

ECOLOGICAL ASSESSMENT (COMPRISING AN EXTENDED PHASE 1 HABITAT & PROTECTED SPECIES SCOPING SURVEY, BAT ROOST ASSESSMENT, AND, GREAT CRESTED NEWT ASSESSMENT) OF:

THE BUILDINGS AT SHEPHERDS FOLD, FINWOOD ROAD, ROWINGTON, WARWICK, CV35 7DF

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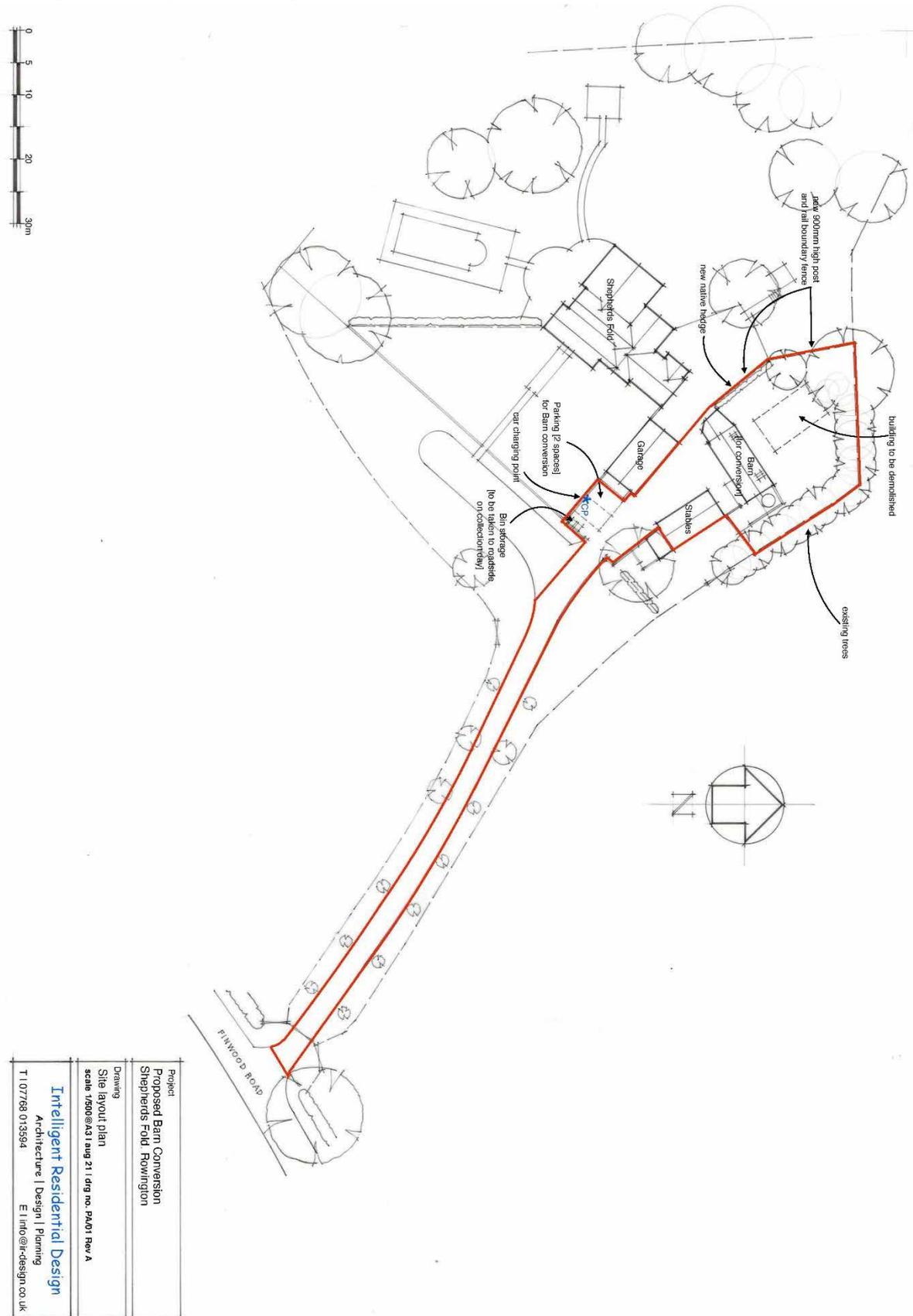
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Figure 2 – Proposed site layout



Project	Proposed Barn Conversion Shepherds Fold, Rowington
Drawing	Site layout plan scale 1:500@a31 aug 21 dwg no. PA.01 Rev A
Intelligent Residential Design Architecture Design Planning T 07768 013594 E info@ir-design.co.uk	

2.0 Methodology

Desk study

- 2.1 A desk study data search was undertaken. This involved reviewing publicly available datasets and citations of statutory designated sites of importance for nature conservation, Natural England's Priority Habitat Inventory GIS dataset for England, and Natural England's Ancient Woodland Inventory for sites within the zone of influence of the survey area which is considered to be a maximum of 1km in this case.
- 2.2 In addition, species records (on Natural England's MAGIC website¹) were accessed, and aerial photographs and Ordnance Survey maps were studied for features of interest.

Extended Phase 1 Habitat and Protected Species Scoping Survey

- 2.3 An Extended Phase 1 Habitat and Protected Species Scoping Survey was undertaken. This comprised a walkover survey of the application site and the classification of habitats following the descriptions provided within the Joint Nature Conservancy Council 'Handbook for Phase 1 Habitat Survey' (JNCC 1993). An assessment of the site in terms of its suitability for notable or protected species was carried out and any features of note were described.

Preliminary Bat Roost Assessment

- 2.4 The preliminary bat roost assessment comprised a survey of the buildings, and any trees to be affected by the proposals, for bats, signs of bats and features potentially suitable for use by roosting bats, and an assessment of the surrounding habitat in terms of its suitability for commuting and foraging bats.
- 2.5 The survey consisted of a detailed search of the interior and exterior of the buildings looking for bats and/or evidence of bats including droppings (on walls and windowsills and in roof and loft spaces), rub or scratch marks, staining at potential roosts and exit holes, live or dead bats and features, such as raised or missing tiles, potentially suitable for use by roosting bats. Binoculars, an endoscope, a ladder and a high-powered torch were used as required.
- 2.6 Buildings are classified according to their suitability for use by roosting bats. The classification is dependent on a number of factors including:
 - Bats and/or signs of bats
 - External and internal features potentially suitable for use by roosting bats (e.g. raised or missing tiles, gaps behind fascia boards)
 - Setting
 - Night time light levels
 - Disturbance levels
 - Proximity of suitable foraging habitat and commuting routes (e.g. ponds, streams, woodland, large gardens, hedgerows)
- 2.7 The categories used to classify buildings and trees and the survey effort required to determine the presence or absence of bats (as per the Bat Conservation Trust's Bat Survey Guidelines², referred to by Natural England in their standing advice to planning officers) are described in Table 1, and factors affecting habitat suitability in Table 2.

¹ <https://magic.defra.gov.uk/>

² Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn) Bat Conservation Trust

Table 1 – Description of the categories used to assess a building or tree’s bat roost potential and the survey effort required to determine the likely presence or absence of bats

	Roost status	Description	Survey effort required to determine the likely presence or absence of bats
Bat Roost Potential	Confirmed	Bats or evidence of bats found.	Surveys would be required to establish the status of the roost. Generally three dusk emergence and/or pre-dawn re-entry surveys between May and September. Optimum period May – August (two surveys should be undertaken during the optimal period and at least one survey should be a pre-dawn survey).
	High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Three dusk emergence and/or pre-dawn re-entry surveys between May and September. Optimum period May – August. Two surveys should be undertaken during the optimal period and at least one survey should be a pre-dawn survey.
	Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only i.e. irrespective of species conservation status, which is established after presence is confirmed).	Two surveys, comprising one dusk emergence and a separate pre-dawn re-entry survey between May and September (one of the surveys needs to be carried out between May and the end of August).
	Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation)	One dusk emergence or pre-dawn re-entry survey between May and the end of August (but only if features will be affected by the proposals).
		A tree of sufficient size and age to contain features but with none seen from the ground or features seen with only very limited roosting potential	May not be required for trees with low roost suitability (dependent on case-specific conditions) as a precautionary approach to tree works can be taken to minimise the risk of harming bats.
	Negligible	Negligible habitat features on site likely to be used by roosting bats.	No further surveys required.

