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Ecological Surveys • Habitat Management • Arboricultural Surveys • Vegetation Clearance

Ecological Impact Assessment

Barn at Beech House, Spaldwick
[NGR: TL 13026 72737]

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On behalf of: Campbell McCrae Ltd - Chartered Architectural Services

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001	Ecological Impact Assessment	Alistair Grant BSc (Hons) MSc MPhil PhD (Cantab)	Crystal Acquaviva BSc (Hons) MSc MCIEEM	Crystal Acquaviva BSc (Hons) MSc MCIEEM	04/10/2024

Factor	Detail
Location	Barn at Beech House, Spaldwick, Cambridgeshire, National Grid Reference: TL 13026 72737
Date	Ecological Impact Assessment Report: 10/04/2024
Personnel Qualifications	Jodie Boocock BA (Hons) MSc MCIEEM has nine years of industry experience and holds a Level 2 Class Licence in Bats [2020-48088-CLS-CLS] and a Level 1 Class Licence in Great Crested Newts [2016-25673-CLS-CLS] with an array of experience in producing bat roost impact assessments, in-depth static and transect studies as well as ecological impact assessments for a range of other species. Crystal Acquaviva BSc (Hons) MSc MCIEEM has over a decade of industry experience and holds Level 3 and 4 Class Licences in bats [Licence nos. 2015-14503-CLS-CLS and 2015-14566-CLS-CLS], a Level 1 Class Licence in dormice [Licence no. 2019-43055-CLS-CLS], and a Level 1 Class Licence in Great Crested Newts [Licence no. 2015-19228-CLS-CLS]. They hold a level 3 FISC certificate. Alistair Grant BSc (Hons) MSc MPhil PhD (Cantab) has four years of industry experience (and 10 years' experience of bat static and transect surveys as a volunteer in wildlife conservation) and holds a Level 1 Class Licence in Dormouse [2017-29432-CLS-CLS] and a Level 1 Class Licence in Great Crested Newts [2023-11692-CL08-GCN]. He has recently completed a three day-intensive Bat Handling Foundation course (including Hand Netting & Endoscope Use) and is currently working towards a Certificate of Bat Acoustics Analysis. He has undertaken two years of bespoke in-house botanical training under the guidance of a BSBI county botanical recorder. A graduate of the inaugural CIEEM Early Careers scheme, he has completed multiple training courses including UK Habitat Classification and Biodiversity Net Gain. He has undertaken ecological impact assessments for a range of other species including badger, dormouse water vole and otter.

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1.0 Executive Summary

1.1 Rationale

Greenwillows Associates Ltd. was commissioned to conduct an ecological impact assessment (EcIA) in relation to the proposed development of a structure at Beech House, Spaldwick. The construction proposals relate to the conversion of a brick-built barn to a garage, workshop and first floor hobby room.

The aim of the EcIA is to provide an assessment of the likely impacts, and level of risk, the proposed development might have upon present and potential ecological features and associated ecosystems. Based on these results, appropriate levels of mitigation, compensation and enhancement measures have been prescribed and any residual impacts identified in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) guidance (CIEEM, 2018).

Greenwillows Associates Ltd. was not instructed to undertake Biodiversity Net Gain using the Statutory Metric. The proposed development does not impact a priority habitat and will impact less than 5m of an onsite linear habitat. It will affect an area greater than 25 square metres (5m by 5m) of on-site habitat. However, this habitat has a biodiversity value of zero and hence the proposals do not represent an impact (*i.e.* a reduction in biodiversity value). As such, in line with government guidance (https://www.gov.uk/guidance/biodiversity-net-gain), the *de minimis* exemption applies and the mandatory biodiversity gain requirement does not apply to this development. It is however recommended that clarification be sought by consulting the Local Planning Authority and/or the Government's standing advice for Biodiversity Net Gain.

The areas surveyed are referred to as the 'site'. Anything beyond the site boundary, but within the same land ownership, is referred to as 'the wider site'. Anything beyond this is referred to as 'neighbouring habitat'.

1.2 Essential Evidence, Conclusions and Recommendations

Table One below, provides a summary of the key information relating to baseline ecological features identified onsite and any potential impacts on these features. In addition, key recommendations for mitigation and enhancements are also made. For full details of mitigation and enhancements measures see Section Six.

This report sets out the methodology employed to undertake the surveys, the results obtained and discusses the implications arising therefrom.

Table One: Conclusions and Recommendations

Ecological Features	Potential Impacts	Mitigation and Enhancement
Birds	Evidence of nesting birds in multiple external features of the barn/within the barn, were found on the walkover survey. If nests are disturbed, damaged or destroyed during the process of incubation and rearing, then mortality of chicks could occur. The construction proposals will result in the damage or destruction of at least some of these features which will result in a minor, permanent loss of nesting habitat.	Mitigation to avoid impact on birds is recommended. Works that have the potential to impact features used by nesting birds should be completed outside the bird breeding season (mid-February to September inclusive) or, alternatively, a nesting bird survey will need to be undertaken so that nesting birds can be avoided. To compensate/enhance for the loss of nesting habitat, two sparrow terraces and two small-hole nest boxes should be installed. See Section Six for further details.
Bats	There was no evidence of roosting bats on the dusk bat emergence survey. The results of the bat survey indicate the wider site is used for foraging and commuting by small numbers of common species of bats. A solitary suspected Pipistrelle *sp*. Bat dropping found in the interior of the barn extension (which is not part of the construction proposals), was attributed to a 'fly-through' bat. Although no bats were found to be roosting in the barn structure, the construction proposals will result in the damage or destruction of at least some potential roost features. This will theoretically result in a minor, permanent loss of roosting habitat.	As no bats were found to be roosting in the barn structure, there is no legislative requirement for a mitigation licence. However, following good ecological practice, mitigation to avoid impact on bats is recommended. Where possible, potential roost features that could support roosting bats should be retained. Works that have the potential to impact potential roost features should be undertaken outside the bat hibernation period (typically November/December to February/March) in accordance with a method statement and under the supervision of an appropriately qualified ecologist. Any new lighting should follow guidelines from the Bat Conservation Trust and Institute of Lighting Professionals. To compensate/enhance for the loss of potential roost features,

		three bat boxes should be installed. See Section Six for further details.
Great Crested Newts	There are no waterbodies within the site. There are two waterbodies outside the site but within the zone of influence of the development that were found to be positive for the presence of great crested newt (*Triturus cristatus*) on eDNA assessment. The site offers limited potential for great crested newt.The terrestrial habitats within the zone of influence have low potential to support this species although there are several potential hibernacula within the wider site that could support resting/sheltering/hibernating great crested newt, including adjacent to the barn. Works pose a risk of injuring/killing individuals and destroying a resting/sheltering place.	Precautionary mitigation to avoid impact on GCN is recommended. Potential hibernacula close to the barn structure likely to be impacted by the works should be moved, in accordance with a method statement and under the supervision of an appropriately qualified ecologist, to an appropriate hardstanding area outside the works area. Materials storage should be on hardstanding away from areas of vegetation. To enhance for great crested newt, an additional hibernaculum should be created at a suitable location within the wider site. See Section Six for further details. **If great crested newt are encountered during the construction phase a mitigation licence from Natural England will be needed for works to proceed lawfully.**
Reptiles	The site offers limited potential for reptiles.The terrestrial habitats within the zone of influence have low potential to support reptile species although there are several potential hibernacula within the wider site that could support resting/sheltering/hibernating reptiles, including adjacent to the barn. Works pose a risk of injuring/killing individuals and destroying a resting/sheltering place.	The precautionary mitigation measures specified for great crested newt will also benefit reptiles if present at the time of the works. See Section Six for further details.

Hedgehog	The site offers limited potential for hedgehogs (*Erinaceus europaeus*). Generally, the terrestrial habitats within the zone of influence have low potential to support hedgehogs although there are several potential hibernacula within the wider site that could support resting/sheltering/hibernating hedgehogs. Works pose a risk of injuring/killing individuals and destroying a resting/sheltering place.	The precautionary mitigation measures specified for great crested newt will also benefit hedgehogs if present at the time of the works. See Section Six for further details.

2.0 Introduction and Terms of Reference

2.1 Objectives

- An assessment of the likely impacts the proposed scheme might have upon notable and/or protected species and habitats features.
- Ecological features to be mapped to provide geographical information on how they relate to the proposed development.
- Review national and local legislation and how these impact upon the proposed development.
- Identification of measures to avoid potential adverse impacts upon notable and/or protected species and habitats identified as potential ecological features.
- Where appropriate, avoidance, mitigation, compensation, and enhancement measures are identified.
- An informative document for use by the Local Planning Authority (LPA) as part of the planning process.

2.2 Site Location and Context

The site is situated off High Street, Spaldwick, Cambridgeshire, PE28 0TD, National Grid Reference: TL 13027 72737.

The site comprises a brick-built barn within a residential garden. The proposed development will be wholly contained within the footprint of this structure and no direct impacts on any habitats of the wider site are anticipated. The site lies within Spaldwick Conservation Area.

Photographs of the site are contained in Appendix One. The location plan, including waterbodies with 250m of the site, is provided in Appendix Three and a habitat map including Target Notes (TNs), is contained in Appendix Four.

2.3 Scheme Details

2.3.1 Plans and Scope

The surveys were based on plans provided by the client (Appendix Two) and on aerial photographs (Appendix Three):

- 22405_SK01 (Mar 24) - Title: Beech House, High Street, Spaldwick, Topo Plan, As proposed

2.3.2 Timings

The schedule of works for the proposed development has not yet been finalised and the duration of the construction phase is not yet known.

2.3.3 Site History/Background

There is no extant planning applications linked to this site and a planning application for the proposed development is yet to be submitted. There is no evidence of any previous ecological surveys related to the site prior to Greenwillows Associates Ltd being instructed.

3.0 Legislation and Policy

3.1 Legislation

Legislation of relevance to this report and its findings are listed below, with full details outlined in Annex One.

- **The Conservation of Habitats and Species Regulations 2017** amended by the **Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019**.
- **Wildlife and Countryside Act 1981** (as amended).
- **Natural Environment and Rural Communities (NERC) Act 2006** (Section 41).
- **Environment Act 2021**.

3.2 Planning Policy

- **National Planning Policy Framework 2021 (Biodiversity).**
- **Huntingdonshire District Council Local Plan (2019)** relevant policies detailed below:

Policy 30 of Section 8.9 of the Huntingdonshire District Council Local Plan states that:

"A proposal will ensure no net loss in biodiversity and provide a net gain where possible, through the planned retention, enhancement and creation of habitats and wildlife features, appropriate to the scale, type and location of development. Large scale development proposals should provide an audit of losses and gains in biodiversity produced according to a recognised methodology. In seeking to provide net gains for biodiversity reference should be had to the Natural Cambridgeshire publication 'Developing with Nature Toolkit' and the proposal should prioritise measures that:

- *complement or enhance existing features of biodiversity value within the design and layout of development;*
- *provide new biodiversity features within the development;*
- *help reverse the decline of species;*
- *assist in achieving local targets for priority habitats and species including those set out in Habitat Action Plans;*
- *improve public access to nature;*
- *ensure the effective management of biodiversity or geological features;*
- *contribute to the provision of multi-functional green infrastructure to enhance ecological networks and the Green Infrastructure Priority Areas*
- *contribute towards the achievement of good ecological status in water bodies (or not compromise achievement of good ecological potential) in accordance with the Anglian River Basin Management Plan (RBMP) and accompanying catchment action plans; or*
- *will help species adapt to climate change."*

4.0 Methodology

4.1 Desktop Study

In order to compile background information on the site and its environs, Cambridgeshire and Peterborough Environmental Records Centre (CPERC) was contacted to provide biological records of protected/notable species and ecological designations within 2km of the site. These data included Cambridgeshire Bat Group records. A search of the Multi-Agency Geographic Information for the Countryside (MAGIC) website was undertaken with regards to the presence of statutory nature conservation sites within the potential zone of influence. The MAGIC database was also searched to identify the known presence of any priority habitats within or adjacent to the site, as well as assessing the soil type onsite via the LandIS database.

A search for waterbodies within 250m of the site was also undertaken using a range of mapping resources, including Google Earth, MAGIC, and OS Maps. The National England Open Data ArcGIS Online Great Crested Newt Geoportal was consulted to ascertain the GCN Risk Zone status of the area in which the site is located.

