WOLD ECOLOGY LTD

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White House Farm, Althorpe

Bat Survey, August 2009.

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Notes.	**This report contains sensitive information concerning protected species and caution should be exercised when copying and distributing to third parties.**	

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1.0 INTRODUCTION

1.1 Background Information

1.1.1 In July 2009, Wold Ecology was commissioned by Sara Potter to undertake a bat survey at White House Farm (approximate National Grid Reference SE 832 094) in Althorpe, North Lincolnshire (see 2.9.1: Site Location Plan and 2.10).

1.1.2 The survey focused on a series of disused and neglected buildings within the farm complex. The proposed work will involve the development of the building into offices, stores and holiday lets. A bat survey was undertaken as part of the planning application process (ODPM Circular 06/2005 Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System).

1.1.3 The survey involved :

- Daytime assessment for bats;
- Emergence survey;
- Return (dawn) survey and;
- Barn owl *Tyto alba* survey.

2.0 SURVEY AND SITE ASSESSMENT

2.1 Pre-existing information on bats at the survey site.

2.1.1 Currently there is no pre-existing information on bats at the site. Data for the 10km grid square SE80 shows no records of bats (NBN Gateway 2009).

2.2 Status of species present in Yorkshire

Table 2.2 highlights the regional and national status of bat species present in Lincolnshire.

Table 2.2 Status of Bat species in Lincolnshire

Bats	UK Distribution	North Lincolnshire Distribution
Common Pipistrelle	Common & widespread	Common & widespread but declining locally
Brown-long eared	Widespread	Unknown
Noctule	Widespread (except in Ireland)	Rare. In severe decline in this region.
Daubenton's	Widespread	Unknown
Natterer's	Widespread (except N & W Scotland)	Rare. Confined to the historic city centre of Lincoln
Barbastelle	Barbastellas barbastellas	Rare. Local decline unknown
Brandts	England and Wales	Rare. Only one record.
Whiskered	England, Wales, Ireland & S Scotland.	Rare. Only one record.
Leisler	Widespread throughout the British Isles, except N Scotland.	Rare

Source – Lincolnshire Local Biodiversity Action Plan

2.3 Objective of survey

In order to fulfil the brief, the site was visited and assessed on 20th July, 19th August and 29th August 2009. This was to determine whether the buildings on site were occupied by bats. The work involved the following elements:

- An on site daytime inspection survey for actual and potential bat roosts.
- An assessment of the on-site potential for bats and the likelihood of their presence.
- Produce a non-technical summary of the legal implications behind bat presence.
- Report the findings of the field survey work and identify recommendations for a potential mitigation strategy.

2.4 Survey area

2.4.1 The survey area targeted the following buildings within the farm complex (see 2.9).

- Fold yard;
- Granary;
- Dove cote;
- 2 barns and;
- Coach shed.

2.5 Habitat description

2.5.1 White House Farm lies in Althorpe village, in a rural location. The river Trent lies within 50 metres of the farm and the remaining adjacent land use is arable. The large flat fields are bounded by drainage ditches with very few hedgerows and woodlands.

2.5.2 A summary of the surrounding habitat is (radius of < 2km from the site):

- Buildings – old farm buildings and residential properties.
- Hedgerow – fragmented.
- Garden trees and small shelterbelt woodland.
- Large arable fields.
- River Trent.

2.6 Field survey

2.6.1 Daytime Survey

2.6.1.1 The daytime assessment identified whether the area had any signs of residency and/or bat usage. This took the form of a methodical search, both internally and externally, for actual roosting bats and their signs. Specifically, the visual survey involved:

- Assessment for droppings on walls, windowsills and in roof spaces;
- Scratch marks and staining on beams, other internal structures and potential entrance and exit holes;
- Wing fragments of butterfly and moth species underneath beams and other internal structures;

- The presence of dense spider webs at a potential roost can often indicate their absence and;
- Assessment of crevices and cracks in the buildings to assess their importance for roosting bats.

2.6.1.2 Timing
The daytime assessment survey was conducted at 1800. The duration of the survey was 1 hour.

2.6.1.3 Personnel
The daytime survey was conducted by Chris Toohie, Project Manager of Wold Ecology with 3 years field experience of surveying bats.

2.6.1.4 Weather conditions

Table 2.6.1 Weather Conditions

Climate	Survey Duration	
	Start	Finish
Time	1800	1900
Wind speed	Still	No change
Wind direction	N/A	No change
Rainfall	None	None
Cloud cover	25%	40%
Temperature	20°C	20°C

2.6.2 Emergence Survey

2.6.2.1 Emergence surveys are used to determine bat presence in a building and can also give a good estimate of the numbers present. Common pipistrelle bats can emerge approximately 30 minutes before sunset and brown long-eared emerge from dark from approximately 1 hour after sunset. The timing should ensure that bats have definitely emerged from their roost sites and would be foraging.

Surveyors were positioned so that all possible bat exits could be observed at one time. Four surveyors concentrated on (see 2.9.3) :

- Fold yard;
- Granary;
- Dove cote;
- Barn 1;
- Barn 2 and;
- Coach shed.

2.6.2.2 Timing
The emergence survey was conducted at 1945. The survey commenced 30 minutes before sunset and continued for duration of 2.5 hours.

2.6.2.3 Personnel
The emergence survey was conducted by Chris Toohie and Bev Hylton; both are experienced bat surveyors who hold Natural England scientific licences.
Wold Ecology staff assisted with the survey.

2.6.2.4 Weather conditions

Table 2.6.2 Weather Conditions

Climate	Survey Duration	
	Start	Finish
Time	1945	2215
Wind speed	18 mph	12 mph
Wind direction	SE	No change
Rainfall	None	None
Cloud cover	O%	No change
Temperature	18°C	17°C

2.6.3 Dawn Bat Survey

2.6.3.1 Surveys conducted at sunrise are particularly useful as bats tend to swarm outside their roosts for up to an hour before entering, thus allowing the surveyor more time to identify the bat and entrance locations. Bats will return to roosts approximately 90 minutes before sunrise and 15 minutes after. The timing of the survey ensured that returning bats would be recorded.

- Surveyors were positioned so that all possible bat entrances could be observed at one time. Two surveyors concentrated on barn 2, barn 1 and the fold yard.

2.6.3.2 Timing

The return survey was conducted at 0400 on 29th August 2009. The survey commenced 2 hours before sunrise and continued until 0615.

2.6.3.3 Personnel

The dawn survey was conducted by Chris Toohie who is an experienced bat surveyor who holds a Natural England scientific licence (20091183). Wold Ecology staff assisted with the survey.

2.6.3.4 Weather conditions

Table 2.6.3 Weather Conditions

Climate	Survey Duration	
	Start	Finish
Time	0400	0620
Wind speed	12 mph	8 mph
Wind direction	W	No change
Rainfall	None	None
Cloud cover	0%	0%
Temperature	11°C	11°C

2.6.4 Equipment

The following equipment was used or at hand during the field survey work:

- Telescopic ladders;
- Binoculars;
- Cluson 1 million candle power lamp;
- Dart Endoscope;

- Frequency Division Bat Box Duet detectors;
- Heterodyne Stag Electronics Bat Box III detectors;
- MP3 recorders and sound analysis software;
- Night vision scope and;
- Anabat.

