

# ECOLOGICAL APPRAISAL AND PRELIMINARY BAT ROOST ASSESSMENT

COLESEED BUSINESS PARK, UPWELL ROAD, MARCH, PE15 0DJ



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(Bat Survey License 2017-30927-CLS-CLS, Great Crested Newt Licence 2018-36283-CLS-CLS)  
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## 1.0 Executive Summary and Site Description

A bat and nesting bird survey were undertaken by James Hodson BSc, MSc (Natural England, Level 2 Bat Survey License 2017-30927-CLS-CLS) of Eco-Check Ltd on 6<sup>th</sup> September 2023 of a former poultry house (B1), now used for storage/workshops and sub-divided into lockup units.

A planning application is submitted to Fenland District Council for the demolition and clearance of the existing building and construction of a replacement industrial unit. The footprint of the new building will be entirely within the existing buildings footprint. The existing site layout is detailed on the drawing attached in Appendix 1 and also showing the scope and extent of the proposed conversion works.

A detailed search of the interior and exterior of the building found no bat droppings or feeding remains. No roosting bats were observed in the building and no other evidence such as a bat roost, oil or urine stains etc. was observed in any of the locations. The floors and other flat surfaces had not been swept or recently cleared and so evidence of bat activity would have been apparent. The units are used for storage and workshops with fluorescent lighting and which are in regular use and disturbed on a regular basis.

Preliminary Roost Assessment Conclusions- The building is a former poultry house measuring approximately 34 metres x 9.45 metres with eaves and ridge heights of 2.3 metres and 3.5 metres respectively. The building is of timber frame construction with timber board cladding and internal chipboard and plyboard lining to the walls and ceiling. The roof of the building is corrugated fibreboard with ridge capping. The building is falling into a poor state of repair with frequent rotten and broken timber boards and cracked/broken fibreboard sheets. The building is accessible via doors on the west elevation and there are extractor fans and boarded up vent holes in the east elevation. The majority of the units are well sealed and inaccessible to volant species such as bats and birds. Whilst there are some cavity voids between the external timbers and internal boarding/insulation the building generally lacks sufficient shelter, protection and/or appropriate thermal/lighting conditions to be used on a regular basis or by larger numbers of bats (i.e., unlikely to be suitable for maternity or hibernation.). The building was assessed as having **Negligible/Low** probability of bat interest due to the lack of any evidence of bat activity or roosts, general lack of potential roost features (PRF's) and suboptimal roosting conditions.

In accordance with Bat Surveys-Good Practice Guidelines, J. Collins, 2016 and 'Bat Workers Manual, 3<sup>rd</sup> Edition, Mitchell and Jones, 2004 buildings with **Negligible roost potential** require no further survey effort. Buildings with **Low** roost potential would normally require a further summer dusk emergence survey; however, I consider that the visual inspection was sufficient to provide reasonable confidence in a negative roost assessment. No further surveys are therefore recommended subject to a further inspection prior to works commencing and reasonable avoidance mitigation measures (RAMS) being implemented during works as detailed in Section 5. This will include an inspection of any cavities with endoscope prior to demolition and supervision of the removal any boarding or sheets by a licensed bat worker.

On the basis of the preliminary roots assessment there is no reasonable expectation that impacts to bats, such as would be considered an offence under Article 12 (1) of the Habitats Directive of The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2017 will occur as a result of the proposal. The potential for roosting bats however can rarely be excluded entirely due to the highly mobile nature of bats and seasonal use of roosts.

The building is bordered by concrete aprons, bare ground, shipping containers, cypress hedging and palisade fencing and as such the presence of any other protected/priority species within the site is considered to be unlikely apart from nesting birds. There is a drain indicated along the east and south boundary of the wider business park, but these were overgrown and inaccessible to survey, however outside of the proposed working areas and therefore unlikely to be disturbed. The site is entirely bordered by large arable fields and as such considered unlikely to be a strategic foraging and commuting corridor for bats. The bordering landscape is entirely large open arable fields and so the site is considered to be more isolated to non-volant species. A sensitive lighting scheme must be implemented to limit light spillage onto the eastern vegetated boundary with the drain, this may include LED downlighters and low light transmission glazing.

No evidence of nesting birds was found inside or outside of the building, however if construction works commence between 1<sup>st</sup> March to 31<sup>st</sup> August, then the building and adjacent vegetation will need inspecting again prior to demolition works commencing, particularly the mature Cypress tree line along the north edge of the existing and proposed building. There are no ponds within 250m, and the drains are unlikely to be used and the site is isolated by the bordering arable fields. The bare ground and concrete hard surfaces are poor habitats for GCN and so considered unlikely to be present within the working areas. This species group is not considered to represent a constraint to development. If development has not commenced within 2 years of September 2023, it is recommended that an updated survey is undertaken, as the suitability of the site for protected species may have changed.

### **1.1 Scope of the Report**

This report details the methodology, results and conclusions of a daytime survey undertaken on the 6<sup>th</sup> September 2023. The purpose of the survey was to confirm the presence or likely absence of bat roosts, within the building, the value of the building for roosting bats and the presence of any nesting birds. The survey data collected was used primarily to evaluate the likely impact of the proposed demolition works on roosting bats and also lighting and design layout proposals on roosting, foraging and commuting bats. A general assessment of the wider site was also undertaken to assess if any other protected or priority species are likely to be present.

### **1.2 Aim of Survey**

To examine the building to determine the presence or likely absence of nesting barn owls and/or roosting bats, species protected under the Wildlife and Countryside Act 1981 with respect to the proposed development works. If found to be present, the survey aims to determine the use of the building by protected species so that the impacts of the development proposal can be assessed, and appropriate advice given to address these impacts.

In the light of the survey this report provides initial recommendations for potential mitigation measures if protected species are likely to be affected by the proposed works. It may be necessary to obtain a European Protected Species (EPS) license in accordance with the above legislation.

This report has been prepared in accordance with the recommended format in 'Bat Surveys-Good Practice Guidelines, J. Collins, 3<sup>rd</sup> Edition, 2023 and 'Bat Workers Manual, 3<sup>rd</sup> Edition, Mitchell and Jones, 2004'. The methodology of the survey adopts the recommended best working practice for the inspection of buildings for bats and bat roosts.

### 1.3 Site Location and Description

Coleseed Business Park is located approximately 1.1km east of March in the Fenland District of Cambridgeshire. The buildings are accessed from Coleseed Drove off the B1099 Upwell Road to the north, National Grid Reference: TL 436959. The site is bordered by large open arable fields on all sides and railway line to the south.

Habitats within the site include bare ground, buildings, scattered trees and adjacent hedging, tree lines, drains and scattered scrub. Beyond the immediate site the landscape is primarily large open arable fields, drains and ditches.

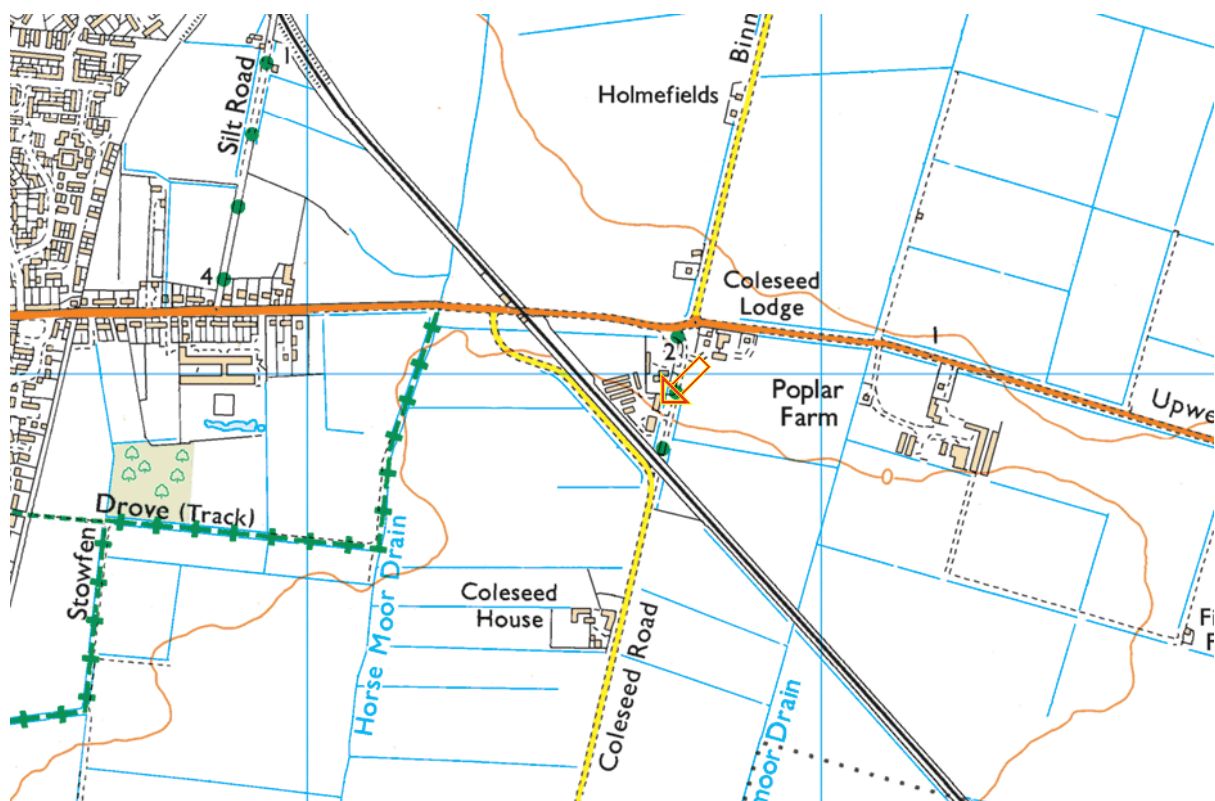


Fig 1. Site Location Map – Street Map



**Fig 2.** Aerial Site View and Buildings – Google Earth-June 2023

#### **1.4 Building Description**

**B1-** The building is a former poultry house measuring approximately 34 metres x 9.45 metres with eaves and ridge heights of 2.3 metres and 3.5 metres respectively. The building is of timber frame construction with timber board cladding and internal chipboard and plyboard lining to the walls and ceiling. The roof of the building is corrugated fibreboard with ridge capping. The building is falling into a poor state of repair with frequent rotten and broken timber boards and cracked/broken fibreboard sheets. The building is accessible via doors on the west elevation and there are extractor fans and boarded up vent holes in the east elevation. The majority of the units are well sealed and inaccessible to volant species such as bats and birds.