A search of the Local Planning Portal for other applications that could be relevant to the proposed development site was undertaken.

4.2 Field Surveys - Habitats

A walkover of the site was undertaken on 17th July 2024 by Alistair Grant and Elizabeth Trayhurn, to provisionally identify and map the habitats present within the site. As the proposed development is wholly contained within the footprint of the existing structure, and no direct impacts upon surrounding habitats are anticipated, formal classification of each habitat parcel using Primary, Essential Secondary and Additional Secondary Codes in accordance with Version 2.0 of the UK Habitats Classification (2023), together with condition assessment of habitats present, was not undertaken.

4.3 Field Surveys - Faunal Species

A search for signs of protected, priority or otherwise notable species and an assessment of the habitats present for their likelihood to support such species (see Annex Two) was also undertaken. Features of interest were recorded as Target Notes (TN), shown on a map in Appendix Four.

Species specific methodologies, of relevance to the site are listed below, with full details and criteria outlined in Annex Two.

4.3.2 Bats

All bat surveys were undertaken using the relevant protocol outlined in the Bat Conservation Trust's Good Practice Guidelines (2023).

4.3.2.1 Preliminary Roost Assessment

A Preliminary Roost Assessment (PRA) bat survey was undertaken on 17th July 2024. The aim of the survey was to determine the actual or potential presence of bats, the need for further survey work and to advise on the impact on bats and legal obligations prior to work being undertaken.

The PRA was carried out by Elizabeth Trayhurn, a Level 1 Class licensed bat surveyor [2021-53542-CLS-CLS] and an accredited agent under the Level 2 Bat Licence of Steve Parnwell [2015-14029-CLS-CLS], and assisted by Alistair Grant, a trained bat surveyor. See Annex Two for details of methodology and assessment criteria.

Equipment available for the PRA included various sized torches, extendable mirror, endoscope, close focusing binoculars, collection pots and gloves for any droppings found, and ladders.

4.3.2.2 Dusk Emergence Survey

A dusk emergence survey focusing on the structure was undertaken on 1st August 2024 by Sharon Dence (who also remotely monitored a second position), Grace Gadsby and Jason Gordon, all trained bat surveyors (Table Two). The survey protocols followed those recommended by the Bat Conservation Trust Good Practice Guidelines (4th edition) (BCT, 2023) with the survey commencing fifteen minutes before sunset and ending 1.5-2 hours after sunset.

Table Two: Summary of Emergence Bat Survey

Date	Survey Type	Number of Surveyors	Focus of Survey
01/08/2024	Dusk Emergence	3 Surveyors + 1 remotely monitored position	Barn

Before the survey, surveyors were briefed that the surveys required constant observation of the aspect of the target structure they had been allocated. Any known PRFs or potential bat access points identified in the PRA were highlighted. Surveyors were instructed that the priority was the detection of emerging (or returning bats) from the target structure although other potentially important contextual information could be recorded (*e.g.* nearby commuting or feeding bats), so long as this did not interfere with constant observation of the target structure. A written record was kept of first bat observed by each surveyor in addition to any emergences. Surveyors communicated first bat/emergences for their respective positions during the survey via two-way radios.

Bat calls were digitally recorded for each survey position using Anabat Walkabout, Scout or Swift full-spectrum bat detectors which recorded echolocation activity for the full duration of each survey. Surveyors were not expected or encouraged to try and identify bat species during the survey. In accordance with the BCT Guidelines and the Interim Guidance Note on

Night-Vision Aids (NVA) (BCT 2022), Nightfox Red Digital Night Vision Goggles were used for each survey position to improve the detection of bats especially beyond the point when ambient light was not sufficient for human eyesight to perceive PRFs, or any bats potentially emerging from PRFs. Although Nightfoxes were switched on from the beginning of the survey to record full high-definition (1920*1080) video for the full survey duration, surveyors did not necessarily use the devices to view allocated PRFs whilst there was sufficient daylight. However, surveyors were instructed to view the target structure through the Nightfox as soon as they first experienced difficulty perceiving detail on the target structure using normal eyesight. Each Nightfox was mounted on a tripod and surveyors were encouraged to adjust video camera exposure and the integrated 940nm infra-red power as ambient light levels dropped. A note was made of the time infra-red was first switched on. Additional infra-red torches were available for illuminating difficult areas although these were not used.

At the end of each survey, the lead for that survey collated summary activity information from each surveyor to facilitate post-survey analysis.

All bat registrations recorded during the bat survey were initially analysed using Anabat Insight software auto classifier to verify the species recorded during survey work. Registration verification was then undertaken by a suitably experienced ecologist with reference to known sonogram parameters for each species (Russ, 2012; Barataud, 2015) and a record kept of original and verified identifications. During the verification process all barbastelle, *Myotis* and NSL calls were individually (100%) verified. 30% of pipistrelle and unlabelled calls were verified allowing for a 10% error ratio, which was corrected during the verification process, e.g., for 100 pipistrelle calls 30 were checked and if only 3 errors were verified, this ratio would suffice. However, if there was more than a 10% error ratio, then 50% were subject to verification, if this remained above the 10% error ratio, then the default was to return to verifying 100% of remaining files.

Additional data such as the presence of 'feeding buzzes' and social calls, which suggest foraging and multiple bats respectively, were kept during sonogram analysis.

Where recordings could not be reliably attributed to species (such as *Myotis* species) or where overlaps in sonogram parameters between otherwise distinguishable species occur (such as in *Pipistrellus* species with a peak frequency of around 40 kHz or 50 kHz), registrations were identified to genus level. In the case of *Nyctalus* and serotine species *Eptesicus serotinus*, these were labelled as 'NSL' (noctule, serotine, Leiseler's). However, professional judgement was made where possible to refine identification to species level using factors such as: associated habitats, geographical location and behaviour as well as other records throughout the survey period/season and desk study data.

Following verification of sonograms to species / genus level, bat registrations were totalled for each species per deployment session. A bat registration/contact is classed as species presence within a 15 second (s) [max.] file. One sound file is counted as one bat registration, though different species within the same 15 second sound file are counted as different bat

registrations.

Documented or suspected emergences were manually reviewed on a high-resolution monitor within the same time period as for the acoustic analysis using VLC Media Player v.3.0.20 software. For the single occasion where a remotely supervised position was necessary, the entire video capture was manually reviewed. Where footage was unclear, the software's functionality (*e.g.* slow-motion, frame-by-frame advance, posterize, negate colours) was used to enhance the video to check for the emergence of bats. Where footage was unclear, the software's functionality (*e.g.* slow-motion, frame-by-frame advance, cropping) was used to enhance the video to check for the emergence of bats. Screenshots of confirmed emergences were taken and footage was verified by a suitably experienced ecologist.

4.3.3 Great Crested Newt (GCN)

4.3.3.1 eDNA Surveys

When great crested newts inhabit a pond, they deposit traces of their DNA in the water as evidence of their presence. Analysis of pond water samples for these small environmental DNA (eDNA) traces can be undertaken to confirm great crested newt habitation or establish absence.

Waterbodies WB4 and WB6 were subject to Habitat Suitability Index (HSI) assessment (Amphibian and Reptile Groups of the UK, 2010) as well as eDNA analysis with water samples collected on 25th June 2024 by Sharon Dence and Jack Lovett under the supervision of Steve Parnwell, a licensed newt worker [2015-18295-CLS-CLS], who has been trained in eDNA sampling.

The samples taken from the waterbody were submitted for eDNA analysis to the protocol stated in Defra WC1067 (Biggs *et al*., 2014).

4.4 Impact Assessment Criteria

The assessment of the impacts and effects[1] on important ecological features within the Zone of Influence (ZoI) of the Scheme has been based on the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (2018) (See Annex Two).

4.5 Constraints and Survey Limitations

The barn is used as a storage space, including for vehicles and motorbikes, and so the interior of the structure could not be fully inspected at close range due to lack of access and/or the inability to safely use ladders to access features at height.

[1] Note: The following definitions are used for the term's 'impact' and 'effect':
Impact – Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow.
Effect – Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow (CIEEM 2018).

Generally, surveys only provide a ‘snap-shot’ of information temporally and spatially. Ecological conditions can vary on a yearly and seasonal basis.

Waterbodies were identified using multiple mapping sources during the desktop survey. Some waterbodies are not illustrated on maps, particularly those that are small in size and within residential properties. Therefore, some waterbodies may have gone undetected.

Mitigation and enhancement measures are based on the current knowledge of the site development. Information as to the design may change or additional development activities included at a later date that could impact on the mitigation measures and possible enhancement opportunities.

Any significant constraints have been addressed below within Section Six.

5.0 Results

5.1 Background Data

There are no Statutory designated sites located within 2km of the site. The site lies within the Impact Risk Zone (IRZ) for Grafham Water Site of Special Scientific Interest (SSSI) and Brampton Wood SSSI although the proposed development type is not a category that requires consultation with Natural England.

There are three non-Statutory sites within 2km of the site (Table Three).

Table Three: Non-Statutory Nature Conservation Sites

Site Name	Designation	Grid Ref	Distance From Site	Reasons For Designation
Ellington Brook Pollard Willows	CWS	TL122729	840m (W)	Supports at least 5 mature pollard willows in association with other semi-natural habitat.
Wolley Hill RSV	CWS	TL148730	1.8km (E)	Supports a population of a Nationally Scarce vascular plant species.
Wolley Hill W40	PRV	TL14857314 – TL14797294	1.8km (E)	Neutral/calcareous grassland, presence of a local red data book species.

NB: CWS= County Wildlife Site, PRV= Protected Road Verge

5.2 Field Survey

5.2.1 Baseline Habitats – Site

5.2.1.1 Structures (u1b5)

The site comprises a single structure: the barn for which the proposed development concerns conversion to a garage, workshop and first floor hobby room. The structure is situated at the northeast corner of the residential garden of Beech House. The barn is a large (although single storey) brick-built construction with double-brick walls but no cavity. It has a pitched corrugated asbestos roof containing two skylights. There is a modern brick/weatherboard extension with a pitched wooden shingle tiled roof adjoining the south elevation which contains a heating oil tank. There are two large sliding doors, two small hatch doors and a blocked-up doorway on the south elevation. There is a large wooden gable-end hatch door high on the east elevation and a smaller wooden hatch door on the north elevation. There

are wooden fascia boards on the north and south elevations with affixed cast-iron guttering. Internally, the barn has three metal roof trusses supported by longitudinal metal brace struts. There is no ceiling/loft void. Overall, the barn appears to be in a structurally sound condition although the brickwork is degraded in places, some of the wooden doors are in poor repair and the west and north elevations are heavily encroached by ivy. Features of the barn that have the potential to support bats are described in more detail in Section 5.3.2.1.

5.2.2 Baseline Habitats – Wider Site

5.2.2.1 Modified Grassland (g4)

Secondary Codes: 106 (Mown), 516 (Active Management)

At the south (beyond the cobbled area on which the barn stands), east and west of the structure is well-managed, species-poor, short-mown modified grassland which is part of the larger residential gardens of the property associated with the barn. The grassland to the west of the barn has several vehicles/trailers parked on it. The grassland to the east is used as an occasional driveway/parking space. There is also a narrow strip of 'amenity' modified grassland to the north of the structure which separates the barn from the public pavement.

5.2.2.2 Structures (u1b5)

There are several outbuildings to the south of the site including a brick-built shed (12m south) and a timber-clad barn (15m south). Beech House, the *c.*17th century Grade II listed residential property to which the barn belongs, is 35m southwest of the site.

5.2.2.3 Developed Land, Sealed Surface (u1b)

There is a cobblestone drive/ramp/hardstanding area and a brick/cobbled elevated platform to the south of the barn structure. There is a large container trailer parked on the drive/ramp.

5.2.2.4 Other Developed Land (u1b6)

There is a public highway (comprising a pavement and an A-road) to the immediate north of the barn.

5.2.2.5 Hedgerow (h2b)

There is a well-managed privet *sp*. (*Ligustrum sp.*) hedgerow to the west of the barn which separates the residential garden from the public highway.

5.2.2.6 Scattered Trees (32)

There is a group of immature scattered trees including ornamental cherry (*Prunus sp.*), common lilac (*Syringa vulgaris*), Norway spruce (*Picea abies*) and common laburnum (*Laburnum anagyroides*) to the immediate west of the barn. The laburnum and spruce are partly overhanging the roof of the barn. Beyond the scattered trees is a mature horse chestnut (*Aesculus hippocastanum*).

