

**HALSNEAD GARDEN VILLAGE NORTH,
KNOWSLEY, MERSEYSIDE -**

**BAT & BARN OWL SURVEY OF
BUILDINGS & BAT ROOST POTENTIAL
ASSESSMENT OF TREES**

2020



ces ecology
consultant ecologists

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EXECUTIVE SUMMARY

- Cheshire Ecological Services Ltd (CES Ecology) undertook a daytime bat and barn owl, dusk and dawn bat surveys of buildings, and ground based bat roost potential (BRP) assessment of trees at land near Halsnead Park, Whiston in 2017, where residential development was proposed.
- No evidence of bats or barn owl was found and no development has been brought forward to date. A new planning application for residential development at the Site is proposed. Given the time period since the previous surveys, updated surveys were carried out in order to determine if the status of bats/barn owl at the Site has changed.
- The daytime bat survey was conducted on 14th May by Lindsay Overstall BSc MSc, CES Consultant Ecologist. Lindsay is licensed by Natural England to disturb, take and handle all species of bat in England under licence number 2019-44165-CLS-CLS (level 2). Dusk and dawn bat surveys were conducted on 20th May and 8th June 2020.
- The Site was located to the south of Whiston and comprised two separate site areas; site area A (located to the immediate south of Lickers Lane) and site area B (located to the immediate east of Windy Arbor Road), collectively termed the 'Site'.
- Both site areas contained areas of broadleaved woodland and scattered trees. Site area B contained 3 buildings. Building 1 was the focus of dusk emergence/dawn re-entry surveys. Habitats at the Site are generally of Moderate suitability for foraging and commuting bats.
- Trees with Low and Moderate bat roost potential (BRP) were recorded at both site areas.
- Trees with Low BRP should be subject to a pre-start check and works undertaken under RAMs if they are due to be impacted by the development.
- Trees categorised as having Moderate or Moderate to High BRP that could not be fully inspected from the ground but are due to be impacted should be subject to further surveys in the form of aerial tree surveys and inspected with an endoscope by a licensed bat ecologist.
- Building 1 was categorised as having Moderate BRP. No evidence of bat roosting was recorded during the dusk emergence /dawn re-entry surveys of Building 1. Therefore a licence from Natural England is not currently required in order to demolish Building 1. Building 2 and 3 have Negligible BRP.
- No evidence of barn owl was recorded and the buildings/trees are not considered suitable for barn owl.
- Nesting birds were recorded within Building 1 and Building 2. Demolition of these buildings should avoid the bird nesting season which generally encompasses March to September. If this is not possible then a nesting bird survey will be required prior to demolition.

1.0 INTRODUCTION

- 1.1 Cheshire Ecological Services (CES Ecology) undertook a daytime bat and barn owl, dusk and dawn bat surveys, and ground based bat roost potential (BRP) assessment of trees at land near Halsnead Park, Whiston in 2017, where residential development was proposed.
- 1.2 During the 2017 surveys of the buildings, no evidence of bats was found, but Building 1 was found to offer features suitable for roosting bats.
- 1.3 No evidence of barn owl was found and the buildings were concluded as unlikely to be used by barn owl.
- 1.4 During the 2017 ground based BRP assessment of the trees, a number of trees were considered to offer potential roosting features for bats which were then subject to aerial tree inspections in 2018 and fully inspected.
- 1.5 No development has been brought forward to date and a new planning application for residential development at the Site is proposed. Given the time period since the previous surveys, updated surveys were carried out in order to determine if the status of bats/barn owl at the Site has changed.
- 1.6 The daytime survey and ground based BRP assessment was conducted on 14th May by Lindsay Overstall BSc MSc, CES Consultant Ecologist. Lindsay is licensed by Natural England to disturb, take and handle all species of bat in England under licence number 2019-44165-CLS-CLS (level 2).
- 1.7 The emergence/re-entry surveys were conducted by:
- Lindsay Overstall BSc (Hons) MSc, ACIEEM, CES Consultant Ecologist
 - Suzie Whitnall BSc (Hons) MSc ACIEEM, CES Senior Ecologist
 - Leo Plevin BSc (Hons) MSc Grad CIEEM, CES Assistant Ecologist
 - Emily Traynor, experienced in undertaking bat activity surveys, and bat carer

Site Description

- 1.8 The Ordnance Survey grid reference for the site is SJ 47143 90310
- 1.9 The Site was located to the south of Whiston and comprised two separate site areas; site area A (located to the immediate south of Lickers Lane) which totalled approximately 9.7Ha and site area B (located to the immediate east of Windy Arbor Road) which totalled approximately 2.2Ha.
- 1.10 At the time of survey site area A comprised an arable field which had not recently been managed, areas of woodland, scattered trees, semi-improved and marshy grassland, tall ruderal herbs, scrub and areas of bare ground. Site area B comprised

three buildings, areas of woodland, scrub, tall ruderal herbs, introduced shrubs and hard-standing. Scattered trees were also present throughout the site.

- 1.11 Building 1 at site area B, and the trees/woodland at both site area A and site area B were the focus of the survey, although Buildings 2 and 3 were also inspected.

Proposed Development

- 1.12 Plans have been proposed to develop the Site for residential use. Detailed proposals were not available at the time of writing but all existing buildings will be lost to the development, as well as a number of trees.

Aims of the Survey

- 1.13 The building surveys and tree assessment aim to:
- Conduct external and internal building inspections to look for bats/barn owl or field signs of bats/barn owl
 - Assess the suitability of the building/s for use by roosting bats/barn owl and determine the actual or potential presence of bats/barn owl
 - Assess the trees on site for their potential to support roosting bats
 - Assess the need for further survey and/or mitigation

Lifespan of Data

- 1.14 The results and recommendations within this report will remain valid for a period of one year from the date of the survey.

2.0 METHODOLOGY

General

- 2.1 The survey was undertaken to recognised guidelines, timings and weather conditions, with particular reference to Natural England and Bat Conservation Trust (BCT) publications (Refer to 8.0 References).

Building inspection

- 2.2 The buildings were searched externally and internally for evidence of bat/barn owl presence, such as pellets, white wash, droppings or feeding remains and any potential roosting features including bat access points and roosting places, as detailed in the BCT Good Practice Guidelines (Collins, 2016).

- 2.3 External inspections of the buildings were carried out from the ground using binoculars, a high-powered hand torch, ladders and a fibre optic endoscope, where necessary.

Areas searched (where present) included:

- Windowsills
- Window panes
- Walls
- Hanging tiles
- Weather bordering
- Eaves
- Boxed soffits
- Fascias
- Lead flashing
- Gaps in felt
- Under tiles
- Gaps in brickwork / stonework
- Existing bat boxes

- 2.4 Internal areas including all accessible rooms and roof voids within the buildings were searched using a ladder, high-powered hand torch and a fibre optic endoscope (where necessary).

Inspections in the roofs of features (where present) included:

- Ridge and hip beams
- Mortise and tenon joints
- Junctions of timbers
- Behind tiles and roof lining
- Top of gable ends or diving walls
- Top of chimney breasts

Inspections in rooms include:

- Behind wooden panelling
- Behind shutters and curtains
- Behind items on walls
- Inside cupboards and chimneys

- 2.5 See Appendix B for more information on Bat Ecology and Bat in Buildings, and Appendix C for Barn Owl Ecology.