2.7 Results

2.7.1 Daytime Survey

2.7.1.1 Fold Yard.

The fold yard is a cool and draughty building that has a pitched, corrugated asbestos roof. Most of the roof is in good condition with no sheets missing but gaps beneath. The timber roof structure is free of crevices but gaps are present at joints. Some of the timbers are rotten and has led to a partial collapse. The north facing gable has timber cladding with gaps present, ivy *Hedera helix* is also growing on the building. Although there were no signs of roosting bats or bat activity in the building, it has been assessed as having a MEDIUM PROBABILITY OF BAT INTEREST due to the gaps underneath the roof sheets, in timber joints and the presence of ivy. These all have potential to provide roosting opportunities for bats (see 2.10 figures). The yard may also be important for light sampling bats, prior to emergence.

2.7.1.2 Barn 1.

The single storey barn 1 lies adjacent to the fold yard and comprises a pitched roof with red pan tiles. There are numerous gaps in the red brickwork and beneath the tiles. The ridge tile is complete with gaps beneath. Internally, the smooth sawn timbers are free of gaps. The roof is felt lined and ripped in places. The walls have gaps and crevices but are thick with dust and cobwebs. Although there were no signs of roosting bats or bat activity in the building, it has been assessed as having a MEDIUM PROBABILITY OF BAT INTEREST due to the gaps underneath the roof tiles and in the brickwork. These all have potential to provide roosting opportunities for bats (see 2.10 figures).

2.7.1.3 Barn 2 and Dovecote.

The two storey, former pig sty's and dove cote are in a poor state of repair with many pan tiles slipped or missing. There are also gaps beneath the tiles and ridge tiles. There are also gaps in the brickwork. Internally, the first floor was unsafe and not inspected. The walls had partly been rendered but gaps were present in the brickwork, however they were thick with dust and debris. Although there were no signs of roosting bats or bat activity in the barn and dove cote, they have been assessed as having a MEDIUM PROBABILITY OF BAT INTEREST due to the gaps underneath the roof tiles, ridge tiles, missing tiles and brickwork. These all have potential to provide roosting opportunities for bats (see 2.10 figures).

2.7.1.4 The granary and coach house.

The two storey granary adjoins the single storey coach house and both buildings comprise pitched roofs with red pan tiles. Some tiles are missing or slipped on the granary and there are many gaps beneath all tiles. There are gaps in the external brickwork and around the window frames and doors. The coach house is open fronted and consequently, cool and draughty conditions occur. The smooth sawn internal timbers are free of cracks and crevices. There is a gap behind the

timbers in the roof apex. Although there were no signs of roosting bats or bat activity in the buildings, they have been assessed as having a MEDIUM PROBABILITY OF BAT INTEREST due to the gaps underneath the tiles, ridge tiles, in the roof apex, brickwork and around window frames. These all have potential to provide roosting opportunities for bats (see 2.10 figures).

2.7.2 Emergence Survey

2.7.2.1 A single Natterer's bat was observed foraging in the fold yard and a roost was confirmed in the barn to the east of the fold yard and barn 1 (see 2.9.3). This barn is not included within the proposed development. The first common pipistrelle *Pipistrellus spp.* bat was detected at 2045. This was not close to the anticipated emergence time and suggests that no roosts are close by. Numerous bats were recorded foraging around the farm complex (see 2.9.4).

2.7.2.2 No bats were observed emerging from the buildings that are to be developed.

Table 2.7.2 Summary of Emergence Survey (see 2.9.4)

Date – 19th August 2009					
Loc.	**Time**	**Species**	**kHz**	**Direction**	**Comment**
3	2037 - 2039	Natterer's	40		Foraging in the fold yard and returned to a roost in the barn to the east of barn 1 and fold yard.
1 & 2	2045	Pipistrelle	45	S	Commuting
3	2050	Natterer's	40		Foraging in fold yard.
2	2052	Pipistrelle	45	SE	Commuting
4	2104	Pipistrelle	45		Entered the fold yard and foraged briefly.
3	2112 - 2128	Pipistrelle	45		Foraging
2	2115	Pipistrelle	45	W	Commuting
2	2125	Pipistrelle	45	W	Commuting
3 & 4	2131	Natterer's	40	N	Commuting
2	2135 - 2140	Pipistrelle	45		Foraging
1	2150 - 2204	Pipistrelle	45		Foraging

2.7.3 Dawn Survey

2.7.3.1 One pipistrelle bat was detected at 0525 but did not enter any of the buildings. A Natterer's bat was briefly observed foraging in the fold yard and the barn to the east. The Natterer's bat did not enter a roost in either barn 1 or the fold yard.

2.7.3.2 No bats were recorded entering the buildings included within the proposed development.

Table 2.7.3 Summary of Dawn Survey (see 2.9.5)

Date – 28th August 2009					
Loc.	Time	Species	kHz	Direction	Comment
1	0525	Natterer's	40		Foraging
1	0533	Pipistrelle	45	South	Commuting

2.8 Interpretation and evaluation

2.8.1 Presence/absence

2.8.1.1 The site is currently used by foraging and commuting pipistrelle and Natterer's bats. No signs of roosting bats or bat roosts were recorded in the buildings to be developed.

2.8.1.2 A Natterer's bat summer roost is located in the internal brickwork of the barn that is adjacent to the fold yard and barn 1 (see 2.9.4). The roost is located in a barn that is not included within the proposed planning application.

2.8.2 Site Status Assessment

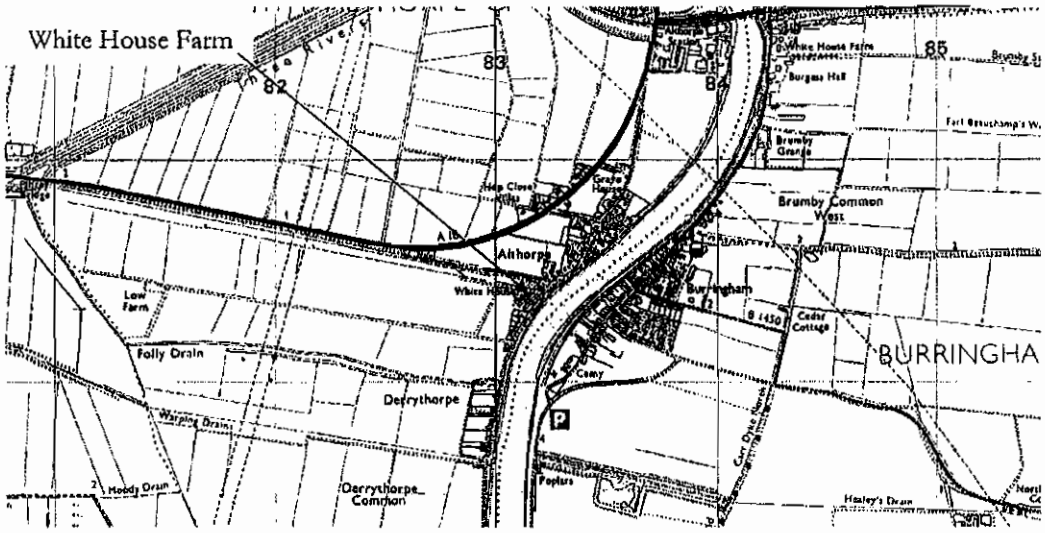
2.8.2.1 Based on a building inspection and an emergence dawn survey, it has been determined that barn 1, barn 2, dovecote, fold yard, granary and coach house is unlikely to support a bat roost. Although no bats or bat roosts were recorded in the aforementioned buildings during the surveys, it is considered that the buildings have a **medium probability of bat interest** (see section 7.2.4) as the buildings have features which could support roosting bats at other times of year.

2.8.3 Constraints

2.8.3.1 A detailed internal inspection of the first floors was not undertaken for health and safety reasons. The first floor was inspected from a ladder.