5.2.2.7 Standing Open Water and Canals (r1)

Secondary Codes: 41 (Pond (non-priority))

There are no waterbodies (WBs) within the site. In terms of the wider site, there are six WBs within 250m of the barn. The four to the north of the High Street (WB1, WB2, WB3 and WB5) were scoped-out in a preliminary walkover assessment undertaken by Steve Parnwell, a licenced GCN ecologist (2015-18295-CLS-CLS) on 25th June 2024. It was assessed that it was extremely unlikely that newts would commute to/from these waterbodies to the site given the major barrier to commuting/dispersal of GCN presented by the busy hard-standing A-road as this is used as a 'rat-run' by traffic off the A14 trunk road. Additionally, the parcel of land containing these WBs is effectively an isolated island as it is sandwiched between the A14 to the north and Spaldwick High Street to the south. The two WBs to the south of the site (WB6 - 35m and WB4 - 233m) are described in more detail in Section 5.3.4.2 to Section 5.3.4.4. WB6 does not appear on OS mapping and was encountered on the preliminary walkover.

5.2.3 Miscellaneous

5.2.3.1 Piles of wood/logs/brash

There is a pile of wooden sleepers to the east (TN01) and another pile to the west (TN02) of the main barn doors on the cobbled hardstanding area. There is a pile of discarded drainpipes at the northeastern corner of the barn (TN03) and various materials including rubble, corrugated metal sheeting and a discarded metal gate at the base of the western elevation (TN04). There is a pile of logs/stumps to the immediate south of the barn extension (TN05), a pile of wooden sheeting boards to the immediate west (TN06), and two piles of wooden pallet cages to the south of the container trailer parked on the cobblestone drive/ramp (TN07). There is also a large pile of logs (TN08) and a pile of roof tiles and wood (TN09) by the other outbuildings to the south of the barn.

5.2.4 Neighbouring Habitat

The site is situated within the gardens of Beech House which is located approximately mid-way along Spaldwick High Street. It is in a conservation area. The northern elevation of the barn faces onto the High Street which is a busy A-road due to its proximity to the A14 trunk road which lies to the north of the village. There is a 24hour forecourt service area at the eastern extent of the village. The village is characterised by 16th and 17th century timber-framed and plastered buildings, many of which are listed, with substantial gardens containing mature trees. The neighbouring habitat comprises mostly arable agricultural land and grazing pasture/horse paddocks.

5.3 Field Survey – Notable and/or Protected Species

5.3.1 Birds

The Biological Records Search (BRS) returned 13 records of birds within 2km of the site. The most recent was from 2023 and, with the caveat that birds are a highly mobile species, the nearest was 150m southeast of the site. Species recorded included barn owl (*Tyto alba*),

black-tailed godwit (*Limosa limosa*), golden plover (*Pluvialis apricaria*), merlin (*Falco columbarius*), nightjar (*Caprimulgus europaeus*), red kite (*Milvus milvus*), spotted flycatcher (*Muscicapa striata*), starling (*Sturnus vulgaris*), turtle dove (*Streptopelia t*urtur) and yellowhammer (*Emberiza citrinella*).

At least two remnant nests, which appeared to be recent judging by the freshness of the vegetation that the nests were constructed from, were located on the south elevation of the structure: one within a gap in brickwork (TN10) and the other behind one of the hatch doors (TN11). It was assessed that these were likely to be small-bird species *i.e.* robin (*Erithacus rubecula*), house sparrow (*Passer domesticus*), tit species (*Paridae*), wren (*Troglodytes troglodytes*). Internally, there was a remnant nest on the north wall of the barn (TN12) and a woodpigeon (*Columba palumbus*) eggshell on the floor (TN13).

In terms of the wider site, there was an active woodpigeon nest (TN14) in a branch of one of the trees to the immediate west of the barn.

Although the BRS returned a record of barn owl, this was relatively old (2011) and over 1km from the site. The metal roof trusses within the structure offer some potential for roosting/perching (but not nesting) barn owl. The only access point for barn owl would be via the gaps in the wooden gable-end hatch door on the east elevation of the barn. These are larger than minimum size hole a barn owl can fit through (70mm x 70mm) but much smaller than barn owls prefer and there is no landing ledge. There was no evidence of barn owl presence within the barn *e.g.* faeces or pellets/roost debris. Taking these observations into consideration, it is assessed that this species is unlikely to use the barn structure. Accordingly, this species is not considered further in this report.

5.3.2 Bats

The BRS returned 17 records of bats within 2km of the site. The most recent was from 2022 (common pipistrelle - *Pipistrellus pipistrellus*) and the nearest was 150m southeast of the site (soprano pipistrelle - *Pipistrellus pygmaeus*). Species recorded included 'bat', brown long-eared (*Plecotus auritus*), common pipistrelle, pipistrelle *sp*. and soprano pipistrelle.

5.3.2.1 Structures

The structure on the site was assessed for its potential to support roosting bats, the results of which are given in Table Four below.

Internally, it was noted that there was a high level of ambient light due to the large skylights at either end of the barn. Additionally, it was noted that there were vehicles parked and fuel/chemicals stored within the barn. Although there were solitary butterfly remains, these were under a table and did not correlate with an overhead perch. It was therefore presumed that this may have been spider/bird predation.

There was a solitary suspected Pipistrelle *sp*. bat dropping, but no feeding remains, in the interior of the extension adjoining the south of the barn.

Table Four: Results of Preliminary Roost Assessment

Structure No. and Description (Inc Access Points)	PRF No.	PRF Description	PRF Suitability/ No. of bats (if known)	Overall Structure Bat Roost Potential Suitability N= None, NEG= Negligible, L= Low, M= Moderate, H= High
Structure One Large (although single storey) brick-built period barn with a pitched corrugated asbestos roof – see Section 5.2.1.1 for further details.	*External – South Elevation*			**L**
	TN15	Multiple gaps between vertical boards of damaged wooden door at ground level providing access to interior of structure; partially obscured by encroaching ivy.	Considered likely able to support only small number of opportunistic bats/individuals.	
	TN16	Gap from damaged brickwork possibly leading to small cavity behind brick; near to external security floodlight. *NB*: no evidence of nesting birds but confirmed recent nesting birds in immediately adjacent brickwork.	Considered likely able to support only small number of opportunistic bats/individuals.	
	TN17	Gap under wooden fascia; near to external security floodlight, evidence of water damage due to broken gutter.	Considered likely able to support only small number of opportunistic bats/individuals.	
	TN18	Gap from damaged brickwork; at height above pitched roof so no access to inspect.	Considered likely able to support only small number of opportunistic bats/individuals.	
	TN19	Gap between timber frame of	Considered likely able to support only small	

		extension and brickwork of barn at chest height.	number of opportunistic bats/individuals.	
	TN20	Ivy encroachment; limited thickness/intertwining of stems, light foliage cover.	Considered likely able to support only small number of opportunistic bats/individuals.	
	TN21	Multiple gaps in damaged wooden hatch door; evidence of nesting birds within hatch doorway.	Considered unlikely to support bats due to the presence of birds (disturbance and potential predation).	
	External – South Elevation, Extension			
	TN22	Lifting of wooden shingle tiles; small, exposed gaps as tiles not overlapping.	Considered unlikely to support bats.	
	TN23	Suspected Pipistrelle sp. dropping; roof truss above (no roost potential as tightly-abutted joints with no gaps) but only solitary dropping, no feeding remains.	Considered likely fly-though of a solitary bat as extension is open at north-west corner.	
	External – East Elevation			
	TN24	Gap in wall plate; possibly providing access to interior of structure.	Considered likely able to support only small number of opportunistic bats/individuals.	
	TN25	Multiple gaps in gable end hatch door; no roost potential.	Access point only.	
	TN26	Gap around frame of hatch door; high ambient light and relatively open/exposed as daylight visible when viewing from interior of barn.	Considered likely able to support only small number of opportunistic bats/individuals.	
	TN27	Crack in mortar (2m length 1cm width); visible barn interior and exterior.	Unknown, however considered likely able to support only small number of opportunistic bats/individuals.	
	TN28	Open drainpipe; lower section missing but drainpipe assumed to be connected to gutter at top (feature at height and encroached by ivy so unable to directly inspect).	Considered unlikely to support bats due to the likelihood of water flowing down the drainpipe in wet conditions.	
	TN29	Ivy encroachment; limited thickness/intertwining of stems,	Considered likely able to support only small number of opportunistic bats/individuals.	

		light foliage cover.		
	External – North Elevation			
	TN30	Ivy encroachment; extensive foliage cover but limited thickness/intertwining of stems.	Considered likely able to support only small number of opportunistic bats/individuals.	
	TN31	Gap around frame of hatch door providing access to interior of structure.	Considered likely able to support only small number of opportunistic bats/individuals.	
	TN32	Multiple gaps in damaged wooden hatch door providing access to interior of structure.	Considered likely able to support only small number of opportunistic bats/individuals.	
	External – West Elevation			
	TN33	Ivy encroachment; extensive foliage cover but limited thickness/intertwining of stems; Limited flight path access due to adjacent trees.	Considered likely able to support only small number of opportunistic bats/individuals.	
	Internal			
	TN34	Splits in corrugated roof sheets; potential access point but no roost potential.	Access point only.	
	TN35	Butterfly remains; under table/stored materials.	Attributed to spider/bird predation as remains under a table not below any potential perch.	

5.3.2.2 Foraging/Commuting

The site was noted during the walkover to have potential to support foraging and commuting bats, particularly along the boundary hedgerow of the wider site, around the tree canopies to the west of the barn, and along the linear road feature.

5.3.2.3 Bat Emergence Survey

A summary of the weather conditions for the bat dusk emergence survey undertaken 1st August 2024 is provided in Table Five. A summary of the results of the survey is given in Table Six.

There was no evidence of roosting bats in the barn during the emergence surveys. Three species† of bats were recorded foraging/commuting at all four survey positions, and all surveyors reported seeing only a small number of commuting/foraging bats throughout the survey with a maximum of one bat seen at any given time. The earliest detected registration of common pipistrelle was 21:06 (14 minutes after sunset), earliest detected registration of 'NSL' was 21:25 (33 minutes after sunset), and the earliest detected registration of soprano pipistrelle was 21:06 (69 minutes after sunset).

For common pipistrelle, the time this species was first recorded was close to the mean emergence time and within the 95% Confidence Interval for this bat species as calculated by Andrews and Pearson (2022) and reproduced in the BCT Good Practice Guidelines (2023) *i.e.* mean 24.8 minutes after sunset, 95% Confidence Interval: 6.9 minutes to 42.7 minutes). This suggests that common pipistrelle are likely to be roosting near to the site. In contrast, the earliest detected registration times for soprano pipistrelle and NSL lie well outside the upper 95% Confidence Intervals calculated by Andrews and Pearson which suggests that these two species of bat are not likely to be roosting near to the site.

†See Section 4.3.2.

Table Five: Summary of Phase 2 Bat Survey Conditions

Date	Type of Survey	Sunset (SS)/Sunrise Time (SR)	Survey Start and End Time	Temp (°C)	Rain (mm)	Wind (Beaufort Scale)
01/08/2024	Dusk Emergence	SS: 20:52	*Start:* 20:37	22.6	0	1 – Calm
			End: 22:22	21.3	0	0 – Light Air

Table Six: Summary of Results from Phase Two Bat Surveys

Date	Surveyor location	Time/species of first bat (dusk) or last bat (dawn)	Max. no. of bats seen at any one time	Roosting Results	Summary
01/08/2024 Dusk	*Position 1* Sharon Dence Observing the eastern elevation of S1	21:07 Common pipistrelle	1	No roosting behaviour observed.	Small number of bats observed. NSL and common pipistrelles were picked up by the bat detector commuting/foraging over the area. There was a single registration of a soprano pipistrelle.
	Position 2 Remotely Monitored (by Sharon Dence) Observing the southern elevation of S1	21:07 Common pipistrelle	1	No roosting behaviour observed.	Small number of bats observed. NSL and common pipistrelles were picked up by the bat detector commuting/foraging over the area. There was a single registration of a soprano pipistrelle.