Emergence/ re-entry surveys

- 2.6 Potential roosting features (PRFs) and access points were identified within the building. These points were the focus of the survey and observed by an ecologist for emerging or re-entering bats.
- 2.7 During the surveys the building was observed by three surveyors from static / semi-static positions ensuring the best possible observation points that covered all elevations and sections of the roof.
- 2.8 Each observer, on the dusk / dawn surveys, was equipped with a bat detector as an aid to locating and identifying bats.
- 2.9 The following models of detector used included:
- Echo Meter Touch 2 Pro full spectrum bat detector
 - Elekon Batlogger M full spectrum bat detector
 - Bat Box Duet Heterodyne bat detector

Weather conditions, temperatures and timings

2.10 Table 1 shows survey timings and weather conditions

Date	Survey Type	Sunset / sunrise	Timings	Temp (°C) Start/End	Precipitation	Beaufort wind scale ^a	Cloud Cover ^b
14/05/2020	Daytime/BRP	n/a	14.00	17°C	None - dry	2 – Light breeze	2
20/05/2020	Emergence	21.14	20.55 22.45	18°C/ 16°C	None - dry	2 – Light breeze	6
08/06/2020	Re-entry	04.44	02.44 04.45	13°C/ 12°C	None - dry	3 – Gentle breeze	8

a. Beaufort wind scale: 0=Calm, 1=Light air, 2=Light breeze, 3=Gentle breeze, 4=Moderate breeze, 5=Fresh breeze, 6=Strong breeze, 7=Near gale, 8=Gale, 9=Strong gale, 10=Storm, 11=Violent storm, 12=Hurricane

b. Oktas: 0=no cloud, 4=half cloudy, 8=completely cloudy

Tree Assessment

2.11 The ground based assessment involved the use of a powerful hand torch, binoculars, and an endoscope where required, in order to gather information on potential roost features (PRF) and their likely suitability for bats.

2.12 Evidence of bats in trees include:

- Live or dead bats
- Noise (squeaking or chittering) from within the PRF
- Dropping – in or below the PRF
- Staining – caused by urine or natural oils in bats' fur
- Odour

2.13 See Appendix D for more information on Bats in Trees.

Assessment criteria

2.14 Based on the number, location and type of any potential roost features, the building and trees were categorised as having **negligible, low, moderate** or **high potential** to support roosting bats, or confirmed roost, as detailed in Table 4.1 of BCT guidelines (Collin 2016), and summarised in Table 1 below.

2.15 The surrounding habitat was assessed for its potential with regards to roosting, foraging and commuting bats. The habitat features were categorised as having **negligible, low, moderate** or **high suitability** for foraging and commuting bats, as detailed in Table 4.1 of BCT guidelines (Collin 2016), and summarised in Table 1 below.

Table 1: Summary of BCT Bat Roost Potential Categories

Suitability	Description – Roosting habitats	Commuting and foraging habitats
Negligible	Buildings/trees with negligible habitat features to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats,
Low	Buildings/trees with one of more potential roost sites that could be used by individual bats opportunistically, although they are unlikely to be suitable for maternity or hibernation roosting. This category also includes buildings/trees of sufficient size and age that elevated inspection may reveal features not previously identified, or features seen that have very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as gappy hedgerows or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	Buildings/trees with one or more potential roost sites to support roosting bats but unlikely to support a roost of high conservation status (with respect to roost type only).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	Buildings/trees with one of more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

2.16 During the daytime survey the building and its associated features were assessed for their suitability for hibernating bats. The following aspects were considered (Middleton 2019):

- The suitability of features to support roosting bats and/or to allow access for roosting bats
- Suitable conditions including temperature and humidity likely to be present within the building during the winter period for hibernating bats

- Surrounding habitat for bats to forage and/or commute during the active bat season (i.e. bats are familiar with the area and thus aware of suitable roosting locations within the site)
- The presence of known roosts within the building, or adjacent buildings, or surrounding area during the active season.

Limitations

- 2.17 The observations made during these surveys have been used to assess the presence, or likely absence of bats roosting within the building and/or trees. It should however, be noted that these surveys represent a 'snap-shot in time' whereby only the bat/s present at the time of survey were recorded. Bats are known to use different roosts during the year and known to move between roosts.
- 2.18 Building 1 was in a state of disrepair, having been subject to fires and vandalism. As such the loft void was only viewed from ladders as the timbers were considered not to be safe.
- 2.19 Trees were in leaf during the ground based BRP assessment, which may have obscured some features although it is considered that a thorough assessment was made.

3.0 LEGAL PROTECTION FOR BATS

- 3.1 All UK bats and their roosts are protected under the Wildlife and Countryside Act (WCA) 1981 (as amended) and by the Conservation of Habitats and Species Regulations (2017), which gives strong legal protection to all bat species and their roosts. For all countries in the UK the legal protection may be summarised as follows:

You will be committing a criminal offence if you:

1. Deliberately* capture, injure or kill a wild bat
2. Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats
3. Damage or destroy a place used by bats for breeding or resting (roosts) (even if bats are not occupying the roost at the time)
4. Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat
5. Intentionally or recklessly obstruct access to a bat roost even if bats are not present at the time

**In a court, 'deliberately' will probably be interpreted as someone who, although not intending to capture/injure or kill a bat, performed the relevant action, being sufficiently informed and aware of the consequence his/her action would most likely have).*

Defences include:

1. Tending/caring for a bat solely for the purpose of restoring it to health and subsequent release.
2. Mercy killing where there is no reasonable hope of recovery (provided that person did not cause the injury in the first place – in which case the illegal act has already taken place).

Penalties on conviction – up to six months' imprisonment and/or unlimited fines. Additionally, any profits made as a consequence of not following lawful process can be confiscated and items used to commit the offences such as vehicles, plant or machinery can be forfeited.

NB. Whilst the protection afforded to bats is virtually the same in all UK countries please refer to the specific legislation for England and Wales, Scotland and Northern Ireland for the precise wording – the above is a brief summary only.

Licensing Procedures

Licences to permit illegal activities relating to bats and their roost sites can be issued for specific purposes by the relevant licensing authorities in each country. These are sometimes called 'derogation licences' or 'European Protected Species' licences, and are issued under the Habitats Regulations. It is an offence not to comply with the terms and conditions of a derogation licence. If you carry out work affecting bats or roosts without a licence, you will be breaking the law.

In the case of development works three tests must all be satisfied before the relevant licensing authority can issue a licence:

1. A licence MAY be granted *'to preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'*.
2. A licence may NOT be granted UNLESS the licensing authority is satisfied *'that there is no satisfactory alternative'*.
3. A licence CANNOT BE ISSUED unless the licensing authority is satisfied that the action proposed *'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'*.

4.0 LEGAL PROTECTION FOR BARN OWLS

- 4.1 All species of wild bird, their nests and eggs are protected under the Wildlife and Countryside Act 1981(as amended) and, amongst other things, it is an offence to, with certain exceptions, intentionally or recklessly:
 - Kill, injure or take any wild bird

- Take, damage or destroy the nest of any wild bird while it is in use or being built
 - Take or destroy the egg of any wild bird
- 4.2 Additionally, under the provision of the Wildlife and Countryside Act 1981(as amended) the Barn Owl (*Tyto alba*) is listed in Schedule 1 – Part 1 of the Act and is protected by special penalties AT ALL TIMES. **In addition to** the protection afforded in paragraph 3.1 above it is also an offence to disturb any wild bird listed on Schedule 1 while it is nest building, or at a nest containing eggs or young, or disturb the dependent young of such a bird.
- 4.3 Professionals involved in the building industry (especially barn conversions) who fail to assess the barn owl status of any probable barn owl site and then carry out potentially disturbing activity may be deemed 'reckless' and thereby guilty of an offence.