**Fig 4.** West elevation and concrete apron (left) and north gable end (right)



**Fig 5.** West elevation doors into units



**Fig 6.** East elevation (left), rotten timbers and broken roof sheets (right)



**Fig 7.** Internal view of roof structure and sealed up vents



**Fig 8.** Internal view of stores/workshop units

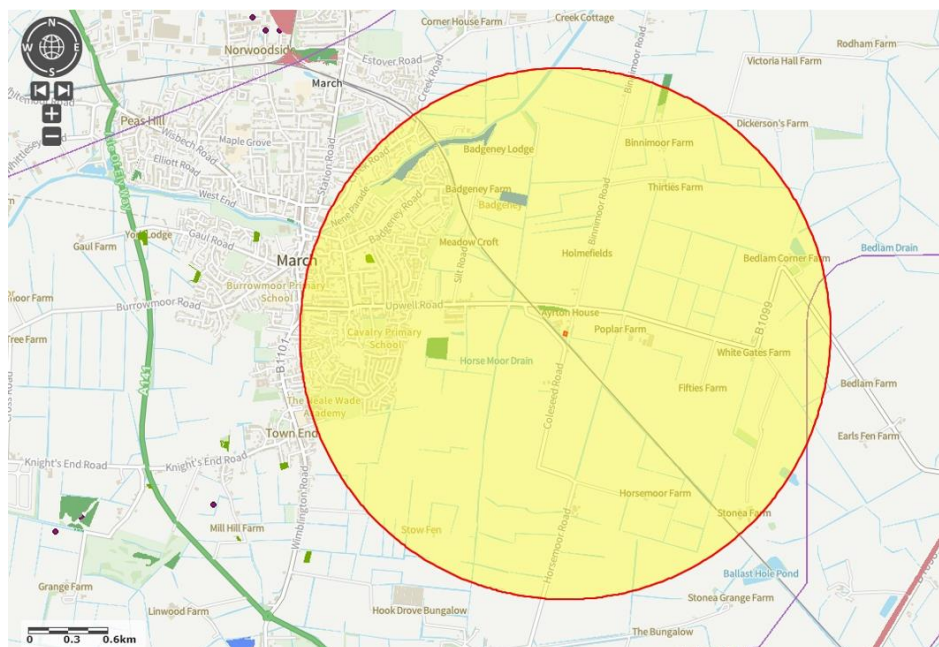
## 1.5 Proposed Works

The proposed works are for the demolition and clearance of the building and construction of a single king span industrial unit with steel frame and plastic-coated corrugated metal sheet walls and roof. The existing access and concrete aprons as well as palisade fencing will remain as existing. The new building will have roller doors along the west elevation. The use of the building will be for Classes E (g) and B2 uses as per the existing building it is to replace.

## 1.6 Site Context and Status

### Statutory designated sites<sup>1</sup> –

The proposed development site is not subject to any statutory or non-statutory nature conservation designations and does not contain equivalent habitat which could be considered as functionally linked to any nature conservation sites. Similarly, no such sites are present within a 2km radius.



**Fig 9. Magic Site Check-2km Radius**

### Non-Statutory designated sites<sup>2</sup> –

No Local Wildlife Sites or Local Nature Reserves were identified within a 2km radius.

### Habitats of Principal Importance

#### *Protected / Priority Habitats:*

There are 2 identified Priority Habitats within the search area:

Deciduous Woodland- Main Habitat: Present Deciduous woodland, Confidence in Main Habitat

Classification: Low. Name of 1st Data Source: NFI Base Map

Floodplain Grazing Marsh, Main Habitat: Present, Confidence in Main Habitat Classification: High.  
Name of 1st Data Source: Coastal and Floodplain Grazing Marsh Inventory.



## Protected/Priority Species<sup>3 4</sup>-

The records for protected species within 2 km of the site are:

1. There are 11 records for great crested newt from ditches/drains approximately 1.5km south-east of the site, nearest (TL449949) (Bern2, FEP7/2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b).
2. There are 7 records of grass snake *Natrix Helvetica* 2021-2020, nearest 1.3km north TL436972, 5 records of common lizard *Zootoca vivipara* 2003-2020, nearest 1.6km north-west, TL426972 (Bern2, FEP7/2, HabRegs2, HSD2p, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b).
3. There is 127 records of Hedgehog (*Erinaceus europaeus*) (Bern3, Sect.41, Sect.42, UKBAP).
4. There are 28 records of bat covering 5 species (Bern2, CMS\_A2, CMS\_EUROBATS-A1, FEP7/2, HabRegs2, HSD4, ScotBL, Sect.41, Sect.42, UKBAP, WCA5/9.4b, WCA5/9.4c, WCA5/9.5a, WCA5/9.5b) Bat species recorded includes, common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle *Pipistrellus pygmaeus*, noctule *Nyctalus noctule*, brown long-eared bat *Plecotus auritus* and Daubentons *Myotis daubentoniid*.
5. There are 16 records for brown hare (*Lepus europaeus*) (FEP7/2, ScotBL, Sect.41, Sect.42, UKBAP).
6. There are 67 records of water vole *Arvicola amphibius* and 11 records of otter *Lutra lutra* associated with the high density of drains.
7. There are 3 records of badger *Meles meles* all roadkill observations.
8. There are 132 records of bird species within a 2 km radius. None of the records pertain to the site or its boundaries but are indicative of the wide variety of species utilising the locality, particularly associated with the main drains and River Nene. These records included ring ouzel (*Turdus torquatus*), yellowhammer (*Emberiza citrinella*), lapwing (*Vanellus vanellus*), corn bunting (*Emberiza calandra*). There are also several Schedule 1 species including barn owl (*Tyto alba*), fieldfare (*Turdus pilaris*).

## Non-Native and Invasive Species:

There are records for muntjac (*Muntiacus reevesi*), and Canada goose (*Branta canadensis*). There are no records for invasive species within a 2km radius and none were observed on site.

## Pond and waterbodies:

A search for ponds and waterbodies within 250m was conducted using Ordnance Survey Data (OS Explorer Map 237 Scale 1:25,000) and publicly available Environment Agency data: There are no ponds within 250m. There are drains indicated along the east and south boundaries but were overgrown and not accessible to survey.

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1 Statutory designation include Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR).

2 Non-statutory sites are designated by local authorities and protected through the planning process (e.g. County Wildlife Sites, Sites of Importance for Nature Conservation or Local Wildlife Sites).

3 Legally protected species include those listed in Schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981; Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended); or in the Protection of Badgers Act 1992 (as amended).

4 Notable species include Species of Principal Importance under the Natural Environment and Rural Communities Act 2006; Local Biodiversity Action Plan (LBAP) species; Birds of Conservation Concern (Eaton et al., 2009); and/or Red Data Book/nationally notable species (JNCC, undated).

## 2.0 Legislation

2.1 All species of bat are fully protected under The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019, through their inclusion on Schedule 2. Regulation 39 prohibits:

- Deliberate killing, injuring or taking (capture) of Schedule 2 species (e.g. bats);
- Deliberate disturbance of bat species as:
  - a) to impair their ability:
    - (i) to survive, breed, or reproduce, or to rear or nurture young;
    - (ii) to hibernate or migrate
  - b) to affect significantly the local distribution or abundance of the species;
    - Damage or destruction of a breeding site or resting place; and
    - Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

Bats are also currently protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5. Under this Act, they are additionally, protected from:

- Intentional or reckless disturbance (at any level);
- Intentional or reckless obstruction of access to any place of shelter or protection; and
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

An EPS Licence issued by the relevant countryside agency (e.g. Natural England) will be required for works liable to affect a bat roost or for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate). The licence is to allow derogation from the relevant legislation but also to enable appropriate mitigation measures to be put in place and their efficacy to be monitored.

Though there is no case law to date, the legislation may also be interpreted such that, in certain circumstances, important foraging areas and/or commuting routes can be regarded as being afforded *de facto* protection, for example, where it can be proven that the continued usage of such areas is crucial to maintaining the integrity and long-term viability of a bat roost.