Date	Surveyor location	Time/species of first bat (dusk) or last bat (dawn)	Max. no. of bats seen at any one time	Roosting Results	Summary
	Position 3 Grace Gadsby Observing the western elevation of S1	22:18 Common pipistrelle	1	No roosting behaviour observed.	Small number of bats observed. NSL and common pipistrelles were picked up by the bat detector commuting/foraging over the area. There were two registrations of soprano pipistrelle.
	Position 4 Jason Gordon Observing the northern elevation of S1	21:31 Soprano pipistrelle	0	No roosting behaviour observed.	Small number of bats observed. NSL and common pipistrelles were picked up by the bat detector commuting/foraging over the area. There was a single registration of a soprano pipistrelle.

Nb. See Appendix Five for surveyor positions

5.3.3 Badgers

The BRS returned 7 records of badgers (*Meles meles*) within 2km of the site. The most recent was from 2011 and the nearest was 622m east of the site.

No evidence of badgers was seen during the survey. There is suitable habitat for foraging and commuting badgers although no opportunities for sett creation within the wider site/zone of influence.

Taking these observations into consideration together with the small number and age of the most recent biological record returned for this species, and on considering the nature and scope of the proposed development, it is assessed that badgers are unlikely to be impacted by the works. Accordingly, badgers are not considered further in this report.

5.3.4 Great Crested Newt

The BRS returned 7 records of GCN within 2km of the site. The most recent was from 2019 and the nearest was 35m south of the site. It is assumed that this record relates to the pond (WB6) within the gardens of Beech House which does not appear on OS mapping. There are also no records of GCN at these coordinates on MAGIC. Consultation with the National England Open Data ArcGIS Online Great Crested Newt Geoportal revealed the site is in a 'amber' risk zone for GCN *i.e.* an area that contains main population centres for GCN and comprise important connecting habitat that aids natural dispersal.

5.3.4.1 Terrestrial Habitat

The site and the habitats surrounding the site, particularly the short-mown modified grassland and pavement/road, offer limited opportunities for foraging/commuting GCN. Where there are suitable habitats for GCN these are small and isolated due the limited connectivity to other suitable areas. However, the number of potential refugia in the wider site (TN01-TN09), including those adjacent to the barn (TN01, TN02 & TN03), have the potential to support resting/sheltering GCN and possibly hibernating individuals.

5.3.4.2 Waterbodies

There are no waterbodies within the site. WB6 is located 35m south of the site within the rear garden of the residential property associated with the barn. WB4 is located 233m south of the site.

5.3.4.3 Habitat Suitability Index (HSI) Assessment

The waterbodies within the potential zone of influence were subject to an HSI assessment. The results of this are given in Table Seven and the key to the score is given in Table Eight.

WB4 was assessed as 'below average' suitability for GCN and WB6 was assessed as 'good' suitability for GCN.

Table Seven: Habitat Suitability Index Scores

Waterbody reference:	WB4	WB6
Location	1	1
Pond area	0.3	0.3
Pond drying	0.5	0.9
Water quality	0.33	0.67
Shade	0.4	1
Fowl	1	1
Fish	1	0.67
Ponds	1	1
Terrestrial habitat	0.33	0.67
Macrophytes	0.5	0.9
HSI	**0.56**	**0.77**

Table Eight: Categorisation of HSI Scores

HSI	Pond Suitability
<0.5	Poor
0.5-0.59	Below Average
0.6-0.69	Average
0.7-0.79	Good
>0.8	Excellent

5.3.4.4 Phase 2 Great Crested Newt Surveys- eDNA

The results from the eDNA survey of WB4 and WB6 were both positive for the presence of GCN. The results are given below in Table Nine.

Table Nine: eDNA Survey Results

Waterbody Reference	Result	Positive Replicates
WB4	Positive	11/12
WB6	Positive	3/12

5.3.5 Reptiles

The BRS returned 5 records of reptiles within 2km of the site: all related to grass snakes (*Natrix natrix*). The most recent was from 2013 and the nearest was 1.3km southeast of the site.

The site and the habitats surrounding the site, particularly the short-mown modified grassland and pavement/road, offer limited opportunities for foraging reptiles. Where there are suitable habitats for reptiles these are small and isolated due the limited connectivity to other suitable areas. However, the number of potential refugia in the wider site (TN01-TN09),

including those immediately adjacent to the barn (TN01, TN02 & TN03), have the potential to support resting/sheltering reptiles and possibly hibernating individuals.

5.3.6 Hedgehog

The BRS returned 2 records of hedgehogs within 2km of the site. The most recent was from 2012 and the nearest was 1.3km southeast of the site.

No evidence of hedgehogs was seen during the survey. The site and the habitats surrounding the site, particularly the short-mown modified grassland and pavement/road, offer limited opportunities for hedgehogs. Where there are suitable habitats for hedgehogs these are small and isolated due the limited connectivity to other suitable areas. However, some of the potential refugia in the wider site (TN01-TN09), including those immediately adjacent to the barn (TN01 & TN02), have the potential to support resting/sheltering hedgehogs and possibly hibernating individuals.

5.4 Potential Receptors

Based on the results outlined in Section Five, Table Ten provides a summary of the important species and habitats that are known to be present and/or have potential to be significantly affected by the proposed construction without mitigation.

Table Ten: Potential Receptors

Potential Receptor
Birds
Bats
Great Crested Newts
Reptiles
Hedgehog

6.0 Impact Assessment and Mitigation Measures

6.1 General Description and Best Practice Recommendations

6.1.1 Conclusions

The site comprises a brick-built barn within a residential garden. The proposed development concerns the conversion of the barn to a garage, workshop and first-floor hobby room. The construction proposals will be wholly contained within the footprint of the existing structure and no direct impacts on any habitats of the wider site are anticipated. Moreover, the dominant habitats surrounding the site are well-managed modified grassland and an urban pavement and an A-road. These habitats are considered to be of low/negligible ecological importance. Nevertheless, the proposed development will result in the loss of several notable ecological features. Appropriate mitigation compensation and enhancement measures are outlined below.

6.1.2 Recommendations

Although no impacts to habitats of the wider site are anticipated, if plans change, hedgerows and/or trees should be retained. If habitats are to be impacted, formal calculation of Biodiversity Net Gain using the Statutory Metric will likely be needed.

Any works close to trees and/or hedgerows should be undertaken in accordance with the British Standard BS 5837: 2012. This includes any works to prune/trim the trees overhanging the west of the barn.

6.2 Designated Sites

6.2.1 Conclusion

There are no Statutory designations within 2km of the site. However, there are three non-Statutory sites within 2km: Ellington Brook Pollard Willows CWS, Wolley Hill RSV CWS and Wolley Hill W40 PRV. Impacts on these sites are not anticipated and recommendations have, therefore, not been made.

6.3 Birds

6.3.1 Conclusion

Multiple external features of the barn structure (*e.g.* cavities around the hatch doors – TN16) provide suitable habitat for nesting birds as evidenced by the various remnant nests identified in the survey. Evidence of nesting birds was also found within the barn.

During the construction phase, if birds' nests are disturbed during the process of incubation and rearing, then mortality of chicks could occur.

As the proposed development will damage or destroy at least some of these features, or otherwise render them unsuitable for nesting birds, there will be a minor permanent loss of suitable nesting habitat. Although not anticipated, if there is vegetation clearance of any hedgerows and/or trees within the wider site, there will also be a further loss of potential

nesting habitat.

6.3.2 Mitigation Measures

Any works within the site that have the potential to impact features used by nesting birds, or features that have the potential to be used by nesting birds, and any works in the wider site involving vegetation clearance should avoid the bird breeding season (mid-February to September inclusive) to avoid damage to nesting species. If this is not practicable then an experienced ecologist should undertake a nesting bird survey to ascertain the number of birds using the site and where they are so they can be avoided until chicks have fledged. Results of nesting bird surveys are only valid for 48hrs and, therefore, multiple surveys may be required for phased works.

Although no impacts to any of the habitats of the wider site are anticipated, if plans change, hedgerows and/or trees should be retained and/or trimming/pruning should be kept to the minimum required.

6.3.3 Compensation/Enhancement Measures

As the proposed development will result in the loss of nesting habitat, compensation measures will include the provision of nesting habitats in the form of nest boxes. Two sparrow terraces shall be installed on the barn to compensate for the loss of nesting habitat. Additionally, two small hole (26mm) nest boxes (for tree sparrows, blue tits, coal tits and great tits) shall be installed as site enhancement. If the plans change, and the proposed development will result in the loss of any habitats within the wider site, further mitigation may be required. See Appendix Six for more details.

6.3.4 Residual impacts

With proposed mitigation it is assessed there will be a minor, long-term, positive effect on this species group at a local level.

6.4 Bats

6.4.1 Conclusion

On the basis of the outcomes of the PRA, the barn was categorised as having low suitability for roosting bats according to the BCT Good Practice Guidelines (2023) *i.e.* '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 and/or suitable habitat to be used on a regular basis or by larger numbers of bats'. Although a hibernation survey was not undertaken and not considered appropriate due to the low potential of returning results as documented in the BCT Guidelines, the Guidelines nonetheless allow for the potential of individual hibernating bats in structures categorised as low suitability *i.e.* 'not a classic cool/stable hibernation site but could be used by individual hibernating bats'.

There was no evidence of roosting bats within the site on the dusk emergence survey.

There was a solitary suspected Pipistrelle sp. bat dropping in the interior of the extension adjoining the south of the barn (which will not be impacted by the development). As this was only one dropping and as there was no feeding remains, it is concluded that this is most likely from a 'fly-through' bat.

Although no roosting bats were detected, the proposed development will damage or destroy at least some of the PRFs present on the exterior of the barn, or otherwise render them unsuitable for roosting/hibernating bats. The construction proposals will mean these PRFs will not be available to individual opportunistic bats once the works are complete. Moreover, the emergence survey suggests common pipistrelle are roosting close to the site (see below) and this species is known to 'roost-switch', which highlights the potential for common pipistrelle to opportunistically roost in the barn. Accordingly, the net outcome will be a minor permanent loss of suitable roosting habitat. Therefore, precautionary mitigation measures should be undertaken during works and to replace lost PRFs, which are outlined below.

Small number of common pipistrelle, soprano pipistrell and NSL batswere established to be using the wider site for commuting/foraging.

No impacts on features within the wider site that bats may be using for commuting/foraging are anticipated.

6.4.2 Mitigation Measures

As no bats are roosting within the barn structure and no impacts on features that bats may be using for commuting/foraging are anticipated, no formal mitigation measures are necessary under current UK legislation.

However, given the potential of the barn to support individual opportunistic roosting/hibernating bats, it is recommended that, in line with good ecological practice, an ecologically approved 'Working Method Statement' is used for the proposed works. This should include the following:

- If a bat is encountered at any time during the proposed works, work should stop immediately, and the advice of an appropriately qualified ecologist should be sought;
- Where possible, PRFs that have the potential to support individual opportunistic roosting bats should be retained;
- All operatives should receive a 'toolbox talk' from an appropriately qualified ecologist before commencing work on the proposed development and should remain vigilant to the potential presence of individual opportunistic roosting bats;
- The proposed works involving PRFs (see below), should be undertaken outside the bat hibernation period (typically November/December to February/March depending on ambient temperature/humidity, species and life-stage of bat) to avoid potentially impacting bats at their most vulnerable time of the year;
- It is assumed scaffolding will be required for the proposed development; this should be erected so that it does not block any PRFs/access points. If scaffold sheeting is

required, this should only be used to cover the roof of the building; and

- Where PRFs cannot be retained, works should be undertaken using a sensitive 'soft-strip' method following a check for the presence of bats by an appropriately qualified ecologist. All works involving PRFs should be supervised by an appropriately qualified ecologist.

If the proposed works will involve roofing felt, it is recommended that the felt used should be bitumen 1F felt. Non bitumen coated roofing membranes (NBCRMs) should not be used due to the risks posed to bats (Essah et al., 2020, Waring et al., 2013). This includes the use of NBCRMs to line any cavity walls, where bats may be able to enter the cavity for roosting purposes.

