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Tyrer Ecological Consultants Ltd, Roselands, 3 Cross Green, Formby, L37 4BH

# **Updated Inspection & Assessment in relation to Bats, Breeding Birds & GCN**

December 2023

## **Outbuildings at Buck Road**

Holt

Wrexham

LL13 9TF

**National Grid Ref: SJ37825348**



**Outbuildings at Buck Road, Holt, Wrexham, LL13 9TF**  
**Updated Inspection & Assessment in Relation to Bats, Breeding Birds & GCN**

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|----------------|---------------------------------------------------------------------------|
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| Prepared by    | Tyrer Ecological Consultants Ltd                                          |

|               |                                   |
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## Executive Summary

As part of proposed planning applications concerning outbuildings at Buck Road, Tyrer Ecological Consultants Ltd carried out a daytime preliminary roost assessment in relation to bats with an inclusive inspection for breeding birds and assessment for great crested newt (*Triturus cristatus*) (GCN) in March 2023; the site was revisited in December 2023 where an additional outbuilding was assessed on the site. The combined proposals are understood to involve the conversion of the currently vacant barn outbuilding into a residential structure and alterations to the yard space.

Detailed methods, findings, conclusions and recommendations are presented throughout the report; however, the reader should be aware of the following Key points:

### Bats:

Based upon the findings of the survey, covered through sections 6.0 – 7.0 of the report and supported by **Appendix I**, the outbuilding referred to as B1 is determined to offer '**Moderate**' and B2 offers '**Low**' bat roost suitability in accordance with Bat Conservation Trust – Bat Surveys for Professional Ecologists: Good Practice Guidelines, 4<sup>th</sup> ed. (2023).

**Table 7.2. Recommended minimum number of survey visits for presence/absence surveys to give confidence in a negative result for structures (also recommended for trees but unlikely to give confidence in a negative result).**

| Low roost suitability or PRF-I                                                                                     | Moderate roost suitability                               | High roost suitability or PRF-M                            |
|--------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------|
| One survey visit. One dusk emergence survey <sup>a</sup> (structures).<br><br>No further surveys required (trees). | Two separate dusk emergence survey visits <sup>b</sup> . | Three separate dusk emergence survey visits <sup>b</sup> . |

See Section 8.0 for further information on B1.

*It is recommended that one dusk emergence survey is undertaken at B2 during the active season of bats (May – August), in order to establish if / how the building is being used by bats, and if so, identify the species present, abundance, roost locations and flight lines around the site following emergence / re-entry. One surveyor would likely be required to monitor the potential roost feature described on B2.*

### Breeding Birds:

In relation to more common birds, direct evidence of breeding birds was located within B1 & B2, with multiple several historic/defunct swallow cups and active house sparrow nests in both B1 and B2.

*In the interests of potential impact avoidance, it is recommended that any proposed works which may impact the areas of nesting potential, such as to the building or to any vegetation under blue line ownership, should be undertaken outside of the nesting bird season. The nesting bird season is weather dependent but generally extends between March and September inclusive (peak period March – August). For works within the breeding bird season, any areas that can support nesting birds should be checked by a professional Ecologist for nesting birds within 48 hours or less prior to works commencing. If birds are found nesting, any works which may affect them would have to be delayed until the young have fledged and the nest has been abandoned naturally, for example via the implementation of an appropriate buffer zone (species dependent) around the nest in which no disturbance is permitted until the nest is no longer in use.*

*Given the presence of both house sparrow and swallow nests and the likely loss of these internal nesting sites, it is considered that replacement nesting sites should be integrated into the converted structures. Suitable enhancement measures have been included in Appendix II; however, the LPA should stipulate the required number of said measures in order to adequately compensate for the loss of nesting sites. This could be secured by a suitably worded planning condition.*

#### **Great Crested Newt:**

With the lack of suitable terrestrial and aquatic habitat within or in close proximity to the site, it is considered highly unlikely that the proposals will result in an impact to this species, and as such no further recommendations have been made in relation to GCN.

*Notwithstanding this, general RAMs are recommended for amphibians given the presence of ponds and ditches within a 250m buffer of the site.*

#### **Biodiversity Benefit:**

As a means of enhancement and aiding the design of the scheme to achieve a net biodiversity benefit in keeping with local and national planning policy, the proposals may consider incorporating wildlife friendly provisions in addition to those described.

*Further recommendations, regarding birds, amphibians, native species and invertebrates are provided within **Appendix II**.*

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## 1.0 Introduction & Reasons for Survey

- 1.1 Tyrer Ecological Consultants Ltd initially carried out a daytime preliminary roost assessment in relation to bats with an inclusive inspection for breeding birds and assessment for great crested newt (*Triturus cristatus*) (GCN) in March 2023 for a planning application on site (Planning reference: P/2023/0547), proposals are understood to involve the conversion of the currently vacant barn outbuilding into a residential structure.
- 1.2 As part of an additional proposed planning application on the site (Planning reference: P/2023/0548), Tyrer Ecological Consultants Ltd carried out a subsequent daytime preliminary roost assessment in relation to bats with an inclusive inspection for breeding birds and assessment for GCN in December 2023, proposals include alterations to the yard space at Buck Road in Holt, Wrexham, See **Figure 1.1** for an existing site and location plan.



**Figure 1.1 – The existing site and location plan (© Blueprint Architectural Services)**

- 1.3 The aim of the surveys was to ascertain:
- Whether or not the outbuilding or surrounding vegetation is of value for bats / bat roosts,
  - If the structure or impacted vegetation is of value to breeding birds,
  - If the site surrounding habitats and impacted areas could support GCN.

- 1.4 If any potential roost features (PRFs) were found to be suitable for bats, or signs of use were observed, then more detailed surveys would be recommended i.e. dusk / dawn emergence / re-entry surveys during the main active season of bats which is May – August (extending into September). If additional surveys are required following the initial site visit for bats, breeding birds or GCN, this report will also outline the details of those further requirements.
- 1.5 If it was determined that bat(s) or their roost / place of rest / shelter will be subsequently impacted by the works then a European Protected Species Development Licence (EPSDL) from Natural Resources Wales (NRW) would be legally required to proceed with the development.
- 1.6 If evidence indicated breeding birds may be impacted by proposals, tailored recommendations would be made accordingly, species pending.
- 1.7 If GCN are adjudged to be at risk of impact from the proposals, then further recommendations will be made in order to negate the chance that this protected species would be at risk.
- 1.8 As part of the local authority's planning policies and obligations to the Planning Framework, ecological surveys are generally required prior to planning permission being granted where protected / priority habitats and species are, or may be present, that could be affected by the proposals for which the application seeks consent. Where more detailed surveys are recommended by the ecologist, following an initial daytime investigation, then Local Planning Authorities (LPA), on the advice of their ecological advisors, will not grant permission until such time that all relevant information is gathered.
- 1.9 In accordance with Welsh planning policy the site visit also aims to identify opportunities for net biodiversity benefit.

## 2.0 Protected Species & Their Requirements

### Bats

2.1 All British bats and their \*\*roosts are afforded full protection under the Wildlife & Countryside Act (1981) (as amended) and are listed in Schedule 2 of the Conservation of Habitats and Species Regulations (2019) (EU Exit). When dealing with cases where a European Protected Species (all UK bats) may be affected, a planning authority is a competent authority within the meaning of Regulation 7 of the Regulations, and therefore has a statutory duty, as the local authority, to have due regard to the provisions of the Regulations in the exercise of its functions.

### 2.2 Uses of Buildings by Bats

- a) Summer breeding roost (May – August)
- b) Hibernation roost (October – March)
- c) Transitional or temporary roost (other months)

2.3 Roost selection is often closely correlated to suitable foraging habitat within a reasonable commuting distance from the roost and different sites are used depending upon insect densities and abundance; climatic conditions can also affect their ability to successfully forage. All British bats are insectivorous.

*\*\* The term roost is generically referred to as a place that bat/s use for the any of the above reasons, however it should be noted that under the Conservation of Habitats and Species Regulations (2019) (EU Exit) (Regulation 43 (d) the term roost is not used but refers to “a breeding site or resting place of such an animal” and is afforded legal protection. The roost, breeding site or resting place of bats, which ever terminology is used is legally protected whether or not bats are in occupation.*

### Breeding birds

2.4 All wild birds, no matter how common, their eggs, young and nests, whilst being built or occupied, are protected under both the Wildlife and Countryside Act (WCA 1981) and Natural Environment and Rural Communities Act (NERC Act 2006). Birds listed on Schedule 1 of the WCA 1981, for example barn owl (*Tyto alba*), are afforded a greater level of protection and are protected also from disturbance.

2.5 Any work that would damage an occupied nest, eggs or young of breeding birds must be avoided; any damage to nests that may occur as a result of the development should be outside of the main breeding bird season (March – August). On occasions nests can become unoccupied during the breeding season but the status of the nest(s) should be determined by a suitably experienced ecologist before any damage takes place.

### Great crested newt

2.6 GCN are fully protected in all life stages by Schedule 2 of The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (SI 2019/579) and the Wildlife and Countryside Act (1981) (as amended). They are listed a priority species under section 7 of the Environment (Wales) Act 2016. The legislation makes it a punishable offence to:

- Deliberately, intentionally or recklessly kill, injure or take a GCN,
- Deliberately, intentionally or recklessly take or destroy GCN eggs,
- Possess or control any live or dead specimen, or anything derived from a GCN,
- Deliberately, intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a GCN,

- Deliberately, intentionally or recklessly disturb a GCN while it is occupying a structure or place which it uses for that purpose.

- 2.7 In summary, GCN are protected from disturbance, killing, injuring or possession at any life stage, whilst confirmed breeding ponds and resting places are afforded the same protection once identified. Habitat for this species is protected when within certain range of a breeding pond. This places an obligation on local authorities to fully assess the impacts of development on this species prior to determining a planning application.
- 2.8 GCN populations have declined within the UK over recent years due to destruction and fragmentation of breeding ponds and terrestrial habitat. They spend a high percentage of their adult life in terrestrial habitat such as woodland, and shelter in environments with piles of rubble, log piles, tree roots, miscellaneous other for safety, refuge and hibernation.
- 2.9 The north-east of Wales, including Wrexham Borough and neighbouring counties, is known to be a stronghold for great crested newt, with the topography and underlying soil type providing a high density of suitable ponds for this species when in their aquatic phase. The Johnstown Newt Sites Special Area of Conservation (SAC) is of international significance for this species, and, as such, for any sites in proximity to this area, GCN are a material consideration.