Table 2 – Habitat suitability scale for commuting and foraging bats

	Habitat Suitability	Description
Suitability of habitat for commuting and foraging	High	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts
	Moderate	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water
	Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. 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.
	Negligible	Negligible habitat features on site likely to be used by commuting or foraging bats

Habitat suitability index appraisal for great crested newts (GCN)

- 2.8 There is a pond within the curtilage of Shepherds Fold, located in the rear of the garden (see Figure 3, P1). This pond and Pond 2 was visited during the survey and their Habitat Suitability Index (HSI)³ scores were calculated.

Great crested newt eDNA sampling

- 2.9 Water samples from Pond 1 were taken and sent for analysis for great crested newt (GCN) DNA at the SureScreen laboratory in Derbyshire. The samples were taken on 28 June 2021 in accordance with Natural England's survey protocol⁴. The samples tested negative for GCN DNA.
- 2.10 The pond adjacent to the application site (P2, Figure 3) was subject to a HSI assessment (as it could be seen from within the application site) but permission was not granted sample it. Permission was also not given to sample two others in the grounds of the adjacent properties (P3 & P4 on Figure 3).

Surveyor details

- 2.11 The survey was undertaken by Ryan Davies BSc (hons) ACIEEM (senior ecologist) and Jessica Cole BSc (hons) of GS Ecology Ltd. Ryan is an associate member of the Chartered Institute of Ecology and Environmental Management, holds a Natural England's great crested newt survey licence (WML-CL08) and a WML A34 Level 2 bat survey licence.
- 2.12 This report has been reviewed by Giles Sutton BSc (Hons) MSc MCIEEM CEnv of GS Ecology Ltd. Giles holds a Natural England WML A34 Level 2 bat survey licence, is registered to use Natural England's Bat Mitigation Class Licence WML-CL21 (Bat Low Impact), holds a Natural England great crested newt survey licence (WML-CL08), is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and is a Chartered Environmentalist with more than 15 years' experience as professional ecologist.

³ HSI scoring systems were originally developed by the US Fish and Wildlife Service as a means of evaluating habitat quality and quantity for fish. In the UK a HSI for GCN has been developed (Oldham et al., 2003). The HSI incorporates ten suitability indices, such as waterbody area, water quality, presence of fish, presence of waterfowl etc. These are multiplied to give a score of between 0 and 1. The higher the score the more likely a pond is to host GCN (for example a study of 248 ponds in southern England found that 93% of ponds with a HSI score of greater than 0.8 hosted GCN).

⁴ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford.

3.0 Results

Desk study

Statutory sites of importance for nature conservation

- 3.1 There are no statutory sites of importance for nature conservation within 1km of the application site.

Ancient Woodland

- 3.2 There is a single area of woodland listed on Natural England's Ancient Woodland Inventory within 1km of the application site – Rowington Coppice – located approximately 600m to the north east.

Protected and notable species records

- 3.3 Within 2km of the site there are three records of licenses issued by Natural England for works affecting protected species on The MAGIC website, all of which are within 1km of the site and two of which affect bat maternity roosts. These records are summarised in Table 3 below.

Table 3 – Summary of Natural England licence records within 2km of the application site

Distance from the application site	Species affected	Breeding site	Year licence was issued
Within 0.1km (Grid ref: SP19587010)	Common pipistrelle	No	2015
0.4km East	Brown long-eared, common pipistrelle	Yes	2012
0.6km South west	Brown long-eared, common pipistrelle	Yes	2015

Previous ecology surveys

- 3.4 To inform a previous planning application for the site Udall-Martin Associates Ltd undertook a bat survey of the barn and stables between 3 July and 19 August 2019 (comprising a preliminary bat roost assessment and three dusk emergence surveys of the buildings).
- 3.5 The bat survey report (dated November 2019) reads:

“5.1.1 From the evidence found, i.e. accumulations of bat droppings and several bats emerging, it is evident that a small maternity roost of brown long-eared bats is present in the barn and stables. It is also evident that the buildings provide a night-time roost for brown long-eared bats due to the feeding remains found. Also, there are small day-time bat roosts of common pipistrelle bats and soprano pipistrelle bats in the barn, which could be individual male or female bats using the building only occasionally or over the active season.”

- 3.6 A peak count of 10 brown long eared bats, 1 common pipistrelle and 1 soprano pipistrelle were observed emerging from the barn during the surveys.
- 3.7 A peak count of 8 brown long eared bats were observed emerging from the stables during the surveys.

Nearby Ponds

- 3.8 There are 16 ponds shown on ordnance survey maps within 500m of the application site, four of which are within 100m of the site (see Figure 3). The nearest of these - within the curtilage of Shepherds Fold (P1) – is located approximately 45m to the west of the site. The remaining ponds within 100m (P2-4) are located approximately 60m west, 65m south west and 80m south west, within the curtilage of two neighbouring properties (Windmill Cottage and Windmill House).

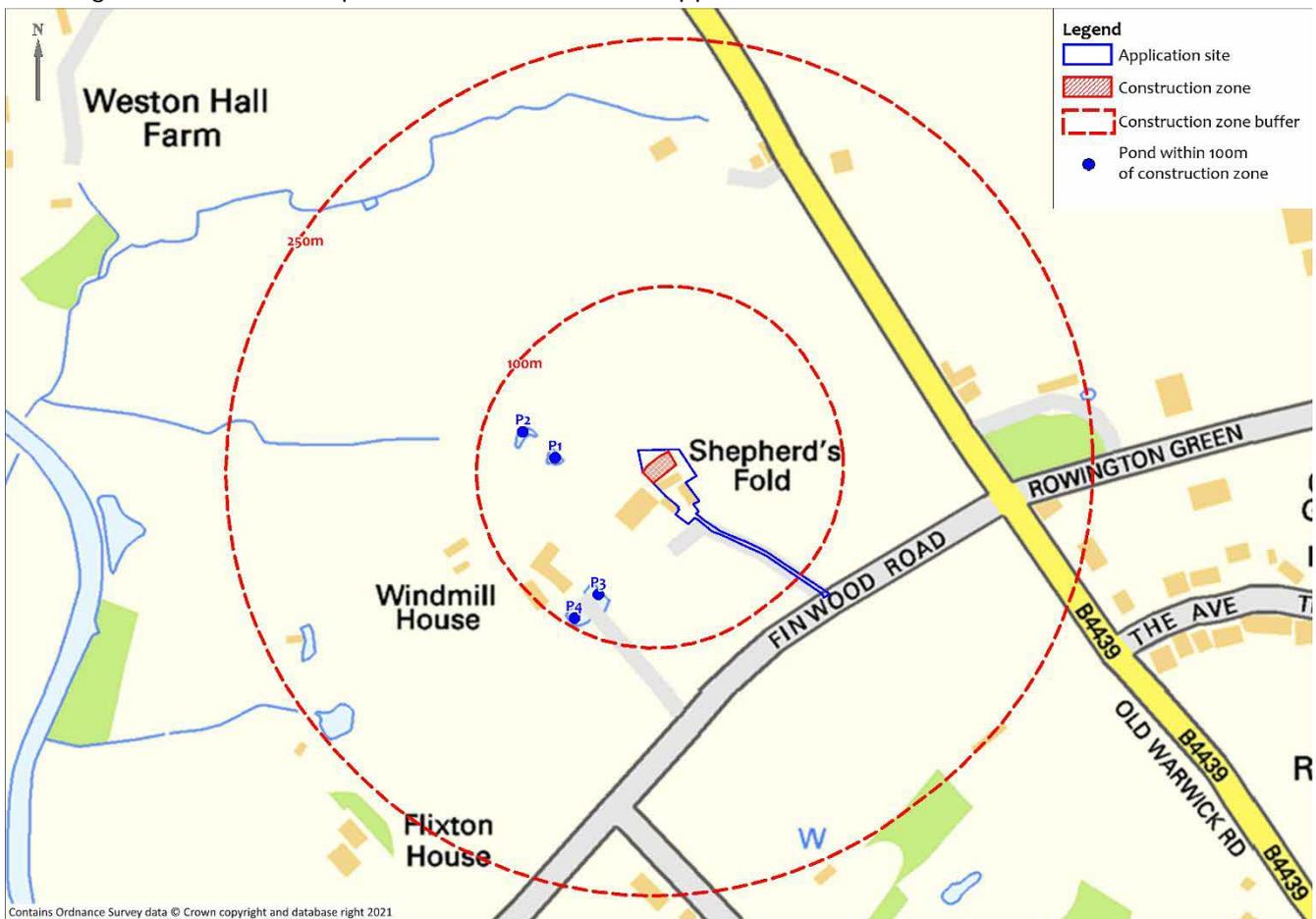
Habitats surrounding the application site

- 3.9 The application site is located off Finwood Road, a rural road situated to the north west of Rowington, Warwickshire. Adjacent to the south and west of the site is the house and grounds of

Shepherds Fold, which include amenity grassland lawns, a swimming pool, a strip of woodland (approx. 45m west) and a pond.