If the proposed development will involve additional or different lighting to the security lights already in place, it is recommended that guidelines from the Bat Conservation Trust and ILP (Institute of Lighting Professionals) - Guidance Note 08/23: Bats and Artificial Lighting At Night are followed. Particular attention should be made to avoid lighting of key habitats which are essential for the function and stability of bat populations both onsite and neighbouring the development site, for example the trees. Any new lighting impacts associated with the proposed development (both during and post-construction phase) should be minimised using warm white light sources (2700Kelvin or lower) to reduce blue light component. Lighting types to be avoided include any blue-white light sources, metal halide, compact fluorescent sources and any form of up-lighting, which lights above the horizontal plane illuminating foraging habitat. The use of bollard or low-level downward-directional luminaires is strongly discouraged. Only if all other options have been explored, accessories such as baffles, hoods and louvres can be used to reduce light spill and direct light to where it is needed, however this should not be solely relied upon. Where appropriate, external security lighting should be set on motion sensors and set to as short a possible a timer as the risk assessment will allow. For most general residential purposes, a 1- or 2-minute timer is likely to be appropriate. It is also recommended that a lux contour lighting plan is produced to demonstrate the lux levels across the site post development. The lighting plan should be discussed in detail with an experienced ecologist prior to it being finalised, to ensure the bats are not negatively impacted by the lighting associated with the development.

6.4.3 Compensation/Enhancement Measures

As the proposed development will result in the loss of potential roosting features, compensation measures will include the provision of alternative roosting features in the form of three bat boxes. There is the potential to enhance the site for bats through the installation of an additional bat box and also bat friendly planting. See Appendix Six for details.

6.4.4 Residual Impact

With proposed mitigation it is assessed there will be a minor, long-term, positive effect on this species group at a local level.

6.5 Great Crested Newts

6.5.1 Conclusion

There are no WBs within the site. In terms of wider site, WB6 is situated within the residential gardens of the property associated with the barn 35m south of the site, and WB4 is located 233m south of the site. Following HSI assessment, WB4 was assessed as 'below average' suitability for GCN and WB6 was assessed as 'good' suitability for GCN. The eDNA survey of WB4 and WB6 revealed both are positive for the presence of GCN. No WBs will be impacted by the proposed development.

The site is in a 'amber' risk zone for GCN, Nevertheless, the site and the habitats surrounding the site, particularly the short-mown modified grassland and pavement/road, offer limited opportunities for foraging/commuting GCN. Where there are suitable habitats for GCN these are small and isolated due the limited connectivity to other suitable areas. However, the positive eDNA result for WB6 indicates that GCN may nevertheless be foraging/commuting in these areas despite the suboptimal status of these habitats. The various potential refugia within the wider site (TN01-TN09) raises the possibility that GCN may be using these features for resting/sheltering/hibernating.

The proposed development is not anticipated to result in the destruction or loss of foraging/commuting or resting/sheltering/hibernation habitat. However, if GCN are present at the time of the works, there is the risk of the injuring/killing of any individuals that may be present. This risk may be significantly higher if GCN are using the potential hibernacula closest to the barn (TN01 - TN03). The risks to GCN will be further increased if any materials associated with the works are stored within the zone of influence as this may provide temporary suitable habitats for amphibians, activity around and the movement of which, pose a risk of injuring/killing individuals.

6.5.2 Mitigation Measures

Works on the proposed development should be undertaken with regard to the possibility of encountering GCN and all workers should remain vigilant to the possible presence of this species. If GCN are encountered during the works, works should stop immediately, and a suitably qualified ecologist should be consulted for advice.

It is recommended that consideration should be given to moving the potential hibernacula closest to the barn structure and most likely to be impacted by the works (*i.e.* TN01, TN02 & TN03) in advance of the proposed development.

Natural England's Standing Advice for GCN lists potential harmful (and thus illegal) activities including 'removing materials like dead wood piled on the ground'. However, as TN01 and TN02 are 'open' (as the wooden sleepers are stacked with batons in-between each layer) and as TN03 is open-ended drainpipes, it is assessed that that movement of these potential hibernacula can be carried out, subject to a method statement and reasonable avoidance measures, without a Natural England licence. This would need to be undertaken under the

supervision of a suitably qualified Ecological Clerk of Works (ECoW) and must be completed during the active season (typically February to October, depending on weather conditions) and cannot be completed in very hot or very dry weather. The process will require an initial hand search followed by careful dismantling of the features with ongoing supervision to check for individuals. Each potential hibernacula should then be moved to an area of hardstanding away from vegetation and the works area. However, if GCN are found to be using either of the hibernacula to be moved, Natural England will need to be contacted for advice and movement of the hibernacula may need to be undertaken under licence. The other potential hibernacula (TN04-TN09), which offer more significant opportunities for GCN due to the number of small cavities/gaps within the logs *etc*., should be left in situ unless these will also be impacted by the works. Any materials or waste from the works should be stored on hardstanding away from vegetation to discourage GCN from using these for shelter.

If plans change and the proposed development will result in the destruction or loss of foraging/commuting or resting/sheltering/hibernation habitat/features, it is likely that works will need to be undertaken under a Natural England licence to allow the proposed development to proceed lawfully.

To provide site enhancement, an additional hibernaculum should be created at a suitable location within the wider site/zone of influence. See Appendix Six for more details.

6.5.3 Residual Impacts

With proposed mitigation it is assessed there will be a minor, long-term, positive effect on this species at a local level.

6.6 Reptiles

6.6.1 Conclusion

The site and the habitats surrounding the site, particularly the short-mown modified grassland and pavement/road, offer limited opportunities for foraging reptiles. Where there are suitable habitats for reptiles these are small and isolated due the limited connectivity to other suitable areas. However, the number of potential refugia in the wider site (TN01-TN09), including those immediately adjacent to the barn (TN01 - TN03), have the potential to support resting/sheltering reptiles and possibly hibernating individuals.

The proposed development is not anticipated to result in the destruction or loss of foraging/commuting or resting/sheltering/hibernation habitat. However, if reptiles are present at the time of the works, there is the risk of the injuring/killing of any individuals that may be present. This risk is likely to be increased if any materials associated with the works are stored within the zone of influence as this may provide temporary suitable habitats for amphibians, activity around and the movement of which pose a risk of injuring/killing individuals.

6.6.2 Mitigation measures

The mitigation measures specified for GCN will also benefit reptiles if present at the time of the works.

6.6.3 Residual Impacts

With proposed mitigation it is assessed there will be a minor, long-term, positive effect on this species group at a local level.

6.7 Hedgehog

6.7.1 Conclusion

No evidence of hedgehogs was seen during the survey. The site and the habitats surrounding the site, particularly the short-mown modified grassland and pavement/road, offer limited opportunities for hedgehogs. Where there are suitable habitats for hedgehogs these are small and isolated due the limited connectivity to other suitable areas. However, some of the potential refugia in the wider site (TN01-TN09), including those immediately adjacent to the barn (TN01 & TN02, but not TN03 as the diameter of the pipes to not large enough to accommodate hedgehog), have the potential to support resting/sheltering hedgehogs and possibly hibernating individuals.

The proposed development is not anticipated to result in the destruction or loss of foraging/commuting or resting/sheltering/hibernation habitat. However, if hedgehogs are present at the time of the works, there is the risk of the injuring/killing of any individuals that may be present. This risk is likely to be increased if any materials associated with the works are stored within the zone of influence as this may provide temporary suitable habitats for hedgehogs, activity around and the movement of which pose a risk of injuring/killing individuals.

6.7.2 Mitigation Measures

The mitigation measures specified for GCN will also benefit hedgehogs if present at the time of the works.

6.7.3 Residual Impacts

With proposed mitigation it is assessed there will be a neutral effect on this species at a local level.

6.8 Conclusions

The proposed development will be wholly contained within the footprint of the existing barn structure and no direct impacts on any surrounding habitats of the wider site are anticipated.

In terms of site ecological receptors, the only definitive finding is that the barn supports nesting birds. As the construction proposals will result in the loss of at least some nesting habitat/features, mitigation compensation and enhancement measures are specified.

The barn has at least one major access point that would allow bats to access the interior of the building. However, ambient interior light levels are high and, in addition to the low quality

of the PRFs, vehicles, fuel and chemicals are stored within the barn. Although the various external PRFs suggest the barn has the potential to support roosting bats, none were detected on a dusk emergence survey. Given that no roosting bats were recorded within the barn during the survey period, a Natural England mitigation licence is not required and there are no specific mitigation measures required. Nevertheless, as the construction proposals will result in the loss of at least some potential roosting/hibernation features and bats are known to regularly change roosts, mitigation and compensation measures are specified to meet biodiversity obligations set out in the NPPF and Huntingdonshire District Council Local Plan.

Precautionary mitigation measures have been recommended to reduce the risk of harming GCN, reptiles and hedgehog that may use debris and materials piles within the works zone.

Altogether, subject to implementation of the mitigation compensation and enhancement measures set out within this report, it is concluded that the proposed development would have a minor positive impact on biodiversity.

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Appendix One: Photographs



P1: Barn: south elevation



P2: Brick/cobbled platform



P3: Container trailer on ramp



P4: Barn: east elevation



P5: Barn: north elevation



P6: Barn: west elevation



P7: Extension: south elevation



P8: Extension: west elevation



P9: Barn interior: east



P10: Barn interior: east



P11: Vehicles/motorbikes



P12: Fuel/chemicals



P13: Chemicals



P14: Extension: interior



P15: Modified grassland: south



P16: Modified grassland: east



P17: Modified/amenity grassland: north



P18: Modified grassland: west



P19: Vehicles parked to west of barn



P20: Hedgerow: west



P21: Scattered trees: west



P22: Barn from High Street



P23: High Street



P24: Other outbuildings: south



P25: WB4: 35m south



P26: Sleeper pile: TN01



P27: Sleeper pile: TN02



P28: Drainpipes: TN03



P29: Rubble/sheeting/gate: TN04



P30: Logs/stumps: TN05



P31: Wood sheeting: TN06



P32: Wooden pallet cages: TN07



P33: Logs: TN08



P34: Tiles/wood: TN09



P35: Brickwork nest: TN10



P36: Hatch door nest: TN11



P37: Interior nest: TN12



P38: Wood pigeon eggshell: TN13



P39: Active woodpigeon nest in tree: TN14



P40: Wooden door with gaps



P41: Example of Ivy encroachment



P42: Example of gaps in gable end door providing internal access and PRFs of gaps/cracks in brickwork