### **Policy**

- 2.10 Planning Policy Wales (PPW) 11<sup>th</sup> Edition (2021) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs, MTANs and policy clarification letters comprise national planning policy.
- 2.11 PPW and the National Development Framework (published as Future Wales – the National Plan 2040) set out how the planning system at a national, regional and local level can assist in delivering these requirements through Strategic Development Plans (SDPs) and Local Development Plans (LDPs).
- 2.12 PPW (2021) states:
- “The presence of a species protected under European or UK legislation, or under Section 7 of the Environment (Wales) Act 2016 is a material consideration when a planning authority is considering a development proposal which, if carried out, would be likely to result in disturbance or harm to the species or its habitat and to ensure that the range and population of the species is sustained. Planning authorities should advise anyone submitting a planning application that they must conform with any statutory species protection provisions affecting the site, and potentially the surrounding area, concerned. An ecological survey to confirm whether a protected species is present and an assessment of the likely impact of the development on a protected species may be required in order to inform the development management process. It is considered best practice that screening to determine the presence of protected species should be carried out by a competent ecologist on the basis of data provided by the relevant Local Environmental Record Centre.”*
- 2.13 Planning authorities must therefore follow a step-wise approach to maintain and enhance biodiversity and build resilient ecological networks by ensuring that any adverse environmental effects are firstly avoided, or minimized, or mitigated, and as a last resort compensated for; enhancement must be secured wherever possible.
- 2.14 The first priority for planning authorities is therefore to avoid damage to biodiversity and ecosystem functioning. Where there may be harmful environmental effects, planning

authorities will need to be satisfied that any reasonable alternative sites that would result in less harm, no harm or pro-gain have been fully considered.

- 2.15 The Environment (Wales) Act 2016 (“the Act”) – requires local planning authorities to have regard to area statements in the development of Local Development Plans. The Act introduced an enhanced biodiversity and resilience of ecosystems duty (Section 6 Duty). This duty applies to public authorities in the exercise of their functions in relation to Wales and will help maximise contributions to achieving the well-being goals. The Nature Recovery Action Plan supports this legislative requirement to reverse the decline in biodiversity, address the underlying causes of biodiversity loss by putting nature at the heart of decision-making and increasing the resilience of ecosystems by taking specific action focused around objectives for habitats and species.

Part 1 of the Act promotes sustainable management of natural resources, and in Part 1 section 6 states:

*“A public authority must seek to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems, so far as consistent with the proper exercise of those functions.”*

- 2.16 This is further supported by PPW (2021) which requires developments to achieve a Net Benefit for Biodiversity (NBB):

*“Planning authorities must seek to maintain and enhance biodiversity in the exercise of their functions. This means development should not cause any significant loss of habitats or populations of species, locally or nationally and must provide a **net benefit for biodiversity**. In doing so planning authorities must also take account of and promote the resilience of ecosystems, in particular the follow aspects:*

- diversity between and within ecosystems;*
- the connections between and within ecosystems;*
- the scale of ecosystems;*
- the condition of ecosystems including their structure and functioning; and*
- the adaptability of ecosystems.”*

- 2.17 There are several plans, strategies and national, sub-regional and local policy statements which provide a framework for development in the Plan area. The Planning and Compulsory Purchase Act (2004) makes it a requirement for local planning authorities in Wales to prepare a Local Development Plan (LDP) for their areas.

- 2.18 Wrexham Borough Council prepared a plan, namely the ‘Wrexham Unitary Development Plan (1996 – 2011)’, which was formally adopted in February 2005 and supersedes any previous development plans for the area. A new plan, the ‘Wrexham Local Development Plan 2 (2013 – 2028)’, which will replace the current adopted plan, is currently under review. Until this new plan is adopted, the Wrexham Unitary Development Plan remains in effect, and Policy EC6 of this plan states:

*“Measures to improve the biodiversity value of sites and enhance their natural conservation interest and landscape quality including the establishment of local nature reserves, will be supported.”*

### 3.0 Protected Species in Wrexham

- 3.1 Up to eleven bat species have been recorded in Wrexham, many of which use built structures for roosting. A variety of building types and features are utilised by bat species at different times of year ranging from occupied residential dwellings to disused barns and bridges. The most frequently encountered species is the soprano pipistrelle bat (*Pipistrellus pygmaeus*); its abundant status in Wrexham is mirrored throughout the UK.
- 3.2 All wild birds (with only minor exceptions) and their nests whilst being built or containing eggs or dependant young are protected under the Wildlife & Countryside Act 1981 (as amended). Some species are, however, subject to a greater level of protection, for example the barn owl which is listed under Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), with nests of birds from these species being protected from disturbance as well as destruction. The number of breeding barn owls within rural parts of Wrexham is moderately high across areas of countryside where suitable environs exist; however, they are constantly under threat from loss of habitat and nesting opportunities.
- 3.3 As mentioned previously, the number of GCN across Wrexham is significant, with certain regions showcasing internationally important populations and suitable habitats. The rural and semi-rural nature of the land as well as the topography and soil type mean that networks of ponds and water bodies suitable for GCN are present in abundance, with suitable terrestrial commuting and refuge sites allowing for movement between the ponds, forming metapopulations of newts where there is an absence of barriers to dispersal. The number of confirmed GCN ponds is increasing with the adaptation of new surveying methods, with the eDNA technique allowing surveyors to determine where GCN are present.

## 4.0 Survey Methodology

- 4.1 As part of the Inspection & Assessment in relation to Bats, Breeding Birds & GCN report, a desk-top and field-based study is conducted. Methods for both components of the appraisal are given below.

### Desktop study

- 4.2 Prior to a site visit a desktop study was conducted using online resources to obtain information pertaining to any sites afforded statutory (e.g. SSSI) and non-statutory (e.g. LWS) designations within 2.0 kilometres of the site boundary. To do so, the Multi Agency Geographic Information for the Countryside (MAGiC – provided by DEFRA) was accessed, alongside DataMapWales, which holds protected species and habitat information for Wales. These sites were utilised to further inform conclusions concerning such species in the context of the study site and its proposed development.
- 4.3 Historic satellite imagery was reviewed using sources such as Google Earth (© 2022/23) to help establish past use of the land and determine the nature of adjoining and extending habitats; such information aids in the understanding of how the site might interact with its surroundings ecologically and its value in that context, and how the development may impact at a wider scale.
- 4.4 A commercial data request to the Local Environment Records Centre serving the area – Cofnod – has not been sourced and is justified through application of the following recent guidance:

1) The Guidelines for Accessing, Using and Sharing Biodiversity Data in the UK (CIEEM, 2020) states:

*“It is generally expected that a desk study, including a data search, will be a key part of the ecological surveys or reports produced to inform a planning application. Freely available web-based sources of data and contextual information should always be used; in some cases, it may be acceptable to not undertake a data search with the LERC or other relevant NSS or local interest groups, for example:*

*ii) Situations where the **data search would be extremely unlikely to provide information needed to inform the assessment, due to the scale and location of the proposed development**. The appropriateness of excluding a data search will need to be judged on a case-by-case basis as, in most situations, it will be essential to carry out such a search even if the development is very small or is likely to have a low impact. It can be very difficult to demonstrate that a data search would not have provided relevant information without obtaining and reviewing those data.*

*iii) In some cases for Preliminary Roost Assessments of buildings in **low impact / small-scale scenarios**, such as an extension to a residential property, loft conversions (full or partial), installation of Velux/dormer windows, **single modern agricultural or similar building conversion** or demolition; however, it should not be assumed that data searches are never required for such scenarios and this must be judged on a case by case basis and justified accordingly.*

2) The Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017) also states:

*“Very occasionally it might be possible to carry out a robust PEA without obtaining LERC/NBDC/CEDaR data; this will usually only apply to low impact or small-scale projects (e.g. by virtue of size, extent, duration of works, magnitude and locality), and should be determined on a case-by-case basis.”*

- 4.5 As exemptions as made **bold** above can be applied for this site, whilst following best practice, it is considered unnecessary to conduct a commercial data request following the desk study effort and daytime assessment at this time, which offers a proportionate level of survey effort. **If, however, a data search is considered necessary by the Local Authority advisory body to inform the ecological impact assessment following any further surveys recommended in this report, a proportionate data search should be commissioned with results interpreted into the conclusions and recommendations of a re-issued / updated report.**

#### **Field survey**

- 4.6 In context with the above, a diurnal inspection and assessment of the site and the immediate environment in relation to bats and breeding birds and GCN was conducted initially on 15<sup>th</sup> March 2023 in breezy, cool conditions (4°C), wind 3/12 (Beaufort scale), 20% cloud by Mr. B. Richards then subsequently on 12<sup>th</sup> December 2023 by Miss. C. Rimmer in mild conditions (10°C), wind 1/12, 40% cloud (see **Table 4.1**):

**Table 4.1 – Site surveyor credentials**

| <b>Name</b>                                | <b>Description of most relevant credentials</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mr. B. Richards</b><br>Qualifying CIEEM | <ul style="list-style-type: none"> <li>• Junior Ecologist with a range of training and experience,</li> <li>• 2 years as a professional ecologist,</li> <li>• MBiolSci in Biological Sciences (Zoology),</li> <li>• Qualifying CIEEM,</li> <li>• Accredited agent on the Natural England Great Crested Newt: CL08 Class 1 licence (2018-34062-CLS-CLS) of Mr. M. Pritchard,</li> <li>• Accredited agent on the Natural Resources Wales bat licence of Mrs. K. Wilding (S086297/1).</li> </ul> |
| <b>Miss. C. Rimmer</b>                     | <ul style="list-style-type: none"> <li>• Graduate Ecologist with one year training and experience, currently undergoing extensive survey training,</li> <li>• BSc Hons in Wildlife and Conservation.</li> </ul>                                                                                                                                                                                                                                                                               |

- 4.7 Bat Conservation Trust (BCT) – Bat Surveys for Professional Ecologists: Good Practice Guidelines, 4<sup>th</sup> ed. (2023) states:

*“The guidelines should be interpreted and adapted on a case-by-case basis according to site-specific factors and the professional judgement of an experienced ecologist. The question should not be whether the guidelines were followed, but whether the objectives of the survey met? Where examples are used in the guidelines, they are descriptive rather than prescriptive.”*

- 4.8 The bat and breeding bird survey was conducted in tandem; the building was inspected for potential places that may be of value to bats or breeding birds, and to determine if evidence of use by either group was present. An internal assessment of the building took place with the aid of a high-powered torch for evidence of bat use, which mainly includes bat droppings and / or prey items, or the incidental presence of live or dead animals, and investigated for evidence of breeding birds, which broadly involves a search for nesting materials, presence of pellets or accumulated faeces and / or dead juveniles / hatchlings.
- 4.9 External elevations were investigated with the aid of a high-powered torch and close focus binoculars (where necessary) for places that can be used as a roost by bats or as a means of ingress for bats and birds leading to areas of roosting/nesting potential. These features are

typically referred to as potential roost features (PRF) concerning bats. All external features were able to be surveyed without constraint.