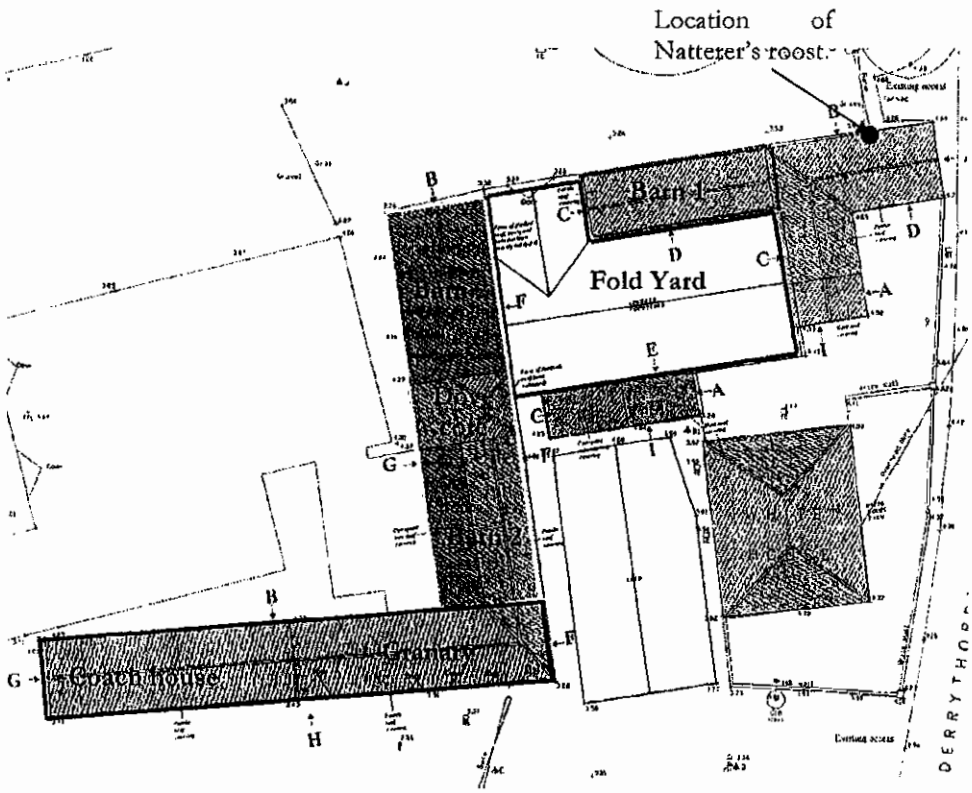
2.9 Maps of the survey area

2.9.1 Location Map

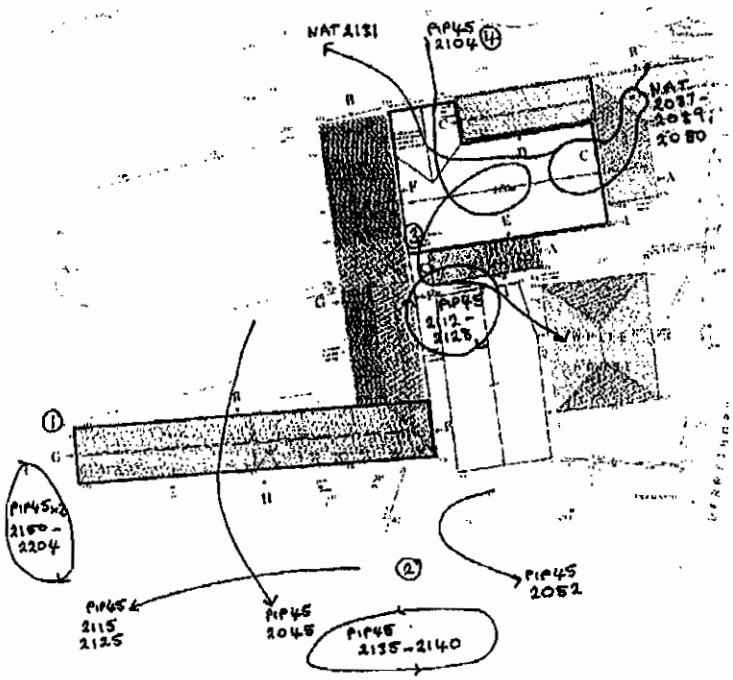


2.9.2 Aerial Photograph

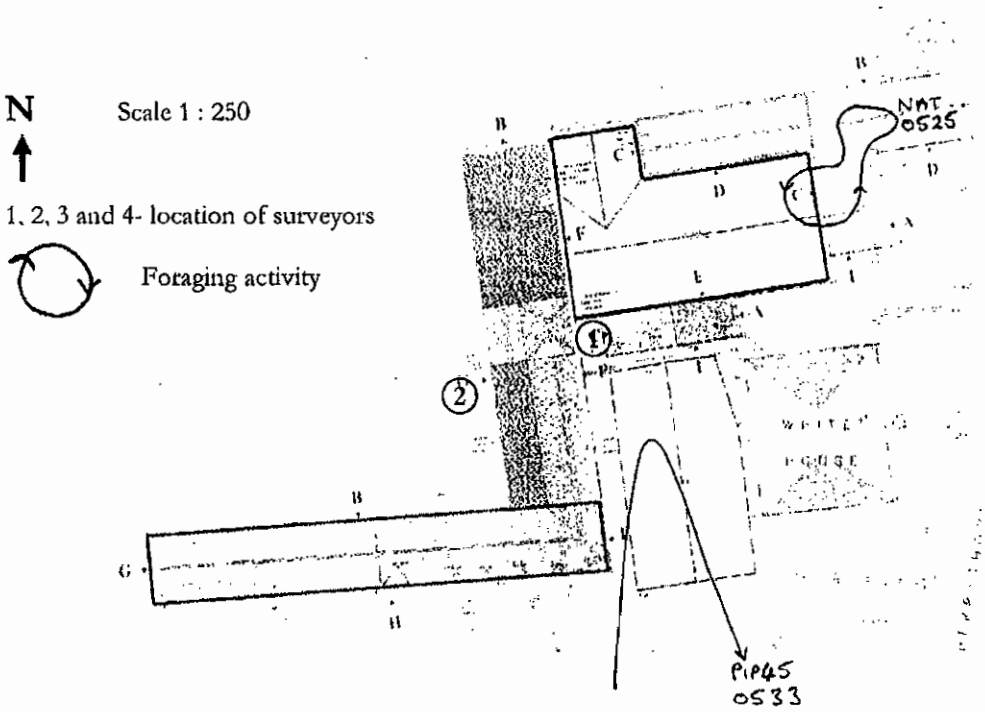
2.9.3 Layout Plan of White House Farm. Scale 1 : 250.



2.9.4 Emergence Survey – 19th May 2009.



2.9.5 Return Survey – 29th May 2009.



2.10 Photographs of key features

Figure 1 – Fold Yard

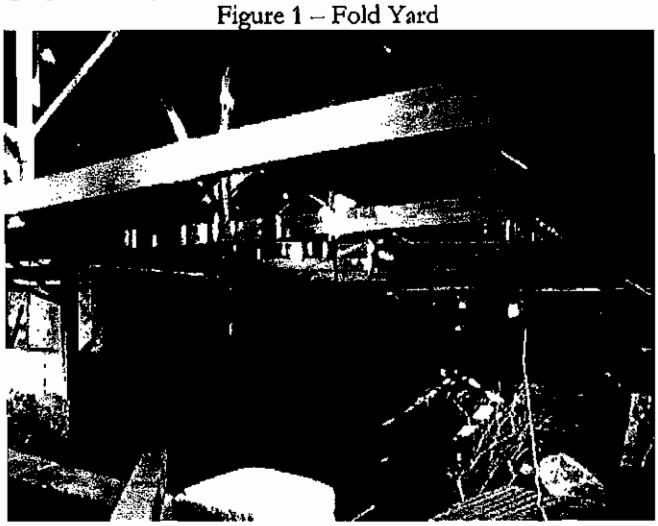


Figure 2 – Fold yard, north gable.