The species protection provision of the Habitats Directive, as implemented by The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019 contain three “derogation tests” which must be applied by the Local Planning Authority when deciding whether to grant planning permission for a development that could harm a European Protected Species. The three tests are that:

- The activity to be licensed must be for imperative reasons of overriding public interest or for public health and safety
- There must be no satisfactory alternative; and
- Favourable conservation status of the species must be maintained.

It is the responsibility of the applicant to submit sufficient information to address these tests when applying for planning permission. NB: For development activities, a Natural England EPS Licence

application can only be obtained after planning permission has been granted. However, the granting of planning permission does not guarantee that a licence will be issued by Natural England.

## **2.2 Natural Environment and Rural Communities Act 2006 (NERC)**

The NERC Act 2006 states that ‘every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity’, otherwise known as the Biodiversity Duty. Under Section 41 of the Act, the Secretary of State must publish a list of the living organisms and types of habitat which in the Secretary of State’s opinion are of principal importance for the purpose of conserving biodiversity.

This list is based on those species listed in the UK Biodiversity Framework as priority species (see Section 2.3) in addition to Annex II species listed under The Conservation (Natural Habitats, &c.) Regulations 2017. The S41 list replaces the list published under Section 74 of the Countryside and Rights of Way (CROW) Act 2000.

## **2.3 UK Biodiversity Framework and Biodiversity 2030**

The European Commission has adopted the new EU Biodiversity Strategy for 2030 and an associated Action Plan (annex) - a comprehensive, ambitious, long-term plan for protecting nature and reversing the degradation of ecosystems. It aims to put Europe's biodiversity on a path to recovery by 2030 with benefits for people, the climate and the planet. It aims to build our societies’ resilience to future threats such as climate change impacts, forest fires, food insecurity or disease outbreaks, including by protecting wildlife and fighting illegal wildlife trade. A core part of the European Green Deal, the Biodiversity Strategy will also support a green recovery following the COVID-19 pandemic.

Now the UK BAP partnership no longer operates, but many of the outputs originally developed under the UK BAP still remain valid and of use. For example, background information on UK priority habitats and species still inform much of the biodiversity work at country level and remain a point of reference for targeted conservation efforts. Priority habitats and species lists can be seen on the JNCC website.

Current UK Bat Priority Species include:

- soprano pipistrelle
- lesser horseshoe bat
- greater horseshoe bat
- barbastelle
- bechstein's bat
- noctule
- brown long-eared bat

## 3.0 Methodology

### 3.1 Building Inspection

Bat surveys usually involve two elements, surveying sites for likely roost and hibernation sites and surveying likely foraging areas. The daytime survey of the site was carried out on the 6<sup>th</sup> September 2023. The weather conditions were sunny, 5mph south westerly wind and with a temperature of 18°C. The survey was undertaken in accordance with the Bat Conservation Trust's *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2023).

A thorough methodical inspection of the outside of the building was carried out from ground level to eaves level looking for evidence of bats and possible bat access points. An inspection was carried out inside the building looking for evidence of bats and bat roosting sites. In examining the building for barn owls, a search was made for evidence of barn owls (feathers, pellets and faecal 'splashes' on timbers), their nest sites and the birds themselves. The building was also assessed for potential to support nesting or roosting barn owls and other nesting birds.

In examining the building for bats, particular attention was given to any gaps in which bats may roost. It is important to remember that bats are difficult to survey and find and it is usually signs of their activity rather than their actual presence that indicates the existence of a bat roosting site. The presence of moth and butterfly wings for example can indicate bat presence. Bat droppings on walls, floors and flat surfaces can be used to identify species. Floors, walls, supports, and exposed surfaces were inspected for bat droppings, bat urine, feeding remains, oil staining from the fur of bats (indication of frequent use of a particular site), clean cob-web free areas on the ridge boards or crevices and wear of substrates caused by the movement of bats in and out of potential roost exit holes over a long period of time. Beneath ledges, the ground was examined for feathers, pellets and birdlime that could indicate occupation by barn owls.

### 3.3 Limitations

The extensiveness of the ecological assessment was limited by the season in which the site visit was made. To confirm the presence or absence of all protected species usually requires multiple visits at suitable times of the year. Summer surveys between May and September are considered optimal. The site visit focussed on assessing the potential of the site to support species given protection under British or European law. In view of the above constraints this assessment cannot be considered to provide a comprehensive survey of the ecological interest of the site. It does however provide a "snapshot" of the ecological interest present on the day of the visit and highlights areas where further survey work may be required.

It is expected that evidence of bats (particularly in exposed areas or on external faces of the building) which may be present at other times of the year may not have been visible during the survey. A difficulty in inspecting buildings for bats is that the presence of smaller roosts is generally harder to detect than more significant colonies, particularly those of crevice dwelling bats such as pipistrelle. In addition, bats are very transient in nature with complex roosting behaviour and often move between several different roosting sites during the year. Therefore, the presence of transient singleton roosts (e.g. single male roost) can be present at any time of year.

## 4.0 Survey Results

### 4.1 Barn Owls (*Tyto alba*)

No signs of barn owls were recorded in the building although most of the building sections are considered unsuitable because of lack of access and regular disturbance.

#### 4.1.1 Nesting Birds

No birds' nests were observed inside the building, and none were evident externally. There are some ledges in the east elevation where extractor fans have been removed and these provide ideal nesting areas. Small passerines could potentially access the buildings in a few places, but the building is generally of low value to nesting birds. Pigeons were active within the Cypress hedge on the north boundary and so likely nesting birds present during the nesting season.

### 4.2 Bats: (All species)

A detailed search of the interior and exterior of the building found no bat droppings or feeding remains. No roosting bats were observed in the building and no other evidence such as a bat roost, oil or urine stains etc. was observed in any of the locations. The floors and other flat surfaces had not been swept or recently cleared and so evidence of bat activity would have been apparent. The units are used for storage and workshops which are in regular use and disturbed on a regular basis.

Preliminary Roost Assessment Conclusions- The buildings are of timber frame and timber clad construction with some internal blockwork and concrete floors. Internally the units have been boarded out with a mixture of fireboards, sterling boards, chipboard and plywood. The units have corrugated fibreboard roofs on a timber frame. The majority of the units are well sealed and inaccessible to volant species such as bats and birds. Whilst there are some cavity voids between the external timbers and internal boarding/insulation the buildings generally lack sufficient shelter, protection and/or appropriate thermal/lighting conditions to be used on a regular basis or by larger numbers of bats (i.e., unlikely to be suitable for maternity or hibernation.). All of the buildings were assessed as having **Negligible/Low** probability of bat interest due to the lack of any evidence of bat activity or roosts, general lack of potential roost features (PRF's) and suboptimal roosting conditions.

In accordance with Bat Surveys-Good Practice Guidelines, J. Collins, 2016 and 'Bat Workers Manual, 3<sup>rd</sup> Edition, Mitchell and Jones, 2004 buildings with **Negligible roost potential** require no further survey effort. Buildings with **Low** roost potential would normally require a further summer dusk emergence survey; however, I consider that the visual inspection was sufficient to provide reasonable confidence in a negative roost assessment. No further surveys are therefore recommended subject to a further inspection prior to works commencing and reasonable avoidance mitigation measures (RAMS) being implemented during works as detailed in Section 5. This will include an inspection of any cavities with endoscope prior to demolition and supervision of the removal any boarding or sheets by a licensed bat worker.

### ***Foraging and commuting bats***

Due to the habitats present within the site and the local landscape it is considered likely that foraging or commuting bats use the wider site area. This is due to the site having connectivity to hedgerows, tree lines, scrub and linear features such as drains, ditches, railway line etc.