5.0 RESULTS

Surrounding habitat assessment

- 5.1 The Site is located within the predominantly urban metropolitan borough of Knowsley, to the immediate south of the village of Whiston in Merseyside. The Site comprised two separate site areas; site area A (located to the immediate south of Lickers Lane) which totalled approximately 9.7Ha and site area B (located to the immediate east of Windy Arbor Road) which totalled approximately 2.2Ha.
- 5.2 The immediate surrounding area comprised small pockets of broad-leaved deciduous woodland, mixed use farmland and residential areas and associated road networks. Thus providing **Moderate** foraging habitats for bats.
- 5.3 The wider area comprised mixed use farmland, residential areas, woodland, ponds, and road networks, including the M62 motorway approximately 400m to the south, thus providing suitable roosting, foraging and commuting habitat for bats.

Building assessment (site area B) – Refer to Appendix Ai – Photo Plates

- 5.4 Building 1 was a bungalow which had a pitched roof with roof and ridge tiles. Roof pitches faced north, south, east, and west, gable ends faced north, south, and west. There was a small single storey section with a flat felted roof on the east side.
- 5.5 Gable end walls above eaves height, were wooden clad. There were wooden boxed soffits at the eaves. Walls were brick with an insulated cavity. The building was in a significant state of disrepair, having suffered fire damage and vandalism.
- 5.6 Since the 2017 survey, the state of the building had deteriorated with further wide holes in the roof pitches. The door and most of the windows were without glass and

many had had boarding removed, leaving the interior exposed and open to the elements.

- 5.7 The roof had a wooden rafter and purlin structure, which was lined with bitumen felt. The holes in the roof could allow direct access. Ceilings were damaged and/or missing, allowing free movement between the roof void, and living areas.
- 5.8 Gaps in wooden cladding at the gables, gaps leading into boxed soffits, gaps between roof tiles and felt, wall cavities could be used by bats. Given the exposed nature of the loft void, it is considered unlikely that the void would be used for roosting.
- 5.9 The building has numerous PRFs for bats but no evidence of bats was recorded.
- 5.10 Building 2 was a large warehouse with a steel structure with concrete blockwork walls at the base which were open and exposed at the tops. It had an asbestos cement roof with sky lights. There was no internal loft void. It had no PRFs.
- 5.11 Building 3 was a small brick and blockwork shed which housed electrical connections for the site. It had no roof and the blockwork was exposed at the top. It had no PRFs.

Dusk Emergence Survey (20/05/2020)

- 5.12 No bats were seen to emerge from Building 1 during the survey.
- 5.13 Bats were recorded foraging and commuting around the building within scrub at the site, and around the mature oak tree adjacent to the building.
- 5.14 Species recorded were predominantly common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*).
- 5.15 Each of the three surveyors recorded a single noctule bat (*Nyctalus noctule*), commuting high overhead.

Dawn Re-entry Survey (08/06/2020)

- 5.16 No bats were seen to re-enter Building 1 during the survey.
- 5.17 Bats were again recorded foraging and commuting around Building 1, the adjacent oak (*Quercus sp*) tree and scrub habitats.
- 5.18 Species recorded were predominantly common pipistrelle, with low numbers of soprano pipistrelle, and a myotis sp. pass at 03.30am.

Barn owl

- 5.19 No evidence of use by barn owl, such as casts, feathers, or whitewash was recorded within any of the buildings 1 to 3 during the daytime survey.

- 5.20 Blue tits (*Cyanistes caeruleus*) were noted as nesting within Building 1, and pigeons (*Columba livia domestica*) within Building 2.

Ground Based Tree assessment

- 5.21 Refer Appendix Aii for a full description and detailed photographs of potential roost features (PRFs). Refer Appendix E for tree location plans.

Site area A (land immediately south of Lickers Lane)

- 5.22 **T1** was a mature oak tree located to the south of the site. It had old pruning wounds which are upwards facing. It has Low BRP.
- 5.23 **T2** was a semi-mature sycamore (*Acer pseudoplatanus*) located outside the sites western boundary. It has Negligible BRP.
- 5.24 **G1** was a cluster of semi-mature sycamore at the north eastern corner of the arable field. They have Negligible BRP.
- 5.25 **G2** was a group of immature oak trees to the north east of site area A. They have Negligible BRP.
- 5.26 **G3** was group of mature and semi-mature birch (*Betula sp*) within an area of scrub to the east of site area A. They have Negligible BRP.
- 5.27 **G4** was a number of groups of scrub comprising mainly of goat willow (*Salix caprea*) to the east of site area A. They have Negligible BRP.
- 5.28 **G5** was a group of semi-mature sycamore and a dead elm (*Ulmus sp*) tree in the south eastern corner of site area A. They have Negligible BRP.
- 5.29 **G6** was a line of scattered sycamore trees located just outside site area A's western boundary. They have Negligible BRP.

W1

- 5.30 **W1** was a block of woodland along part of site area A's northern boundary, and is also designated as Lickers Lane Wood Local Wildlife Site. It is dominated by sycamore, with occasional ash (*Fraxinus excelsior*) and oak as well as two dead elm trees. Trees were approximately 20m in height and semi-mature. Stem diameters were generally below 40cm. Trees of note are described below:
- 5.31 **W1.1** was a semi-mature sycamore with a frost crack type wound. It has Low BRP.
- 5.32 **W1.2** was a sycamore with a wound at 1m on the main stem. It has Low BRP.

- 5.33 **W1.3** was a three stemmed sycamore with a frost crack type wound and a further small wound. It has Low BRP.
- 5.34 **W1.4** was a twin stemmed sycamore with butt rot and a further lower wound at its base. It has Low BRP.
- 5.35 **W1.5** was a sycamore with a frost crack type wound. It has Low BRP.
- 5.36 **W1.6** was a sycamore with two frost crack type wounds. It has Low BRP.
- 5.37 **W1.7** was a sycamore with a frost crack type wound. It has Moderate BRP.
- 5.38 **W1.8** was a sycamore with two frost crack type wounds. It has Moderate BRP.
- 5.39 **W1.9** was a sycamore with a frost crack type wound. It has Moderate BRP.

W2

- 5.40 **W2** was a smaller block of woodland in the north eastern corner of site area A. It was dominated by sycamore, with occasional birch, oak and lime (*Tilia sp.*). Trees were approximately 20m in height with most stem diameters less than 40cm. Trees of note are described below:
- 5.41 **W2.1** was a multi-stemmed sycamore with a frost crack type wound on the northern stem. It has Moderate BRP.
- 5.42 **W2.2** was a multi-stemmed sycamore with a dead branch with a rot hole. It has Moderate BRP.

Site area B (land immediately east of Windy Arbor)

- 5.43 **T1, T2, T3** and **T4** were cedars (*Cedrus sp.*) located on the western boundary of site area B. They have Negligible BRP.
- 5.44 **G1** was a group of pine (*Pinus sp.*) and spruce (*Picea sp.*) trees, also on the western boundary. They have Negligible BRP.
- 5.45 **H1** was a line of Leyland cypress (*Leylandii x Cupressocyparis leylandii*). They have Negligible BRP.
- 5.46 **T5** was a mature oak tree with old pruning wounds in the crown. It has Low BRP.