- 3.10 Further west are similar-sized properties and their associated grounds, comprising formal lawns and planting, grassland fields bound by trees and woodland, and, several ponds. Beyond to the west runs the Grand Union Canal (approx. 340m west) which is bound by numerous trees and sections of woodland.
- 3.11 Directly to the north and east, and further in all directions, are large grassland fields, the majority of which are sheep grazed. Further to the south (approx. 120m) lies a block of woodland.
- 3.12 Most of the habitats surrounding the site are therefore of “high” suitability for commuting and foraging bats (see Table 2).

Figure 3 – Location of ponds within 250m of the application site



Habitats within the application site

- 3.13 The application site comprises three buildings (a barn, stables, and “games room”), their associated yard and driveway, and, the surrounding garden. A Phase 1 habitat map and associated target notes are provided in Appendix 1, and photographs provided in Appendix 2. A brief description of each habitat is given below:
- 3.14 Buildings – see section below.
- 3.15 Hardstanding – Leading in from Finwood Road at the far south east of the site is a tarmac access track which continues north west to a small yard between the buildings. The hardstanding continues to the rear of the barn where building materials are stored (tiles and flagstones). This area to the rear of the barn has become colonised by nettle, scattered scrub and coarse grasses.

- 3.16 Grassland – To the east of the stables, and, at the north west of the site are areas of improved grassland, with the latter being mown and the former left uncut at the time of the survey. In addition, alongside the access track are strips of short-cut amenity grassland.
- 3.17 Dense continuous scrub –At the north of the site there is a block of dense scrub which includes non-native shrubs, young conifers and a number of broadleaved saplings. There are a number of rabbit burrows in the scrub at the north-east of the site.
- 3.18 Conifer hedging – Along the north-western boundary of the site is an outgrown Leyland cypress hedge which is now a line of conifer trees. As it consists almost entirely of non-native species, this hedge does not fall within the priority habitat definition for “hedgerows”.
- 3.19 Scattered broadleaved trees – There are a number of broadleaved trees within the application site, the majority of which are saplings present within the dense scrub. The only notable trees on site are a semi-mature ash tree at the northern boundary, and, a willow to the south of the stables. Both trees will be unaffected by the proposed works.

Bats – preliminary roost assessment

The Barn

- 3.20 The barn at Shepherds Fold is a detached, one and two-storey agricultural building with single-skinned (non-cavity) brick walls. The roofs are pitched and clad with red concrete tiles. The building has no soffits or bargeboards - except for a soffit at the front of the single-storey section - with brick corbelling at the eaves.
- 3.21 Numerous features potentially suitable for use by roosting bats were observed, including:
- Gaps under roof and ridge tiles
 - Gaps under mortar where the single storey roof joins the main section of the barn
 - Gaps due to missing verge mortar
 - Holes in the brickwork
 - Gaps along the top of the large barn doors
- 3.22 Internally, both sections of the barn are open to the roof. The main section of the barn has large wooden timbers and ridge board, with a bituminous underfelt lining. A number of tears in the roof lining were observed, as were gaps along the wall tops inside the barn. Approximately ten old bat droppings, akin to those of brown long-eared bats, and a number of butterfly wings (probably feeding remains) were observed inside this section of the barn.
- 3.23 The single-storey section of the barn has a simple wooden-framed roof with exposed ridge board and bitumen roof lining. Approximately six bat droppings, akin to those of brown long-eared bats, were observed inside this section of the barn.
- 3.24 [NB The barn at Shepherds Fold was found to host a small brown long-eared bat maternity roost, along with common and soprano pipistrelle day roosts in 2019. The conditions of the barn in June 2021 were consistent with those in 2019 and it is considered unlikely that the status of these roosts has changed.]

The Stables

- 3.25 Directly to the south east of the barn, linked by a brick wall, is a single-storey, brick-walled (non-cavity) stable block. The roof of the stables is pitched and clad with red concrete tiles. The building has no soffits or bargeboard, with brick corbelling at the eaves. Adjoined to the southern end of the building is a small store with a corrugated fibreboard roof which has partially collapsed.

3.26 Numerous features potentially suitable for use by roosting bats were observed, including:

- Gaps under roof and ridge tiles
- Holes in the brickwork
- Open window at the south eastern gable end

3.27 Inside the stables are open to the roof, with large wooden timbers and ridge board, and a bituminous underfelt lining. There are a number of gaps in the internal brickwork, between the roof timbers, and, where the roof lining is torn. Several fresh bat droppings (brown long-eared type) were observed inside the stables. In addition, birds' nests (including two swallows nests) were observed inside the stables.

[NB The stables at Shepherds Fold were found to host a small brown long-eared bat maternity roost in 2019. The conditions of the stables in June 2021 was consistent with those in 2019 and it is considered highly likely that the status of the roost has not changed.]

Games room

3.28 Directly north of the barn and stables is a sunken annex ("games room") with rendered brick walls and a flat, felt clad roof which is becoming overgrown with scrub. Internally the roof is lined with plasterboard which has partially collapsed. No bats, signs of bats or features potentially suitable for use by bats were observed inside or outside of the games room.

3.29 The games room is assessed as having "negligible" potential to host a bat roost (see Table 1).

GCN Habitat suitability index appraisal

3.30 The HSI calculations and photos of the ponds are given in Appendix 3.

Pond 1

3.31 Pond 1 is located to the west of the application site; within a strip of woodland that borders the garden of Shepherds Fold. The pond is heavily shaded and had virtually no macrophyte cover at the time of the survey. A dense layer of leaf litter was present in the pond at the time of the survey.

3.32 Pond 1 has an HSI Score of 0.53 ("Below average"⁵).

Pond 2

3.33 Pond 2 is located to the west of the application site, approximately 10m north west of Pond 1. It comprises a circular pond bound by woodland which was completely covered by duckweed at the time of the survey.

3.34 Pond 2 has an HSI Score of 0.62 ("Average").

Great crested newt eDNA

3.35 The water samples taken from Pond 1 tested negative for great crested newt eDNA. Appendix 4 provides a copy of the test results.

⁵ Oldham et al's study of 248 ponds in South Eastern England found that 20% of ponds with a score of "Below average" and 55% of ponds with a score of "Average" hosted GCN.

4.0 Assessment and recommendations (excluding bats)

Sites of importance for nature conservation and ancient woodland

- 4.1 There are no statutory sites of importance for nature conservation within 1km of the application site.
- 4.2 In addition, there is no identified ecological linkage between the application site, and the area of ancient woodland - Rowington Coppice - located approximately 600m to the northeast. As such, there should be no statutory site or ancient woodland related constraints to the proposals.

Habitats

- 4.3 The Secretary of State periodically publishes a list of habitats that are of principal importance for the conservation of biodiversity in England under Section 41 (S41) of the 2006 Natural Environment and Rural Communities (NERC) Act. The list currently comprises 56 habitats which are referred to as “priority habitats” in the National Planning Policy Framework (NPPF).
- 4.4 Paragraph 179 of the NPPF reads:

“To protect and enhance biodiversity and geodiversity, plans should [...] promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity”
- 4.5 As such where priority habitats are found they should be protected from the adverse impacts of development.
- 4.6 The habitats to be affected by the proposal: buildings, hardstanding, improved grassland and scrub are of limited ecological value and are not “priority habitats”. Their loss would not be a constraint to the proposals.