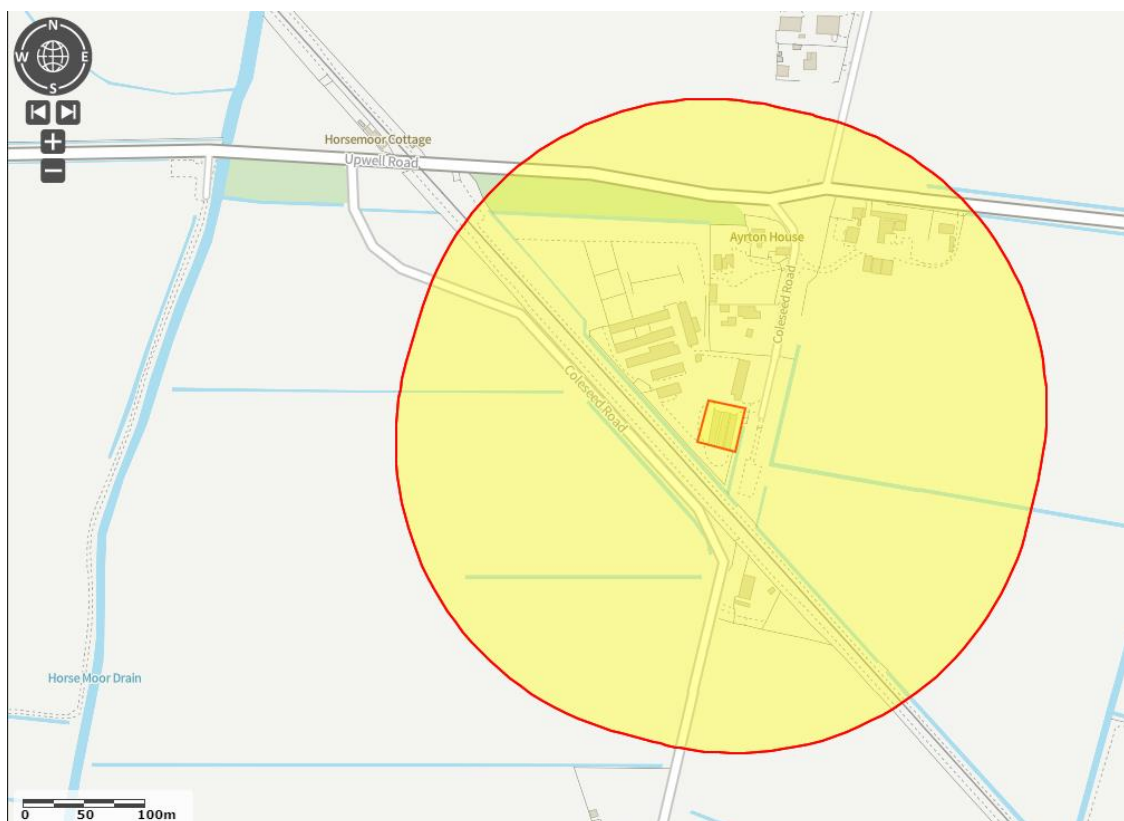
### ***Other species***

#### **Breeding Birds**

The wider site is considered to be of value to breeding birds, especially the tall dense Cypress hedge on the north boundary of the building. The site typically lacks any suitable habitat for ground nesting birds such as skylark though the adjacent arable fields would be. The survey and adjacent buildings have areas accessible to wildlife, also will likely be utilised during the breeding season.

#### **4.3 Great crested newts**

There are no ponds within 250m and the site is considered to be isolated by the surrounding arable fields and lack of other ponds nearby. There are no records of great crested newt within 1km of the site and the adjacent drains/ditches are unlikely to be suitable to due flowing water, waterfowl, fish etc.



**Figure.10- Map of ponds within 250m**

Research undertaken by Natural England suggests that although great crested newts can move up to 500m from breeding ponds, much reduced distances are recorded where adjacent habitats are of

good quality; Jehle (2000) determined a terrestrial zone of 63m, within which 95% of summer refuges were located. In addition, following the breeding season, (Jehle and Arntzen, 2000) recorded 64% of newts within 20m of the pond edge (EN, 2004) <sup>5</sup>. Great crested newts may typically disperse up to 500m from their breeding ponds, although research undertaken by Natural England (Cresswell & Whitworth 2004) suggests that newts will rarely move further than 200-250m from breeding ponds, with much reduced distances recorded where adjacent habitats are of good quality.

Mitigation with regards to amphibians is required due to the ditches/drains nearby, although implementation of safe working practices for GCN will also account for reptiles (in the event that they are present). Whilst the site lacks core habitat requirements for reptiles there are some habitats such as brash and wood piles, rabbit holes and earth banks with hollows that could be used by herpetofauna as refugia or hibernacula.

The following non-Licensed avoidance measures are recommended (and should form part of the CEMP), incorporating the above habitat measures to minimise the potential of an offence occurring during clearance or development and mitigate any impacts to the Favourable Conservation Status (FCS) of the species.

- Timing and duration: - If possible, restrict site clearance to late the winter / early spring period; Restrict groundworks to daytime only.
- Site clearance: - Vegetation required for removal within the development site should be kept short (less than 10cm) for at least 3 months prior to removal of topsoil. Trees and shrubs should be cut to stump level and removed in spring when the hibernation period has ended.
- Construction methods: - Building materials (that might act as resting places, for example: bricks, timber, sheet materials) stored on site should be raised off the ground on pallets 2m away from boundaries; Backfill any excavations before nightfall or leave a ramp to allow newts to easily exit. Surface drainage should be installed using a sustainable drainage system (SuDS), with the inclusion of wildlife kerbs and amphibian friendly gully pots (if used at all).

### **Additional Protected Species**

The site and adjacent habitats have some suitable for hedgehog *Erinaceus europaeus*, a S41 Species of Principal Importance but the open landscape lacks shelter for this species. No evidence of or potential habitat for any other protected species was recorded within the immediate vicinity of the proposed building works.

<sup>5</sup> EN 2004 An assessment of the efficiency of capture techniques and the value of different habitats for the great crested newt *Triturus cristatus* English Nature Research Reports.

Table 1.0 - Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape (Adapted from table 4.1 pp. 35 in Collins, 2016)

Suitability.	Description of Roosting habitats.	Description of Commuting and Foraging habitats.
Negligible	Negligible habitat features on-site likely to be used by roosting bats.	Negligible habitat features on-site likely to be used by commuting or foraging bats.
	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation.)</p> <p>A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.</p>	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>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.</p>
Medium	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	<p>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.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	A structure or tree with one or 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 of time due to their size, shelter, protection, conditions and surrounding habitat.	<p>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.</p> <p>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.</p> <p>Site is close to and connected to known roosts.</p>



## 5.0 Interpretation of Results and Requirement for Wildlife Licensing

### 5.1. Bat Species

#### 5.1.1. Overview of legislation relating to bat species

British bat species are protected under the Wildlife and Countryside Act (1981) and The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019. This makes it an offence to kill or injure bats or damage or destroy a place of shelter or protection, amongst other actions (see **Appendix 2** for more details).

#### 5.1.2. Summary of findings and likely impacts in absence of mitigation

No evidence of bats was found and I consider the buildings to have low enough bat roosting potential such that the visual inspection was sufficient to provide reasonable confidence in a negative roost assessment. There is therefore no reasonable expectation that impacts to bats, such as would be considered an offence under Article 12 (1) of The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019, will occur as a result of the proposal. The potential for roosting bats however can rarely be excluded entirely due to the highly mobile nature of bats and seasonal use of roosts.

#### 5.1.3. Recommendations

**Bats:** The built scheme should take the opportunity to enhance roosting opportunities through the provision of bat boxes. As part of general biodiversity enhancement for the site, it is recommended that new bat roosting and bird nesting resources are introduced. This will include bat roosting boxes erected on the new building or mature trees within the site (**Appendix 3**):

- 1 x Eco-Roost Double chamber hibernation box
- 2 x Eco-Roost Kent bat boxes

It is recommended that any new fascia or weatherboards should be proud of the wall by c15/20mm with a gap at the bottom to allow roosting by bats. In order for the resources discussed to be viable bat sensitive lighting should be employed to avoid light pollution. In general, it is recommended that site lighting is kept to a minimum. Security lighting should be operated on short timers.

Any new external lights will be set on a motion detector and positioned in such a way that they do not shine on the boundary habitats to the east and south. Low intensity lighting should be used where possible in place of high intensity discharge or sodium lamps, this will minimize disturbance to foraging and commuting bats.

In accordance with the Bat Conservation Trust's publication *Bats and artificial lighting* (BCT, 2018) light pollution by artificial lighting will be kept to a minimum and light spillage avoided. The following specific mitigation will be put in place to minimize disturbance to bats caused by the lighting of the site. The following mitigation strategies have been taken from Bat Conservation Trust Landscape and Urban Design for Bats and Biodiversity (Gunnell et al., 2012) and other referenced sources:

- Minimise light spill by eliminating any bare bulbs and upward pointing light fixtures. The spread of light should be kept near to or below the horizontal plane, by using as steep a downward angle as possible and/or shield hood. Flat, cut-off lanterns are best;
- Use light sources that emit minimal ultra-violet light (van Langevelde and Feta, 2001) and avoid the white and blue wavelengths of the light spectrum, so as to avoid attracting insects and thus potentially reducing numbers in adjacent areas;
- Limiting the height of lighting columns to eight metres and increase the spacing of lighting columns (Fure, 2006) can reduce the spill of light into unwanted areas;
- Avoid using reflective surfaces under lights or light reflecting off windows (e.g., on to trees);
- Only the minimum amount of light needed for safety and access should be used and or turned off when the site is not in use;
- Artificial lighting proposals should not directly illuminate boundary habitats, which may be of value to foraging or commuting bats and birds (e.g., green corridors);
- Lighting that is required for security reasons should use a lamp of no greater than 2000 lumens (150 Watts) and be PIR sensor activated, to ensure that the lights are not on only when required (Jones, 2000; Collins, 2016);

#### **5.1.4. Assessment of impact and licensing**

The value of the site to bats is assessed as **Low** at the **Parish/ Neighbourhood** scale due to the probability of minor bat use. The impact of the development upon bats is considered to be **Neutral** subject to the reasonable avoidance and mitigation measures being implemented. The proposed work has a low likelihood of impacting on bats so the requirement for a European Protected Species Mitigation License EPSM is unlikely. This is based on the lack of evidence of bat roosts and low/negligible probability of bat interest within the working areas.

#### **5.1.5 Reasonable avoidance measures**

Avoiding damage to existing roosts is always the preferred option. This involves taking steps to avoid killing, injury or disturbance to bats and damage to or loss of their roosts. The most effective method of avoidance is to carry out the work at an appropriate time of the year when bats are absent. The great majority of roosts are used only seasonally so there is usually some period when bats are not present and works can occur without adverse impacts on bats.

An EPS development licence is not required in situations where it can be demonstrated that satisfactory mitigation and enhancement works are sufficient to avoid offences being committed under the Habitat Regulations.

If no evidence of roosting bats is found during the daytime internal inspection and/or nocturnal roost surveys, works may proceed. As part of the site induction process, all staff working on site will be made aware of the low potential for presence of roosting bats on site and their status as a UK and European

Protected Species through a toolbox talk given by the Ecological Clerk of Works (ECoW). All recommendations listed in this chapter will also be outlined.