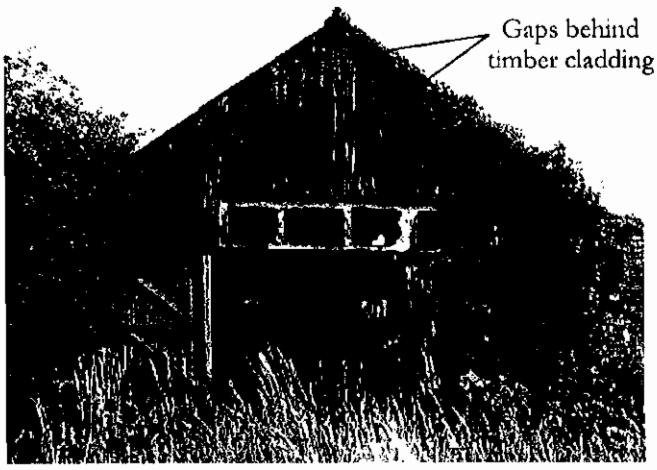


Figure 3 – Barn 1, north elevation

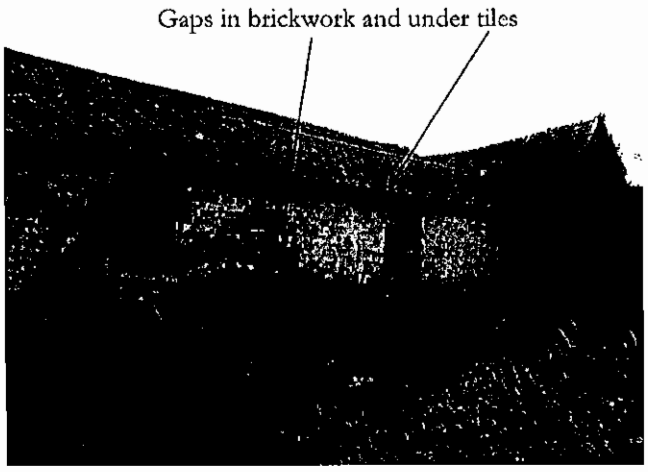


Figure 4 – Barn 2, east elevation

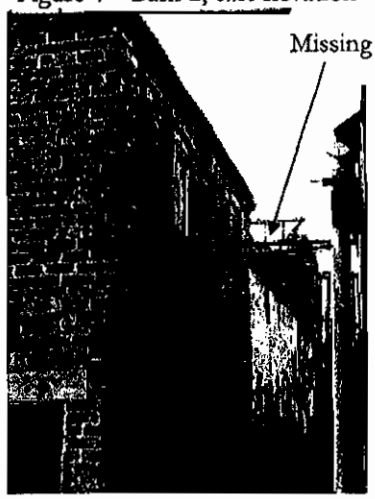


Figure 5 – Barn 2, east elevation.

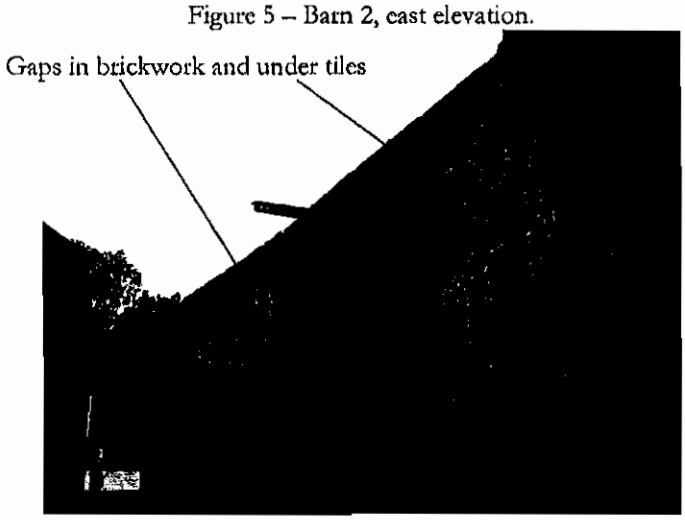


Figure 6 – Granary, south elevation.

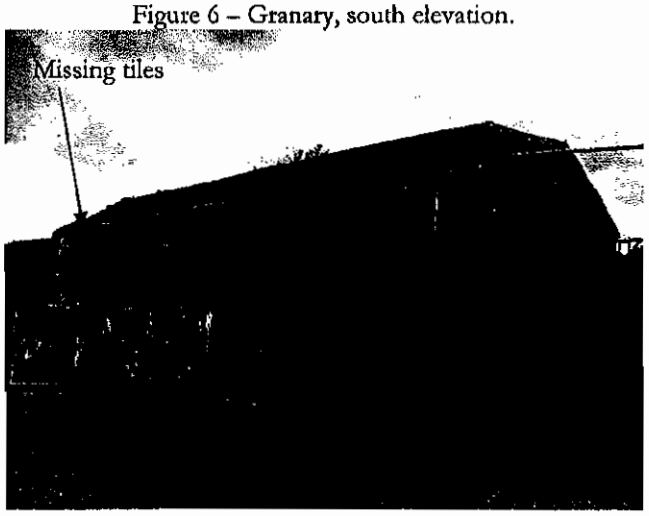


Figure 7 – Granary, west gable

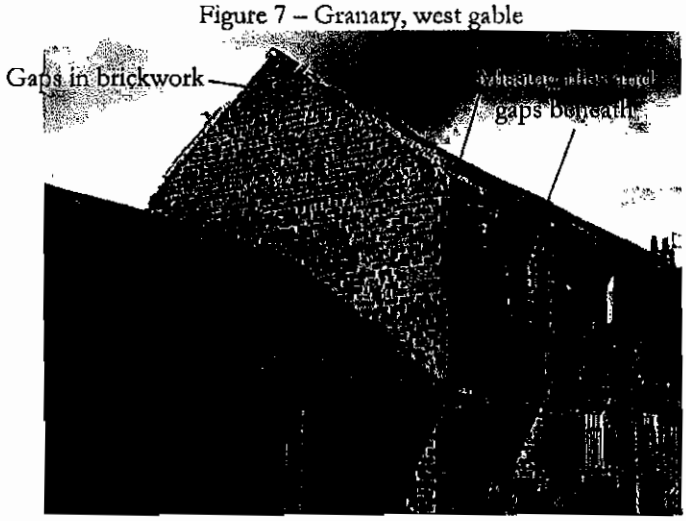


Figure 8 – Coach house.