G2

- 5.47 **G2** was a group of ash trees which have been individually described below:
- 5.48 **G2.1** was an ash tree with a small superficial rot hole. It has Low BRP.

- 5.49 **G2.2** was an ash tree with a lightning strike type wound at the top of the main stem. It has Moderate BRP.
- 5.50 **G2.3** was an ash tree with a knot hole. It has Low BRP.
- 5.51 **G2.4** was an ash tree with a broken branch with a tear out type wound on the underside. It has Moderate BRP.
- 5.52 **G3** was a group of sycamore, with varying degrees of ivy. Those with very dense ivy have Low BRP.
- 5.53 **G3.1** was a dead sycamore within the group. It has a woodpecker hole at 15m on the northern aspect. It has Low BRP.
- 5.54 **G4** was a group of immature goat willow trees. They have Negligible BRP.

W1

- 5.55 **W1** was an area of semi mature to mature woodland located in the south eastern part of site area B. It was dominated by sycamore with occasional oak. Tree were on average 20m in height with stem diameters of up to 50cm. A number of these trees were densely clad in ivy. Tree of note are described below:
- 5.56 **W1.1** was a snapped/fallen tree. It has open gaps into heart wood and minor/superficial cavities and ivy. It has Low BRP.
- 5.57 **W1.2** was a holly (*Ilex aquifoliaceae*) tree with a tear out type wound at 2m high. It has Low BRP.
- 5.58 **W1.3** was a dead sycamore with a frost crack type wound down its entire length. It has Moderate to High BRP.
- 5.59 **W1.4** was a sycamore with a frost crack type wound down its entire length. It has Moderate BRP.
- 5.60 **W1.5** was a twin stemmed sycamore with snapped branches with significant stem damage. There is a small cavity in deadwood. It has Moderate BRP.
- 5.61 **W1.6** was a sycamore with a frost crack type cavity. It has Low BRP.
- 5.62 **W1.7** was a dead, twin stemmed sycamore with woodpecker holes and a rot hole at 2-3m. It has Moderate BRP.
- 5.63 **W1.8** was a triple sycamore with a dead stem which has a cavity behind exposed heart wood. It has Moderate BRP.
- 5.64 **W1.9** was a twin stemmed sycamore with a frost crack type wound. It has Low BRP.

5.65 **W1.10** was a dead, partially hollow trunk. It has a number of small entry points into the hollow areas. It has Low BRP.

5.66 A number of trees within **W1** were densely ivy clad. These have Low BRP.

6.0 DISCUSSION

Buildings

Bats

6.1 The building contained a number of PRFs, including external features such as behind wooden boarding and gaps between tiles and roof felt.

6.2 The building was considered to have **Moderate** suitability for roosting bats.

6.3 No bats were recorded as using the building to roost during the dusk emergence and dawn re-entry surveys.

6.4 The building was considered to have **Low** suitability for hibernating bats. Suitable features were limited and a lot of the building is exposed to the elements. Bats are also not typically found to over wintering in this type of building. However, due to the uncertain nature of hibernation occurring with *Pipistrellus* sp (Korsten et al., 2015) unexpected incidents of hibernation could occur, albeit low. No further survey work is considered necessary in respect of hibernating bats.

Barn owl

6.5 No evidence of the use of the site by barn owl, was found during the survey, and the buildings on site are unlikely to be used by barn owl.

6.6 Barn owl are more likely to forage over grassland, and woodland edge, than the scrub encroached concrete, within site area B.

Trees

6.7 No evidence of bat roosting was recorded during the ground based assessment of the trees.

6.8 However, it should be noted that evidence of the use of tree roosts, such as droppings, does not persist in trees in the same way as it does in buildings. Environmental factors such as moisture, or the presence of invertebrates means such evidence can be quickly removed.

Site area A (land immediately south of Lickers Lane)

- 6.9 The following trees/groups of trees offer Negligible bat roost potential and as such there is no further survey work in respect of bats recommended; **T2, G1, G2, G3, G4, G5, G6.**
- 6.10 The following trees offer Low bat roost potential and should be subject to a pre-commencement check and works undertaken under Reasonable Avoidance Measures (RAM) if due to be impacted by the development; **T1, W1.1, W1.2, W1.3, W1.4, W1.5, W1.6.**
- 6.11 The following trees offer Moderate bat roost potential. They have cavities that were inspected fully from the ground with an endoscope. No evidence of bat occupation was recorded. Given the likely time lag between this survey and development of the site, the cavities should be checked again by a licenced bat ecologist before any potentially disturbing works to the trees take place. If no evidence of bats is found, they should be felled under RAM; **W1.8, W1.9.**
- 6.12 The following tree offers Moderate bat roost potential and should be subject to further survey in the form of climbed with ladders and inspected with an endoscope if it is due to be impacted; **W1.7**
- 6.13 The following trees offer Moderate bat roost potential and are confirmed as being lost to the development. They should be subject to further survey in the form of climbed via ladder and rope access, and inspected with an endoscope; **W2.1, W2.2.**

Site area B (land immediately east of Windy Arbor)

- 6.14 The following trees/groups of trees offer Negligible bat roost potential and as such there is no further survey work in respect of bats recommended; **T1, T2, T3, T4, G1, H1, G4.**
- 6.15 The following trees offer Low bat roost potential and should be subject to a pre-commencement check and works undertaken under RAM if they are due to be impacted by the development; **T5, G2.1, G2.3, G3.1, W1.1, W1.2, W1.6, W1.9, W1.10.**
- 6.16 The following trees offer Moderate or Moderate to High bat roost potential and should be subject to further survey in the form of climbed with ladders and inspected with an endoscope if they are due to be impacted by the development; **W1.3, W1.4, W1.5, W1.7, W1.8.**
- 6.17 The following trees offer Moderate bat roost potential and should be subject to further survey in the form of climbed via ladder and rope access, and inspected with an endoscope if they are due to be impacted by the development; **G2.2, G2.4.**

7.0 IMPLICATIONS AND RECOMMENDATIONS

Buildings

Bats

- 7.1 No bats were recorded as using the building to roost during the dusk emergence and dawn re-entry surveys.
- 7.2 Therefore there are no known implications for bats with regards to building demolition and a licence from Natural England is not currently required.
- 7.3 Given that Building 1 offers **Moderate** suitability for roosting bats, it is recommended that if demolition has not taken place within 1 year of this survey, an updated building assessment should be conducted to determine if the status of bat roosting within the building has changed.
- 7.4 The building is considered to have **Low** potential for hibernating bats and as such no further winter survey is recommended.

Barn owl & Nesting birds

- 7.5 No further survey work is required with regard to barn owl.
- 7.6 Nesting birds were recorded within Building 1 and Building 2. Demolition of these buildings should avoid the bird nesting season which generally encompasses March to September. If this is not possible then a nesting bird survey will be required prior to demolition.