## 5.2 Birds-

No evidence of nesting birds was recorded. The active nests of all bird species are protected and if works to the buildings commence during the period **1<sup>st</sup> March- 31<sup>st</sup> August** a nesting bird survey will be undertaken by the ECoW. These dates are subject to change with climatic conditions.

To increase nesting opportunities generally and to compensate for the loss of nesting areas, 3 nest boxes should be installed. Installation of the nest boxes will be supervised by 'Eco- Check Ltd' or an experienced ecologist to ensure the correct positioning for each species. The types of nest boxes will include;

- 1 x Eco-Roost bird box (32mm)
- 1 x Eco-Roost nest box (28mm)
- 1 x House sparrow box

## 5.3 Biodiversity Enhancement-

Plant native broad-leaved trees. A row of poplars to the east side of the building have been heavily pollarded and it is not clear if they are to be removed. If removed then a native hedgerow could be planted in its place. Suggested species include; blackthorn (*Prunus spinosa*), crab apple (*Malus sylvestris sens.str*), elder (*Sambucus nigra*), field maple (*Acer campestre*), guelder rose (*Viburnum opulus*), hawthorn, honeysuckle (*Lonicera periclymenum*), holly (*Ilex aquifolium*) and English oak (*Quercus robur*) could be used to provide known benefit to wildlife.

Any new hedge planting will include native species and/or species of known ecological value including hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), hazel (*Corylus avellana*), field maple (*Acer campestre*), beech (*Fagus sylvatica*) and dogwood (*Cornus sanguinea*). Any new hedge planting should be double row staggered at 0.5m spacings with spiral guards and supports and maintained until established. Hedging will be planted between October and April when the ground is moist and free from frost, set out in a staggered pattern in two rows 40cms apart. The native species will consist of 50% Hawthorn (*Crataegus monogyna*) with a mixture of at least five of the following species: - Blackthorn (*Prunus spinose*), Field Maple (*Acer Campestre*), Hazel (*Corylus Avellana*), Hornbeam (*Carpinus Betulus*), Holly (*Ilex aquafolium*), Dogwood (*Cornus Sanguinea*) and Guelder Rose (*Viburnum opulus*), See Table 2.

PLANTING SCHEDULE				
HEDGEROW MIX (As necessary)				
SPECIES	DENSITY	AGE	ROOT	HEIGHT
10% Blackthorn ( <i>Prunus spinosa</i> )	0.45m	1+1 or 1/1	BR	40-60cm
50% Hawthorn ( <i>Crataegus monogyna</i> )	0.45m	1+1 or 1/1	BR	40-60cm
10% Guelder Rose ( <i>Viburnum opulus</i> )	0.45m	1+1 or 1/1	BR	40-60cm
10% Dog Rose ( <i>Rosa Canina</i> )	0.45m	1+1 or 1/1	BR	20-30cm
5% Dog Wood ( <i>Cornus sanguinea</i> )	0.45m	1+1 or 1/1	BR	20-30cm
5% Holly ( <i>Ilex aquifolium</i> )	0.45m	1+1 or 1/1	CG-3I	40-60cm
10% Hazel ( <i>Corylus avellana</i> )	0.45m	1+1 or 1/1	BR	40-60cm

Table 2.- Proposed Hedgerow Planting Mix

## 6.0 Habitats Regulations and Derogation Test

With respect to the impact on bats, an offence under Article 12 of the European Directive and Regulation 41 of The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019 is unlikely to occur as a result of conversion works.

Given the lack of evidence of bat activity within the buildings, the **Negligible/Low** probability of bat interest within the working areas and the potential to incorporate mitigation within the development for bats, it is considered there are reasonable and realistic opportunities to maintain the favourable conservation status of the local bat population despite the proposed construction works.

## 7.0 Recommendations for Further Surveys

We suggest that any habitat loss associated with the proposal can be adequately mitigated through landscaping, planting and other biodiversity enhancement measures. The following advisory recommendations include:

- Destruction of in-use nests or harm to adult birds caused by removal of trees/hedgerows on site during the main breeding bird season (1st March to 31st August). If works commence during this period a nesting bird survey must first be undertaken by an appointed ecological clerk of works (ECoW).
- Site Clearance- The site is adjacent to some rough vegetation and some suitable refuge/hibernacula for amphibians and reptiles. It is recommended that clearance of the site is undertaken under the supervision of an ecological clerk of works ECoW.

The suggested condition below is based on BS42020:2013 and in terms of biodiversity net gain, the enhancements proposed will contribute to this aim. Recommended conditions:

### **PRIOR TO COMMENCEMENT: COMPLIANCE WITH ECOLOGICAL REPORT RECOMMENDATIONS**

**“All ecological mitigation and enhancement measures and/or works shall be carried out in accordance with the details contained within the report (Eco-Check, November 2023), as submitted with the planning application and agreed with the local planning authority prior to determination.”**

**“A ‘statement of good practice’ shall be signed upon completion by the competent ecologist, and be submitted to the LPA, confirming that the specified enhancement measures have been implemented in accordance with good practice upon which the planning consent was granted’.**

Reason: To conserve and enhance Protected and Priority species and allow the LPA to discharge its duties under the UK Habitats Regulations, the Wildlife & Countryside Act 1981 as amended and s40 of the NERC Act 2006 and s17 Crime & Disorder Act 1998.

It is advised that if a period of more than 2 years passes between the date of this survey and the commencement of clearance and construction works then a further site survey should be made in addition to the pre-works checks outlined above.

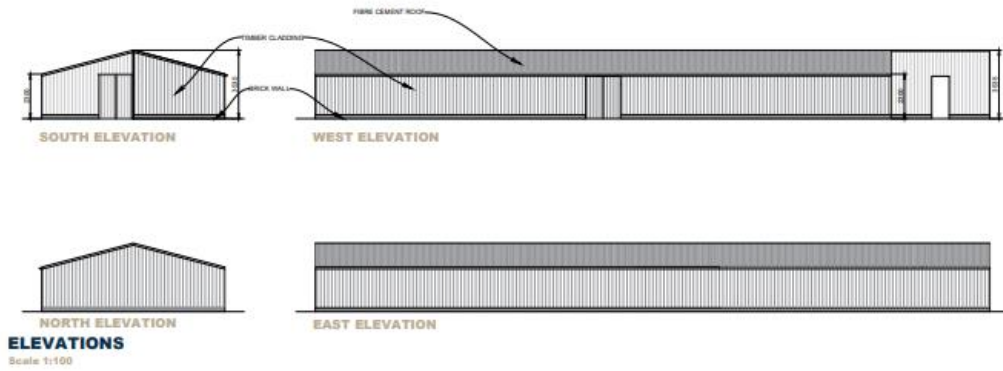
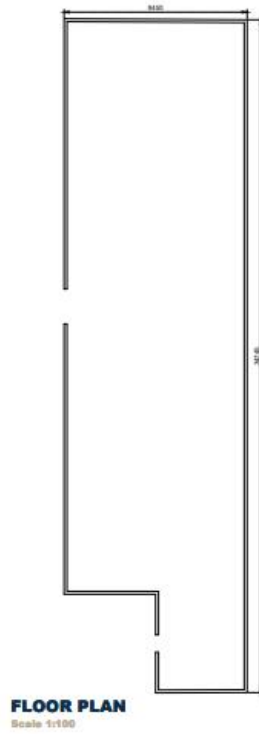
## 8.0 References

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Appendix 1



Site Location Plan



**NOTES:**

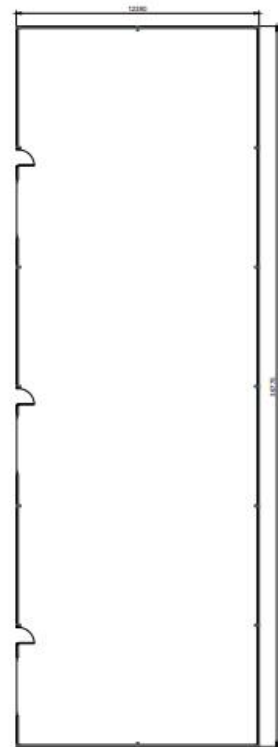
1. Use within dimensions only. All dimensions to be checked on site and any discrepancies reported to ACORUS immediately, if in doubt call.
2. Where relevant, significant hazards have been identified on the drawing. Hazards which should be checked to a competent contractor or professionals have not been identified.
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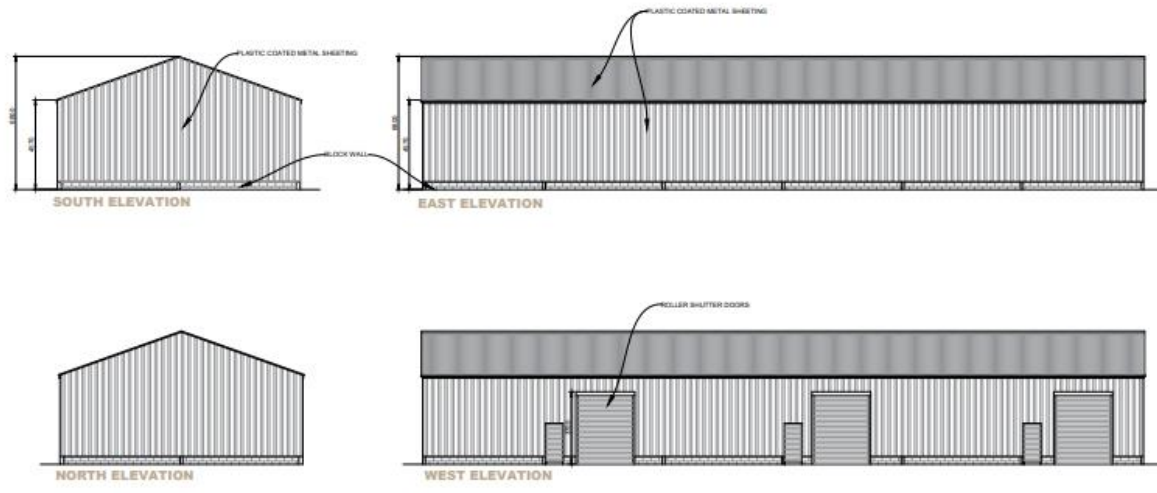