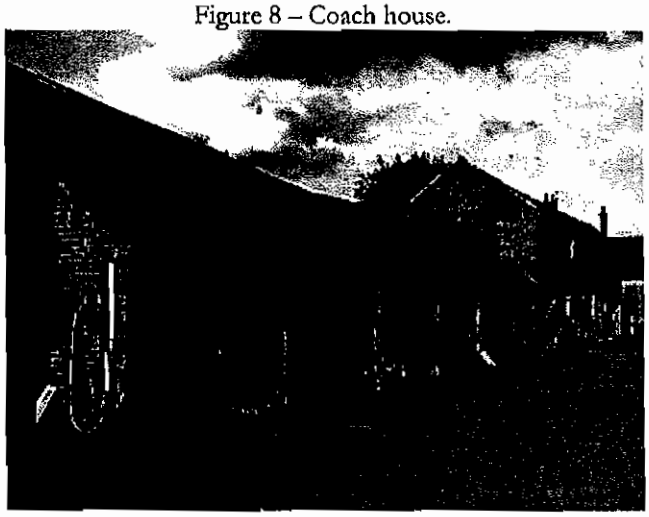
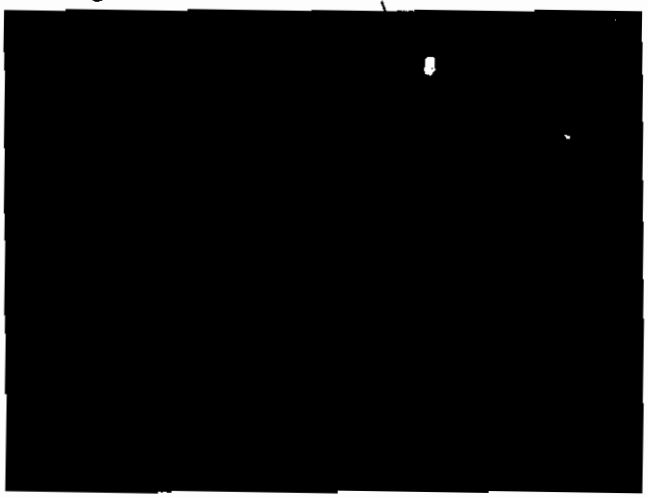


Figure 9 – Natterer's roost located in brickwork.



3.0 IMPACT ASSESSMENT

3.1 Based on current information, barn 1, barn 2, dovecote, fold yard, granary and coach house does not support a bat roost. Consequently, the impact to bats from the conversion of these buildings is considered to be **negligible.**

3.2 The barn to the east of the fold yard supports a Natterer's roost and access into the barn should be maintained at all times.

4.0 MITIGATION & COMPENSATION

4.1 Legal Protection

4.1.1 Legal obligations towards bats are generally concerned with roost protection. All developments, known to contain bat roosts, require a licence from Natural England (see 7.1.10 – 7.1.15). Under Section 9 of the Wildlife and Countryside Act (1981), it is an offence for anyone without a licence to kill, injure, disturb, catch, handle, possess or exchange a bat intentionally. It is also illegal for anyone without a licence to intentionally damage or obstruct access to any place that a bat uses for shelter or protection. As no bat roosts were detected during the surveys, the conversion of barn 1, barn 2, dovecote, fold yard, granary and coach house would not require a Natural England derogation licence. However, the buildings have a medium probability of bat interest and therefore have features that could support roosting bats. It is possible that individual bats could turn up roosting in the building at any time during the year. The following procedures highlighted in Section 4.2 should be adopted during the conversion work. Section 4.2 identifies working practices or precautions necessary to avoid injury or death to any bats that may be present in the buildings.

4.1.2 The barn adjacent to the fold yard and barn 1 will require a Natural England license if work to this building is planned in the future. The window on the north elevation and the opening on the west elevation that leads into the fold yard should be kept open at all times to allow continued access for the roosting bat. The barn should also remain free of storage, building sundries, dust and any other indirect building work that may result in disturbance to the bat roost.

4.2 Method Statement

4.2.1 This statement should be copied to contractors and all those involved with demolition, conversion, timber treatment, roofing and building works, whose work may affect bats and their roosts on site. These are the recommendations for demolition and conversion, even though bats have not been found, construction work should occur as though bats could be present.

4.2.2 Locating Bats

Bats are by nature highly secretive, mobile mammals, therefore bats and their roosts can be very difficult to detect. A pipistrelle bat is capable of roosting in a crack measuring 20mm. In order to reduce any unnecessary disturbance, injury or death of any late discoveries of individual bats roosting in the buildings the following procedures should be implemented. Common roosts locations must be checked. These include:

- Underneath slates and tiles;
- Crevices in brickwork and gaps in mortar;
- Mortice joints;
- Around window frames;
- Under lead flashing;
- Behind fascia, soffits and barge boards;
- Behind ivy growing on buildings and;
- Roof timbers including ridge beams and rafters.

4.2.3 Working Approach
Careful removal by hand of all fittings and fixtures as describe in 4.2.2. Wall cavities should be checked prior to demolition and pointing.

4.2.4 Remove roof coverings by hand. Only half of the roof should be removed on the first day and the second half 24 hours later. This will create unfavourable conditions for any bats still roosting within the roof structure and encourage the bats to leave on their own accord.

4.2.5 As the status of the building as a potential hibernation roost is not known the initial start of the work should avoid late October – early April. This will ensure that bats are not disturbed at a vulnerable time of year.

4.2.6 Late discoveries
In the event that bats are discovered in any buildings, Natural England's Regional North and East Yorkshire Team should be contacted on 01904 435500. Alternatively, the Bat Conservation Trust National Bat Helpline number is 0845 1300 228.

4.2.6.1 If it is necessary to remove a bat from the premises to avoid it being harmed, ensure that gloves are worn. It should be placed carefully in a cardboard box and placed in a dark quiet place until it can be released at dusk near to where it was found. Alternatively, it can be moved to an undisturbed part of the building with access to the outside. It is important to ensure that the bat is kept safe from predators. Bats should only be removed as a last option and if the bat is in immediate danger.

4.2.7 The data collected to support the output of this report is valid for one year. This report is valid until **August 2010**. After this time, additional surveys need to be undertaken to confirm that the status of the building, as a bat roost, has not changed.

4.2.8 Habitat Enhancements

4.2.8.1 Freshwater, woodland, grassland, urban gardens, trees and amenity green space are suitable foraging habitats for bats whilst linear habitats such as hedgerows and streams are particularly important commuting routes between roosts and foraging ground. Management of these habitats should aim to maintain a favourable status of local populations by encouraging bat usage through the provision of additional roosting opportunities, habitat enhancement and maintaining commuting routes.

4.2.8.2 Lighting has a detrimental effect on bat activity; many bats will actually avoid areas that are well lit. Lighting can cause habitat fragmentation by preventing bats

from commuting between roosts and foraging grounds (A.J Mitchell-Jones 2004). External lighting requirements will be carefully designed to avoid light spillage. All on site lighting will be fitted with downward facing cowls or hoods to prevent light contamination. Security lighting should be on a short timer and motion sensitive to large objects only.

4.2.8.3 Urban gardens and recreation areas can provide good foraging grounds for bats. Green areas can be improved by growing night-scented flowers and other flowers favoured by insects. Suitable species include:

- Tobacco plant, *Nicotiana alata.*
- Cherry pie, *Heliotropium arborescens.*
- Evening primrose, *Oenothera biennis.*
- Night-scented catchfly, *Silene noctiflora.*
- White jasmine, *Jasminum officinale.*
- Honeysuckle, *Lonicera periclymenum.*
- Sweet rocket *Hesperis matronalis.*
- Soapwort *Spanoria officinalis.*

More information on suitable planting to encourage bats obtained from The Bat Conservation Trust (www.bats.org).

4.2.8.4 Leaving areas of uncut grass and providing open water will attract insects. Trees and shrubs in gardens will provide cover and additional feeding grounds

4.2.8.5 Bat boxes

4.2.8.5.1 Specially designed bat boxes can be located on site. Schwegler Bat Boxes are recommended and well tested boxes:

4.2.8.5.2 The following bat boxes provide additional roost habitats and are available from Wold Ecology:

- The **2F** is the most popular general purpose box, particularly attractive to the smaller British bats such as pipistrelle. It comprises a simple design with a narrow entrance slit on the front and is ideal for trees.