- 4.10 A daytime bat walkover (DBW) of the immediate surrounding habitat was also carried out to assess the general suitability of the local habitat types in relation to bats, in terms of commuting, foraging, and roosting.
- 4.11 Buildings and other permanent / semi-permanent structures were subject to a preliminary roost assessment (PRA), to identify potential areas which may be of value to bats and to determine evidence of use. This typically involves a systematic search of the external aspects of any structure(s), comprising an investigation of features known to be used by bats (for example roofing material, soffits, fascia, lead flashing hanging tiles) using a high-powered torch and close-focus binoculars, where necessary. An internal assessment of the structure(s) was also carried out, with the aid of a high-powered torch and endoscope, where necessary, to identify any evidence of bat use of a structure. Field signs of bats typically comprise bat droppings, urine splashing, fur-oil staining, incidental animal presence, dead specimens and / or the presence of prey items, such as moth wings.
- 4.12 Trees on site were subject to a ground level tree assessment (GLTA) this typically involves a search for potential roost features along with an investigation of those features using a high-powered torch or close focus binoculars. Potential roost features can include woodpecker holes, rot holes, hazard beams, other vertical or horizontal cracks or splits in stems and branches, partially decayed lifted bark, knot holes, man-made holes, tear-outs, cankers in which cavities have developed, other hollows or cavities, including butt-rots, double-leaders forming compression forks with included bark, gaps between overlapping stems or branches, partially detached ivy with stem diameters in excess of 50mm or bat / bird boxes. Trees (where present) were also checked for evidence of nesting birds and suitability for relevant species.
- 4.13 Criteria for roost assessment are based upon the determinants given in the Bat Conservation Trust – Bat Surveys for Professional Ecologists: Good Practice Guidelines, 4<sup>th</sup> ed. (2023) (see **Figures 4.1 – 4.3** overleaf).
- 4.14 An assessment of the building was conducted when birds are outside of their breeding season (this is typically March – August inclusive). Elevations were inspected for evidence of birds that show a high dependency upon built structures, many of which are in a state of decline. These might include the following species for example:
- **Starling** (*Sturnus vulgaris*): Birds of Conservation Concern (BoCC) red status
  - **House sparrow** (*Passer domesticus*): BoCC red status
  - **House martin** (*Delichon urbica*): BoCC red status
  - **Swift** (*Apus apus*): BoCC red status
- 4.15 Additional to the site's capacity to support common species of bird, the area was subject to an assessment for capacity to support specially protected species such as barn owl, which is protected under Schedule 1 of the Wildlife & Countryside Act (1981) (as amended).

**Table 4.1. Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement.**

| Potential suitability   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                         | Roosting habitats in structures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Potential flight-paths and foraging habitats                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| None                    | No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevices/suitable shelter at all ground/underground levels).                                                                                                                                                                                                                                                                                                                                        | No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/protection for flight-lines, or generate/shelter insect populations available to foraging bats).                                                                                                                                                                                                                         |
| Negligible <sup>a</sup> | No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.                                                                                                                                                                                                                                                                                                                              | No obvious habitat features on site likely to be used as flight-paths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour.                                                                                                                                                                                                                                                                                            |
| Low                     | A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions <sup>b</sup> 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 and not a classic cool/stable hibernation site, but could be used by individual hibernating bats <sup>c</sup> ). | Habitat that could be used by small numbers of bats as flight-paths such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.<br><br>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                | A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions <sup>b</sup> and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation – the categorisation described in this table is made irrespective of species conservation status, which is established after presence is confirmed).                                                                 | Continuous habitat connected to the wider landscape that could be used by bats for flight-paths such as lines of trees and scrub or linked back gardens.<br><br>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.                                                                                                                                                                                        |
| High                    | A structure 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 <sup>b</sup> and surrounding habitat. These structures have the potential to support high conservation status roosts, e.g. maternity or classic cool/stable hibernation site.                                                                                                       | Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight-paths such as river valleys, streams, hedgerows, lines of trees and woodland edge.<br><br>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.<br><br>Site is close to and connected to known roosts. |

**a** Negligible is defined as 'so small or unimportant as to be not worth considering, insignificant'. This category may be used where there are places that a bat could roost or forage (due to one attribute) but it is unlikely that they actually would (due to another attribute).

**b** For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

**c** Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2016 and Jansen *et al.*, 2022). Common pipistrelle swarming has been observed in the UK (Bell, 2022 and Tomlinson, 2020) and winter hibernation of numbers of this species has been detected at Seaton Delaval Hall in Northumberland (National Trust, 2018). This phenomenon requires some research in the UK, but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in prominent buildings in the landscape, urban or otherwise.

**Figure 4.1 – BCT guidelines extract**

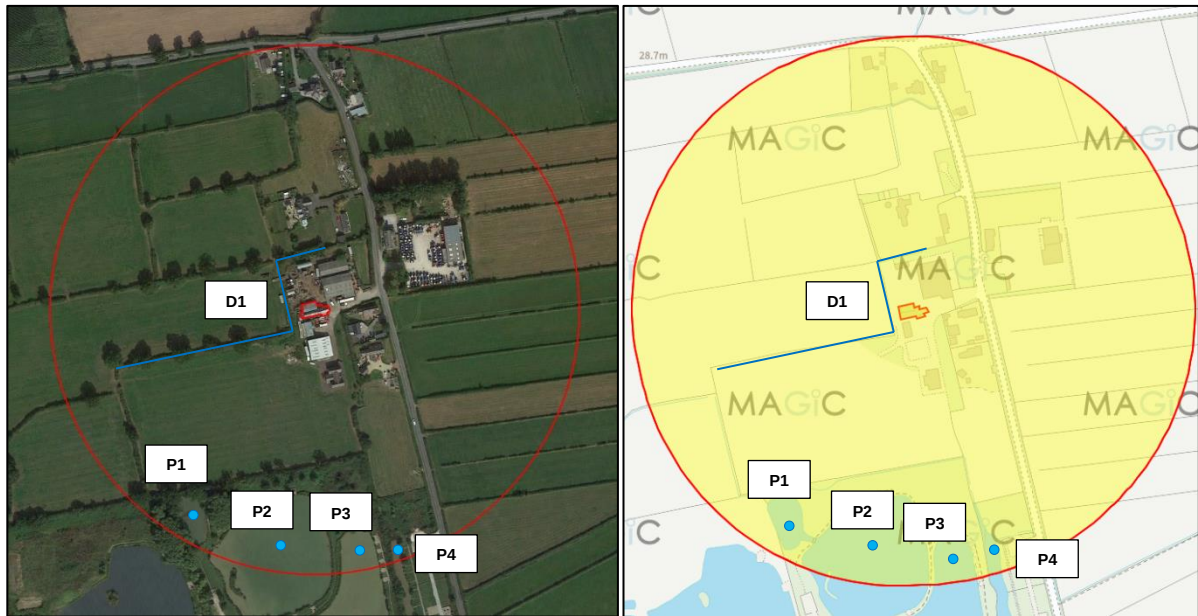
| Table 4.2. Guidelines for assessing the suitability of trees on proposed development sites for bats, to be applied using professional judgement. |                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Suitability                                                                                                                                      | Description                                                              |
| NONE                                                                                                                                             | Either no PRFs in the tree or highly unlikely to be any                  |
| FAR                                                                                                                                              | Further assessment required to establish if PRFs are present in the tree |
| PRF                                                                                                                                              | A tree with at least one PRF present                                     |

**Figure 4.2 – BCT extract on tree roost suitability criteria**

| Table 6.2. Guidelines for categorising the potential suitability of PRFs on a proposed development site for bats, to be applied using professional judgement. |                                                                                                                                     |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Suitability                                                                                                                                                   | Description                                                                                                                         |
| PRF-I                                                                                                                                                         | PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats. |
| PRF-M                                                                                                                                                         | PRF is suitable for multiple bats and may therefore be used by a maternity colony.                                                  |

**Figure 4.3 – BCT extract on tree roost categorisation criteria**

- 4.16 During the desktop assessment, a 250 metre radial search was undertaken from a site-central grid reference in relation to the presence of ponds, ditches or other water bodies that may have potential to support GCN. The information gathered would then be used to aid in establishing if more detailed surveys may be required in relation to this species, either in the form of presence / absence surveys or population class assessments.
- 4.17 Based on the desk study and utilising both satellite imagery as well as mapping services such as Magic Maps and DataMapWales, four ponds were located within a 250 metre radial buffer of the site. These are all located at a distance of approximately 170m to the south of the site and are spatially separated from the proposals by arable agricultural fields. In addition, a ditch network was identified during the diurnal appraisal to the west of the area proposed for development. See **Figure 4.4** overleaf for pond and water body locations.
- 4.18 Information on the above ponds was gathered during the desktop study by the author, with data obtained from internet sources pertaining to the usage of the ponds. See **Section 6.0** for further information.