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EXISTING BUILDING FLOOR PLAN AND ELEVATIONS			
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SCB/RB23/01	100_02		

Existing Building and Elevations



**FLOOR PLAN**  
Scale: 1:100



**ELEVATIONS**  
Scale: 1:100

**NOTES:**

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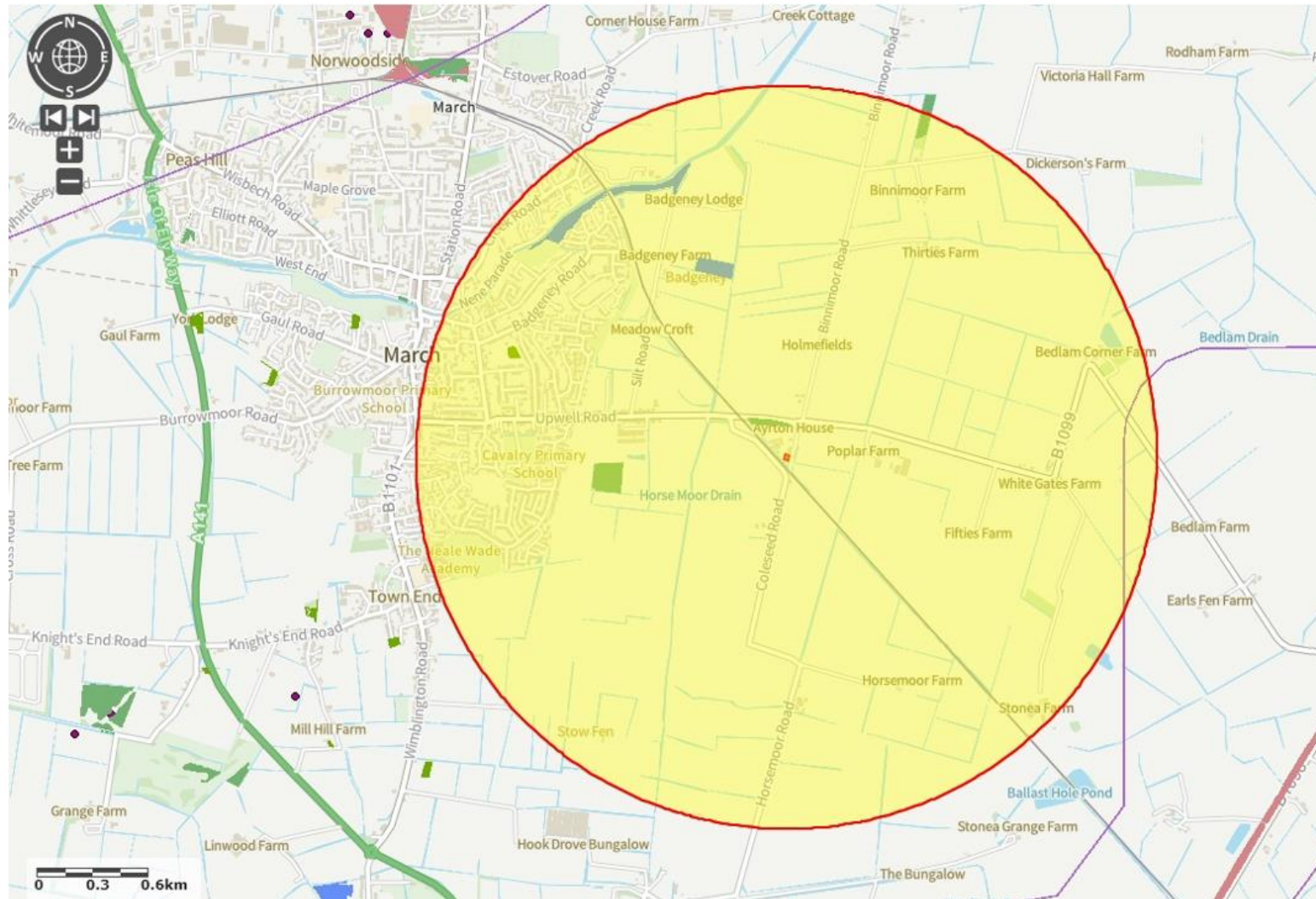


SAKARD COLESEED BUSINESS COMPLEX FEIS 004		 ACORUS Planning, Design, Property
PROPOSED REPLACEMENT BUILDING PROPOSED PLAN AND ELEVATIONS		
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Proposed Building and Elevations



## Appendix 2



Map of Statutory Wildlife Sites and Priority Habitats – Magic Map

## Appendix 3

**Table 6.1 Guidance on the optimal timing for carrying out specialist ecological surveys and mitigation**

This is not definitive and is intended to provide an indication only. The timing of surveys and animal activity will be dependent on factors such as weather conditions. Please consult the species briefing sheets for more detailed information, including species distribution.

KEY	
	Recommended survey time
	No surveys
	Mitigation conducted at these times
	Mitigation works restricted

- \* Where survey techniques involve the capture, handling or disturbance of protected species then only licensed persons can undertake surveys; personal survey and monitoring licences are obtained from English Nature, Countryside Council for Wales, Environment and Heritage Service (NI) or Scottish Natural Heritage
- \*\* Where mitigation involves the killing, capture, injury and/or disturbance of protected species and/or the damage, destruction or obstruction of their habitats, a development licence must be obtained from the Department for Food and Rural Affairs (England), Scottish Executive's Environment and Rural Affairs Department, Welsh Assembly (Countryside Division) or the Environment and Heritage Service Northern Ireland. Licences will be granted only to persons who have proven competence in dealing with the species concerned. Development licence applications will need to be submitted approximately 30 days to be processed by government departments. Where mitigation works need to be conducted under licence before works begin, licence applications will need to be submitted considerably earlier.

		Licence required?	J	F	M	A	M	J	J	A	S	O	N	D
Habitats / vegetation	Surveys	N	Mosses and lichens. No other detailed plant surveys – Phase 1 surveys only (least suitable time)			Detailed habitat assessment surveys. Surveys for higher plants and ferns. Mosses and lichens in April, May and September only						Mosses and lichens. No other detailed plant surveys – Phase 1 surveys only (least suitable time)		
	Mitigation	N	Planting and translocation		No mitigations for majority of species						Planting and translocation			
Birds	Surveys	N	Winter birds		Breeding birds / migrant species			Breeding birds		Breeding birds / migrant species		Winter birds		
	Mitigation	N	Clearance works may be conducted at this time, but must stop immediately if any nesting birds are found		No clearance or construction works. Bird nesting season						Clearance works may be conducted at this time, but must stop immediately if any nesting birds are found			
Badgers	Surveys	*	All survey methods – best time is in spring and early autumn / winter											
	Mitigation	**	Building of artificial setts. No disturbance of existing setts						Stopping up or destruction of existing setts					
Bats	Surveys	*	Inspection of hibernation, tree and building roosts		No surveys		Activity surveys and inspection of building roosts. Emergence counts.				No surveys		Inspection of hibernation, tree and building roosts	
	Mitigation	**	Works on maternity roosts		Works on maternity roosts until mid-May. Works on hibernation roosts from mid-March		Works on hibernation roosts only				Hibernation roosts until November. Maternity roosts from mid-October		Works on maternity roosts only	

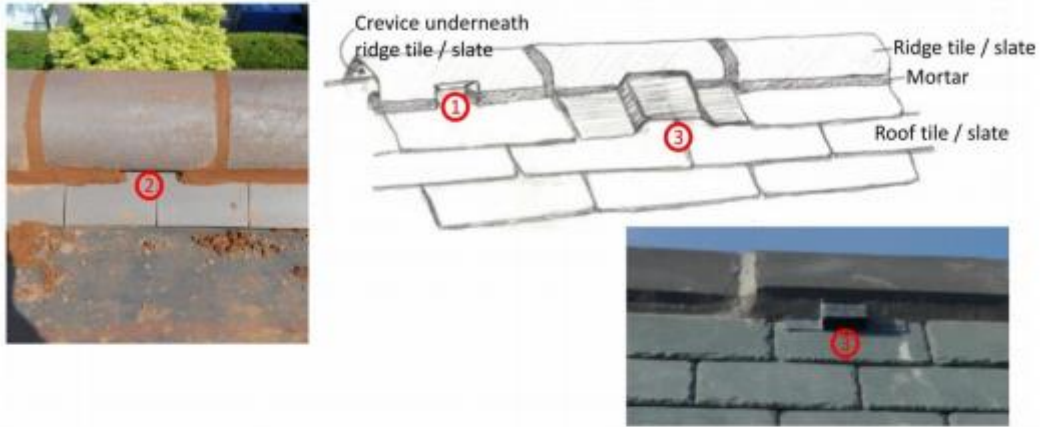
**Table 6.1 Guidance on the optimal timing for carrying out specialist ecological surveys and mitigation (continued)**