- The **1FD** is a larger version of the 2F. A general purpose bat box with two internal rough wood panels which simulate crevices.

- The **2FN** is a larger box with both a wide access slit at the base and an access hole on the underside. Particularly successful in attracting noctule and Bechstein's bats. It is ideally suited for trees.

- The rectangular shape makes the **1FF** ideal for attaching to the sides of buildings and trees or in sites such as bridges. It has a narrow crevice-like internal space to attract pipistrelle and noctule bats.

- The **1FS** is a larger capacity general purpose bat box with more insulation than most boxes for a more stable temperature in the winter.

- The **1FW** is a hibernation box that is designed to provide a protected

environment, particularly through the cold winter months when bats hibernate. It has three internal wooden panels, imitating crevices.

- The **1FQ** is an attractive box designed specifically to be fitted on the external wall of a house, barn or other building. Equally appealing to bats as a roost or a nursery, it features a special porous coating to help maintain the ideal temperature inside along with a rough sawn front panel to enable the bats to land securely.

- Bat Tube (**1FR** and **2FR**) system. The tube is designed to meet behavioural requirements of the types of bats that roost in buildings i.e. pipistrelle spp. This design can be installed flush to external walls and beneath a rendered surface.

- Brick Box. This design has been used for over 40 years to encourage bats to roost around buildings and bridges. It can be installed flush with the out side wall and rendered over so that only the entrance hole is visible.

4.2.8.5.3 The majority of these boxes are self-cleaning as they are designed so that the droppings fall out of the entrance. This reduces the possibility of smell during the summer months. For more information on designs and installation of bat boxes see: www.schwegler-natur.de and www.bct.org.uk.

4.2.8.5.4 Wold Ecology recommends that 3 boxes are sited within the farm complex.

5.0 BARN OWL SURVEY

5.1 The following survey followed guidance and methods recommended within *Bird Monitoring Methods, a manual of techniques for key UK species* Gilbert et. al RSPB 1998, *Common Standards Monitoring Guidance for Birds* JNCC 2004 and *Survey Techniques Leaflet 8,* The Barn Owl Trust.

5.2 Wold Ecology conducts voluntary monitoring of barn owl nests within designated grid squares in East Yorkshire for the Wolds Barn Owl Study Group (WBSG). Wold Ecology also liaises with the WBSG to ensure data is shared and good survey practice is maintained.

5.3 Breeding Status

The British race of barn owl, for which Scotland is the northern limit, has a European distribution that includes countries adjoining the Mediterranean basin. In 1987, the British barn owl population was estimated at 5,000 pairs, a reduction from 12,000 pairs in 1934. Since the 1930's, the barn owl has undergone a significant decline in numbers. Despite continued decline, the barn owl is still widespread in lowland agricultural habitats. Yorkshire has one of the highest densities of breeding barn owls in the UK.

5.4 Breeding Biology

The barn owl is associated with ruined farm buildings, church towers, parks, timbered hedges, cliffs, and quarries. It nests in roof spaces, hollow trees (particularly elms and oaks), rock crevices, caves and buildings. The species feeds predominantly on small mammals, as well as insects and birds and is largely crepuscular, hunting at dawn and dusk, as well as at night.

5.5 Legal Status

Barn owl is protected under schedules 1 and 9 of the Wildlife and Countryside Act 1981. It is listed in the EC birds Directive and under Appendix II of the Bern Convention. Barn owl is on the 'amber' list in 'Birds of Conservation Concern' as a bird of unfavourable conservation status in Europe and it is included on the list of species of conservation concern in the UK Biodiversity Steering Group Report (1995).

5.6 Field Survey Methods

The survey on 20th July 2009 was carried out by Chris Toohie who is an experienced barn owl surveyor. Extreme care was taken when approaching potential roosts, in accordance with guidance from JNCC and Natural England.

5.6.1 Daytime Survey – Methodology

The daytime assessment identified whether the area had any signs of residency and/or barn owl usage. This took the form of a methodical search in all suitable buildings, both internally and externally, for actual roosting barn owls and/or their signs. Specifically, the visual survey involved:

- An assessment of the suitability of the buildings that provide access for breeding barn owls within the study area.
- A thorough check for pellets, feathers or signs of old nest remains in the form of pellet debris and/or old broken egg shells.
- A visual survey of one hour for barn owl sightings within or close to the study area.

- An assessment of the suitability of the habitat for hunting barn owls within and surrounding the study area.

5.7 Results

There was no evidence of barn owls using any of the buildings. The emergence and return bat surveys did not observe any barn owls using the site or buildings. Wold Ecology recommends no further barn owl surveys or mitigation.

6.0 SUMMARY

6.1 The field surveys during August 2009 revealed no evidence of roosting bats. As no bats or signs of bats were recorded in barn 1, barn 2, dovecote, fold yard, granary and coach house, a Natural England derogation license is not required. The method statement outlined in section 4.2, details the best working practice and precautions to be taken to avoid breaking the law and must be followed and provided to all contractors involved with the renovation of the building.

6.2 The barn adjacent to the fold yard and barn 1 will require a Natural England license if work to this building is planned in the future. The window on the north elevation and the opening on the west elevation that leads into the fold yard should be kept open at all times to allow continued access for the roosting bat. The barn should also remain free of storage, building sundries, dust and any other indirect building work that may result in disturbance to the bat roost.

6.3 All bats and their roosts are fully protected under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000) and are further protected under Regulation 39(1) of the Conservation (Natural Habitats &c.) Regulations 1994. Should any bats or evidence of bats be found prior to or during development, work must stop immediately and Natural England contacted for further advice. This is a legal requirement under the Wildlife and Countryside Act 1981 (as amended) and applies to whoever carries out the work. All contractors on site should be made aware of this requirement and given Natural England's contact details.

6.4 Habitat enhancement for bats should be implemented as outlined in section 4.2.8, in order to improve foraging opportunities to bats in the local area.

6.5 Species list within this report may be forwarded to the local biodiversity records centre to be included on their national database. No personal information will be sent. Please contact Wold Ecology if you do not wish the species accounts and six figure grid references to be shared.

6.6 Whilst the survey provided detailed information on bats, bird's nests were observed in the buildings. All nests should remain undisturbed and intact until after the breeding bird season – 1st March to 31st August.

7.0 REFERENCES

Bat Conservation Trust. 'Bats in Churches' leaflet.

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

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Mitchell-Jones, A.J. & McLeish, A.P. (1999) 'The bat workers' manual' 2nd edition. Joint Nature Conservation Committee.

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The Bat Conservation Trust (electronic 2002) www.bats.org.uk Much additional information is available on bats at this website.

The Barn Owl Trust. 'Survey Techniques Leaflet 8'.

8.0 APPENDICES

8.1 Background to Bats - Bat Biology.

8.1.1 There are currently 17 species of bat native to the United Kingdom. Bats roost in a variety places such as caves, mines, trees and buildings. Woodlands, pasture, ponds and slow flowing rivers or canals provide suitable feeding areas for bats as they support an abundance of suitable insect forage. Bats tend to feed during the first two to three hours after sunset and again before dawn, when insect activity is at its most intense (JNCC 2004).

8.1.2 Bat activity over the course of a year reflects the seasonal climate and the availability of food as follows (The Bat Conservation Trust, undated):

January - March - insect prey is scarce and bats will hibernate alone or in small groups.

April - May - insects are more plentiful and bats will become active. They may become torpid (cool and inactive) in bad weather. Females will start to form groups and will roost in several sites.