Great crested newts

- 4.7 Great crested newts receive special protection under UK law and it is an offence under the Wildlife and Countryside Act 1981 (as amended) and the European Habitats and Species Directive (92/43/EC), enacted in the UK through The Conservation of Habitats and Species Regulations 2017 (The Habitat Regulations) to deliberately or recklessly destroy or damage their habitat, or to disturb, kill or harm them without first having obtained the relevant licence for derogation from the regulations from the Statutory Nature Conservation Organisation (the SNCO - Natural England in England).
- 4.8 Great crested newts spend most of their lives on land, within up to 500m of a breeding pond. The most important terrestrial habitat is within 100m, where most of the population are likely to be located foraging, resting, sheltering and hibernating relatively close to their breeding site. However, a proportion of the population is also likely to forage for food and shelter in suitable habitats up to 250m from a breeding pond and juvenile animals have been known to disperse up to 500m from it in a single season.
- 4.9 Newts are likely to be disturbed by any work that involves altering their breeding pond (e.g. by introducing fish or deepening or altering its size) or works that involve clearing land up to 500m around ponds, where such land has been managed and maintained in such a way that it is likely to support great crested newts. In such cases a licence for derogation from the provisions of the habitat regulations may need to be obtained.

4.10 In addition, great crested newts are a species of principal importance for the conservation of biodiversity in England under Section 41 (S41) of the 2006 Natural Environment and Rural Communities (NERC) Act (these are the “priority species” as per the NPPF).

Site status

4.11 There are four ponds shown on ordnance survey maps 100m of the site (see Figure 3). The nearest of these - within the curtilage of Shepherds Fold (P1) – is located approximately 45m to the west of the site. The remaining ponds within 100m (P2 to 4) are located within the curtilage of two neighbouring properties.

Table 4 – Risk assessment for great crested newts as per Natural England’s Great Crested Newt method statement in the event that the ponds within 100m of the application site were to host breeding great crested newts.

Component	Likely effect	Notional offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	0.01ha – 0.1ha lost or damaged	0.3
Land 100-250m from any breeding pond(s)	No effect	0
Land >250m from any breeding pond(s)	No effect	0
Individual great crested newts	No effect	0
Maximum:		0.3
Rapid risk assessment result:	AMBER: OFFENCE LIKELY	

4.12 Application of Natural England’s risk assessment, as given in their great crested newt licence method statement template, states that in the absence of avoidance measures there is an “amber” risk of an offence under the 2017 Habitat Regulations (see Table 4). However, in the associated guidance Natural England state that: “Amber: offence ‘likely’ indicates that the development activities are of such a type, scale and location that an offence is likely. [...] Bear in mind that this generic risk assessment will over- or under-estimate some risks because it cannot take into account site-specific details, as mentioned in caveats above. In particular, the exact location of the development in relation to resting places, dispersal areas and barriers should be critically examined.”

4.13 As such, in view of the following site-specific factors, it is considered unlikely that great crested newts will be affected by the proposals:

- (1) Pond 1 tested negative for GCN eDNA (see Appendix 4 for test results), and as such, it is highly unlikely that GCN occupy this pond.
- (2) Furthermore, given the close proximity to Pond 2 – approximately 10m - it is reasonable to conclude that if GCN are not present in Pond 1, they are very unlikely to be present in Pond 2, an adjacent pond of similar suitability.
- (3) Pond 3 does not appear on aerial photos, and it is likely that this pond no longer exists (it appears that the driveway at Windmill Cottage was moved and now covers the area where pond was located).
- (4) Pond 4 is located approximately 80m from the application site and further from the proposed construction zone (approximately 85m). The habitats between Pond 4 and the construction zone include areas of hardstanding (driveways and patios), short cut amenity grassland lawns and several buildings (including Shepherds Fold – a large house). These

habitats are unsuitable or sub-optimal for GCN and are likely to represent barriers to the movement of newts between the pond and the application site (in the event that they were present in Pond 4).

- (5) Application of the Natural England’s risk assessment shows that an offence under the 2017 Habitat Regulations as a result of the proposals is “highly unlikely”, if GCN were to be present in any of the ponds beyond 100m (see Table 5).

Table 5 – Risk assessment for great crested newts as per Natural England’s Great Crested Newt method statement in the event that any of the ponds 100m (or further) from the application site were to host breeding great crested newts.

Component	Likely effect	Notional offence probability score
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	No effect	0
Land 100-250m from any breeding pond(s)	0.01 - 0.1 ha lost or damaged	0.01
Land >250m from any breeding pond(s)	0.01 - 0.1 ha lost or damaged	0.001
Individual great crested newts	No effect	0
Maximum:		0.01
Rapid risk assessment result:	GREEN: OFFENCE HIGHLY UNLIKELY	

Non-licensed Method Statement

- 4.14 For the reasons detailed above great crested newts are very unlikely to be a constraint to the proposals. This will be further reduced if the following method statement is adhered to:

Site clearance and preparation

- (1) The trees and scrub to be removed will be cleared using hand tools (including chainsaws) with the arisings taken off the site. Vegetation within the construction zone will be maintained at a height of 50 to 100mm until works in the area commence (i.e. the demolition of the games room).
- (2) A suitably qualified ecologist, acting as an Ecological Clerk of Works (ECoW) will supervise a large excavator equipped with a toothed bucket that will slowly remove the top layer of any scrub or tree roots that need to be removed. A fingertip search of habitats will also be undertaken where appropriate.
- (3) These works are to take place outside of the hibernation period (i.e. before November or after February of any given year).

During construction

- (4) All building materials to be kept off the ground and stored on pallets.
- (5) Any bulk materials such as sand which cannot be stored off the ground to be covered with a tarpaulin overnight to prevent GCN from sheltering within it.
- (6) In the highly unlikely event that great crested newts are encountered works will stop immediately, GS Ecology are to be contacted and any GCN will be moved to a nearby safe place. Works will not continue until any requisite licence has been obtained from Natural England.

Other herpetofauna

- 4.15 Under the 1981 Wildlife and Countryside Act (as amended) it is illegal intentionally or recklessly to kill or injure any species of reptile. In practice, this means that reasonable avoidance measures need to be taken to avoid harm to these animals.
- 4.16 Under Section 41 (S41) of the 2006 NERC Act, the Secretary of State periodically publishes a list of species that are considered by the government to be of principal importance for the conservation of biodiversity in England. The list currently comprises 943 species, referred to as “priority species” in the NPPF. All native species of reptile are “priority species” and paragraph 179 of the NPPF states that: “plans should [...] promote [...] the protection and recovery of priority species”.

Site status

- 4.17 The construction zone has potential to be used by low numbers of common species of reptiles and amphibians (such as slow worm and common frog).
- 4.18 If the method statement given above (see Section 4.14) is adhered to, this will minimise the risk of harm to herpetofauna inhabiting the construction zone. As such, there should be no adverse effect to this group as a result of the proposed works.
- 4.19 Appendix 7 contains further details on reptile ecology and legislation.

Nesting birds

- 4.20 All wild birds are protected under the Wildlife and Countryside Act 1981 (as amended). Section 1 of this Act makes it an offence to kill, injure or take any wild bird, or intentionally to take, damage or destroy the nest of any wild bird while that nest is in use or being built.
- 4.21 The buildings are used by nesting birds (two swallow nests were observed) and it is likely that the trees and scrub will also be used by birds during the nesting season. As such, conversion works, demolition and vegetation removal should be undertaken outside of the bird nesting season (March – August inclusive depending on weather conditions).
- 4.22 If this is not practicable then areas to be cleared will first need to be checked for nesting birds and, if any nests are found, works that would disturb the nest must be postponed until all young have fledged the nest and it is no longer in use.

Other protected species

- 4.23 It is considered highly unlikely that the proposals will have any adverse effect on other protected species (excluding bats), such as badgers, barn owls or dormouse because: the habitats to be affected by the proposals are unsuitable or sub-optimal for use by these species, and, in the case of badgers, no signs of badgers (setts, latrines, dung pits, etc.) were observed on or adjacent to the site during the survey.

Landscaping and ecological enhancements

- 4.24 Paragraph 180 of the NPPF reads:
“[...] 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[.]”
- 4.25 It is therefore recommended that any new planting comprises predominantly native and wildlife-friendly species.

4.26 It is also recommended that bird and bat boxes are installed and that specifically swallow nest cups are installed in suitable locations, under the eaves of the converted barn to mitigate the loss of swallow nest sites.