		Licence required?	J	F	M	A	M	J	J	A	S	O	N	D	
Other reptiles	Surveys	N	No surveys – reptiles in hibernation		Activity surveys from March to June and in September / October. Surveys are limited by high temperatures during July and August. Peak survey months are April, May and September.								No surveys – reptiles in hibernation		
	Mitigation	N	Scrub clearance		Capture and translocation programmes can only be conducted whilst reptiles are active (March to June and September / October). Trapping is limited by high temperatures during July / August. Scrub clearance								Scrub clearance		
Great crested newts (n/a in NI)	Surveys	*	No surveys – newts in hibernation		Pond surveys for adults: mid-March to mid-June. Surveys must include visits undertaken between mid-April and mid-May. Egg surveys April to mid-June. Larvae surveys from mid-May. Terrestrial habitat surveys				Larvae surveys to mid-August. Terrestrial habitat surveys		Terrestrial habitat surveys		No surveys – newts in hibernation		
	Mitigation	**	No trapping of newts. Pond management only		Newt trapping programmes in ponds and on land								Newt trapping on land only		No trapping of newts. Pond management only
Natterjack toads	Surveys	*	No surveys – toads in hibernation			Surveys of breeding ponds for adults. Surveys for tadpoles from May onwards. Surveys for adults on land				Surveys for adults on land		No surveys – toads in hibernation			
	Mitigation	**	Pond management works			Trapping of adults in ponds from April to July. Trapping of adults on land. Trapping of tadpoles from May to early September								Pond management works	
White-clawed crayfish	Surveys	*	Reduced activity			Surveys can be undertaken		Avoid surveys (females are releasing young)		Optimum time for surveys			Reduced activity		
	Mitigation	***	Avoid capture programmes (low activity levels may lead to animals being easily missed)			Exclusion of crayfish from construction areas		Avoid capture programmes		Exclusion of crayfish from construction areas			Avoid capture programmes (low activity levels may lead to animals being easily missed)		
Fish	Surveys	*	For coastal, river and stream-dwelling species, the timing of surveys will depend on the migration pattern of the species concerned. Where surveys require information on breeding, the timing of surveys will need to coincide with the breeding period, which may be summer or winter months, depending on the species.												
	Mitigation	**	Mitigation for the protection of watercourses is required at all times of year. Mitigation for particular fish species will need to be timed so as to avoid the breeding season. This varies from species to species.												

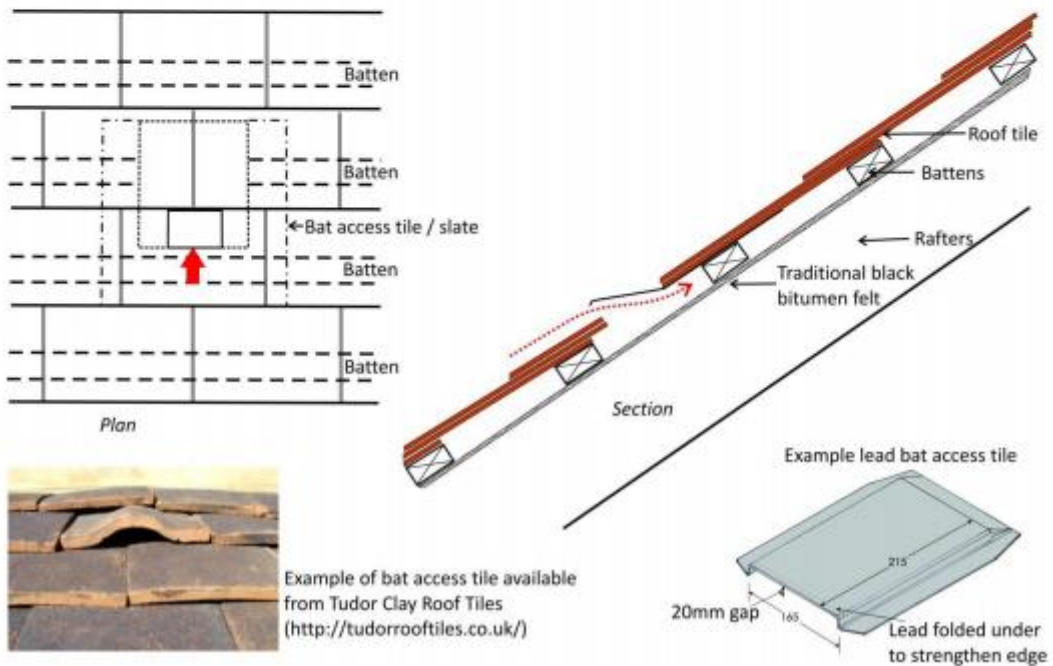
\*\*\* Where mitigation involves the capture of white-clawed crayfish, a mitigation licence must be obtained from English Nature, Countryside Council for Wales, Environment and Heritage Service (NI) or Scottish Natural Heritage. Licences will be granted only to persons who have proven competence in dealing with the species concerned.







## Bat Ridge Tile Design




Ridge tiles with section of edge cut away to leave an access hole measuring 15mm-20mm high by 50mm-70 mm long (*shown as 1*); or an access hole of similar dimensions created by leaving an area free of mortar (*shown as 2*), or by straddling two tiles with a third (*not shown*) to leave an appropriate gap. If necessary (i.e. if weather ingress is considered a problem (e.g. where ridges are in very exposed locations)), a lead 'saddle' (*shown as 3*) should be used to increase the distance from the entry hole to the ridge hole.



## Bat Access Tile Design



Examples of Bat Boxes		
<p>It is important that the bat boxes are positioned sufficiently high above the ground to dissuade ground predators, a minimum of 4m up; and at a distance from sources of artificial lighting. The boxes should be located on the west, south and east facing sides of the trees / buildings giving bats a range of microclimates through the year and direct access to foraging and commuting habitat along site boundaries.</p>		
Schwegler 1FF Bat Box		The 1FF bat box can be sited in trees or on buildings. Size: 43cm high x 27cm wide x 14cm deep.
Schwegler 2F Bat Box		The 2F bat box can be sited in trees or on buildings. Size: 33cm high x 16cm diameter.
1FQ Schwegler Bat Roost (For External Walls)		Suitable for a variety of crevice-dwelling bats, for larger roosts or maternity groups. Internal layout provides 3 different areas where bats can roost, offering different levels of light and temperature. Gaps ranging from 1.5cm to 3.5cm wide offering various places for bats to roost. Suitable to erect on most types of external brick, timber or concrete structures. Size: 60cm high x 35cm wide x 9cm deep.
Improved Roost-Maternity Bat Box		A large 3 crevice bat box. 3 separate crevices each with different temperature characteristics. Suitable for larger roosts or maternity groups of small crevice-dwelling species such as pipistrelle bats. Suitable to erect on buildings or trees. Size: 49cm high x 26cm wide x 13cm deep.
Timber Double Chamber Bat Box		This bat box is suitable for siting on trees in gardens or woodland and requires no annual maintenance. Should not be painted or treated with any type of preservative, as these can harm the bats. Size: 31.3cm high x 16cm wide x 16cm deep.
The Kent Bat Box		Made from untreated rough-sawn timbers ca.20mm thick. Crevices can be between 15mm and 25mm wide. Suitable to fit to walls, other flat surfaces or trees. Approximate dimensions (boxes vary in size): 24cm wide x 47.5cm high x 17cm deep.

<b>Bird Nesting Habitat</b>	
<p><b>CedarPlus Nest Box</b> Available with 2 entrance hole sizes:</p> <p><b>32mm hole</b> – suitable for great, marsh and coal tits, redstart, nuthatch, pied flycatcher, house sparrow and tree sparrows.</p> <p><b>26mm hole</b> – to allow access only to blue, marsh and coal tits (and possibly wrens).</p> <p>Height: 370mm; Width: 156mm; Depth: 175mm</p>	
<p><b>Schwegler 1B Bird Box</b></p> <p>The 1B nest box will attract a wide range of species and is available with different entrance hole sizes to prevent birds from competing with each other for the boxes.</p> <p>It is available in 4 colours: brown, green, white and red. The nest box can be attached to the tree or wall using an aluminium nail or by hanging over a branch and is made from Woodcrete to ensure that it is long-lasting.</p> <p>Entrance hole sizes:</p> <p><b>32mm hole</b> – will attract great, blue, marsh, coal and crested tit, redstart, nuthatch, collared and pied flycatcher, wryneck, tree and house sparrow.</p> <p><b>26mm hole</b> – suits blue, marsh, coal and crested tit and possibly wren. All other species are prevented from using the nest box due to the smaller entrance hole.</p> <p><b>Oval hole (29x55mm)</b> – suits redstarts because more light enters the brood chamber. It is also suitable for all other species which nest in the 32mm boxes.</p> <p>Height: 23cm; Diameter: 16cm</p>	
<p><b>No. 10 Schwegler Swallow Nest</b></p> <p>The Swallow Nest No. 10 consists of a woodcrete nesting bowl which is attached to a wooden panel of formaldehyde-free chipboard. The nest should be placed inside outbuildings such as sheds, barns or stables leaving a distance of at least 35mm between the top of the nest and wall top. Ensure there is always access for the birds through an open window or skylight, or other high level access (minimum of 50mm (H) x 70mm (W) gap). Multiple nests should not be placed at less than 1m intervals.</p> <p>To avoid problems with droppings accumulating, a droppings board could be placed beneath each nest box to collect the droppings.</p>	

**Eco-Roost Bat Brick**



**Eco-Roost Double Chamber Bat Box**



**Eco-Roost Double Kent Box**



**Eco-Roost 28mm, 32mm and Open fronted bird boxes**





## Artificial lighting and wildlife

### Interim Guidance: Recommendations to help minimise the impact artificial lighting

Wherever human habitation spreads, so does artificial lighting. This increase in lighting has been shown to have an adverse effect on our native wildlife, particularly on those species that have evolved to be active during the hours of darkness. Consequently, development needs to carefully consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. When the impacts on different species groups are reviewed, the solutions proposed have commonalities that form the basis of good practice. These are outlined in the following document.