June - July - females gather in maternity roosts and give birth to young, which are suckled for several weeks. Males roost alone nearby.

August - September – mothers leave the roost before the young. Bats mate and build up fat for the winter.

October - December – Bats search for potential hibernacula. They become torpid for longer periods and then hibernate.

8.1.3 Bats do not stay in the same roost throughout the year. They have different requirements of roosts at different times of the year. During late April/May the bats leave their winter roosts and the females come together to form 'nursery roosts', these usually consists of pregnant females along with a few non-breeding and immature females. At this time the males roost either singly or in small numbers.
The single offspring is born during late June early July and can fly within 3-5 weeks.

8.1.4 Typical roost site are cracks and crevices in buildings and other structures but more typically under hanging tiles, slates, soffits and cavity walls of fairly modern buildings or holes and splits in trees.

8.1.5 The conditions needed by bats for hibernation require the maintenance of a relatively stable low temperature (2 – 6^{0}). Suitable sites include; old trees, caves, cellars, tunnels, and icehouses.

8.1.6 Whilst the summer roosts consist of single species (although 2 – 3 species can be found within one large structure but occupying separate roost sites), winter sites often consist of 4 – 6 different species of bat, although there is often niche separation.

8.1.7 Bats have a complex social structure based on 'meta populations' and also utilise other transitional or intermediate roost sites.

The several different types of roost, which bats occupy throughout the year, are as follows:

Daytime summer roosts are usually cool and secluded and are where bats wait for their next feeding opportunity.

Nursery/maternity roosts where young are born and are usually quite warm. Young spend their first few weeks here before they become independent.

Temporary night roosts are used for shelter nearer to feeding areas if the weather is bad. They are also used for short periods between dusk and dawn to save returning to the main roost.

Mating roosts are set up by the males, where they attempt to attract females for mating.

Hibernacula are those roosts in which bats hibernate over winter. These have to be cold and free from any temperature fluctuation. The coldness enables bats to lower their body temperature and become torpid. This saves a lot of energy, enabling them to survive on the fat stores within their bodies that they have built up throughout the summer.

8.1.8 The main threats to bats include:

- Habitat loss (e.g. deforestation)
- Loss of feeding areas as a result of modern forestry and farming practices.
- Use of toxic agrochemicals and remedial timber treatment chemicals.
- Disturbance and damage to bat roosts.

8.1.9 Bats have been in decline both nationally and internationally during the latter part of the 20th Century. Bats require a variety of specific habitats in order to meet the basic needs of feeding, breeding and hibernating and are therefore extremely vulnerable to change such as the loss of flight lines through the removal of hedgerows.

It is thought that even the two most common and widespread bats, the common pipistrelle and the soprano pipistrelle, have declined by an estimated 70% (1978-1993 figures). There are a number of bat species, which are now considered seriously threatened with one species, the greater mouse-eared bat being classed as extinct as it is no longer breeding in the U.K.

8.1.10 All European bats are listed in Annex IV of the EC Directive 92/94/EEC 'The Conservation of Natural Habitats and of Wild Fauna and Flora' as being in need of "strict protection". This is translated into British Law under Statutory Instrument No. 2716 Conservation (Natural Habitats & c.) Regulations 1994. British bats are included under Schedule 5 of the Wildlife & Countryside Act 1981. They can therefore be described as a 'fully protected' or 'protected' species.

8.1.11 Under Section 9 of the Wildlife and Countryside Act (1981) it is an offence for anyone without a licence to kill, injure, disturb, catch, handle, possess or exchange

a bat intentionally. It is also illegal for anyone without a licence intentionally to damage or obstruct access to any place that a bat uses for shelter or protection (i.e. a roost). This holds true even for sites that are not currently occupied, as bats can return to roosts year after year. The Bat Conservation Trust recognises bat roosts for up to 5 years after being vacant (Anon 2004).

8.1.12 Under the Regulations it is an offence to:

- Deliberately capture or kill any wild animal of a European Protected species.
- Deliberately disturb any such animal.
- Damage or destroy a breeding site or resting place of such a wild animal.
- Keep, transport, sell or exchange, or offer for sale or exchange, any live or dead wild animal (or plant) of a European protected species, or any part of, or anything derived from such a wild animal.

8.1.13 The species is also listed in Appendix II of the Bonn Convention (and its Agreement on the Conservation of Bats in Europe) and Appendix II of the Bern Convention (and Recommendation 36 on the Conservation of Underground Habitats). Although these are recommendations and not statutory instruments.

8.1.14 Natural England is the Government body responsible for nature conservation. Local planning authorities must consult them before granting planning permission for any work that would be likely to result in harm to the species or its habitat. Natural England issue "survey" licenses for survey work that requires the disturbance or capture of a species for scientific purposes. They also issue "conservation" licenses that are required for actions that are intended to improve the natural habitat of a European protected species or to halt the natural degradation of its habitat.

8.1.15 "Development" licences are issued by Natural England for any actions that may compromise the protection of a European protected species, including bats, under the Conservation (Natural Habitats, &c.) Regulations 1994. This includes all developments and engineering schemes, regardless of whether or not they require planning permission.

8.1.16 The UK Biodiversity Action Plan states that although the pipistrelle is one of the most abundant and widespread bat species in the UK, it is still thought to have undergone a significant decline in the latter part of this century. The main factors cited for causing loss and decline include;

- A reduction in insect prey abundance, due to high intensity farming practice and inappropriate riparian management.
- Loss of insect-rich feeding habitats and flyways, due to loss of wetlands, hedgerows and other suitable prey habitats.
- Loss of winter roosting sites in buildings and old trees.
- Disturbance and destruction of roosts, including the loss of maternity roosts due to the use of toxic timber treatment chemicals.

The main action plan aims and objectives include;

- Maintain the existing population size of *Pipistrellus pipistrellus* and *Pipistrellus pygmaeus*

- Maintain the existing geographical range of *Pipistrellus pipistrellus* and *Pipistrellus pygmaeus*
  Restore population size of *Pipistrellus pipistrellus* and *Pipistrellus pygmaeus* to pre-1970 numbers.

8.2 Significance of bat roosts, appraising the nature conservation value;

8.2.1 The significance of bat roosts should be appraised against the following table. Where the extent of the bat roost is unclear a precautionary approach should be taken in evaluating the significance of the roost and the highest potential category should be selected.

Table 8.2.1 Appraisal of significance of bat roosts.

Scale	Summary	Examples
International	Any significant roosting sites for European Annex 2 species	Barbastelle bat roosts are only known applicable feature in East Anglia.
National	Any roosts qualifying as SSSI under the EN criteria.	Details of criteria are given in 9.1.2 Site Selection Guidelines for Biological SSSI's.
Regional	Any significant bat roosts and features, equivalent in interest to qualifying a site as a Country Wildlife Site.	Breeding and hibernation roosts of most species.
Local	All other sites supporting feeding bats as Wildlife and Countryside Act protected species.	Bats foraging within a structure, night roosts and minor transition roosts.

8.2.2 Site Selection Guidelines for Biological SSSIs

8.2.2.1 The following statements are made in respect of selecting SSSIs for bats in JNCC (1989) and JNCC (1998) in Section 13;

Sub-section 1.9 Reason for notification
"The bats have become a major focus of conservation concern in Britain, and all 15 species are protected through Schedule 5 of the 1981 Act.
The mouse-eared bat is now virtually extinct in Britain and other species, most notably the two horseshoe bats, are threatened.
Some species, for example the barbastelle, are so rare that little is known about their conservation status, but other species appear to be declining in numbers.
All bats are vulnerable, through their use of a relatively small number of sites for communal roosting and breeding, often in buildings; so legal protection against disturbance and taking has been an effective conservation measure.
Enhancing the protection of key sites through the SSSI mechanism can be helpful, but the notification of sites in buildings, particularly domestic dwellings, needs to be considered carefully if it is to have the desired effect."