5.0 Assessment and recommendations (bats)

Survey constraints

- 5.1 The survey was carried out at a time of year suitable for undertaking preliminary bat roost assessments and there were no constraints to the survey.

Site status

- 5.2 The barn and stables at Shepherds Fold was found to host a small brown long-eared bat maternity roost, along with common and soprano pipistrelle day roosts in 2019.
- 5.3 The conditions of the buildings in June 2021 was consistent with those in described in the 2019 report and it is considered unlikely that the status of these roosts has changed
- 5.4 [NB large accumulations of droppings were not observed seen in 2021, however this may have been because the building had been cleared of the items that were stored in their by the previous owners]
- 5.5 Brown long eared bats, common pipistrelle and soprano pipistrelle are all common and widespread across the UK.
- 5.6 The common and soprano pipistrelle roosts are both small, non-maternity roosts, their conservation status can be considered to be low (i.e. the site best fits the description “Small numbers of common species. Not a maternity site”). [see Figure 4 on Page 39 of the Bat Mitigation Guidelines⁶]
- 5.7 The brown long-eared bat roost is a maternity roost, its conservation status is considered to be moderate (i.e. “Maternity site of common species”) [see Figure 4 on Page 39 of the Bat Mitigation Guidelines].
- 5.8 The games room has no features suitable for roosting bats, has “negligible” potential to host a bat roost (see Table 1) and can be demolished with minimal risk of harm to bats.

Further survey requirements

- 5.9 Three dusk emergence surveys of the barn and stables were undertaken during the 2019 survey season and in accordance with The Bat Conservation Trust’s Bat Survey Guidelines. Sufficient survey effort has therefore been undertaken to accurately assess the status of the roosts and as such there is no need to undertake further surveys.
- 5.10 However, to inform a Natural England licence application, should works to the barn not commence prior to May 2022, an updated bat survey (3 dusk / dawn surveys) may need to be carried out to confirm whether or not the status of the roosts has changed.

Mitigation

- 5.11 In order to comply with planning policy and wildlife legislation it will be necessary to ensure that following development the “favourable conservation status” of bats will be maintained. Since the conservation status of the roost can be considered to be moderate (see above) mitigation would need to comply with the following recommendations (given on Figure 4 on Page 39 of the Bat Mitigation Guidelines):

“Timing constraints. More or less like-for-like replacement. Bats not to be left without a roost and must be given time to find the replacement. Monitoring for 2 years preferred.”

⁶ Mitchell-Jones A.J. 2004 Bat Mitigation Guidelines. English Nature

5.12 The following mitigation strategy will meet these requirements and is to be implemented (see Figures 4 to 7):

Working method statement (to ensure that bats are not harmed during works)

- (1) Works to the existing bat roost will be timed to avoid the periods when bats are most susceptible to disturbance i.e. the summer breeding season (1 May to 30 September).
- (2) All works with the potential to harm bats (e.g. removal of roof tiles, roof lining and roof timbers, installation of insulation) will be overseen by a Natural England bat licence holder. The bat licence holder will oversee the careful dismantling of all features suitable for use by roosting bats. In the event that bats are found they will be caught by hand or using a static hand net and moved to the bat boxes that will have been installed in nearby trees (see below). The entrance to the box will be temporarily blocked with a cloth which will be removed at dusk.
- (3) Once all features potentially suitable for use by roosting bats have been removed, contractors will be allowed to continue unimpeded.

New roosting provisions (to ensure that the long term conservation status of bats is maintained)

- (4) Four Schwegler 2f bat boxes (or similar) will be installed on trees within the vicinity of the site.
- (5) A dedicated permanent bat loft is to be provided. This will be at the north eastern end of the stable block and will be 2m high (loft floor to apex) by 4m wide by 4m long. It will have four roof line and two ridge line bat access tiles, and eaves level access points. The roof of the stables will be lined with type 1f bitumen underfelt and access to the loft will be through a small hatch that is just wide enough for a single person to enter, and the loft will not be used for storage. The loft will have a wooden ridgeboard as currently and a traditional structure with no timbers running through the loft. The loft will be constructed at the start of the construction period (i.e. the winter before works start) so that bats are not left without a roost.
- (6) New roosting provisions for pipistrelle bats will be provided on the roof of the converted barn in the form of 4 roof line access tiles.

Ongoing habitat management (to ensure that the roosts remain suitable for use by roosting bats)

- (7) Roost access points will not be illuminated and care will be taken to ensure that exterior lighting does not illuminate access points or large parts of the building. Elsewhere, if security lighting is installed, it will be directional low lux and/or triggered by motion detection devices located below (human) head height.
- (8) The bat population in the barn will be monitored for at least two years in accordance with Bat Mitigation Guidelines (loft check followed by dusk emergence/ dawn re-entry survey in the months of June, July or August)