P43: Gaps under shingle tiles: TN22



P44: Gaps between shingle tiles: TN22



P45: Suspected Pipistrelle sp. dropping: TN23



P46: Internal space above where dropping found



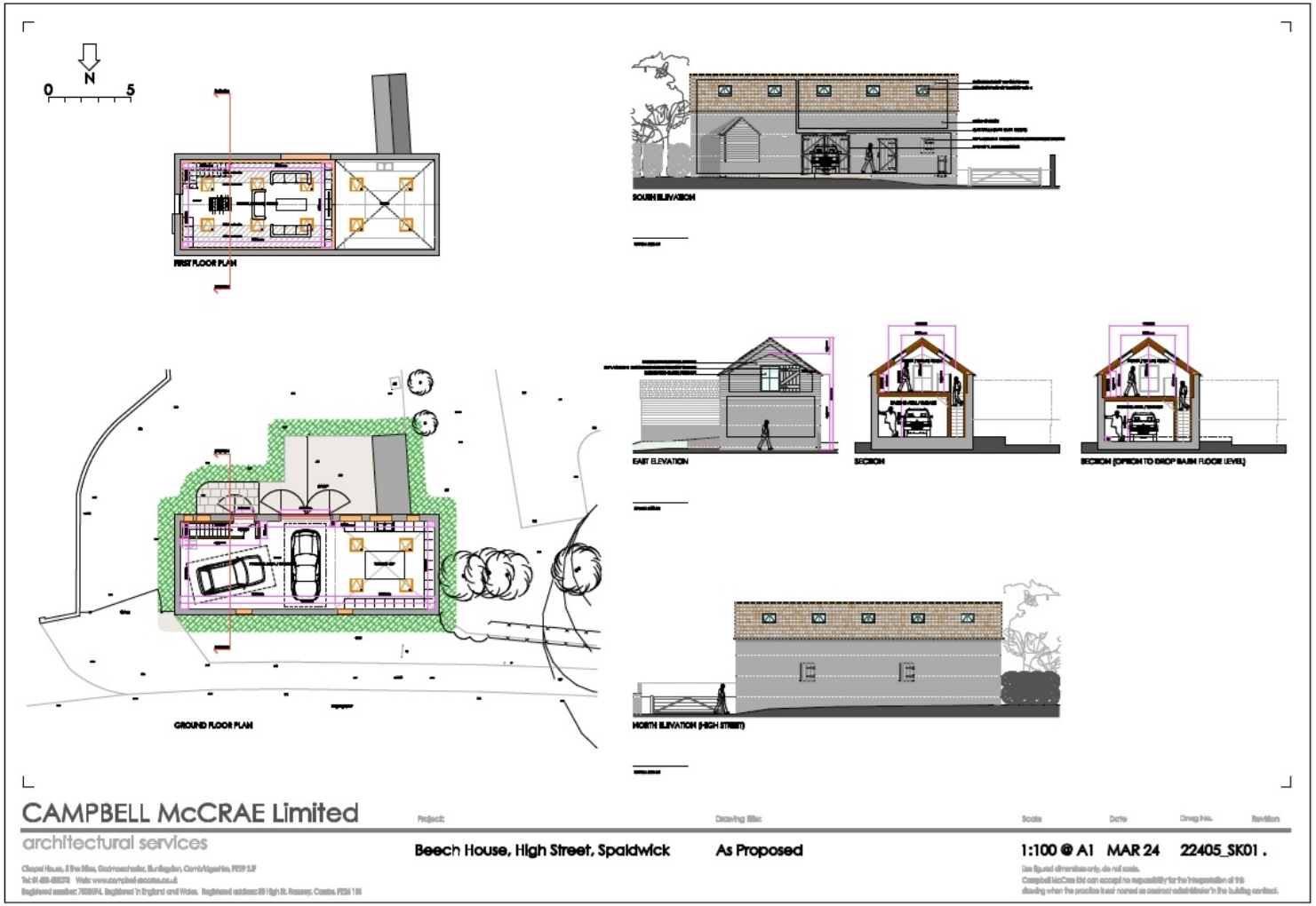
P47: Crack in mortar: TN28



P48: Gaps around/in gable end door: TN25

	
P49: Splits in roofing sheet: TN34	P50: Butterfly remains under table: TN35

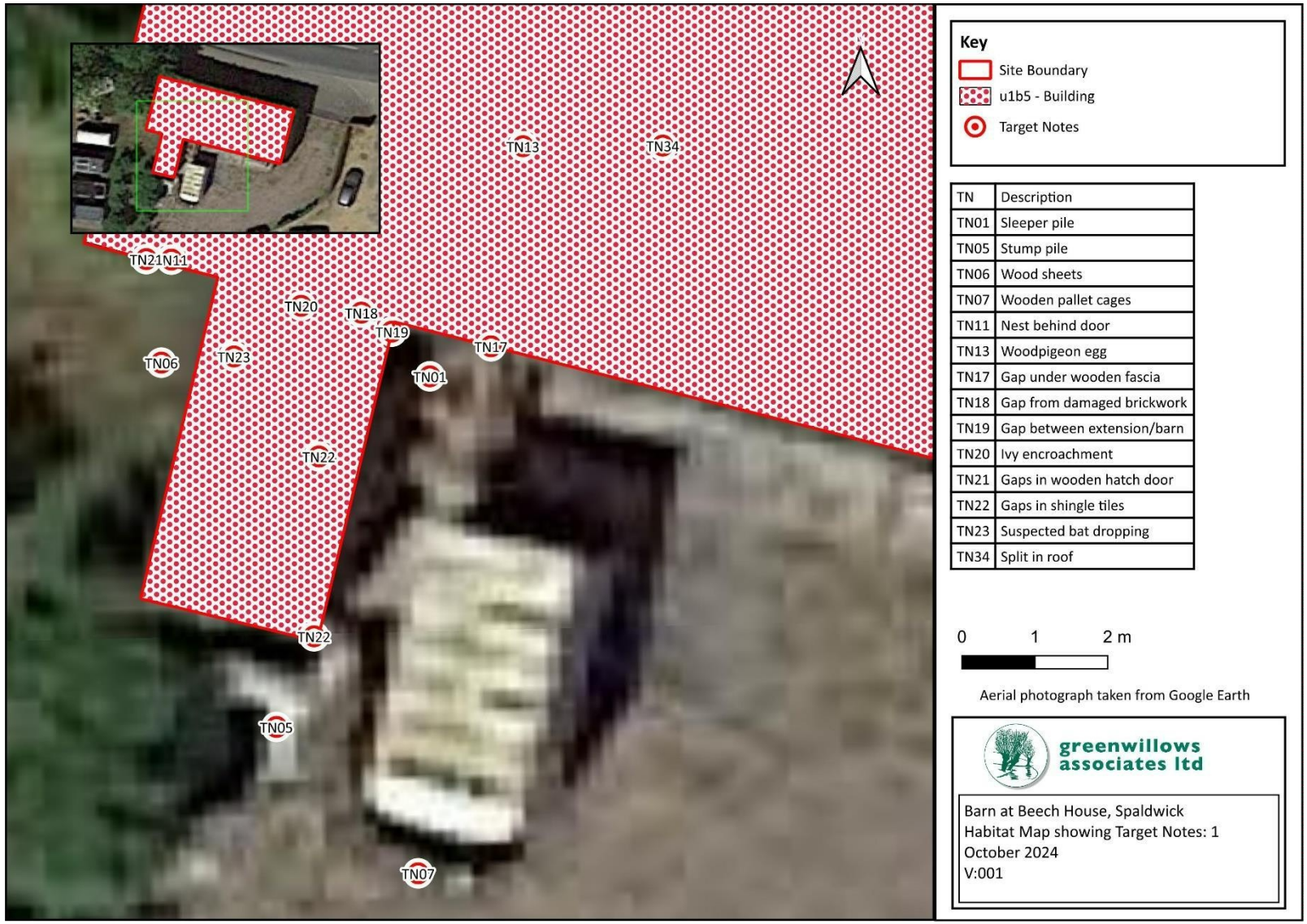
Appendix Two: Proposed Plans



Appendix Three: Location Plan *NB: Barn extension shown as this is included on proposed plans although is not to be impacted by development*



Appendix Four: Habitat Map with Target Notes: 1



Internal Reference: J664

Appendix Four: Habitat Map with Target Notes: 2



TN	Description
TN02	Sleeper pile
TN03	Drainpipe pile
TN10	Nest in brickwork
TN15	Gaps in wooden door
TN16	Gap from damaged brickwork
TN24	Gap in roof plate
TN25	Gaps in wooden gable end door
TN26	Gap around frame of gable end door
TN27	Crack in mortar
TN28	Open drainpipe
TN29	Ivy encroachment
TN30	Ivy encroachment
TN35	Butterfly remains under table

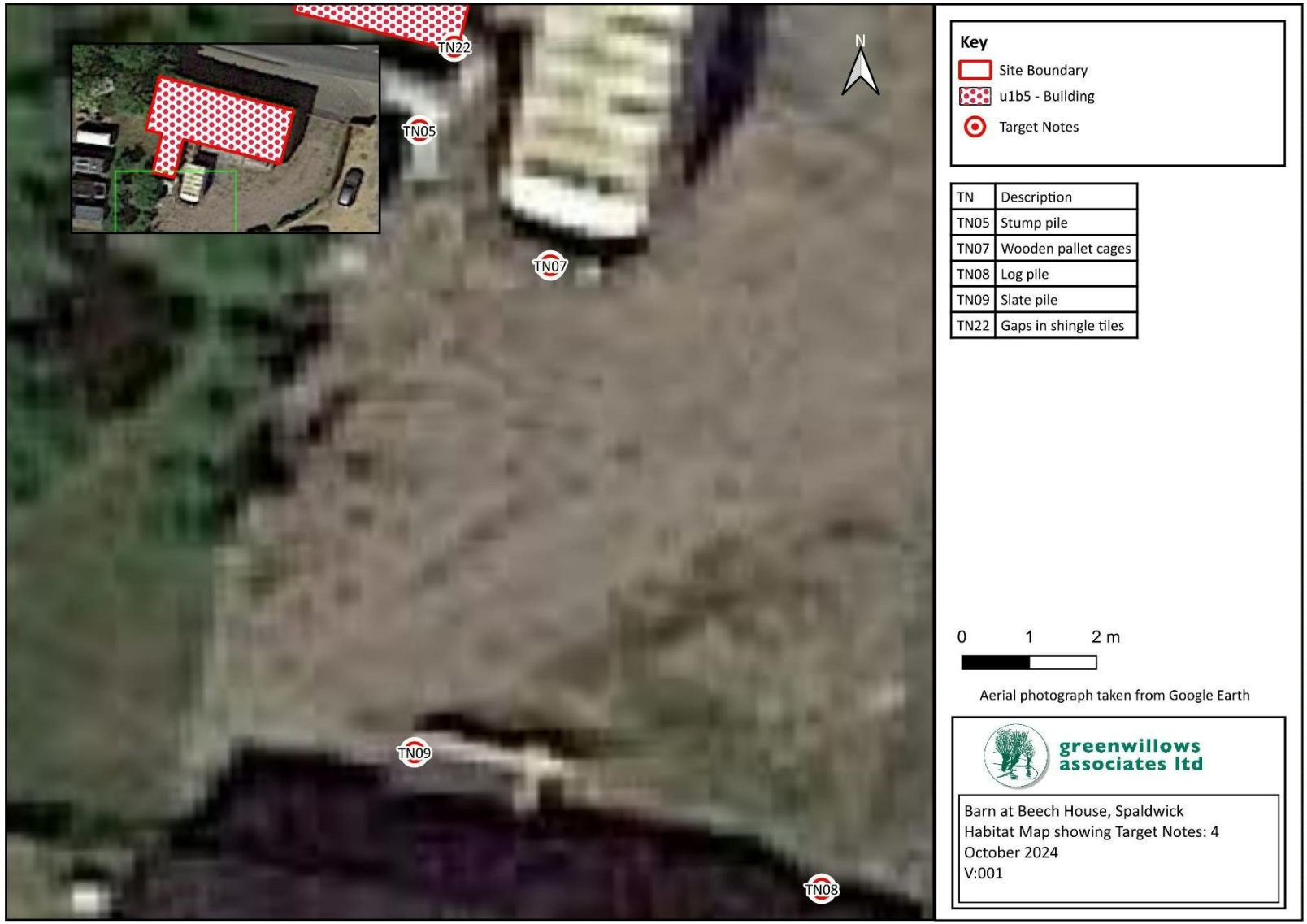
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Appendix Four: Habitat Map with Target Notes: 3



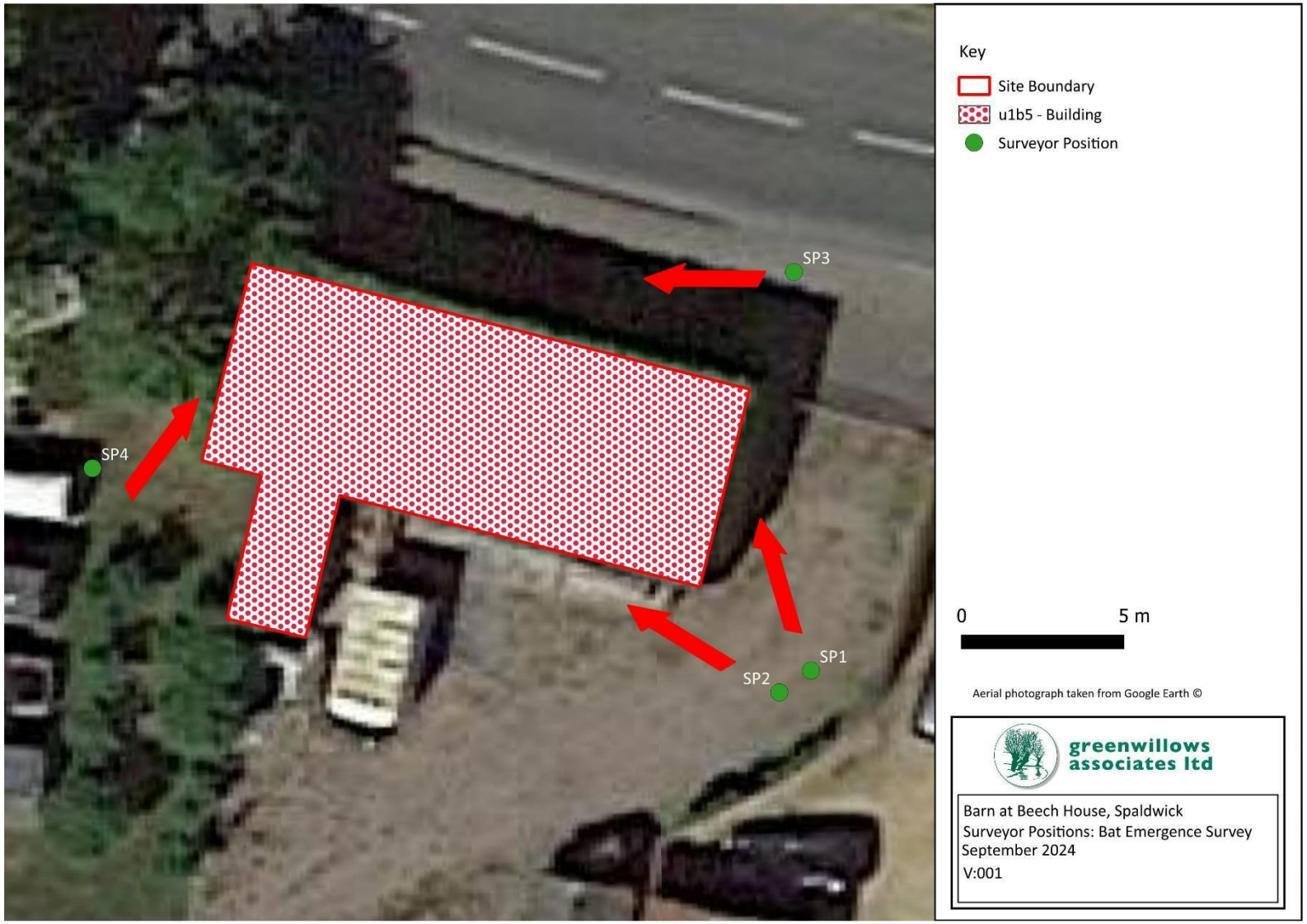
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Appendix Four: Habitat Map with Target Notes: 4



