, drill or cold chisel, taking proper safety precautions, then inserting the bat brick using an appropriate mortar (e.g. a soft lime mortar for old brickwork, or 6:1 sand:cement for modern brickwork). Modern resin-based mortars can be used, but they should be used sparingly, only in the summer when no bats are present, with extra ventilation and so placed to provide a water soluble 'wick' with the original substrate. Prop the brick in place with a length of timber or an "Acro-prop" for a day or so until set, then carefully point-up around any gaps.

They are NOT 'entry bricks', neither were they designed to be used facing into the cavity wall of modern houses and are considered unlikely to be used by bats in this situation.

### What is a Norfolk Bat Brick?

These are brick-sized objects approximately 200mm x 100mm x 70mm hand-made from an absorbent clay, roughened with sand and fired to about 1100 degrees C. to make them frost-proof. They have a series of slits of the correct size for Daubenton's, Natterer's, Brown Long-eared, Brandts, Whiskered and Barbastelle to hide in.

These are of a registered design and are *only* produced by The Norfolk Bat Group.



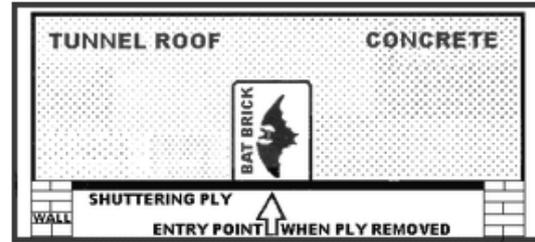
### Alternative Fixings

In existing concrete tunnels or sites where it is considered difficult or undesirable to excavate or damage the existing surfaces, then surface attachment is acceptable, though may not give quite such good results. Embedding the bricks into the concrete roof of a new tunnel also works well. Simply place the bat brick on the surface of the shuttering ply, having first filled all the holes with sharp sand or grit, allowing a little to spill out when placed. This stops wet concrete entering the holes and gives a rough gripping area around each bat brick after the shuttering is removed. Do seek the advice of a structural engineer before doing this, as these units may influence the structural integrity of a cast concrete tunnel roof.

### How Many?

In East Anglia our largest hibernation sites contain perhaps 400 bats at peak. However at most sites one typically finds less than a dozen bats of two species. Since only 10% of bats, from a given population, are seen at any one time, each of these small sites could be 'home' to over 120 bats!

1 - 3 bats per bat brick have been seen in most occupied sites during December - February, since the first experimental ones were installed, but occasionally up to seven bats of three species will occupy a single Norfolk Bat Brick. Obviously they are going to work best where there are plenty of bats, *but* a shortage of suitable hibernating holes. Over 3000 of these items have now been placed in the UK, with considerable success.



Our experience is that our most densely occupied underground hibernating sites have less than one sleeping bat per 3 cubic meters of air space, so something the size of say a World War II air-raid shelter with about 30 cubic meters of air-space might need no more than ten bricks set in a variety of locations.

### Cost and Delivery

There has been a heavy demand for these bat bricks, but they are now available again. The price is currently £10.50 each (with discounts for quantity) plus transport at cost (please phone or fax for quote - or arrange your own transport). They weigh c. 2.5 kg each, so cost just over £1 to post, but can be sent by carrier at cost. Delivery times for small quantities are typically within 21 days, when in stock. Please allow 12 weeks for larger quantities and also note that drying and firing times may be further extended during the winter months.

### Ordering

Please fax your order to: 01508 550850 - or telephone 01508 550784 to discuss your requirements. You may also post your order to: The Norfolk Bat Group, The Barn Cottage, Wheelers Lane, Seething, Norwich, Norfolk. NR15 1EJ. Invoices will be sent to recognised firms and bat groups, on the understanding that payment will be within 30 days, but small orders should ideally contain a cheque for an agreed amount.

**INFORMATION CORRECT AS OF APRIL 2008.**

## 11. References

Bat Workers Manual (3<sup>rd</sup> Edition) JNCC, 2004  
Bat Survey Guidelines, Bat Conservation Trust, 2012, 2nd ed  
Bat Mitigation Guidelines, English Nature Jan 2004  
Long-eared bats, Susan M Swift 1998  
The Conservation of Habitats and Species Regulations, HMSO (2010, as amended)  
NPPF - National Planning and Policy Framework  
Circular 06/2005: Biodiversity and geological conservation: Statutory obligations and their impacts in the planning system  
Warwickshire Biological Records Centre  
[www.natureonthemap.naturalengland.org.uk](http://www.natureonthemap.naturalengland.org.uk)  
Google Earth Pro