#### Overview of impacts

##### Invertebrates

Artificial light significantly disrupts natural patterns of light and dark, disturbing invertebrate feeding, breeding and movement, which may reduce and fragment populations. Some invertebrates, such as moths, are attracted to artificial lights at night. It is estimated that as many as a third of flying insects that are attracted to external lights will die as a result of their encounter.<sup>1</sup> Insects can become disoriented and exhausted making them more susceptible to predation. In addition, the polarisation of light by shiny surfaces attracts insects, particularly egg laying females away from water. Reflected light has the potential to attract pollinators and impact on their populations, predators and pollination rates. Many invertebrates natural rhythms depend upon day-night and seasonal and lunar changes which can be adversely affected by artificial lighting levels.

It is not always easy to disentangle the effects of lighting on moths from other impacts of urbanisation. However, it is known that UV and green and blue light, which have short wavelengths and high frequencies, are seen by most insects and are highly attractive to them. Where a light source has a UV component, male moths in particular will be drawn to it. Most light-induced changes in physiology and behaviour are likely to be detrimental. They discern it to be 'light', so they do not fly to feed or mate.<sup>2</sup>

##### Birds

There are several aspects of changes to bird behaviour to take into account. The phenomenon of robins and other birds singing by the light of a street light or other external lighting installations is well known, and research has shown that singing did not have a significant effect on the bird's body mass regulation. However, it was felt that the continual lack of sleep was likely to be detrimental to the birds' survival and could disrupt the long-term circadian rhythm that dictates the onset of the breeding season<sup>3</sup>. Many species of bird migrate at night and there are well-documented cases of the mass mortality of nocturnal migrating birds as they strike tall lit buildings. Other UK bird species that are particularly sensitive to artificial lighting are long-eared owls, black-tailed godwit and stone curlew.<sup>4</sup>

<sup>1</sup> Bruce-White C and Shardlow M (2011) A Review of the Impact of Artificial Light on Invertebrates - See more at: <http://www.buglife.org.uk/advice-and-publications/publications/campaigns-and-reports/review-impact-artificial-light#sthash:s7GPA1vL.dpuf>

<sup>2</sup> As above

<sup>3</sup> Pollard A. (2009) Visual constraints on bird behaviour. University of Cardiff

<sup>4</sup> Rodriguez A., Garcia A.M., Cervera F. and Palacios V. (2006) Landscape and anti-predation determinants of nest site selection, nest distribution and productivity in Mediterranean population of Long-eared Owls, *Asio otus*. *Ibis*, 148(1), pp. 133-145

## Mammals

A number of our British mammals are nocturnal and have adapted their lifestyle so that they are active in the dark in order to avoid predators. Artificial illumination of the areas in which these mammals are active and foraging is likely to be disturbing to their normal activities and their foraging areas could be lost in this way. It is thought that the most pronounced effect is likely to be on small mammals due to their need to avoid predators. However, this in itself has a knock-on effect on those predators.

The detrimental effect of artificial lighting is most clearly seen in bats. Our resident bat species have all suffered dramatic reductions in their numbers in the past century. Light falling on a bat roost exit point, regardless of species, will at least delay bats from emerging, which shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed. At worst, the bats may feel compelled to abandon the roost. Bats are faithful to their roosts over many years and disturbance of this sort can have a significant effect on the future of the colony. It is likely to be deemed a breach of the national and European legislation that protects British bats and their roosts.

In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats and their use of commuting routes. There are two aspects to this: one is the attraction that short wave length light (UV and blue light) has to a range of insects; the other is the presence of lit conditions.

As mentioned, many night-flying species of insect are attracted to lamps that emit short wavelength component. Studies have shown that, although noctules, serotines, pipistrelle and Leisler's bats, take advantage of the concentration of insects around white street lights as a source of prey, this behaviour is not true for all bat species. The slower flying, broad-winged species, such as long-eared bats, barbastelle, greater and lesser horseshoe bats and the *Myotis* species (which include Brandt's, whiskered, Daubenton's, Natterer's and Bechstein's bats) generally avoid external lights.

Lighting can be particularly harmful if it illuminates important foraging habitats such as river corridors, woodland edges and hedgerows used by bats. Studies have shown that continuous lighting along roads creates barriers which some bat species cannot cross<sup>5</sup>. It is also known that insects are attracted to lit areas from further afield. This could result in adjacent habitats supporting reduced numbers of insects, causing a further impact on the ability of light-avoiding bats to feed.

These are just a few examples of the effects of artificial lighting on British wildlife, with migratory fish, amphibians, some flowering plants, a number of bird species, glow worms and a range of other invertebrates all exhibiting changes in their behaviour as a result of this unnatural lighting.

## Recommendations

### Survey and Planning

The potential impacts of obtrusive light on wildlife should be a routine consideration in the Environmental Impact Assessment (EIA) process<sup>6</sup>. Risks should be eliminated or minimised wherever possible. Some locations are particularly sensitive to obtrusive light and lighting schemes in these areas should be carefully planned.

In August 2013, Planning Minister Nick Boles launched the new National Online Planning Guidance Resource aimed at providing clearer protection for our natural and historic environment. The guidance looks at when lighting pollution concerns should be considered and is covered within one of the on line planning practice

<sup>5</sup> Stone E. L., Jones G and Harriss (2009) Street lighting disturbs commuting bats. *Current Biology*, 19, pp 1-5

<sup>6</sup> See also: Institution of Lighting Professionals - Professional Lighting Guide (PLG 04) Guidance on undertaking lighting environmental impact assessments)



guides<sup>7</sup>. The guide provides an overview for planners with links to documents that aim to give planners an overview of the subject through the following discussion points:

1. When is obtrusive light / light pollution relevant to planning?
2. What factors should be considered when assessing whether a development proposal might have implications for obtrusive lighting / light pollution?
3. What factors are relevant when considering where light shines?
4. What factors are relevant when considering how much the light shines?
5. What factors are relevant when considering possible ecological impact?

This can help planners reach the right design through the setting of appropriate conditions relating to performance and mitigation measures at the planning stage.

The Institution of Lighting Professionals (ILP) recommends that Local Planning Authorities specify internationally recognised environmental zones for exterior lighting control within their Development Plans<sup>8</sup>. In instances lacking classification, it may be necessary to request a Baseline Lighting Assessment/Survey conducted by a Lighting Professional in order to inform the classification of areas, particularly for large-scale schemes and major infrastructure projects.

When assessing or commissioning projects that include the installation of lighting schemes, particularly those subject to the EIA process, the following should be considered and relayed to applicants:

- *Ecological consultants should confirm the presence of any sensitive fauna and flora*, advising the lighting designers of bat routes and roosts and other areas of importance in order to ensure that reports correspond with each other.
- *Ecological consultants should consider the need for quantitative lighting measurements*. In some instances it may be necessary for further lighting measurements to be taken. For example, outside an important bat roost. These should follow best practice guidance from the ILP and would ideally be conducted by a Lighting Professional.
- *Where appropriate, professional lighting designers should be consulted* to design and model appropriate installations that achieve the task but mitigate the impacts. This should be done at the earliest opportunity. Early decisions can play a key role in mitigating the impact from lighting.
- *Reports submitted should outline the impacts of lighting in relation to ecology*, making clear reference to the ecological findings, highlighting any sensitive areas and detail proposed mitigation. Consideration should also be given to internal lighting where appropriate.
- *Post -installation checks and sign off upon commissioning should be carried out by the lighting designer* to ensure that the lighting installation has been installed in accordance with the design, that predictions were accurate and mitigation methods have been successful.

## Principles and design considerations

### *Do not*

- *provide excessive lighting*. Use only the minimum amount of light needed for the task.
- *directly illuminate bat roosts* or important areas for nesting birds

### *Avoid*

- *installing lighting in ecologically sensitive areas* such as: near ponds, lakes, rivers, areas of high conservation value; sites supporting particularly light-sensitive species of conservation significance (e.g. glow worms, rare moths, slow-flying bats) and habitat used by protected species.
- *using reflective surfaces under lights*.

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<sup>7</sup><http://planningguidance.planningportal.gov.uk/blog/guidance/light-pollution/when-is-light-pollution-relevant-to-planning/>

<sup>8</sup>Institution of Lighting Professionals (2011) Guidance Notes for the Reduction of Obtrusive Light GN01:2011.