Trees

- 7.7 At the time of writing a detailed tree removal plan was not available. At site area A, Lickers Lane Wood LWS is due to be retained, however dead/dying and dangerous trees will be removed as part of the development. Much of the woodland to the north east of site area A will be lost to facilitate development. The majority of scrub and scattered trees along the eastern edge of site area A will also be removed.
- 7.8 At site area B, a large portion of **W1** will be retained, however it is likely that dead/dying and dangerous trees will be removed as part of the development. Scattered trees throughout the western half of the site will likely be removed for the most part.
- 7.9 Bats are known to use different roost sites throughout the year and individual male bats in particular can change their roost sites regularly. As such a precautionary approach will be carried out in respect of the following category of trees should they be required to be felled or have works undertaken on them that impacts upon PRFs;

- 7.10 Trees categorised as having Low BRP will be subject to a pre-start check of PRF's where possible immediately prior to their removal, and the works will be undertaken under Reasonable Avoidance Measures (RAM) using soft felling techniques in the presence of a licensed bat ecologist.
- 7.11 The following Reasonable Avoidance Measures (RAM) will be implemented during any disturbing works:
- a) Soft felling techniques should be implemented, in the presence of a licensed bat ecologist, acting as an ecological clerk of works. The clerk of works will brief the tree surgeons prior to tree works with a tool-box-talk, highlighting features which have potential for roosting bats and the legal protection that they are afforded. If tree surgeons find features previously undiscovered which may be suitable for bats, then the clerk of works will advise on how to proceed.
 - b) As single or small numbers of bats can easily get tucked into relatively insignificant cracks and crevices care should be taken when pruning/felling any of the trees on site, particularly those singled out as having some, even low, potential.
 - c) Features that cannot be inspected at close quarters, but where bat roost potential has been identified, should be sectioned from the tree and lowered gently to the ground, to be inspected by the licensed bat ecologist prior to chipping and removal from site. If the tree cannot be sectioned then it should be felled with the branches intact, allowing them to cushion the fall so that features can be inspected once on the ground.
 - d) Any features that cannot be fully inspected should be left on the ground for a period of 24 hours prior to them being chipped and removed from site.
 - e) If any trees are found to contain bats or evidence of roosting bats, then work to that tree should stop and a licence must be obtained from Natural England before the tree works can proceed.
 - f) Ideally work on likely bat trees should be carried out in the spring (late March, April, May) or the autumn (September, October, November). This avoids periods when bats are particularly vulnerable – during hibernation and when non-flying young are present. **The use of trees by nesting birds needs to be considered if removal takes place between March and August inclusive.**
- 7.12 Trees categorised as having Moderate or Moderate to High BRP that cannot be fully inspected from the ground, that are due to be impacted should be subject to further survey in the form of climbed with ladders and/or rope access techniques (where required) and inspected with an endoscope by a licensed bat ecologist.
- 7.13 It is recommended that where possible, woodland and trees are retained and incorporated into the development. This includes the trees noted within retained

areas that have been identified as having features suitable for roosting bats (although it is noted that some may require removal on health and safety grounds).

- 7.14 It is recommended that a bat sensitive lighting scheme be formulated that avoids light spillage onto areas of woodland, tree and hedge lines (both on and off site). Refer to Appendix F for further information on bat and lighting.
- 7.15 It is recommended that a scheme for the provision of bat boxes on retained trees be formulated to provide additional features for roosting bats following completion of the development.

8.0 CONCLUSIONS

- 8.1 The daytime building assessment has concluded that Buildings 2 and 3 continue to offer Negligible bat roost potential.
- 8.2 Building 1 offers **Moderate** bat roost potential, however no bats were recorded as roosting within the building during the dusk emergence and dawn re-entry surveys.
- 8.3 Therefore demolition of the buildings does not require a licence from Natural England and is unlikely to impact upon bats.
- 8.4 If demolition of Building 1 has not taken place within 1 year of this report, it is recommended that an updated building assessment be undertaken.
- 8.5 No evidence of the use of the site by barn owl was noted during the survey. The buildings on site are unlikely to be used by barn owl and no further survey work is required for this species.
- 8.6 Demolition of the buildings should avoid the bird nesting season which generally encompasses March to September. If this is not possible then a nesting bird survey will be required prior to demolition.
- 8.7 No further survey is required in respect of trees categorised as having Negligible BRP.
- 8.8 Trees categorised as having Low BRP should be subject to a pre-commencement check and works conducted under RAM if they are due to be impacted.
- 8.9 Trees categorised as having Moderate or Moderate to High BRP that cannot be fully inspected from the ground should be subject to further survey in the form of climbed with ladders and/or rope access techniques (where required) and inspected with an endoscope by a licensed bat ecologist if they are due to be impacted.
- 8.10 If bats are recorded roosting in the trees, then a Bat Mitigation Licence will be required prior to any potentially disturbing work taking place.

9.0 REFERENCES

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Appendices

Appendix Ai: Photographic Plates - Building



Plate 1a, 1b: External views of Building 1



Plate 2a, 2b: External potential roost features of Building 1



Plate 3a, 3b: Internal views of Building 1



Plate 4: Internal view of Building 2 (pigeons were nesting on the metal framework at the end)



Plate 5: View of Building 3

Appendix Aii: Photographic Plates - Trees

NB: Tree/group numbering follows that of Tree Solutions Arboricultural Impact Assessment and Method Statement

Site area A (land immediately south of Lickers Lane)

Tree/Group and Potential Roost Feature (PRF) description

PRF Photographs

T1 – oak

Mature tree with old pruning wounds at 3m and 6m on the northern aspect. These features were inspected aerially in 2018 and were found to be offer negligible BRP. It is unlikely that such features have developed in the space of 2 years. The features are relatively upwards facing and as such are likely wet/damp. No new features were observed.

Precautionary Low BRP

Fell under RAM



T2 – Sycamore

Semi mature sycamore located just outside site boundary. No features observed, but only the eastern side could be surveyed. Unlikely to be directly impacted by proposals.

Negligible BRP

No further survey work.



G1 – Sycamore

Multi stemmed sycamore trees with no obvious features suitable for bat roosting.

Negligible BRP

No further survey work.



G2 – Oak

Immature oak trees with no features suitable for bat roosting.

Negligible BRP

No further survey work.



G3 – Birch

Birch trees within scrub with no features suitable for roosting bats.

Negligible BRP

No further survey work.



G4 – Goat willow, birch, aspen, cherry, oak Unmanaged scrub. No features suitable for roosting bats. Negligible BRP No further survey work.	
G5 – Sycamore, elm (dead) Semi mature sycamore trees, some peeling bark observed but no features suitable for roosting bats. Negligible BRP No further survey work.	
G6 – Sycamore Immature to semi mature sycamore trees located just outside site boundary. No features observed, but only the eastern side could be surveyed. Unlikely to be directly impacted by proposals. Negligible BRP No further survey work.	

W1 – Sycamore, ash, oak woodland

W1.1 - Sycamore

Frost crack type wound, from the ground up to approx. 2m. Rams horns developing around exposed heart wood. No apparent access into callus gaps. Small upwards dry cavity at the apex, 5cm x 5cm entrance hole, 6cm upwards travel. Somewhat exposed. BRP - Low

Fell under RAM



W1.2 – Sycamore

Wound with a cavity at the apex at 1m height. 5cm x 5cm entrance hole, approx.. 15cm upwards travel. Dry inside, with woodlice.