**Figure 4.4** – Location of water bodies (blue regions) within a 250 metre radial buffer of the site (© Google Earth Pro 2022/23, Magic Maps 2022/23)

4.19 The results, conclusions and recommendations are based on a number of factors i.e.

- Practical experience of surveyor,
- Knowledge of bat / bird species relevant to the site location and geographical range,
- Nature of immediate / surrounding habitat in relation to foraging / commuting,
- Condition of the building,
- Presence / absence of a loft space or cellar and reasonable practicality of use,
- Presence / absence of roost potential,
- Value of roost potential – if present,
- Presence of suitable habitat features for GCN,
- Nature of the pond(s) / pond networks in the immediate landscape.

4.20 The results, conclusions and recommendations of this report have been assessed by Mrs. K. Wilding, the Director of Tyrer Ecological Consultants Ltd, and her assessment is consistent with that of the surveyors Mr. Richards and Miss. C. Rimmer.

## 5.0 Limitations

- 5.1 Both surveys were conducted outside of the bat active season, therefore there was a lower probability of encountering direct evidence of bats. Roost potential and suitability of potential roost features can, however, be adjudged as decisively as within the active season of bats, saving time and unnecessary delay to applicants, thus frequently the assessment can be as conclusive as if it was carried out in the active season. Timing is not, therefore, considered a constraint in this instance.
- 5.2 The surveys took place outside of the breeding bird season (typically March – September inclusive), therefore incidental breeding bird behaviour has a lower probability of being encountered. Suitability for breeding birds is readily identifiable all year round however, and often past nesting material can attest to presence of breeding birds at buildings, and as such timing is again not considered a constraint in this instance.
- 5.3 No access was possible to Ponds 1 – 4 as they were outside of red line ownership on a privately owned fishery. Whilst this has been taken into account in **section 7.0**, it is not considered a constraint as it is deemed that enough information has been gathered relative to these water bodies from the combination of online sources accessed during the desk study as well as field data gathered during the diurnal appraisal.
- 5.4 No other access constraints were encountered by the surveyor during the diurnal appraisal, and having considered possible survey constraints, no significant limitations were experienced that might adversely influence the results, conclusions, and recommendations of this report.

## 6.0 Desk Study Results

- 6.1 The site of the proposed works (referred to in part as “the application site” and “the site”) is situated to the west of Buck Road in a rural setting, approximately 5.40 kilometres north-east of Wrexham city centre (see **Figure 6.1** below for satellite imagery).



**Figure 6.1** – Location of the application site (red boundary) within the landscape (© Google Earth Pro 2022/23)

- 6.2 Based on historic imagery, the barn structure appears to have been present since at least ~1900, with OS maps from this period indicating the presence of a structure since this time. The immediate area has changed somewhat in the time between the construction of the barn and the present day, with further agricultural and storage structures having been erected.
- 6.3 The immediate habitat is entirely rural, with the landscape typical of this region of north-eastern Wales, predominantly constituted of agricultural land and development, with both arable and pastoral fields present and demarcated by boundary features such as hedgerows and lines of trees. The application site is part of a small collection of minor developments, with several houses, farm complexes and commercial properties along this section of Buck Road. To the south of the site is located Commonwood Fishery with its associated ponds (P1 – P4) and semi-natural habitat in the form of rough grassland and scrub. Irrigation channels are prevalent in the immediacy, with a number of interconnected ditch networks present, although these are almost entirely located to the east of the site with residential properties and agricultural fields acting as spatial buffers between these networks and the site.
- 6.4 The extending environment largely reflects that of the immediate, with further expanses of agricultural land to each direction generally providing little in the way of niche and habitat variety, although the linear border features are considered suitable as commuting pathways for a variety of species groups. Approximately 0.56 kilometres to the west of the site beyond

arable land is located Borrass Far Wood, which is identified on the DataMapWales layer 'NRW Ancient Woodland Inventory 2021' as containing a 0.87 hectare area of ancient semi-natural woodland. Additionally, 'Borrass Woods' is positioned to the south of the application site and provides a large parcel of ancient semi-natural woodland with an estimated size of 11.5 hectares.

6.5 Collectively, there is an abundance of suitable semi-natural habitat in both the immediacy and the contiguous landscape, with these large regions of woodland functionally linked to the application site via linear boundary features.

6.6 The ecological corridors of connectivity provide suitable features for commuting animals, notably terrestrial organisms such as bats, with the species most typically associated with the habitats described being the soprano pipistrelle, frequently associated with buildings in sub-urban and rural areas, and brown long-eared bats (*Plecotus auritus*), which are commonly associated with woodland and semi-natural habitats. Given the location of the site, the presence of Horseshoe bats (*Rhinolophus sp.*) is also considered possible, with these species' residing in areas where woodland and open pasture are in close proximity, given their preference for feeding both on the dung flies which are abundant above the grazing fields of livestock, as well as within broadleaved woodland.

**NB:** *Where quality habitat is present close to buildings then the percentage use of those buildings, by bats, increases given that roost opportunities are available and vice versa.*

6.7 The aforementioned commuting routes are also considered to be appropriate for usage by bird species known to be in proximity to the site, as well as potentially by commuting amphibians.

#### **Statutory designated sites**

6.8 There are two statutory designated sites for nature conservation within 2.0 kilometres of the application site (see **Table 6.1** for further information on the designations and **Figure 6.3** for a visual representation).

**Table 6.1 – Statutory designation types and reasons for designation within 2.0 kilometres buffer**

| Site name                                                           | Designation | Interest features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Midland Meres &amp; Mosses Phase 2</b><br>(1.62 kilometres west) | Ramsar      | <p>A series of geographically diverse lowland open water and peatland sites ranging across the north-west midlands of England and north-east Wales, which have developed in natural glacial depressions. The site's primary interest is its wide range of lowland wetland types and successional stages within a distinct biogeographical area. Waters are generally circumneutral or acidic depending on the component site's soil type, catchment size and usage. Substantial areas of open water remain in some sites, and in many cases this is fringed by extensive and varied swamp, fen and carr communities. Some basins have become peat-filled, leading in some circumstances to development of ombotrophic conditions; of particular importance are the quaking bogs or schwingmoors.</p> <p>The sites support a number of rare species of wetland associated plants, such as the nationally scarce cowbane (<i>Cicuta virosa</i>) and elongated sedge (<i>Carex elongata</i>), as well as nationally rare bryophytes <i>Dicranum affine</i> and <i>Sphagnum pulchrum</i>. Nationally important numbers of cormorant (<i>Phalacrocorax carbo</i>), gadwall</p> |

|                                                |                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                |                                            | ( <i>Anas strepera</i> ), pochard ( <i>Aythya ferina</i> ) and shoveler ( <i>Anas clypeata</i> ) overwinter within the site(s).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Vicarage Moss</b><br>(1.62 kilometres west) | Site of Special Scientific Interest (SSSI) | <p>A 21.1 hectare site identified as the largest example of a basin mire in Clwyd, with the vegetation being distinctly zoned, particularly in the isolated mire occupying a subsidiary kettle hole to the south.</p> <p>The plant communities on the outer edge of the mire, which is generally species-poor, are dominated by soft rush (<i>Juncus effusus</i>) with extensive 'lawns' of <i>Sphagnum recurvum</i> and areas of bottle sedge (<i>Carex rostrata</i>) with tufted sedge (<i>Carex elata</i>) and brown bent-grass (<i>Agrostis canine</i>). Further towards the centre of the mire is an area dominated by marsh cinquefoil (<i>Potentilla palustris</i>) and tufted hair-grass (<i>Deschampsia cespitosa</i>). The central part of the mire supports purple moor-grass (<i>Molinia caerulea</i>), common cotton-grass (<i>Eriophorum angustifolium</i>), hare's-tail cotton-grass (<i>Eriophorum vaginatum</i>) together with heather (<i>Calluna vulgaris</i>) and cross-leaved heath (<i>Erica tetralix</i>). There is an area of wet woodland consisting of alder (<i>Alnus glutinosa</i>) and willows (<i>Salix spp.</i>) at the northern edge of the mire and drier parts have been colonised by downy birch (<i>Betula pubescens</i>) and scots pine (<i>Pinus sylvestris</i>).</p> |

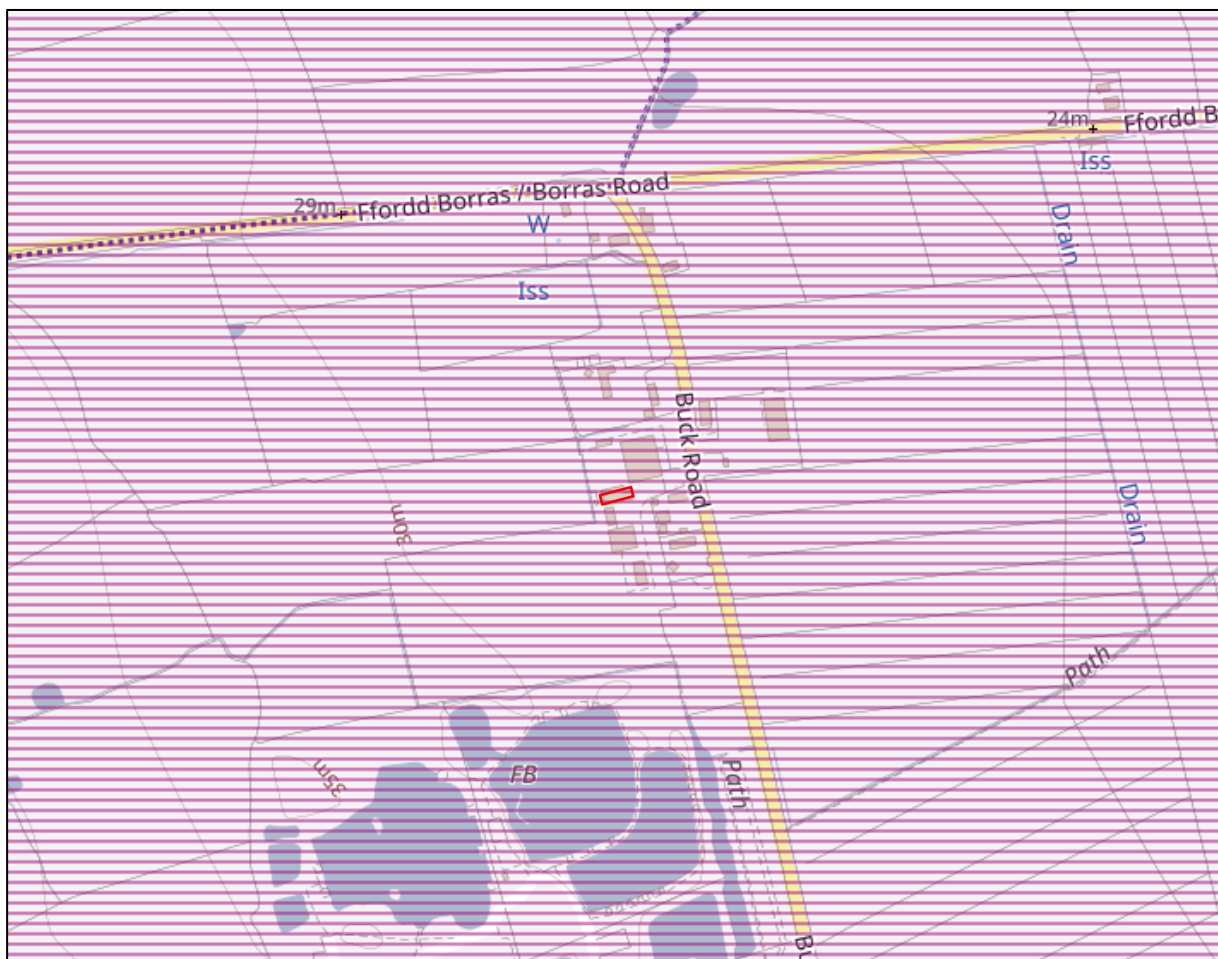
- 6.9 The site lies within the impact risk zone (IRZ) for one designated site in the wider landscape, namely River Dee and Bala Lake / Afon Dyfrdwy a Llyn Tegid SSSI, located approximately 2.50 kilometres to the east of the application site. The proposed development does not fall into any of the categories whereby Natural Resources Wales would need to be consulted in relation to any potential impacts to the designated site.
- 6.10 In this sense, it is considered highly unlikely that the proposals will impact upon the designated site or the species within. In relation to Regulation 63 of the Conservation of Habitats and Species Regulations and with all current information and recommendations taken into account, there is considered to be no pathway by which the proposals could have a significant impact on the designated sites or the qualifying species.