Sub-section 3.3 basis of selection
"The selection of bat roosts is on a national basis except for certain mixed hibernacula in AOSs where large roosts are unknown."

Sub-section 3.3.4 Barbastelle, Bechstein's and grey long-eared bats
"All of these are rare species with no or very few breeding roosts known. Any traditional breeding roosts should be considered for selection if found."

Sub-section 3.3.5 Natterer's, Daubenton's, Whiskered, Brandt's, Serotine, Noctule and Leisler's bats
"These species are reasonably widespread and it would be difficult to justify the notification of breeding roosts except in the most exceptional circumstances. These might include exceptionally large colonies with a long history of usage of a particular site. In general, protection of roosts of these species should come under section 9 of the 1981 Act."

Sub-section 3.3.6 Pipistrelle and brown long-eared bat
"These two species are widespread and more common than the above. Protection should rely on section 9 of the 1981 Act."

Sub-section 3.3.7 All bat species – mixed assemblages
"Large hibernacula of mixed species are very important and sometimes spectacular, but perhaps number only 20 sites in total. On a national basis, all hibernacula containing (a) four or more species and 50 or more individuals, (b) three species and 100 or more individuals or (c) two species and 150 or more individuals should be selected. In some parts of Britain such large sites are unknown, so alternatively in these areas one hibernaculum site per AOS containing 30 or more bats of two or more species may be considered for selection."
"Because of the complications associated with the notification of sites in buildings, the appropriate CSD mammal's specialist should be consulted over the selection of all such sites."

8.2.3 Current status of bats in the UK.

8.2.3.1 The current known status of bats as given by the Bat Conservation Trust is shown in Table 6.

Table 8.2.3 Status of bats.

Species	Status of Population Nationally
Whiskered/Brandt's	Endangered
Natterer's	Not Threatened
Daubenton's	Not Threatened
Noctule	Not Threatened
Serotine	Vulnerable
Pipistrelle 45	Not Threatened
Pipistrelle 55	Not Threatened

8.2.4 Definitions of probabilities of bat interest.

8.2.4.1 Low probability of bat interest.
Buildings in this category fall into two main types:

- Generally well maintained without cracks and crevices, no gaps between bargeboard or soffit and wall or without an attic space.

- Contain some or all of the above features but are both draughty and thick in cobwebs or contain strong odours such as solvents, diesel, etc.

It must be borne in mind that a building from this latter group can become suitable for bats due to refurbishment. This often happens to houses once the attic space has been cleaned and under felted prior to timber treatment.

In a non-residential property no licence is required for development to a building classified as **Low probability of bat interest.**

8.2.4.2 Medium probability of bat interest

- The buildings here contain many sites suitable for roosting bats although no obvious signs were recorded during the survey. In exposed conditions on large buildings the signs of bat usage such as droppings and urine marks can be obliterated by heavy rain.

- Occasionally a light scattering of droppings will be recorded in an attic or a semi-derelict building, which is considered by the surveyor unsuitable for use as a bat roost or may be used occasionally as a night perch or feeding post. The medium probability of bat interest can be used based on the surveyor's experience

- Whilst no licence is required for development to a non- residential building classified as **Medium probability of bat interest**, it is often best practice to conduct sensitive roof stripping or architectural salvaging to minimise any possible disturbance and to employ mitigation techniques.

8.2.4.3 High probability of bat interest

- This group includes buildings with known roosts or signs of bat occupancy such as droppings and staining at a roost entrance. The description of high probability buildings will also contain an indication as to the time of the year when it will be occupied by bats i.e. summer – nursery roost. Winter – hibernation.

- If the building/buildings fall into the high probability group then the area of bat interest should be identified on site with the contractors to ensure that work does not affect the bats roost.

- If it is thought the work will have a direct effect on the bat roost and is unavoidable then advice must be sought from the Species Office for Natural England and derogation licence obtained prior to any of the work proceeding.

8.2.5 Further information on Bats

8.2.5.1 Review of Bat Legislation

Bats are fully protected under the Wildlife and Countryside Act 1981 and the Conservation (Natural Habitats &c) Regulations 1994. The Act and Regulations include provisions making it illegal to intentionally or deliberately kill, injure or

capture (take) bats or deliberately or recklessly disturb bats (whether in a roost or not) or damage, destroy or obstruct access to bat roosts.

8.2.5.2 Review of Bat Ecology

All British bats have two main types of roost (a) A summer or nursery roost and (b) A winter or hibernation roost.

a. Summer Nursery or Breeding Roost.

During late April/May the bats leave their winter roosts and the females come together to form 'nursery roosts', these usually consists of pregnant females along with a few non-breeding and immature females. At this time the males roost either singly or in small numbers.

The single offspring is born during late June early July and can fly within 3-5 weeks.

Typical roost site are cracks and crevices in buildings and other structures but more typically under hanging tiles, slates, soffits and cavity walls of fairly modern buildings or holes and splits in trees.

b. Winter or Hibernation Roost

The conditions required by bats for hibernation are the opposite of the warm dry summer roost, often being cold and wet, and where a relatively stable low temperature ($2 - 6^0$) can be maintained. Suitable sites include; old trees, caves, cellars, tunnels, and ice houses.

Whilst the summer roosts consist of single species (although 2 – 3 species can be found within one large structure but occupying separate roost sites), winter sites often consist of 4 – 6 different species of bat, although again there is often niche separation.

c. Bats have a complex social structure based on 'meta populations' and also utilise other transitional or intermediate roost sites.

7.2.5.3 Species accounts.

Pipistrelle Bat.		One of our smallest and commonest bat species, which has only recently been split into two separate species *Pipistrellus pipistrellus* and *P. pygmaeus*, which have been found to have differing ecological niches. In summer, large nursery colonies are found in the cracks and crevices of modern houses where the single offspring is born during late June and early July. Typical roosts are under the soffit and bargeboards, cavity wall, under hanging tiles and under lose lead flashing but not normally within an attic space. The nursery roosts consists of mainly pregnant female bats and a few immature females and can number up to hundreds but 20-30 is a more normal figure. The male bats are often found either singly or in small numbers, more often away from the breeding roost. As with all bats their hibernation (winter) requirement is the

		opposite from the summer. In the summer their roosts are warm and dry in the winter they are cold and damp. In hibernation Pipistrelle bats are often found roost singly or in small numbers, although occasionally fairly large numbers have been found, where they are associated with a variety of habitats within buildings As their winter roosts are located deep within cavity walls, between tiles and felt or behind lose plaster or skirting board or panelling, they are difficult to locate. Whilst in such locations their presence is only discovered by building workers during demolition and refurbishment.
Natterer's Bat.		A medium sized bat (weighing about 9g). A characteristic feature is a fringe of very stiff bristles along the trailing edge of its broad tail membrane. It has rather pinkish limbs which gives rise to its old name of 'red armed bat'. Few summer roosts are known but most are in old stone buildings with large wooden beams. Crevices in beams or gaps in beam joints are common roost sites. Winter roosts are often in any small cave like site or exposed rock crevices. They are usually solitary but small groups are not uncommon and may include other species. Individual Natterer's are occasionally found hibernating in churches, in crevices between beams. Their feeding habitat is open woodland, parkland, hedgerows and along waterside vegetation.