BRP – Low

Fell under RAM



W1.3 – Sycamore

Three stemmed tree with wounds on two stems. Frost crack type wound extended 1m up stem from ground. 10 x 20cm entry hole, with 20cm upwards travel. Appeared dry inside but small amount of white mould present indicating some damp.

Small wound on second stem at 1m height. 2 x 10cm entry hole, with 15cm upwards travel. Narrow inside.

BRP – Low

Fell under RAM



W1.4 – Sycamore

Twin stemmed tree with wounds at base of both stems. Butt rot. Small cavities developing at apex of both wounds. 5 x 5cm entry points and 5cm upwards travel in lower of the two wounds. Exposed.

BRP – Low

Fell under RAM



W1.5 – Sycamore

Frost crack type wound extended 1m up from the ground. 5 x 10cm entry hole at apex, leading into 10cm upwards travel. Damp lower down but drier at the top.

Low BRP

Fell under RAM



W1.6 – Sycamore

Two large frost crack type wounds. The first from the ground, terminating at 2m. Rams horns developing. No apparent access into callus gaps. Cavity at midpoint apex. 5 x 5cm entry hole leading to 20cm upwards travel. Relatively dry and narrow cavity.

A further frost crack type wound above this appeared damp with no suitable cavity.

Low BRP

Fell under RAM



W1.7 – Sycamore

Frost crack type wound extending from ground up to 4m with rams horns developing on both sides. Cavity at the apex with an entrance hole of 5cm x 5cm.

Moderate BRP

Climb with ladders and inspect with endoscope



W1.8 – Sycamore

Two frost crack type wounds. The first from 0.5m to 1m, with rams horns developing. No apparent access to callus gaps. Cavity at apex with 5cm by 5cm entrance hole. 25cm upwards travel at apex.

Second frost crack wound at 2.5m. This appeared wet and unsuitable.

All features fully inspected.
Moderate BRP

Check again with endoscope prior to development. If no evidence of bats, fell under RAM.



W1.9 – Sycamore

Frost crack type wound extending from the ground to 1.5m high. Rams horns developing. No apparent access into callus gaps. Cavity at apex of wound with entrance hole of 3cm x 3cm. 20cm upwards travel offering a dry cavity. Occasional woodlice.

All features fully inspected.
Moderate BRP

Check again with endoscope prior to development. If no evidence of bats, fell under RAM.



W2 – Sycamore, birch, oak, lime woodland

W2.1 – Sycamore

Multi stemmed tree with a frost crack type wound on northern stem at 5m high. Appears to lead into a possible cavity with an entrance hole of 5cm by 20cm.

Moderate BRP

Climb with ladders/rope access and inspect with endoscope.



W2.2 – Sycamore

Multi stemmed tree with a dead and damaged branch facing south, at 6m high. Rot hole observed in dead wood, leading into possible cavity with an entrance hole of 5cm x 5cm.

Moderate BRP

Climb with ladders/rope access and inspect with endoscope



Site area B (land immediately east of Windy Arbor Road)	
Tree/Group and Potential Roost Feature (PRF) description	PRF Photographs
T1 – Cedar T2 – Cedar T3 – Cedar T4 – Cedar G1 – Pine, spruce H1 – Leyland cypress No features suitable for bat roosting observed. Negligible BRP No further survey work.	
T5 – Oak Mature oak tree with old pruning wounds in the crown which appeared superficial. Precautionary Low BRP Fell under RAM	
G2 – Ash A group of four ash trees G2.1 A small superficial rot hole observed at end of western branch at 5m. Low BRP Fell/prune under RAM	

G2.2

Semi mature ash tree with lightning strike type wound from the top of the main stem where the crown had snapped off, leading downwards for approximately 2m. Rams horns were developing either side. This features was climbed and inspected in 2018 and found to have Moderate BRP.

The same classification is given and it is recommended the tree be climbed and inspected again.

Moderate BRP



G2.3

Semi mature ash tree with a knot hole at 10m high on the southern aspect.

In 2018 this tree was climbed and the knot hole was found to have a cavity feature which was open to the elements and had Low BRP. The feature is considered unlikely to have improved in BRP due to being exposed but may have deteriorated. It is slightly upwards facing and appeared damp. The same classification is given as a precaution.

Low BRP

Fell under RAM



G2.4

Semi mature ash with a broken branch on the western aspect at 10m. A tear out type wound is present on the underside of this branch, leading to a possible cavity with an entry hole of 5cm by 5cm.

Moderate BRP

Climb via rope access to inspect features with endoscope,



G3.1 – Sycamore

A dead multi stemmed sycamore tree with a woodpecker hole at 15m on the northern aspect.

This tree was climbed and inspected in 2018 and the cavity was found to be wet and unsuitable for bats. Given the trees appearance re-climbing is not considered safe. The feature appeared damp and is considered unlikely to have improved but a precautionary approach is considered suitable.

Low BPR

Fell under RAM

The remaining trees in G3 were semi mature to mature sycamore, many being densely ivy clad. Ivy clad trees were categorised as Low BRP

Fell under RAM



G4 – Goat Willow

This is an area of dense willow scrub. Trees are immature and no features suitable for bat roosting were recorded.

Negligible BRP

No further survey work.



W1 – Sycamore, oak

An area of woodland with semi mature to mature trees.

W1.1 – Snapped/fallen tree

Located on the south side of G3/north of W1. This was considered to be a tree that had fallen since the 2018 survey (also labelled at W1.1 in 2018 report). In 2018 it was found to be a confirmed roost with a bat dropping recorded in a gap behind the heart wood. The remnant stem was 1.5m high with some open gaps into/behind heartwood with minor/superficial cavities and ivy.

Low BRP

Fell under RAM

W1.2 – Holly

Semi mature holly with dense low growth. Tear out wound at 2m high. Cavity appeared to go inwards and upwards but close inspection could not be made due to low growth. Cavity entrance hole 20cm x 5cm but obscured by clutter.

Low BRP

Fell under RAM

W1.3 – Dead sycamore tree

Small Y shaped tree, approx. 10m high with a DBH of 30cm. Tree had a frost crack type wound down its entire length with rams horns on both sides. They had developed into hollow callus rolls. On the left the access hole was at 1m with entrance hole of 5cm x 3cm. It extended upwards to 1m. On the right there were 2 entrance holes 5cm x 5cm and 2cm x 10cm. The lower hole extended upwards for 20cm into the callus roll. Callus rolls continued upwards with possible entry points higher up.

BRP Moderate to High



Climb with ladders to inspect higher potential features.



W1.4 – Sycamore

Approx. 20m high with 45cm DBH. Frost crack type wound down the length of the tree which was obscured at the top by dense ivy. There was a 25cm area of exposed heartwood and rams horns developing on both sides, potentially leading into callus rolls. No callus gaps observed but may be present higher up the tree, but this could not be inspected from the ground.

Moderate BRP

Climb with ladders and inspect with endoscope.



W1.5 – Sycamore

Small twin stemmed sycamore tree, both stems are snapped at approx. 8m high. Significant stem damage with deadwood and a small 2cm x 5cm entry hole into a hollow stem at 3m.

Moderate BRP

Climb with ladders and inspect with endoscope.



W1.6 – Sycamore

Frost crack type wound from almost ground up to 2.5m high. Cavity in the apex is small and slugs present.

Low BRP

Fell under RAM



W1.7 – Dead sycamore

Twin stemmed, both with dead wood. Stem on western aspect had 2 x woodpecker holes at 2-3m and a rot hole at 3m.