### **Notable species records**

- 6.11 A search of extensive company records held by Tyrer Ecological Consultants Ltd from 2014 – present, all of which have been submitted to the LERC serving the area, which in this case is COFNOD, revealed no records of bat roosts within the 2.0 kilometre area surrounding the application site.
- 6.12 The nearest company record is located just beyond this radial buffer at a distance of circa 2.50 kilometres to the east of the site, with activity records for brown long-eared and noctule (*Nyctalus noctula*) bats, as well as feeding remains and droppings which were indicative of a day roost for both common and soprano pipistrelle (*Pipistrellus pygmaeus*) bats.
- 6.13 **It should be stated that between the two survey dates, further recommended dusk surveys were carried out at Building 1, which subsequently identified three day roosts, one pertaining to common pipistrelle bats and another two in relation to soprano pipistrelle bats. The presence of three day roosts has been taken into account when forming conclusions in relation to the updated survey effort.**
- 6.14 A number of protected bird species are anecdotally known to exist in the wider landscape (within a 10km buffer), with species including lapwing (*Vanellus vanellus*), song thrush (*Turdus*

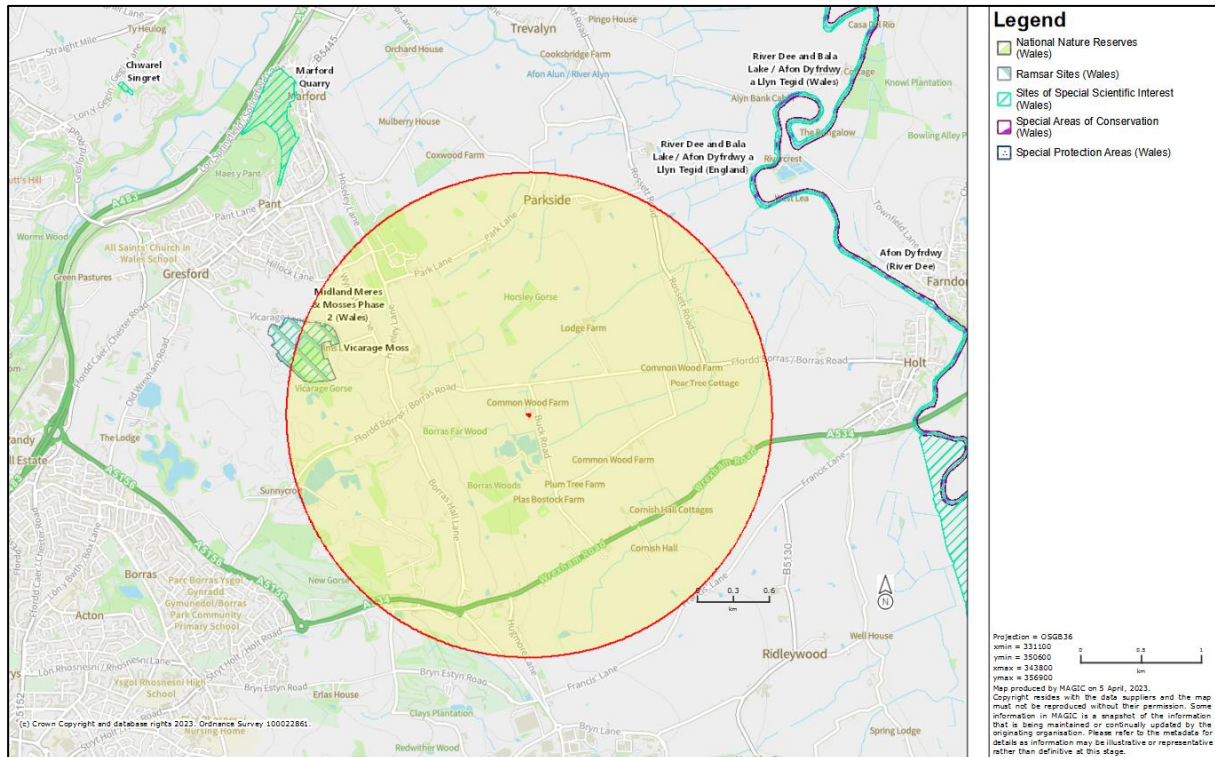
*philomelos*) and yellowhammer (*Emberiza citrinella*), all of which are listed under Section 7 of the Environment Act (Wales) as priority species. Whilst these species are unlikely to be nesting within the barn structure itself, they have been considered as a part of this appraisal.

- 6.15 No records of GCN were identified during the desktop study, however the site is understood to lie within an area designated as being potentially suitable habitat for GCN, as inferred from the DataMapWales layer 'Potential Habitat for Great Crested Newts'. See **Figure 6.2** below for a visual representation.
- 6.16 In respect of the ponds to the south of the site, internet sources were consulted during the desk study in order to ascertain the nature of the water bodies. Utilising internet sources, the following was established:
- **P1** (Aran): a traditional Tench fishing lake, specifically containing Tench up to 7lb as well as Carp and other coarse fish.
  - **P2** (Llewellyn): a specimen Carp water, containing a large number of fish weighted at over 10lbs with a maximum of up to 35lbs.
  - **P3** (Weston): a Carp runs water, with numerous fish over 10lbs and a maximum catch of 25lb.
  - **P4** (Gelert): a canal lake, with Silverfish, Tench, Crucian and Carp, being fishable all year round.



**Figure 6.2 – Location of 'Potential Habitat for Great Crested Newts' in reference to the red line boundary (© DataMapWales 2022/23)**

# **Outbuildings at Buck Road, Holt, Wrexham, LL13 9TF** **Updated Inspection & Assessment in Relation to Bats, Breeding Birds & GCN**

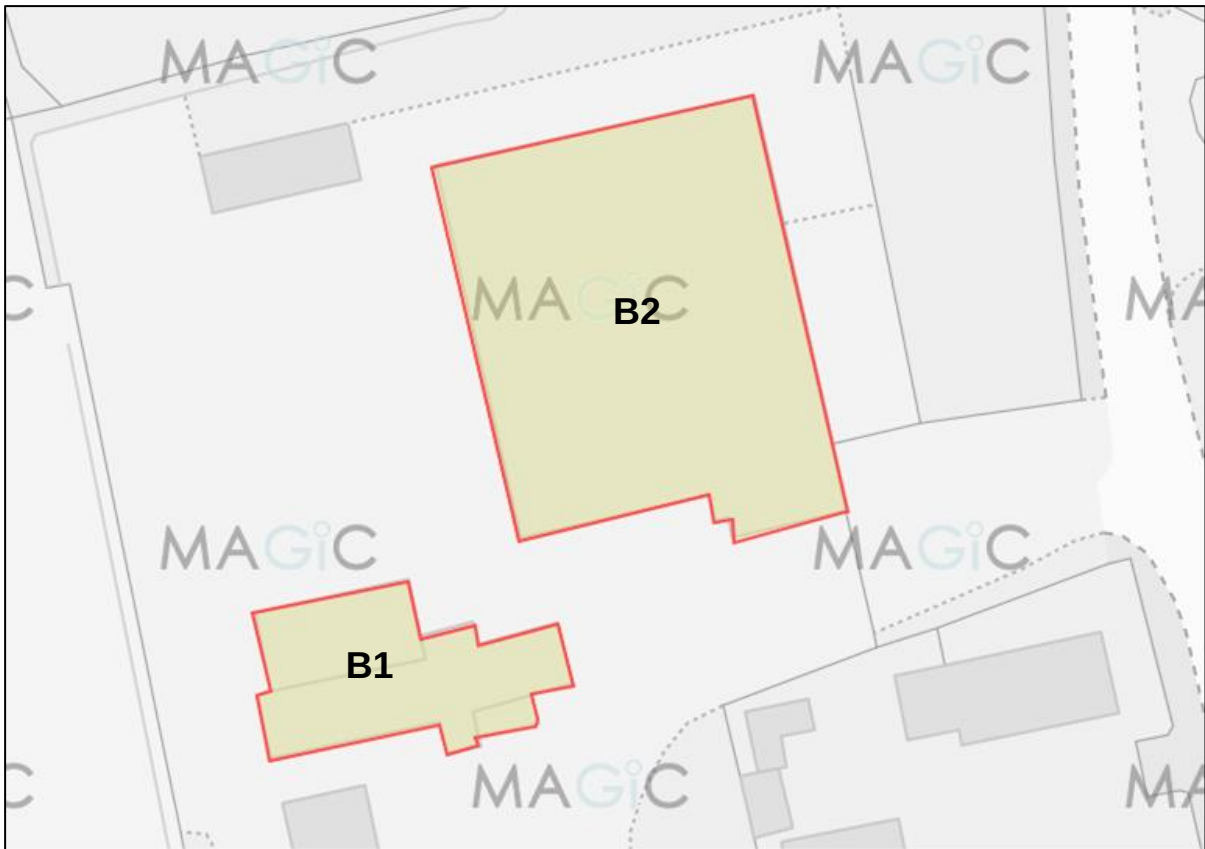


**Figure 6.3 – EPSML and designated site data for the area within 2.0 kilometres of the application site (MAGiC Maps 2023)**

7.0 Field Study Results

Bats

7.1 **Figure 7.1** provides a visual aid indicating the locations of buildings **B1 – B2** within the red line boundary. **Table 7.1** describes **B1 – B2** and assesses them for bat roost suitability.