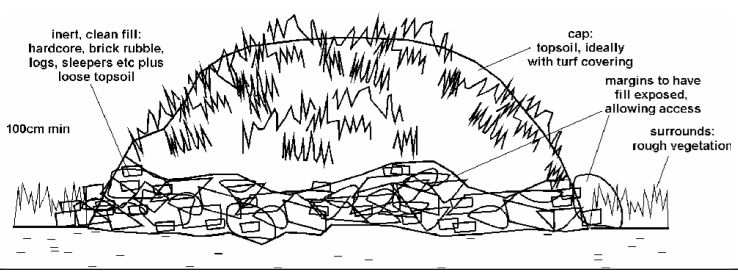
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Appendix Five: Bat Emergence Survey Surveyor Positions



Appendix Six: Examples of Potential Site Compensation/ Enhancement

Species	Specific mitigation/enhancement examples	General recommendations
Birds	Non-integrated Sparrow Terrace  *Schwegler 1SP Sparrow Terrace* It is recommended that **two** sparrow nest boxes of the type above or equivalent is installed on the barn as compensation for this scheme.	Non-integrated options may be used and installed on buildings, trees or posts close to dense vegetation e.g., hedgerow or tree belt. Please note sparrow terraces can only be installed on buildings. Boxes will be installed at a height of 2 m or above, facing between north and east, with sparrow terraces installed just below eave height. The boxes will have a clear flight path to them so avoid any overhanging branches/materials that could block the box entrance.
	Non-integrated Hole Bird Box  *Schwegler 1BNest Box* It is recommended that **two** small hole nest boxes of the type above or equivalent are installed on the barn or suitable trees as enhancement for this scheme.	

Bats	Non-Integrated bat box  *Beaumaris Woodstone Bat Box.*  *Schwegler 3FN Bat Box* It is recommended that **one** Beaumaris Woodstone Bat Box is installed on the barn and **three** Schwegler 3FN bat boxes are installed on suitable trees within the wider site as enhancement and compensation for this scheme.	Non-integrated options may be used and installed on buildings, trees or posts close to linear features such as hedgerows, at a height of 4-6m above ground level, with all lighting angled away to avoid direct illumination of the box. Branches (if present) will be cleared to provide an unrestricted flight path to and from the box.
Amphibians /Reptiles	Hibernacula  	The hibernaculum will be 1m high x 3m long x 2m wide and be made of the materials shown in the diagram.

	Example hibernaculum. **One** hibernaculum will be created at a suitable location in the wider site.	

Bat Friendly Planting Suggestions	
Common Name	**Scientific Name**
Flowers for Borders	
*Aubretia (spring to early summer)	
*Candytuft (summer to autumn)	*Iberis sempervirens*
*Cherry pie (summer to autumn)	*Heliotropium arborescens*
Corncockle	*Agrostemma githago*
Cornflower	*Centaurea cyanus*
Corn marigold	*Glebionis segetum*
Corn poppy	*Papaver rhoeas*
*Echinacea	
English Bluebell (spring)	*Hyacinthoides non-scripta*
*Evening primrose (summer to autumn)	*Oenothera biennis*
*Honesty (spring)	*Lunaria annua*
*Ice plant 'Pink lady' (early autumn)	*Delosperma*
Knapweed (summer to autumn)	*Centaurea*
Mallow (summer to autumn)	*Malva*
*Mexican aster (summer to autumn)	*Cosmos bipinnatus*
*Michaelmas daisy (summer to autumn)	*Aster amellus*
*Night-scented stock (summer)	*Matthiola bicornis*
Ox-eye daisy (summer)	*Leucanthemum vulgare*
*Phacelia (summer to autumn)	*Phacelia tanacetifolia*
*Poached egg plant (summer)	*Limnanthes douglasii*
Primrose (spring)	*Primula vulgaris*
Red campion (spring)	*Silene dioica*
*Red valerian (summer to autumn)	*Centranthus ruber*
Scabious (summer)	*Scabiosa*
St John's wort (spring)	*Hypericum perforatum*
*Sweet William (summer)	*Dianthus barbatus*
*Tobacco plant	*Nicotiana affinis*
*Verbena (summer to autumn)	
Wood forget-me-not (spring)	*Myosotis sylvatica*
Yarrow (early summer)	*Achillea millefolium*
Herbs	
Angelica	*Angelica archangelica*
Bergamot (summer to early autumn)	*Monarda citriodora*
Borage (spring to early autumn)	*Borago officinalis*
Coriander (summer)	*Coriandrum sativum*
English marigolds	*Calendula officinalis*
Fennel (summer to early autumn)	*Foeniculum vulgare*
Feverfew (summer to autumn)	*Tanacetum parthenium*
Hyssop (summer to early autumn)	*Hyssopus officinalis*
Lavenders	*Lavandula*
Lemon balm	*Melissa officinalis*
Marjoram (summer)	*Origanum majorana*
Rosemary (spring)	*Salvia rosmarinus*
Sweet Cicely (spring to early summer)	*Myrrhis odorata*
Thyme (summer)	*Thymus vulgaris*
Climbers	
Honeysuckle (native)	*L. periclymenum.*
White jasmine	*Jasminium officinale*
Dog rose	*Rosa canina*

Sweetbriar	*R. rubiginosa*
Field rose	*R. arvensis*
Ivy	*Hedera helix*
Bramble	*- many species*
Large trees, small trees and shrubs	
Oak	*Quercus robur & Q. petrea*
Ash	*Fraxinus excelsior*
Silver birch	*Betula pendula*
Field maple	*Acer campestre*
Hornbeam	***Carpinus betulus***
Hawthorn	*Crataegus monogyna*
Alder	*Alnus glutinosa*
Goat willow	*Salix caprea*
Gorse	*Ulex europaeus*
Guelder rose	*Viburnum opulus*
Hazel	*Corylus avellana*
Blackthorn	*Prunus spinosa*
Elder	*Sambucus nigra*
Buddleia	*Buddleja davidii*
Rowan	*Sorbus aucuparia*
Rock plants for walls	
Ivy-leaved toadflax	*Cymbana muralis*
Wall pennywort	*Umbilicus rupestris*
Stonecrop	*Sedum acre*
Wildflowers for pond edges & marshy areas	
Bog bean	*Menyanthes trifoliata*
Bugle	*Ajuga reptans*
Creeping Jenny (spring to summer)	*Lysimachia nummularia*
Flag iris	*Iris pseudacorus*
Hemp agrimony (summer)	*Eupatorium cannabinum*
Lady's smock (spring to summer)	*Cardamine pratensis*
Marsh mallow	*Althaea officinalis*
Marsh marigold (spring)	*Caltha palustris*
Marsh woundwort	*Stachys palustris*
Meadowsweet (summer to early autumn)	*Filipendula ulmaria*
Purple loosestrife (summer)	*Lythrum salicaria*
Water avens	*Geum rivale*
Water forget-me-not (summer to autumn)	*Myosotis scorpioides*
Water mint (summer to autumn)	*Mentha aquatica*

Plants marked * are hybrids or exotics that may be useful in gardens.

ANNEX ONE

Legislation and Policy

Statutory Legislation

The Conservation of Habitats and Species Regulations 2017, or the 'Habitats Regulations 2017', transposes European Directives into English and Welsh legislation. This has been amended by **the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019** which continues the same provision for European Protected Species after Brexit. Under these Regulations, wild animals of a European Protected Species and their breeding sites or resting places are protected. It is an offence to deliberately capture, injure or kill any such wild animal and, in the case of great crested newts, deliberately take or destroy their eggs. It is also an offence to damage or destroy a breeding site or resting place of any such wild animal.

Wild animals of a European Protected Species are protected from disturbance. Disturbance of such wild animals includes in particular any disturbance which is likely:

(a) To impair their ability:

- *to survive, to breed or reproduce, or to rear or nurture their young; or*
- *in the case of animals of a hibernating or migratory species, to hibernate or migrate, or*

(b) To affect significantly the local distribution or abundance of the species to which they belong.

Part 1 of the **Wildlife and Countryside Act 1981** (as amended) adds further protection to wildlife in England and Wales. It is unlawful to intentionally kill, injure or take any wild bird or take, damage, or destroy the nest of any wild bird whilst the nest is in use[2] or being built. If the bird is included on the Schedule 1 list (e.g., red kite or barn owl), it is additionally an offence to intentionally disturb its nest during the breeding season.

Certain species of animal are protected under the Wildlife and Countryside Act 1981 (as amended) by being included in Schedule 5 in respect of certain offences under Section 9. Such offences include:

9(1) Intentional killing, injuring, or taking of a Schedule 5 animal (e.g., Water vole or reptiles),

9(4a) Damage to, destruction of, obstruction of access to any structure or place used by a Schedule 5 animal for shelter or protection,

9(4b) Disturbance of a Schedule 5 animal occupying such a structure or place.

Under Section 13(1) it is an offence:

- To intentionally pick, uproot or destroy any wild plant listed in Schedule 8; or
- Unless the authorised person, to intentionally uproot any wild plant not included

in Schedule 8.

The **Countryside and Rights of Way (CRoW) Act 2000** provides increased measures for the management and protection of SSSIs and strengthens wildlife enforcement legislation. Schedule 12 strengthens the legal protection for threatened species under the Wildlife and Countryside Act 1981. The Act also introduced a duty on government to have regard to the conservation of biodiversity and to maintain lists of species and habitats for which conservation measures should be taken or promoted, in accordance with the Convention on Biological Diversity.

The **Natural Environment and Rural Communities (NERC) Act 2006**: Section 41 of the NERC Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list has been drawn up in consultation with Natural England, as required by the Act, and is largely derived from the Priority Habitats and Species listed under the former UK Biodiversity Action Plan, which continue to be regarded as priorities under the subsequent country-level biodiversity strategies. In this report, habitats and species listed in accordance with S41 are referred to as 'priority' habitats or species.

The Section 41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under Section 40 of the NERC Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their normal functions.

Part 6, Section 102 of the **Environment Act 2021** sets out amendments to Section 40 of the Natural Environment and Rural Communities Act 2006 (duty to conserve biodiversity) with emphasis on enhancing biodiversity rather than simply conserving it.

Schedule 14 of the Environment Act 2021 sets out an amendment to Schedule 7A, Part 1 of the Town and Country Planning Act 1990, as amended:

> "1(1) This Schedule makes provision for grants of planning permission in England and Wales to be subject to a condition to secure that the biodiversity gain objective is met.
>
> 2(1) The biodiversity gain objective is met in relation to development for which planning permission is granted if the biodiversity value attributable to the development exceeds the pre-development biodiversity value of the onsite habitat by at least the relevant percentage.
>
> (2) The biodiversity value attributable to the development is the total of:
>
> (a) the post-development biodiversity value of the onsite habitat,
>
> (b) the biodiversity value, in relation to the development, of any registered offsite

[2] The nests of birds that re-use their nests, as listed under Schedule ZA1, e.g. Osprey, are protected against taking, damage or destruction irrespective of whether they are in use or not.

biodiversity gain allocated to the development, and

(c) the biodiversity value of any biodiversity credits purchased for the development.