Figure 4 – Location of bat loft and bat roost features

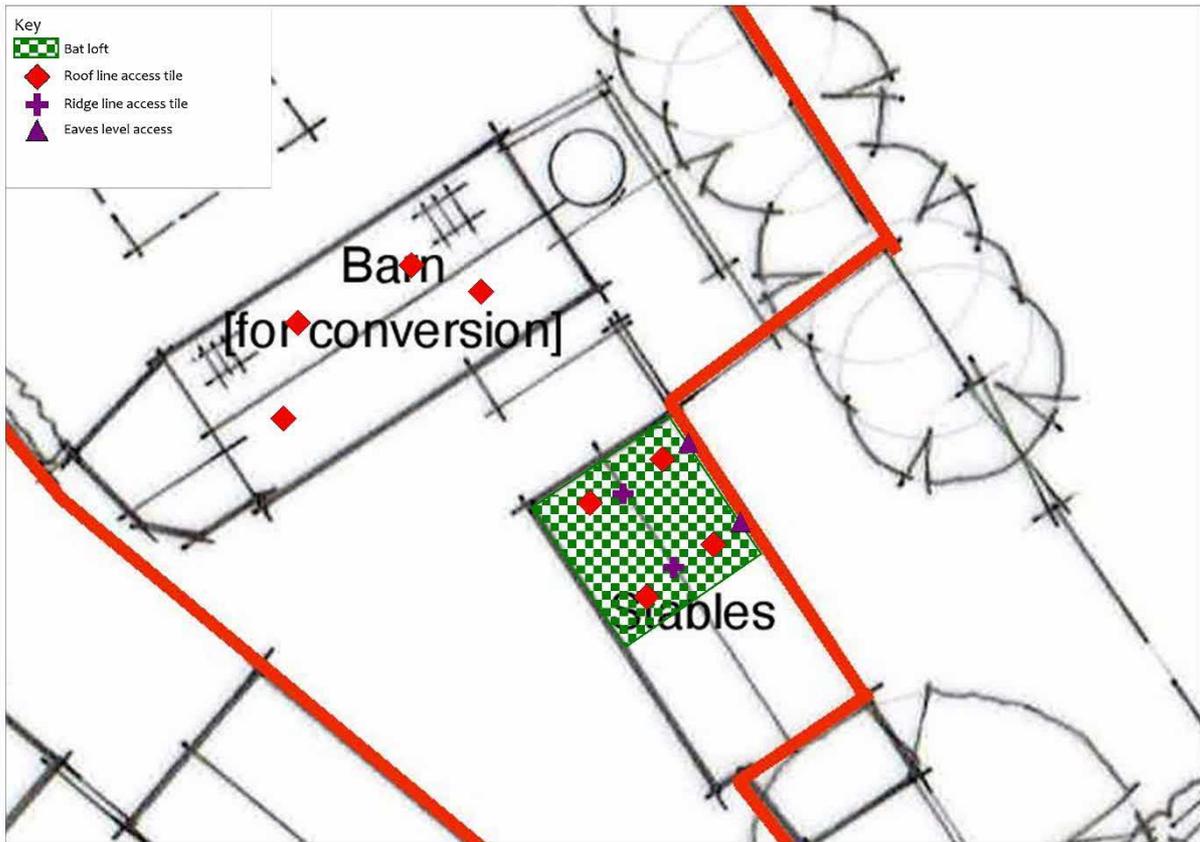


Figure 5 – Bat ridge line access tile detail

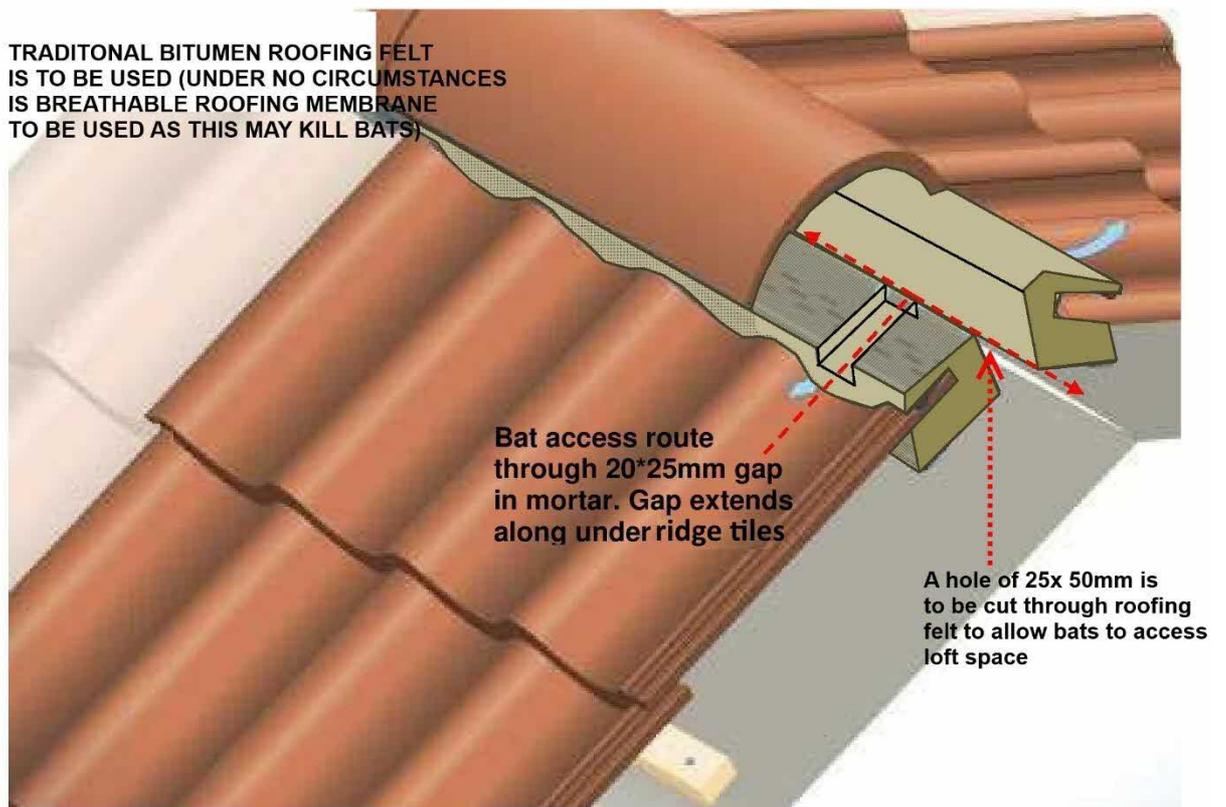


Figure 6 – Bat roof line access tile details

Either a preformed clay tile or a formed lead tile is to be placed on the roof line. A square 75 x 75cm of traditional bitumen roofing felt is to be attached directly to the battens below the felt (modern underlays have been found to harm bats). If access to the loft space is required a hole of 5cm x 2 cm can be cut through the roofing felt at the top of the tile.

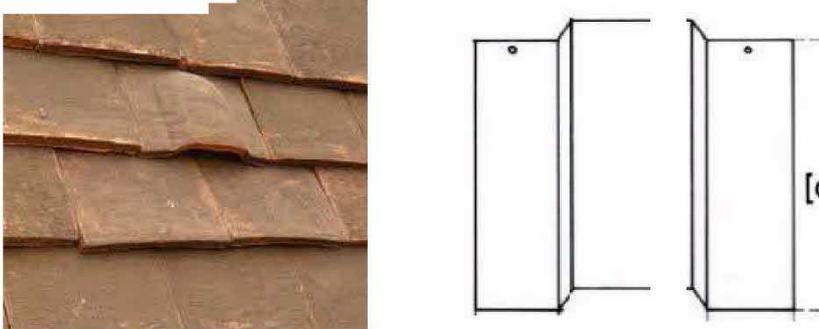
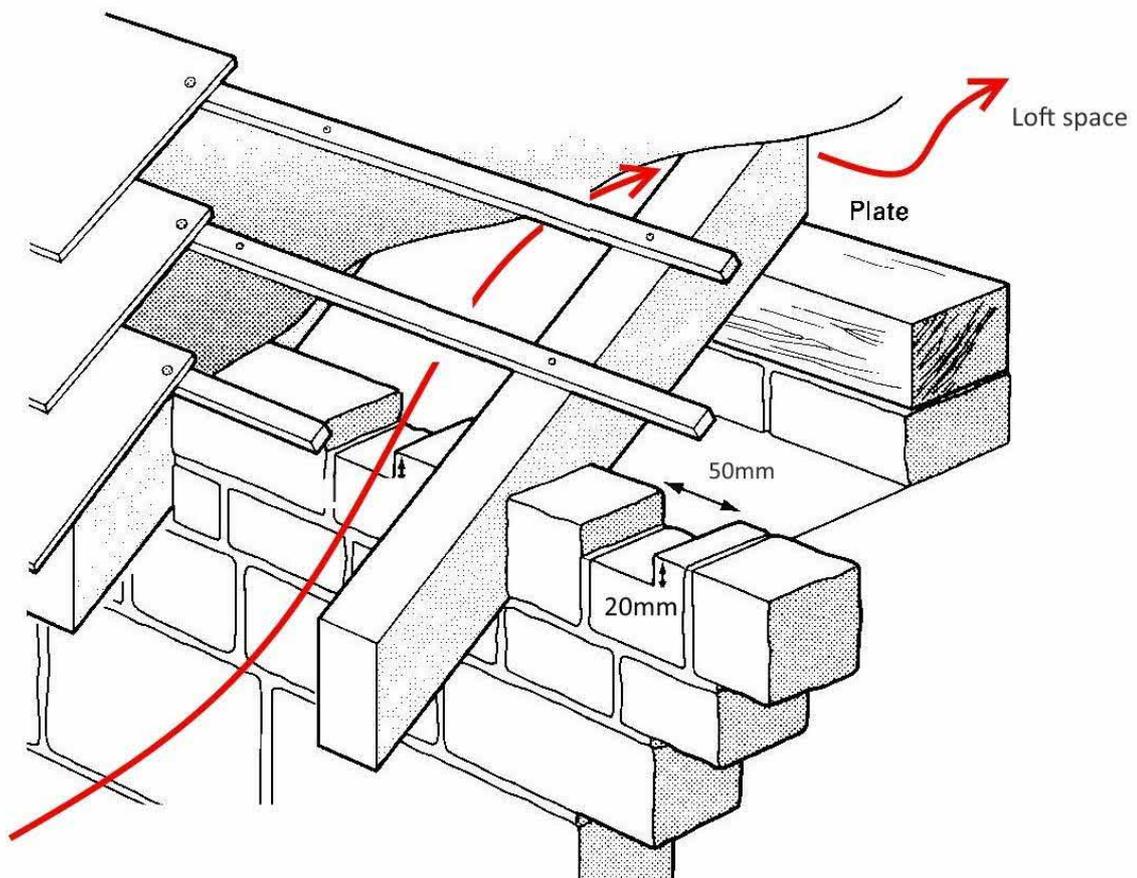


Figure 7 – Eaves level access point details



A hole (a minimum of 20 x 50mm in size) is to be cut through the brickwork and / or fascia board directly below roof lining to allow bats access through the wall, over the wall plate and into the loft. Traditional bitumen felt (Type 1F) to be used throughout the roof (breathable membranes have been found to harm bats). A traditional wooden ridgeboard is to be retained internally along the ridge in the loft.