**Figure 7.1** – Aerial view of the buildings on site outlined in red (© MAGiC Maps 2022/23)

**Table 7.1** – Building descriptions at the site

| B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>B1 is a barn structure currently utilised as storage, which is brick-built with a pitched, slate roof, and with the approximate maximum dimensions of 27 metres x 11 metres x 6 metres (length x width x height). The barn features components such as timber windows and shutters, timber doors and a timber fascia in part, as well as brick lintels and sills. In respect of its condition, the surveyor is not qualified to assess structural state, however the aesthetic condition was adjudged to be poor, with areas of degradation noted to the timber elements as well as to the roof, with further deterioration located by the surveyor in the brickwork.</p> <p>Internally, all areas of the structure were investigated by the surveyor; the bottom floor of the building is utilised as storage, with piles of timber and other material observed. The upper floor is distinct from the space below via a wooden floor, and is mild, somewhat draughty in part, and illuminated in certain areas via gaps in the roof. Despite some parts of the building being draughty and illuminated, certain areas / recesses exist in the loft space which are dark and without draught. The slate roof is held up via wooden purlins and rafters.</p> | A photograph of a brick building with a pitched slate roof. The building is made of red brick and has several windows and doors. It appears to be a barn or storage building. The foreground is a paved area with some debris. |

Given the above, it is considered that the loft is part suitable for the breeding purposes of loft-dwelling species such as the brown long-eared bat. This species requires lofts with open space for flight, although the light ingress and draught are likely to reduce favourability for maternity roost purposes. Despite the thermal characteristics being unsuitable in part, given that some areas within the loft are dark with minimal draught the presence of a breeding roost cannot be categorically ruled out. No evidence of BLE bats was encountered within the loft, although the floor was covered in detritus, likely from bird usage, so in this sense a lack of evidence located does not necessarily equate to an absence of bats / bat droppings. The surrounding habitat is also considered to be highly suitable for this species, with linear features connecting the site to the large regions of semi-natural and ancient woodland in the wider landscape.

Two distinct underlinings are present beneath the slates, with the northern elevation having a deteriorated lime and mortar finish and the southern being underlined with a more recent Bitumen 1F underfelt. Where present, underfelt or other such roof lining typically improves a buildings value to bats, notably for crevice-dwelling bats of the *Pipistrellus* genus, whereby the bats roost between the lining and the roof cover material provided external opportunities exist. No evidence of such bats was found; however, this is often the case due to the crevice-dwelling nature of these species.

*The breeding roosts of Pipistrelle bats are proportionally higher in occupied residential dwellings where the warm, dry conditions favour the requirements of a maternity colony but other structures are also used, especially for hibernation or by male bats which do not need the same conditions as a maternity colony.*

Externally, there are a number of areas where potential roosting features (PRFs) were identified. These are located on both pitches of the roof, where there are damaged / slipped / missing slates, as well as at wall plate level where there are access points providing potential entry to the loft. Further PRFs can be found in the brickwork, where airbricks, which at one time would have allowed air to flow through the barn to prevent grain fermentation, now provide potentially suitable access routes into both the loft and the cavity wall. Damaged / missing bricks also provide ingress opportunities to crevices within the wall, and deterioration within the timber windows could also allow access to the loft space.

To the northern elevation of the building is located a timber-built lean-to with a mono-pitched corrugated metal roof. This space was draughty, cool and highly illuminated, and is considered unsuitable, with the metallic struts supporting the roof containing no crevice opportunity.

The outbuilding, B1 at Buck Road is determined to offer '**Moderate**' bat roost suitability in accordance with Bat Conservation Trust – Bat Surveys for Professional Ecologists: Good Practice Guidelines, 4<sup>th</sup> ed. (2023).

## B2

B2 is a storage building of corrugated metal and breezeblock construction with a dual pitched corrugated asbestos cement roof. The building features components such as security lighting, metal doors and fascia and is to the approximate dimensions of 38m x 27m x 5m. In respect of its condition, the surveyor is not qualified to assess structural state, however the aesthetic condition was adjudged to be poor, with areas of degradation noted to the metal sheets as well as to the roof.



Internally, the structure was investigated by the surveyor; the building is primarily used for agricultural storage and open up to the roof for the most part although there is a small upper mezzanine to the south of the structure, adjacent to this is a small loft void to the approximate dimensions of 4m x 5m x 0.5m, access to both areas was not attained. The building is subject to significant disturbance due to the storage of agricultural machinery; the internal climatic conditions are draughty in part, cool and subject to moderate light ingress due to the clear plastic corrugated sheets on the roof; due to the climatic conditions due to this, the core outbuilding is broadly unsuitable for the breeding purposes of loft-dwelling bats such as brown long-eared. The loft void is similar;

subject to minor light, draught and cold ingress from the open hatch making this building section likely unsuitable for breeding loft-dwelling bats. There is no bitumen lining present throughout the building and there was no evidence of crevice-dwelling bats.

Externally, PRFs are minimal due to the corrugated surface not providing the thermal or physical properties conducive of roosting bats due to the surface being too slick for bats to land and crawl on; There are many areas of potential ingress into B1 such as the ceiling vents or missing piece of corrugated plastic on the roof although within the majority of the structure there is an absence of any internal roosting opportunities. Internally within the breezeblock-built section, there is, however, a viable PRF in the form of a gap leading to a cavity in breezeblocks, above an exposed doorway. This ingress point may allow for access to the cavity wall and suitable roosting locations within.

Based on the PRF as well as the knowledge that bat roosts are present within the immediate surrounding habitat of the outbuilding, B2 at Buck Road is determined to offer 'Low' bat roost suitability in accordance with Bat Conservation Trust – Bat Surveys for Professional Ecologists: Good Practice Guidelines, 4<sup>th</sup> ed. (2023), warranting the requirement for a further survey at the site before an impact assessment can be concluded.

- 7.2 There are no trees with PRFs suitable for bats in close proximity to the surveyed outbuildings.

### **Breeding birds**

- 7.3 In relation to WCA Schedule 1 specially protected bird species, such as barn owl, no evidence to indicate use of the site by such species was identified by the surveyor, despite the site and the surrounding environs providing highly suitable habitat for this species.
- 7.4 In relation to non-Sch.1 listed bird species, clear evidence of usage of both buildings by house sparrow was identified by the surveyor, in the form of droppings, feeding remains, house sparrow nests as well as a multitude of individuals entering and leaving the outbuildings both male and female. Some of the house sparrow nests looked to be previous swallow cups that had been occupied in B1, however several other unaltered swallow cups were also located within the building. In addition, a deceased bird was located by the surveyor in B1 which was thought to be a house sparrow this could not be verified owing to the decomposed nature of the specimen; additionally, a collared dove was found deceased within B2.
- 7.5 The following bird species were encountered during the survey (see **Table 7.1**).

**Table 7.1 – Bird species encountered during the surveys**

| Species                                                                                                                                                                                                                                                                                                               | Scientific Name              | Status | Context (where relevant)              |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|--------|---------------------------------------|
| House sparrow                                                                                                                                                                                                                                                                                                         | <i>Passer domesticus</i>     | Red    | Seen within both B1 and B2            |
| Starling                                                                                                                                                                                                                                                                                                              | <i>Sturnus vulgaris</i>      | Red    | x6 seen on neighbouring structure     |
| Woodpigeon                                                                                                                                                                                                                                                                                                            | <i>Columba palumbus</i>      | Amber  | In neighbouring leyland cypress hedge |
| Songthrush                                                                                                                                                                                                                                                                                                            | <i>Turdus philomelos</i>     | Amber  | In hedge on northern boundary         |
| Jackdaw                                                                                                                                                                                                                                                                                                               | <i>Corvus monedula</i>       | Green  | x5 flying overhead                    |
| Collared dove                                                                                                                                                                                                                                                                                                         | <i>Streptopelia decaocto</i> | Green  | x1 deceased in B2                     |
| Blue tit                                                                                                                                                                                                                                                                                                              | <i>Cyanistes caeruleus</i>   | Green  | In hedge on northern boundary         |
| S.41 - a bird listed on section 41 of the Natural Environment Rural Communities Act 2006 (NERC Act)<br>LBAP - A local biodiversity action plan listed species<br>Q - Qualifying species of nearby SSSI site(s)<br>SPEC - a species of conservation concern, Amber or Red, Red being the highest conservation priority |                              |        |                                       |

### **Great crested newt**

- 7.6 As discussed in the desktop study, there are four ponds within a 250m radial buffer and a single ditch network which runs adjacent to the site (see **Figure 4.2** for pond locations). The four ponds have been discounted as providing potentially suitable breeding habitat for GCN owing to their usage as stocked fishing ponds and the likely impacts that these fish have on both larval and juvenile newts.
- 7.7 The ditch network was assessed in relation to its potential to offer suitable GCN habitat, as its proximity to the proposals meant that newts could likely be impacted, subject to their presence. The ditch was found to be generally fast flowing and was culverted underneath the hardstanding to the north of the barn. With this in mind, and the subsequent inferences regarding newt specific habitat preferences, it is considered highly unlikely that the ditch is host to any population of GCN.
- 7.8 Terrestrial habitat within the site of the proposed works is considered negligible in value for GCN, comprising of homogenous hardstanding or active arable farmland, which also encompasses the site. On the basis of the poor suitability of the application site for GCN, along with the absence of a suitable pond network within the immediate area that might host a breeding population of this species, no impacts to GCN are foreseen as a result of the development.