(3) The relevant percentage is a minimum of 10%."

The 10% requirement for biodiversity net gain set out above became statutory on 12th February 2024 (2nd April 2024 for small sites).

Badgers are primarily protected by the **Protection of Badgers Act 1992**, under which it is a criminal offence to:

- willfully kill, injure, take, possess, or cruelly ill-treat* a badger, or to attempt to do so; and
- to intentionally or recklessly interfere with a sett (this includes disturbing badgers while they are occupying a sett, as well as damaging, destroying or obstructing access to a sett).

* the intentional elimination of sufficient foraging area to support a known social group of badgers may, in certain circumstances, be construed as an offence.

Under **The Hedgerows Regulations 1997** it is an offence to remove most hedgerows without permission from the Local Planning Authority. Permission for the removal of hedgerows may be refused if the Local Planning Authority determines any hedgerow to be 'important' under criteria listed in Part II of Schedule 1 of the Regulations.

Planning Policy

The National Planning Policy Framework (2021) relating to biodiversity (NPPF) is both guidance for local governing authorities on the content of their Local Plans and material consideration in determining planning applications. The NPPF has replaced much existing planning policy guidance, including Planning Policy Statement 9: Biological and Geological Conservation. However, the government circular 06/05: 'Biodiversity and Geological Conservation- Statutory Obligations and their impact within the Planning System', which accompanied PPS9, remains valid.

Paragraph 180 of the NPPF states: *"When determining planning applications, local authorities should apply the following principles:*

a. *If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.*
b. *Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its*

likely impact on the features of the site that makes it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest.

c. *Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient and veteran trees) should be refused, unless there are wholly exceptional reasons, and a suitable compensation strategy exists; and*

d. *Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate."*

ANNEX TWO

Standard Survey Methodologies

& Impact Assessment Criteria

A site walkover is undertaken to identify potential habitats suitable for protected species and/or evidence of field signs indicating presence of protected species and invasive plants.

Species Specific Methodologies

Great Crested Newts

A habitat suitability assessment for newts is undertaken taking due note of the presence of water bodies within 250 metres of the site (based on English Nature (2001) now Natural England) guidelines and potentially suitable terrestrial resting and shelter habitat.

At certain times of the year and/or in some years but not others, ponds may be seasonally dry, but these are not necessarily ruled out as ephemeral ponds can be important 'steppingstones' from one pond to another and/or refuges from the ravages of fish populations that can build up in permanent ponds.

Ponds are assessed using a combination of professional judgment and applying the nationally accepted Habitat Suitability Index (HSI) for Great Crested Newts based on Oldham *et al 2001* which uses nationally accepted formulae based on a number of factors which are assigned a score ranging from 0 to 1 with a score of <0.5 assessed as poor, 0.5 to 0.59 below average, 0.6 to 0.69 average, 0.7 to 0.79 good and >0.8 excellent.

If appropriate, follow-up pond surveys are undertaken in the spring to cover all ponds within 250 metres (or further where professional judgment dictates) of the construction footprint to determine presence/absence of this species. Night-torch surveys, egg searching, netting and funnel trapping are the main methods employed where practicable.

Bats

A habitat suitability assessment for bats is undertaken by identifying structures, trees, and vegetation likely to be affected by the proposed construction works.

Structures: Roosting habitat in structures are assessed using the following criteria:

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).

Negligible potential suitability for bats. 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.

Low potential suitability for bats. 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 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).

Moderate potential suitability for bats. A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions, and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, 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).

High potential suitability for bats. 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, and surrounding habitat. These structures have the potential to support high conservation status roosts e.g., maternity, or classic cool/stable hibernation site.

All suitable areas and surfaces were inspected for the following signs:

- Bat droppings.
- Fur-oil staining around roosting places and entry/exit points.
- Urine splashes.
- Prey remains.
- Areas devoid of cobwebs.
- Live or dead bats.
- Audible squeaking sounds.
- Suitable cracks and crevices for bats to enter for roosting.

Commuting and Foraging: potential flight-paths and foraging habitats was assessed using the following criteria:

None. 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 potential suitability for bats. 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 potential suitability for bats. 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. 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 potential suitability for bats. 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. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.

High potential suitability for bats. 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. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by forging bats such as broadleaved woodland, tree-lined watercourses, and grazed parkland. The site is close to and connected to known roosts.

Trees: The tree assessments involve looking for the following signs:

- Woodpecker holes.
- Squirrel holes.
- Wounds.
- Hazard beams.
- Fluting.
- Other vertical or horizontal cracks and splits.
- Partially detached/lifting bark.
- Knot holes from pruning or naturally shed branches.
- Tear-outs.
- Cankers.
- Other hollows or cavities.
- Double leaders with compression forks.
- Overlapping stems or branches.
- Ivy cladding (diam. >50mm)
- Bat, bird, dormouse boxes.

Trees were assessed using the following criteria:

NONE. Either no Potential Roost Features (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.

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.

N.b. Only PRFs fully accessible from the ground can be further categorised as PRF-I or PRF-M. If PRFs are identified during the GLTA surveys that cannot be fully inspected from the ground the tree can only be

assessed as None, FAR or PRF and further PRF inspection surveys will be required to formally categorise the overall suitability of the tree.

Reptiles

A habitat suitability assessment for reptiles is undertaken looking for, *inter alia,* areas of rough scrub, tussocky/rank grassland, areas of structural diversity offering short open areas of grassland and bare soil for basking with taller vegetation and habitat edges offering shelter and rapid escape routes, natural refugia such as brash piles and rubble heaps.

Where appropriate, follow-up surveys are undertaken utilizing artificial refugia to determine presence/absence of this species.

Badgers

Field signs are searched for including setts, runs, prints, dung pits, hairs and feeding signs.

Otters

Field signs are searched for including holts, prints, spraints, haul out points and feeding signs.

Water Voles

A habitat suitability assessment for water voles is undertaken within riparian habitat assessment factors including, *inter alia,* water levels and seasonal longevity of water table, seasonal flash floods, bank profiles and substrates, vegetation for cover and suitable food sources, over shading, and evidence of the presence of mink. Where appropriate, follow-up surveys are undertaken where field signs are searched for including burrows, prints, runs, droppings, latrines and feeding signs.

White-Clawed Native Crayfish

A habitat suitability assessment for crayfish is undertaken within riparian habitat assessment factors including, *inter alia,* water levels and quality and seasonal longevity of water table, water flow, underlying geology, bank, and watercourse substrates, suitable submerged refugia and known presence of signal crayfish. Where appropriate, follow-up surveys are undertaken to search for presence of this species by stone turning in the stream bed, netting, and searching for burrows in the stream banks. Humane trapping may also be employed.

Harvest Mice

A habitat suitability assessment for harvest mice is undertaken within rough grassland and tall herb vegetation. Harvest mice build breeding nests in dense vegetation by weaving a nest out of leaves which will be at the top of a tussock of grass or around halfway up the stem of cereals. To search for these nests surveyors walk transects of the target habitat

checking within tussocks of grass and on stems. All areas of suitable vegetation are checked.

Notable Flora and Invasive Weeds

A habitat suitability assessment for notable flora (rare and protected) is undertaken and species are recorded. Evidence of the presence of invasive weeds included within Schedule 9 of the Wildlife and Countryside Act 1981 as amended is searched for.

Impact Assessment Criteria

The assessment of the impacts and effects[3] on important ecological features within the Zone of Influence (ZoI) of the Scheme has been based on the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (2018). This process includes:

- Identification of ecological features likely to be affected.
- Identification of which ecological features are 'important', and therefore should be subject to detailed assessment.
- Characterising whether the effect on these ecological features is 'significant' in terms of the extent, magnitude, duration, reversibility, frequency/timing and whether it is likely to have a positive or negative effect.

Identifying the Zone of Influence (ZoI)

The 'Zone of Influence' for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This may be confined to within the site boundaries and land immediately adjacent, but for some ecological features may extend beyond the project site. For example, great crested newts (and breeding colonies) could potentially also be affected within 250-500m metres of construction activities, depending on the scale of works and habitats present.

Evaluation

Determining Importance of Ecological Features and Resources

The CIEEM Guidelines acknowledge that determining importance of ecological features and resources is a complex and subjective process, but it provides key factors to take into consideration. These include geographic context; legal protection or control; site designations and features; habitat type and priority; biodiversity value; species of conservation value (including population size, distribution, and abundance); ecosystem

[3] Note: The following definitions are used for the term's 'impact' and 'effect':
Impact – Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow.
Effect – Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow (CIEEM 2018).

value/natural capital.

Focusing on assessments of biodiversity value, there are various characteristics that can be used to identify ecological resources or features that are likely to be important in terms of biodiversity. These include:

- Rare or uncommon species in the local, national or international context.
- Endemic or locally distinct sub-populations of a species.
- Species on the edge of their distribution.
- Notably large populations of animals or concentration of animals considered uncommon or threatened in a wider context.
- Species-rich assemblages of plants or animals.
- Ecosystems and their component parts which provide the habitats required by the above species, populations and/or assemblages.
- Plant communities (and associated animals) considered typical of valued natural/semi-natural vegetation types.
- Habitat diversity, connectivity and/or synergistic associations.

This assessment also measures the contribution to nature conservation interest from non-statutory sites, and the presence of habitats and species which, although not specially protected, are still considered to be of local, regional, or national conservation importance.

This latter category includes identification of flora and fauna that are listed as Species of Principal Importance under the Natural Environmental and Rural Communities Act 2006 (NERC), those prioritised under the UK Biodiversity Action Plan (UK BAP)/Local Biodiversity Action Plans (LBAP), as well as Red Data Book Species.

Considering Geographic Context

The following frame of reference[4] is used when considering the importance of an ecological feature:

- International and European.
- National.
- Regional.
- Metropolitan, County, vice-county or other local authority-wide area.
- River Basin District.
- Estuarine system/Coastal cell; and
- Local[5]

Prediction of Ecological Impacts and Effects

[4] Note- this is not a hierarchy.
[5] Where appropriate, impacts may also be assessed at the site scale, although it is acknowledged that this can be difficult to assess.

This assessment has considered potential impacts on each ecological feature determined as 'important' from all phases of the project. Impacts are characterised, through consideration of their magnitude and/or extent, the route through which they occur (whether direct, indirect, secondary or cumulative) and their duration and their reversibility. Positive impacts are assessed as well as negative ones.

Significance of Effects

The CIEEM guidelines (2018) explain 'significant effect' with the following definition:

"For the purpose of EcIA, 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g., for a designated site) or broad (e.g., national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local."

A significant effect is an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project.

The following characteristics are considered when describing ecological impacts and effects:

- positive or negative
- extent
- magnitude
- duration
- frequency and timing
- reversibility

Following the characterisation of impacts and effects, an assessment of the ecological significance of an effect is made. The Guidelines promote a transparent approach in which a beneficial or adverse effect is determined to be significant or not, in ecological terms, in relation to the conservation objectives of the defined site, the structure and functions of the ecosystem(s) and/or the conservation status[6] of habitats or species within a given geographical area. The Guidelines also advise that it is important to consider the likelihood of a predicted impact.

The Guidelines also state that:

"After assessing the impacts of the proposal, all attempts should be made to avoid and

[6] Habitats: conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area. Species: conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

mitigate ecological impacts. Once measures to avoid and mitigate ecological impacts have been finalised, assessment of the residual impacts should be undertaken to determine the significance of their effects on ecological features. Any residual impacts that will result in effects that are significant, and the proposed compensatory measures, will be the factors considered against ecological objectives (legislation and policy) in determining the outcome of the application."

For the purposes of this report, a detailed impact assessment has only been presented for residual effects present after mitigation, although the above assessment has been undertaken for each important ecological feature pre-mitigation, to inform the recommendations outlined in Section Seven. Where residual effects are identified, compensatory measures are then identified.

Key Principles Underpinning Recommendations

The following hierarchy of principles underpin EcIA and are followed in the assessment undertaken in this report:

- Avoidance - Seek options that avoid harm to ecological features (for example, by locating on an alternative site). This is the preferred option.
- Mitigation - Negative effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.
- Compensation - Where there are significant residual negative ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.
- Enhancement - Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation, or compensation.