Legislation relating to bats

- 5.13 All species of bats receive special protection under UK law and it is an offence under the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2017 (The Habitat Regulations) to deliberately or recklessly destroy or damage their roosts, or to disturb, kill or injure them without first having obtained the relevant licence for derogation from the regulations from the Statutory Nature Conservation Organisation (the SNCO - Natural England in England).
- 5.14 In order to obtain such a licence the SNCO must apply the requirements of Regulation 55 of the Regulations and, in particular, the three tests set out in sub-paragraphs (2)(e), (9)(a) and (9)(b). These are as follows:
- (1) Regulation 55(2)(e) states: a licence can be granted for the purposes of “preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment”.
 - (2) Regulation 55(9)(a) states: the appropriate authority (the SNCO) shall not grant a licence unless they are satisfied “that there is no satisfactory alternative”.
 - (3) Regulation 55(9)(b) states: the appropriate authority (the SNCO) shall not grant a licence unless they are satisfied “that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.”

Consideration of the three tests of The Conservation of Habitats and Species Regulations 2017

- 5.15 Planning Authorities have statutory duties under The Habitat Regulations. The Planning Authority needs to be satisfied that a licence for development works affecting bats is likely to be granted by Natural England and in order to be satisfied that this is the case they will need to consider whether the development meets the tests of The Habitat Regulations⁷.
- 5.16 It is considered that as long as a mitigation plan such as that given in Section 5.9 above can be provided the proposed works would pass the three tests of The Habitat Regulations, and as such receive from Natural England a licence, because:

The development is for an imperative reason of overriding public interest of an economic nature as the development will contribute to a social and economic need of the local community for better housing (this is assuming that it is in compliance with other planning policy which is outside the remit of this report) - therefore Regulation 55(2)(e) can be met
There is no satisfactory alternative to the development as without carrying out the works the aforementioned need would not be met - therefore Regulation 55(9)(a) can be met
Appropriate mitigation can be provided which will ensure that there will not be a detrimental impact to the favourable conservation status of the bat species concerned (see Section 5.9 above) - therefore Regulation 55(9)(b) can be met

⁷ The courts have considered the application of a planning authority's duty under the Habitat Regulations (and therefore the Habitat Directive) in the cases of Woolley vs Cheshire Borough Council (2009) and Morge vs Hampshire County Council (2010). In the Morge vs Hampshire County Council case the supreme court has ruled that it cannot see why planning permission should not be granted unless the proposed development:

- Would be likely to offend the prohibitions in Article 12(1) and
- Would be unlikely to be licensed as a derogation from those provisions

- 5.17 The Local Planning Authority can therefore be confident that, if they were to permit the development, a licence for development works affecting bats is likely to be obtained from Natural England.

The licensing process

- 5.18 Since the site hosts three bat roosts, which will be lost or disturbed as a result of the proposals, a licence for development works affecting bats (i.e. for derogation from the provisions of the Habitat Regulations) will need to be obtained before roofing works commence. This involves submitting a licence application to Natural England with a detailed mitigation plan informed by surveys undertaken in accordance with national guidelines. Natural England takes between 30 to 60 working days to process a licence application.
- 5.19 Because the licensing process is separate and distinct from the planning system Natural England will only register an application for a licence after planning permission has been obtained. This will therefore need to be factored into the project timeframe.

Planning policy

- 5.20 Paragraph 99 of the government Circular 06/05: Biodiversity and Geological Conservation - Statutory Obligations and Their Impact Within The Planning System (NB this document has not been revoked by the National Planning Policy Framework) reads:

“99) It is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision. The need to ensure ecological surveys are carried out should therefore only be left to coverage under planning conditions in exceptional circumstances, with the result that the surveys are carried out after planning permission has been granted. However, bearing in mind the delay and cost that may be involved, developers should not be required to undertake surveys for protected species unless there is a reasonable likelihood of the species being present and affected by the development. Where this is the case, the survey should be completed and any necessary measures to protect the species should be in place, through conditions and/or planning obligations, before the permission is granted. In appropriate circumstances the permission may also impose a condition preventing the development from proceeding without the prior acquisition of a licence under the procedure set out in section C below. “

- 5.21 In this case, it has been established that the barn (and stable) at Shepherd Fold host three bat roosts which will be lost or disturbed if planning permission is granted and implemented.
- 5.22 Section 5.9 above sets out a mitigation strategy to ensure that the favourable conservation status of brown long-eared, common pipistrelle and soprano bats will be maintained and Section 5.12 – 5.14 details why the proposals meet the three tests of The Habitat Regulations.
- 5.23 As such, if a mitigation strategy such as that given above is implemented, and subject to imposing a condition preventing the development from proceeding without the prior acquisition of a licence, the proposals would comply with the above (and other wildlife related) planning policy.

6.0 Summary

Habitats

- 6.1 The habitats to be affected by the proposal: buildings, hardstanding, improved grassland and scrub are of limited ecological value, being common, widespread and easily replaceable. These habitats are not “priority habitats” and their loss would not be a constraint to the proposals.

Bats

- 6.2 The barn and stables at Shepherds Fold host three bat roosts (comprising common and soprano pipistrelle day roosts, and, a brown long-eared maternity roost). Therefore, works to convert the barn, which will destroy or disturb the roosts, cannot legally commence until a licence for development works affecting bats has been obtained from Natural England.
- 6.3 This report includes a mitigation plan that will ensure that there will not be a detrimental impact on the favourable conservation status of bats and subject to a condition preventing the development from proceeding without the prior acquisition of a licence from Natural England, the proposals will be in accordance with planning policy in relation to bats.

Great crested newts (GCN)

- 6.4 There are four ponds within 100m of the application site, the nearest of which– within the curtilage of Shepherds Fold - tested negative (permission to test the others was not given) for GCN eDNA. As such, for the reasons discussed above, it is considered highly unlikely that GCN will be affected by the proposals.

Reptiles

- 6.5 The construction zone could be used by small numbers of reptiles (and common species of amphibians). As such, a precautionary mitigation strategy to ensure that individual reptiles and amphibians are not harmed will need to be implemented.

Other protected species

- 6.6 It is considered unlikely that other protected species such as badgers, barn owls or dormouse, will be affected by the proposals.
- 6.7 If the recommendations given in this report regarding precautionary measures to protect nesting birds and terrestrial mammals are adhered to, there are unlikely to be any other ecological constraints to the proposals.

Ecological enhancements

- 6.8 In accordance with paragraph 180 of the NPPF it is recommended that any new planting comprises predominantly native and wildlife-friendly species and that nesting provisions for swallows (and other birds) are installed around the converted barn.

Appendix 1 – Extended Phase 1 Habitat Map and Target Notes

Target notes

- (1) The barn. A detached, one and two-storey agricultural building with single-skinned brick walls. The roofs are pitched and clad with red concrete tiles. The building has no brick corbelling at the eaves and a soffit on the front of the single-storey section.
- (2) The stables. A single-storey, brick-walled stable block with a pitched roof clad with red concrete tiles. The building has brick corbelling at the eaves. Adjoined to the southern end of the building is a small store with a corrugated fibreboard roof which has partially collapsed. Directly to the south is a small, brick-walled livestock pen which is over grown with scattered scrub and willow (*Salix* spp.)
- (3) Games room. A sunken annex with rendered brick walls and a flat, felt clad roof which is becoming overgrown with scrub.
- (4) Garage at Shepherds Fold. A large, detached, triple garage with cavity brick walls and a pitched, clay tiled roof.
- (5) Tarmac access track bound by amenity grassland and scattered ornamental shrubs
- (6) Tarmac and brick-paved yard bound by brick walls
- (7) Area of hardstanding at rear of barn used for storing building materials, which is becoming overgrown by nettle (*Urtica dioica*), scattered scrub and colonising grasses.
- (8) Area of unmown improved grassland which is bound by an outgrown Leyland cypress hedge (*Cupressus × leylandii*) on its north eastern edge, a young laurel hedge (*Prunus laurocerasus*) at its southern hedge, and a sheep-grazed, improved grassland field to the east.
- (9) Block of dense scrub alongside a Leyland cypress hedge. Species include ash saplings (*Fraxinus excelsior*), elder (*Sambucus nigra*), dogrose (*Rosa canina*), ivy (*Hedera helix*), bramble (*Rubus fruticosus*), conifers and non-native shrubs. Directly to the north is a semi-mature ash tree above an area of mown improved grassland.
- (10) Rabbit burrows.