## 8.0 Conclusions & Recommendations

### Designated sites

- 8.1 As mentioned previously, it is considered that there are no pathways by which the proposals could impact on designated sites in the wider landscape. No recommendations have therefore been made in relation to designated sites at this time.

### Bats

- 8.2 Based upon the findings of the survey, covered through sections 6.0 – 7.0 of the report and supported by **Appendix I**, the outbuilding B1 at Buck Road is determined to offer ‘**Moderate**’ and B2 is determined to offer ‘**Low**’ bat roost suitability in accordance with Bat Conservation Trust – Bat Surveys for Professional Ecologists: Good Practice Guidelines, 4<sup>th</sup> ed. (2023).

Table 7.2. Recommended minimum number of survey visits for presence/absence surveys to give confidence in a negative result for structures (also recommended for trees but unlikely to give confidence in a negative result).

| Low roost suitability or PRF-I                                                                                 | Moderate roost suitability                               | High roost suitability or PRF-M                            |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|------------------------------------------------------------|
| One survey visit. One dusk emergence survey <sup>a</sup> (structures).<br>No further surveys required (trees). | Two separate dusk emergence survey visits <sup>b</sup> . | Three separate dusk emergence survey visits <sup>b</sup> . |

Figure 8.1 – BCT extract on roost suitability criteria

- 8.3 It is noted that the recommended further surveys for Building 1 have been carried out within the 2023 active season for bats, with a summary of results outlined in section 5.0. **No further recommendations are therefore made for this structure.**
- 8.4 It is recommended that one dusk emergence survey is undertaken at B2 during the active season of bats (May – August), in order to establish if / how the building is being used by bats, and if so, identify the species present, abundance, roost locations and flight lines around the site following emergence / re-entry. One surveyor would likely be required to monitor the potential roost feature described on B2.
- 8.5 In the event that the presence of roosting bats at the building is initially established within the active season, then an additional survey may be required and the granting of a European Protected Species Development Licence (EPSDL) from Natural Resources Wales will be required for the development to legally proceed where bat roosts will be destroyed, altered, obstructed or damaged or if bats will be disturbed or capture / exclusion is required prior to demolition. However, it should be noted that if a breeding roost is discovered then work that will result in any of the above actions cannot take place until after the breeding season, which is widely accepted as running from May – August inclusive.
- 8.6 Natural Resources Wales provide online information and guidance concerning the requirement for EPSDL’s and the following extract is included in that guidance:

*“When would works require a licence?”*

*A licence is required for anything that would be an offence under the Regulations (covered in section 2.9 of this report). For example, this could include works which would disturb (as defined in the legislation) bats, damage a bat roost, or damage or destroy a breeding site.*

*NRW can only grant a licence if the following three tests are met:*

*1) The purpose of the work is for preserving public health or public safety or other imperative reasons of over-riding public interest (IROPI) including those of a social or economic nature and beneficial consequences of primary importance for the environment,*

*2) There is no satisfactory alternative,*

*3) The action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status (FCS) in their natural range; this last test might require that the work is modified to avoid or minimise adverse effects (mitigation), or that an alternative breeding site/resting place or habitat is provided instead to safeguard the FCS (compensation). Either way, you will need the advice of an ecological consultant. Along with filling in the licence application form, the ecological consultant will need to write a method statement (within the EPSML) explaining how the work will be done to minimise any detrimental effects.*

*If the consultant ecologist, on the basis of survey information and specialist knowledge of the species concerned, considers that on balance the proposed activity is reasonably unlikely to result in an offence being committed then no licence is required. However, in these circumstances Natural Resources Wales would urge that reasonable precautions be taken to minimise the effect on European protected species should they be found during the course of the activity. If protected species are found, cease the work until you have assessed whether you can proceed without committing an offence.*

#### *When might I work without a licence?*

*There might be situations in which you could continue without a licence. If the work can be organised in such a way that there would be no offences committed (i.e. no damage or destruction of a breeding site/resting place, no capturing, killing or injuring of individuals) then there is no need for a licence. This is a difficult area legally and your ecological consultant will be able to advise you further.*

*Developers should be aware that if work is held up or modified and there is a possibility that animals will be disturbed, or a breeding site / resting place will be unavailable to them (even if only temporarily), they should apply for a licence in good time.*

*Example: If a building with a bat roost requires re-roofing or repair work, you would not need a licence if:*

- the existing materials are replaced like-for-like (i.e. similar type of roofing slates, similar felt or membrane),*
- the same access points are retained and there are no structural changes made to the roost,*
- the work is done whilst bats are absent and is completed before they would normally return to the roost."*

**NB:** *Where more detailed bat surveys are recommended, following an initial investigation, then Local Authorities on the advice of their ecological advisors, may not determine the application until such time that all relevant information is gathered, i.e. by conducting dusk/dawn surveys. The advice that is provided by the ecological advisors is also in accordance with the obligations placed upon Local Authorities by way of its duties under the Conservation of Habitats & Species Regulations 2017. Therefore, it would be prudent to make enquiries to the relevant departmental Planning Officer before submitting a Planning Application that includes an ecological survey report that recommends more detailed surveys.*

- 8.7 Installation of overly harsh artificial lighting as part of any development that exceeds current levels may have a negative impact upon foraging / commuting bats in the landscape, subject

to their presence, particularly if increased light spillage occurs in areas of that are currently free from illumination. A bat-sensitive lighting plan is therefore recommended in order to avoid potential impacts to bats that may use the surrounding treelines. Several options to consider have been listed below, though the reader is referred to the Bat Conservation Trust's 'Bats and Artificial Lighting at Night' guidelines (August 2023) for further information (see **Table 8.1** below):

**Table 8.1** – Extract from *Bats and Artificial Lighting at Night*, BCT (August 2023)

Appropriate luminaire specifications: Light sources, lamps, LEDs and their fittings come in a myriad of different specifications which a lighting professional can help to select. However, the following should be considered when choosing luminaires and their potential impact on Key Habitats and features:

- All luminaires should lack UV elements when manufactured. Metal halide, compact fluorescent sources should not be used
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability
- A warm white light source (2700Kelvin or lower) should be adopted to reduce blue light component
- Light sources should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012)
- Internal luminaires can be recessed (as opposed to using a pendant fitting) where installed in proximity to windows to reduce glare and light spill
- Waymarking inground markers (low output with cowls or similar to minimise upward light spill) to delineate path edges
- Column heights should be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards
- Only luminaires with a negligible or zero Upward Light Ratio, and with good optical control, should be considered - See ILP GN01
- Luminaires should always be mounted horizontally, with no light output above 90° and/or no upward tilt
- Where appropriate, external security lighting should be set on motion-sensors and set to as short a timer as the risk assessment will allow. For most general residential purposes, a 1 or 2 minute timer is likely to be appropriate
- Use of a Central Management System (CMS) with additional web-enabled devices to light on demand
- Use of motion sensors for local authority street lighting may not be feasible unless the authority has the potential for smart metering through a CMS
- The use of bollard or low-level downward-directional luminaires is strongly discouraged. This is due to a considerable range of issues, such as unacceptable glare, poor illumination efficiency, unacceptable upward light output, increased upward light scatter from surfaces and poor facial recognition which makes them unsuitable for most sites. Therefore, they should only be considered in specific cases where the lighting professional and project manager are able to resolve these issues.
- Only if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed. However, due to the lensing and fine cut-off control of the beam inherent in modern LED luminaires, the effect of cowls and baffles is often far less than anticipated and so should not be relied upon solely.

- 8.8 No recommendations are made in relation to bats and trees, with no trees set to be impacted by the proposals. If any trees are set to be planted as a part of any future landscaping proposals, they should be constituted of native species, with suitable individuals shown in **Appendix II**.

## Breeding Birds

- 8.9 No impacts are applicable in relation to any Sch.1 (WCA) specially protected bird species such as barn owl and no further surveys or recommendations are necessary in relation to specially protected birds at this time.
- 8.10 In relation to more common birds, direct evidence of breeding birds was located within B1 the structure set for conversion, with multiple active house sparrow nests and several defunct swallow cups. Additionally, house sparrow nests were present within B2 alongside a deceased collared dove. Directly adjacent to B2, at the north of the structure is a goat willow, although no direct evidence of breeding was observed, this semi-mature tree has potential to support breeding birds.
- 8.11 In the interests of potential impact avoidance it is recommended that any proposed works which may impact the areas of nesting potential, such as to the building or to any vegetation under blue line ownership, should be undertaken outside of the nesting bird season. The nesting bird season is weather dependent but generally extends between March and September inclusive (peak period March – August).
- 8.12 **For works within the breeding bird season**, any areas of vegetation, or areas within the building that can support nesting birds should be checked by a professional Ecologist for nesting birds within 48 hours or less prior to works commencing.
- Point 3.24 of the British Standards Publication 42020:2013 defines a professional ecologist as: *“a person who has, through relevant education, training or experience, gained recognised qualifications and expertise in the field of ecology and environmental management.”*
- 8.13 Where / if active nests are located by the Ecologist, then any works which may affect them would have to be delayed until the young have fledged and the nest has been abandoned naturally, this can be aided, for example, via implementation of appropriate buffer zone(s) around the nest site (typically 5 – 10 metres) in which no disturbance is permitted until the nest is no longer in use. This would have to be coordinated through the expert judgement of the professional ecologist and species pending.
- NB:** *All wild birds (with only minor exceptions) and their nests whilst being built or containing eggs or dependant young are protected from destruction, damage and disturbance under the Wildlife & Countryside Act 1981 (as amended). It is a punishable offence to interfere in any way with an active nest.*
- 8.14 Given the presence of both house sparrow and swallow nests and the likely loss of these internal nesting sites, it is considered that replacement nesting sites should be integrated into the converted structures. Suitable enhancement measures have been included in **Appendix II**; however, the LPA should stipulate the required number of said measures in order to adequately compensate for the loss of nesting sites. This could be secured by a suitably worded planning condition.