Moderate BRP

Climb with ladders and inspect with endoscope.



W1.8 – Sycamore

Triple stemmed tree. Eastern stem appears dead. Exposed heart wood and cavity observed behind it at 5m high. Entrance hole 4cm x 2cm. Callus rolls developing either side but no access into cavities observed.

Moderate BRP

Climb with ladders and inspect with endoscope.



W1.9 – Sycamore

Twin stemmed tree with frost crack type wound from ground to 0.5m. Cavity entry at apex of wound approx. 5cm x 5cm, leading to 40cm upwards travel. Damp inside, slugs.

Low BRP

Fell under RAM



W1.10 – Dead tree trunk

DBH of 20cm, dead hollow trunk with numerous small (approx. 10cm x 5cm) entry points. Not one continuous cavity but a few separate ones. Relatively exposed in areas. Some inwards/upwards travel of up to 10cm.

Low BRP

Fell under RAM





Appendix B: Bat Ecology and Bats in Buildings

BAT ECOLOGY AND BATS IN BUILDINGS

General

- 1.1 There are 18 species of bats in the UK, 17 of which are known to be breeding in the UK. Bat populations have declined considerably over the last century.
- 1.2 Bats are under threat from development and building work that affects roosts, loss of habitat, the severing of commuting routes by roads and threats in the home including cat attacks, flypaper and some chemical treatments of building material. Other potential treats can include lighting sited on key bat habitat on near roosts.

Bats in Buildings

- 1.3 Buildings provide a choice of safe, dry places made from materials like timbers, bricks, stone, tiles and slates.
- 1.4 Buildings present a whole range of potential roost sites for bats e.g.: -
 - In walls:
 - Behind external hanging tiles or weatherboarding
 - In cavity spaces
 - At top of solid walls
 - In eaves:
 - Above soffit, or behind fascia and barge boarding
 - In roofs:
 - In tunnel under ridge tiles
 - Between underfelt and tiles or slates
 - In roof space along ridge beam and at timber joints, at gable end or around chimneybreast.
- 1.5 The most obvious use of buildings by bats is between May and August, when the pregnant females gather in maternity roosts to give birth and raise their young.
- 1.6 Females and young often remain in one site all summer or move about using several roosts.
- 1.7 Most summer colonies will have dispersed by the autumn, though brown long-eared *Plecotus auritus* bats often appear early in the year (early April) and leave later (October or later). These bats occasionally use the roost throughout the entire year.
- 1.8 Buildings may also be used as temporary or “transitional roosts” by small numbers of adult and immature bats of both sexes, particularly in spring and autumn.
- 1.9 Many outbuildings are attractive to bats for temporary night-time roosts or as sheltered feeding perches. The latter are indicated by the presence of a lot of insect remains, particularly of moths or large beetles and some droppings.
- 1.10 Cool, undisturbed, humid places are important as hibernation sites. Most species will tuck themselves into small crevices e.g. between bricks/stonework, and can easily pass the winter there unnoticed.
- 1.11 Bats are usually concealed in crevices, behind roofing felt, in cavity walls, behind soffits and barge boards, in old timber joints or under ridge tiles and are only occasionally seen out in the open in lofts. Consequently, the key identification feature is the presence of droppings. Sometimes droppings may be found on the outside of buildings

e.g. on windows, walls or windowsills. On other occasions droppings found in loft spaces beneath ridge-boards and around chimneys or gable ends is also typical of bats. Hibernating bats leave little or no field signs.

- 1.12 Other evidence to the presence of bats is a characteristic odour. A polished or clean surface near a place where light enters may also indicate habitual usage by bats. Sometimes bats can be heard “chittering” but this is usually in warm summer weather or when they are about to leave the roost to forage at dusk.
- 1.13 The species most commonly occurring in buildings (usually modern houses in summer) are two of the pipistrelle species, (*Pipistrellus pipistrellus*, *Pipistrellus pygmaeus*). These highly gregarious small bats use buildings for breeding during the summer and, in general, the bats disperse during the autumn. They often roost behind soffits, in cavity walls or behind external cladding. In such cases droppings are often found on external surfaces below the roost entrance/exit. The most likely place to find droppings in the roof void are at the gable end wall and along the eaves. In some cases, the bats may roost beneath ridge tiles, on top of the ridge beam or under insulation close to the eaves. Pipistrelles are frequently found overwintering deep in the cracks, crevices and cavities of usually uninhabited buildings (e.g. barns) and in such cases they leave little or no field signs.
- 1.14 The brown long-eared bat is one of the most common species in Britain and is the one most likely to be encountered in roof voids and may occasionally be seen clinging on to timbers near the apex of the roof. Like the pipistrelle, highest numbers may be seen on hot days between June and September when breeding colonies may be present. During the autumn and in cool weather, bats remain concealed in crevices or hollow walls but may appear on mild days or if disturbed. Brown long-eared bats tend to fly around in the open roof void and cling from the ridge during the night, so droppings are usually found scattered over the floor or concentrated in piles beneath favoured roosting areas, typically beneath the ridge beam. In hipped roofs, piles of droppings may also be found in the junction between two hips.
- 1.15 A number of other species - serotine *Eptesicus serotinus*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe *Rhinolophus hipposideros* are dependent on roofs but are not found locally in the area, though there has been the occasional record of serotine in the North West.
- 1.16 Whiskered *Myotis mystacinus*, Brandt's *Myotis brandtii*, Natterer's *Myotis nattereri* and Daubenton's *Myotis daubentonii* bats may be present in the area and may be found in roofs but they are not particularly common in such sites. Roosting position is variable but they will be found in the same sorts of places as other species.
- 1.17 There are nine different types of bat roost (Table 3.1 BCT Bat Survey Guideline 2016)
 - I. Day roost
 - II. Night roost
 - III. Feeding roost
 - IV. Transitional / occasional roost
 - V. Swarming roost
 - VI. Mating roost
 - VII. Maternity roost
 - VIII. Hibernation roost
 - IX. Satellite roost

Bats regularly move from site to site even within the above categories.

Appendix C: Barn Owl Ecology

BARN OWL ECOLOGY & CONSERVATION STATUS

- 1.1 Barn owls are birds of open habitat that predominantly feed on small mammals including field voles, common shrews and wood mice. They are not territorial; however, they often remain faithful to their foraging and breeding sites.
- 1.2 They nest and roost within holes, cavities and chambers in mature trees, buildings and other structures. Barn owls will use several sites within their home range. These sites usually fall into one of the following three categories:
 - breeding and roosting
 - regular roosting only
 - occasional roosting
- 1.3 However, it should be noted that a bird's status can change overnight. For example, a roosting bird may start to nest, or an unoccupied site may suddenly become occupied.
- 1.4 Barn owls will travel several kilometres from their nesting and roosting sites to foraging habitat. Therefore nest and roost sites are not necessarily located in areas of good foraging habitat.
- 1.5 Breeding has been recorded in every month of the year, however, the peak nesting season usually encompasses April - July. Barn owls do not construct a nest; rather they lay their eggs on a cushion of shredded pellets and other debris. Typically, five eggs are laid at 2-3 day intervals. Incubation by the female commences after the first egg is laid, resulting in asynchronous hatching and a marked size difference between the young.
- 1.6 Young barn owls fledge at approximately 60 days after hatching although they remain dependent on the parent birds for food and will often return to the nest site until they become fully independent.
- 1.7 Late or repeat clutches are usually laid in the latter half of June, whilst second clutches are often not begun until the end of July or early August (Shawyer, 2011).
- 1.8 Barn owl field signs include pellets (the regurgitated indigestible parts of their prey), feathers and droppings, which often appear as white splashes beneath favoured perching/roosting sites.
- 1.9 Barn owl pellets are distinctive in colour and size, enabling them to be distinguished from that of other species of bird of prey. Their change in colour from dark black to light grey as they decompose can be used to estimate the age of a pellet.
- 1.10 The barn owl is a relatively scarce breeding species for which there is conservation concern in the UK. The population was thought to have declined by approximately 70% between 1932 and 1985, from an estimated 12,000 to 3,800 breeding pairs in England and Wales (Shawyer, 2011). Recent surveys of the UK barn owl population have recorded a similar breeding population (Toms *et al.* 2000). Factors contributing to the

decline of this species include habitat loss and fragmentation, loss of nesting sites, and hazards such as roads, railways and overhead power cables.

- 1.11 Barn owls, like many other species listed on Schedule 1 of the *Wildlife & Countryside Act*, are under particular threat from disturbance whilst they are breeding. Even individuals of the same species may exhibit different responses to the same activities depending on the local context.
- 1.12 The barn owl is a Local Biodiversity Action Plan (LBAP) species, for which the Cheshire Region Biodiversity Partnership has developed a Species Action Plan for the conservation of this species at the county level. It is also listed as a RSPB Amber Status species.

Appendix D: Bats in Trees and Linear Landscapes

Bats in Trees and Linear Landscapes

- 1.1 Some bat species rely exclusively on trees for roost sites; others use them for only a part of the year.
- 1.2 The availability of tree holes may limit the number of these species.
- 1.3 All UK bat species feed on insects associated with trees.
- 1.4 The importance of trees to bats varies with species, season and foraging behaviour.
- 1.5 Trees and hedgerows, especially native ones, play host to many species of insect, which are food for bats.
- 1.6 Bats rest; give birth, raise young, form groups and hibernate in natural holes, crevices and sheltered places. Such conditions occur particularly in mature trees.
- 1.7 Identification of tree roosts is an area with a poor record of success. Typical sites may be old woodpecker holes, cavities and cracks in trees, crevices behind peeling-off bark, woodpiles and behind ivy.
- 1.8 Bats favour native trees such as oak, beech, ash and Scots pine. Even in winter, deep cavities can provide protection against bad weather and fluctuations in temperature.
- 1.9 Over a period of time bats will use a number of trees to optimise roosting conditions. External disturbances, an internal build-up of parasites or distance from feeding area can influence the choice of tree.
- 1.10 Bats also use trees, lines of trees and hedges to navigate at night. Loss or damage to such features affects the ability of bats to commute safely and economically between roosts and feeding sites. A gap in a hedge as little as 10 metres may force some bats to seek an alternative route or to change roosts.
- 1.11 Even if not directly affected by development work, bat roosts may be abandoned if the connectivity of the landscape around it is lost by hedge or tree removal or breaking up of other linear features.
- 1.12 Evidence of bats in trees can be identified in a number of ways:
 - Obvious holes, cavities and splits
 - Dark staining caused by urine on the tree below a hole
 - Staining around a hole caused by the natural oils in bats' fur
 - A maze of tiny scratch marks around the hole made by bats' claws
 - Droppings below a hole – they look similar to those for rodents, but crumble to a powder of insect fragments
 - On close inspection a hole may contain droppings or smell of bats
 - Noise (squeaking or chittering) coming from a hole-especially on a hot day or at dusk

However, it should be noted that bats often produce little or no evidence of their occupation.

Appendix E: Tree Location Plans

Appendix F: Bats and Lighting

Bats and Lighting

This is a summary of the Institution of Lighting Professionals Guidance Note 08/18 – Bats and artificial lighting in the UK. Bats and the Built Environment series. This document was produced in collaboration with the Bat Conservation Trust and is available on the ILP website and should be referred to for full details.

- 1.1 Research has shown that lighting can have several impacts upon bats at roost sites. It can cause a disturbance to roost sites, which may lead to roost abandonment, bats becoming entombed within the roost, or delayed emergence leading to reduced available foraging time. Causing disturbance in this manner could constitute an offence both to a population and to individuals.
- 1.2 Lighting can also affect the way bats forage. Many night-flying insects are attracted to light, especially when certain components are emitted. Bats such as Leisler's, serotine and pipistrelles will gather around certain lights, to feed off the insects attracted to the light. On the other hand, the slower flying species such as long-eared bats and some myotis species are largely light avoiding. This can result in less light tolerant species being less able to feed successfully. Furthermore, the attraction that insects have to light sources can indirectly cause reduced insect numbers in areas further afield, again decreasing the ability of light-avoiding species to be able to feed.
- 1.3 Artificial lighting can be particularly harmful if used near woodland edges, river corridors and hedgerows. Bats use linear features such as these, not only as a foraging resource, but as commuting routes. Continuously lit areas can create a barrier that certain species cannot cross, particularly slower-flying species, but also seen in common pipistrelle.
- 1.4 There is no legal requirement for an area or road to be lit. There are a number of British Standards that relate to different components of lighting – such as road lighting, outdoor workplaces, emergency lighting. In addition, many county councils set out standards in local policy. However, deviating from these documents is allowed when there is significant ecological reason for doing so, and local authorities have a duty to ensure impacts upon legally protected species are avoided.
- 1.5 Dark buffer zones – the creation of a dark perimeter around habitats or features used by bats. These areas can be created by ensuring light levels (in lux) within a certain distance of a feature do not exceed defined limits. Buffer zones widths and lighting limits can be determined by the importance of the habitat or feature (i.e. the number of bats and species, and the way in which the feature is used).
- 1.6 When choosing luminaires, the following should be considered:
 - Lights should avoid UV elements when manufactured. Metal halide, fluorescent sources should not be used.
 - LED luminaires should be used where possible. They benefit from sharp cut-off, lower intensity, good colour rendition and dimming capabilities.
 - A warm white spectrum (ideally <2700Kelvin) should be used so that blue light components are reduced.
 - Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
 - Internal lighting within buildings should be recessed to avoid/minimise light spill through windows.

- The use of specialist bollard or low-level downwards directional luminaires to retain darkness above can be considered.
- Light spill should be minimised by adjusting column heights.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used.
- Luminaires should always be mounted on the horizontal (no upward tilt).
- External security lighting should be set on motion-sensors where practicable, with short timers.
- As a last resort accessories such as baffles/hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

1.7 Site configuration can have a considerable impact on light spill. Consideration should be given to including key habitats/features into unlit public open space; buildings, walls and hard landscaping may be sited so as to block light spill from reaching habitats/features; taller buildings may be better placed centrally or sufficiently set back from key habitats/features; street lights can be located so that rear shields are adjacent to habitats/features, or luminaires selected that stop back light and direct light spill to required areas.

1.8 Screening of light spill through soft landscaping and/or the installation of walls/fences/bunding can be effective means of light control. The use of green corridors such as hedgerows, scrub and woodland can provide natural light screening if designed well, and are encouraged as they offer additional benefits to wildlife, including bats. In some instances, temporary barriers may be required, until vegetation is determined to be sufficiently established.



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