## Great Crested Newt

- 8.15 Important elements to consider when assessing likely impacts against GCN includes:
1. The scale, nature and magnitude of proposals,
  2. Site proximity to a potential breeding pond and to any additional ponds,
  3. Habitat linkage / barriers between potential breeding ponds and the site,
  4. Nature and extent of available terrestrial habitat around the pond,

5. Area of site habitat loss,
6. Nature of habitat to be lost and potential value to GCN,
7. Most up to date Government guidance considering EPS.

8.16 As derived from the desktop assessment, evidence of GCN in the locale includes:

- No granted EPSMLs for GCN are present within a 2.0 kilometre search buffer,
- No 'Present' Class Survey Licence Returns located within the search range,
- Four ponds and one ditch network within 250m of the application site, all of which have been discounted as offering suitable breeding habitat for GCN.

8.17 With the lack of suitable terrestrial and aquatic habitat within or in close proximity to the site, it is considered highly unlikely that the proposals will result in an impact to this species, and as such no further recommendations have been made in relation to GCN.

8.18 Despite the above, given the presence of multiple water bodies within a 250m buffer of the site, the presence of generalist amphibians such as common toad (*Bufo bufo*) cannot be ruled out. This species is more robust and as such able to overcome both barriers to dispersal as well as surviving in ponds which are stocked with fish. With this in mind, should any vegetation clearance occur in close proximity to the ditch network or any drainage areas, then reasonable precaution should be taken in respect of wider herpetofauna. If works are contained to areas of hardstanding and will not impact on any areas of vegetation to the west then simple precautions would be suitable, however if the scope of works are extended to impact vegetated habitats then a Method Statement detailing a programme of Reasonable Avoidance Measures (RAMs) may need to be collated by a suitably qualified ecologist (SQE).

### **Biodiversity Enhancement**

8.19 As a means of enhancement and aiding the design of the scheme in keeping with local and national planning policy considering biodiversity net-gain principles, the proposals may consider incorporating wildlife friendly provisions in addition to those described. Further recommendations, regarding birds, amphibians, native species and invertebrates are provided within **Appendix II**.

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## Appendix I: Site Photographs



**Plate 1** – *The southern elevation of the outbuilding B1*



**Plate 2** – *The eastern aspect of B1*



**Plate 3** – *The northern elevation of B1, with the timber built lean to present*



**Plate 4** – *The western aspect of B1, with airbricks visible*



**Plate 5** – *PRFs on southern elevation of B1*



**Plate 6** – *The PRFs on northern aspect of B1*



*Plate 7 – Northern elevation of B1, with potential entry points*



*Plate 8 – Gap in the roof of B1, with swallow cup visible*



**Plate 9** – *Further swallow cup in B1*



**Plate 10** – *Bird droppings in the loft of B1, indicative of sparrow usage*



**Plate 11** – *Deceased bird in loft space of B1*



**Plate 12** – *Nature of the hardstanding surrounding site*



**Plate 13** – *Ditch to the west of the site, with flowing water contained*



**Plate 14** – *House sparrow nest located within B1*



**Plate 15** – *Southern elevation of B2*



**Plate 16** – *Void present within south of B2*



**Plate 17** – *Goat willow to the north of B2*



**Plate 18** – *Interior of B2*



**Plate 19** – *Viable PRF within B2, leading to cavity wall*



**Plate 20** – *Closer angle of PRF, note clear access to cavity*

## **Appendix II: Biodiversity Enhancement: General Recommendations**

### **Breeding Birds – House Sparrow**

The Sparrow Terrace has been designed to help redress the balance of falling House Sparrow numbers. The current UK population is now half of what it previously was in 1980 and this is widely attributed to habitat destruction and lack of suitable nesting spaces. House Sparrows are social birds and like to nest in company, therefore, this terrace provides ideal nesting opportunities for three families. The terrace can be fixed on to the surface of a suitable wall or incorporated into the wall. It is suitable for all types of buildings.



### **Breeding Birds – Swallow**

Although Swallows are currently placed on the Green list for Birds of Conservation Concern (BoCC), meaning that they are under the least protection, numbers of this species can fluctuate heavily based on environmental and ecological factors, with high regional variation observed.

Swallows will readily adopt these nest cups which are based on the size and shape of natural swallow nests. The nest cup is ideal for placing in a garage, shed, stable, barn or even beneath an archway and should be placed beneath the roof with free access. It provides somewhere secure for swallows to nest and means that they will expend less energy in producing their own nest. It also means that they do not need to find suitable nest building mud which can be in short supply in a dry spring. This WoodStone® Swallow Bowl is made from durable WoodStone®, a mixture of concrete and wood fibres, that is guaranteed to last for years and is mounted on an exterior grade plywood board.



#### **Specifications**

- \* Height: 120mm
- \* Width: 200mm
- \* Depth: 110mm
- \* Weight: 600g

### **Breeding Birds – Other**

This traditional design has proved to be highly effective in attracting Robins, as well as other small species such as Black Redstart, Spotted Flycatcher and Wren. It is designed to be installed on the walls of houses, barns, garden sheds or other buildings and should be hung so that the entrance is to one side (at an angle of 90° to the wall). The front panel can be easily removed for cleaning.

This type of box should not be made conspicuous on a tree or bush because small predators can enter through the unprotected opening. By hanging on a wall, predators won't be able to reach the box. Alternatively hide the box in Ivy, Honeysuckle or other climbing plants.



### **Invertebrates – Bee bricks**

The Bee Brick can be used in place of a standard brick or block in construction to create habitat for solitary bees. Alternatively, it can be used as a standalone bee house in your garden or wild patch. It will provide much needed nesting space for solitary bee species such as red mason bees and leafcutter bees, both of which are non-aggressive.

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Each Bee Brick contains cavities in which solitary bees can lay their eggs before sealing the entrance with mud and chewed-up vegetation. The offspring will emerge the following spring and the cycle will begin again. Each cavity goes part way into the brick, which is solid at the back. Bee Bricks should be placed in a warm sunny spot on a south-facing wall at a minimum height of 1m, with no vegetation obstructing the holes. It is highly recommended that bee-friendly plants should be located nearby so that the bees using the bricks have food, otherwise it is unlikely that the brick will be used.

Available in a choice of four colours: white grey, dark grey, yellow and red.

#### Specification

- \* Material: Concrete
- \* Origin: Cornwall, UK
- \* Dimensions: W 215mm x D 105mm x H 65mm
- \* Weight: 2.9kg
- \* Colours: White grey, yellow, dark grey and red



#### Native Planting and/or Landscaping

New feature landscaping should incorporate native woody plants as opposed to non-native species that are of significantly less benefit to biodiversity. Species such as Blackthorn, Honeysuckle, Rowan, Guelder-rose and Hawthorn are native and will provide a valuable resource for a myriad of wildlife as opposed to non-native, exotic species which are generally much less effective, particularly to pollinator groups including bees, butterflies and moths.

| Suitable Trees                                 | Suitable Woody Shrubs                        |
|------------------------------------------------|----------------------------------------------|
| English Oak ( <i>Quercus robur</i> )           | Hawthorn ( <i>Crataegus monogyna</i> )       |
| Rowan ( <i>Sorbus aucuparia</i> )              | Honeysuckle ( <i>Lonicera periclymenum</i> ) |
| Wild Service Tree ( <i>Sorbus torminalis</i> ) | Guelder Rose ( <i>Viburnum opulus</i> )      |
| Silver Birch ( <i>Betula pendula</i> )         | Elder ( <i>Sambucus nigra</i> )              |
| Ash ( <i>Fraxinus excelsior</i> )              | Wild Privet ( <i>Ligustrum vulgare</i> )     |
| Goat Willow ( <i>Salix caprea</i> )            | Blackthorn ( <i>Prunus spinosa</i> )         |
| Beech ( <i>Fagus sylvatica</i> )               |                                              |
| Wild Cherry ( <i>Prunus avium</i> )            |                                              |

#### Herpetofauna

Hibernacula are underground chambers that amphibians and reptiles use throughout the winter to protect themselves from the cold. Creating a hibernaculum will provide a safe space for amphibians and reptiles to hibernate over winter, as well as a spot for solitary bees to soak up the sun and for birds to relax. These habitats can be integrated into a wide variety newly created or enhanced habitats and attract herps to new areas.

*You will need:*

- A spade
- Logs and branches
- Rocks and bricks
- 2-3 drainpipe cut-offs or cement pipes (if using plastic drainpipes, roughen the insides with sandpaper, so that they are not too slippery for animals to climb)
- Turf or meadow flower seeds (optional)

*How to make your hibernaculum yourself:*

- In a sunny spot, dig a hole about 50cm deep and 1.5 metres across.
- Fill with logs, branches, bricks and rocks, leaving plenty of gaps in between.
- Insert entrance tubes (drainpipes) at ground level into the hole.
- Cover the pile with soil (to about 50cm high).
- Plant meadow seeds or long grasses over the mound to create a feast for summer pollinators.

*To construct a hibernaculum to Natural England standard:*

- In desired areas, remove the turf from the footprint of the hibernaculum and set aside.
- On well-drained soil excavate to a depth of approximately 500 mm and set aside spoil (this is unnecessary on poorly drained soils).
- Fill the footprint or pit with core material. Materials likely to retain moisture are preferable, such as cut timber, brash and grubbed up tree roots. Other material such as inert hardcore, bricks, rocks, and building rubble may also be used. Materials that will decompose should not be placed beneath heavy components such as bricks or rocks, to reduce the risk of collapse.
- Pack the larger spaces within the core materials with wood chippings, loose topsoil or spoil.
- Cover the hibernaculum with the turves removed from the footprint.
- Take care not to create structures that might attract rodents, such as piles of rubble with many entrance holes. There has been no rigorous investigation of the optimum size of hibernacula, but larger hibernacula are probably more useful than small constructions because they contain a variety of different microhabitats and are more likely to maintain stable conditions.
- A suggested minimum size is 4.0 m long by 2.0 m wide by 1.0 m deep. 2.0 x 2.0 x 1.0 metres (length x width x height) as a minimum.

*Illustrative aid for hibernaculum:*