Appendix 2 - Photographs

Photos 1 and 2 – The barn viewed from the south east and west



Photo 3 and 4 – Inside the barn



Photo 5 and 6 – The stables viewed from the west and south east



Photos 7 and 8 – Inside the stables



Photo 9 – The games room viewed from the north west, and, Photo 10 – Inside the games room



Photos 11 and 12 – The dense scrub to the north and east of the games room



Photos 13 and 14 – The hardstanding, grassland and outgrown conifer hedge to the rear of the barn and stables



Appendix 3 – Habitat Suitability Index scores

Pond 1

Pond reference: Pond 1			
Factor 1. Geographic location (SI1)	1	Factor 6. Waterfowl	1
Zone A, location is optimal, SI = 1	X	Absent - No evidence of waterfowl impact (moorhens may be present) - 1	X
Zone B, location is marginal, SI = 0.5		Minor - waterfowl present, but little indication of impact on pond vegetation. Pond still supports submerged plants and banks are not denuded of vegetation - 0.67	
Zone C, location is unsuitable, SI = 0.01.		Major - severe impact of waterfowl. Little or no evidence of submerged plants, water turbid, pond banks showing patches where vegetation removed, evidence of provisioning waterfowl - 0.01	
Factor 2. Pond area	0.11	Factor 7. Fish	1
Enter value in m2:	55	Absent - no records of fish stocking and no fish revealed by netting or observed by torchlight - 1	X
Factor 3. Permanence	0.5	Possible - no evidence of fish, but local conditions suggest that they may be present. - 0.67	
Never dries = 0.9		Minor - small numbers of crucian carp, goldfish or stickleback known to be present - 0.33	
Rarely dries (dries no more than two years in ten or only in drought) = 1.0		Major - dense populations of fish known to be present - 0.01	
Sometimes dries (dries between three years in ten to most years) = 0.5	X	Factor 8. Pond count	1
Dries annually - 0.1		Enter the number of ponds within 1km of site from OS maps here, exclude those behind major barriers	14
Factor 4. Water quality	0.33	Factor 9. Terrestrial habitat	0.67
Good - Water supports an abundant and diverse invertebrate community. Netting reveals handfuls of diverse invertebrates, including groups such as mayfly larvae and water shrimps - 1.0		Good - habitat that offers good opportunities for foraging and shelter (e.g. most semi-natural environments, such as rough grassland, scrub or woodland, also brownfield sites and low intensity farmland) covers more than 75% of available area - 1	
Moderate - moderate invertebrate diversity - 0.67		Moderate habitat offers opportunities for foraging and shelter but may not be extensive (25-75%) of available area - 0.67	X
Poor - low invertebrate diversity (e.g. species such as midge and mosquito larvae). Few submerged plants. - 0.33	X	Poor - habitat with poor structure (e.g. amenity grassland, improved pasture and arable) that offers limited opportunities (less than 25% of available area) for foraging and shelter - 0.33	
Bad - clearly polluted, only pollution-tolerant invertebrates (such as rat-tailed maggots), no submerged plants - 0.01		None - no suitable habitat around pond (e.g. centre of arable field or large expanse of bare habitat) = 0.01	
Factor 5. Shade	0.4	Factor 10. Macrophytes	0.35
Estimate percentage pond perimeter shaded, to at least 1m from the shore. Shading is usually from trees, but can include buildings. Shading should not include emergent pond vegetation. The estimate should be made during the period from May to the end of September.	90	Estimate the percentage of the pond surface area occupied by macrophyte cover. This includes emergents, floating plants (excluding duckweed) and submerged plants reaching the surface. Make an estimate between March and the end of September. Read off the SI value from graph	5
		HSI Score =	0.53
		HSI Index	Below average



Pond 2

Pond reference: Pond 2				
Factor 1. Geographic location (SI1)		1	Factor 6. Waterfowl	1
Zone A, location is optimal, SI = 1		X	Absent - No evidence of waterfowl impact (moorhens may be present) - 1	X
Zone B, location is marginal, SI = 0.5			Minor - waterfowl present, but little indication of impact on pond vegetation. Pond still supports submerged plants and banks are not denuded of vegetation - 0.67	
Zone C, location is unsuitable, SI = 0.01.			Major - severe impact of waterfowl. Little or no evidence of submerged plants, water turbid, pond banks showing patches where vegetation removed, evidence of provisioning waterfowl - 0.01	
Factor 2. Pond area		0.13	Factor 7. Fish	
Enter value in m2:		65	Absent - no records of fish stocking and no fish revealed by netting or observed by torchlight - 1	X
			Possible - no evidence of fish, but local conditions suggest that they may be present. - 0.67	
Factor 3. Permanence		1	Minor - small numbers of crucian carp, goldfish or stickleback known to be present - 0.33	
Never dries = 0.9			Major - dense populations of fish known to be present - 0.01	
Rarely dries (dries no more than two years in ten or only in drought) = 1.0		X		
Sometimes dries (dries between three years in ten to most years) = 0.5			Factor 8. Pond count	
Dries annually - 0.1			Enter the number of ponds within 1km of site from OS maps here, exclude those behind major barriers	
			14	
Factor 4. Water quality		0.33	Factor 9. Terrestrial habitat	
Good - Water supports an abundant and diverse invertebrate community. Netting reveals handfuls of diverse invertebrates, including groups such as mayfly larvae and water shrimps - 1.0			Good - habitat that offers good opportunities for foraging and shelter (e.g. most semi-natural environments, such as rough grassland, scrub or woodland, also brownfield sites and low intensity farmland) covers more than 75% of available area - 1	
Moderate - moderate invertebrate diversity - 0.67			Moderate habitat offers opportunities for foraging and shelter but may not be extensive (25-75%) of available area - 0.67	
Poor - low invertebrate diversity (e.g. species such as midge and mosquito larvae). Few submerged plants - 0.33		X	Poor - habitat with poor structure (e.g. amenity grassland, improved pasture and arable) that offers limited opportunities (less than 25% of available area) for foraging and shelter - 0.33	
Bad - clearly polluted, only pollution-tolerant invertebrates (such as rat-tailed maggots), no submerged plants - 0.01			None - no suitable habitat around pond (e.g. centre of arable field or large expanse of bare habitat) = 0.01	
Factor 5. Shade		0.8	Factor 10. Macrophytes	
Estimate percentage pond perimeter shaded, to at least 1m from the shore. Shading is usually from trees, but can include buildings. Shading should not include emergent pond vegetation. The estimate should be made during the period from May to the end of September.		70	Estimate the percentage of the pond surface area occupied by macrophyte cover. This includes emergents, floating plants (excluding duckweed) and submerged plants reaching the surface. Make an estimate between March and the end of September. Read off the SI value from graph	
			5	
			HSI Score = 0.62	
			HSI Index Average	



Appendix 4 – Great crested newt eDNA test results



Folio No: E11709
Report No: 1
Purchase Order: GSPO2833
Client: GS ECOLOGY LTD
Contact: Giles Sutton

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (*TRITURUS CRISTATUS*)

SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

RESULTS

Date sample received at Laboratory: 07/07/2021
Date Reported: 26/07/2021
Matters Affecting Results: None

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
6258	Shepherds Fold Pond 1		Pass	Pass	Pass	Negative	0

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chris Troth

Approved by: Chris Troth



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METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

INTERPRETATION OF RESULTS

- SIC: Sample Integrity Check [Pass/Fail]**
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.
- DC: Degradation Check [Pass/Fail]**
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.
- IC: Inhibition Check [Pass/Fail]**
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.
- Result: Presence of GCN eDNA [Positive/Negative/Inconclusive]**
Positive: GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
Positive Replicates: Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
Negative: GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.



Appendix 5 – Legislation and planning policy

Planning Authorities have a legal duty to consider biodiversity when assessing planning applications. Where there is a reasonable likelihood that a planning application might affect important protected sites, species or habitats, information on the species, habitat or site likely to be affected, together with an assessment of the impacts of the proposals, will almost certainly be required.

The legal duty for Planning Authorities to have regard to the conservation of biodiversity was introduced in the 2006 Natural Environment and Rural Communities Act (The NERC Act). This act clarified existing commitments with regard to biodiversity, raised the profile of biodiversity and aimed to make the consideration of biodiversity a natural and integral part of policy and decision making.

In addition to the NERC Act there is also national and international biodiversity legislation. This includes legislation in relation to protected species and sites which operates outside of the planning system. Local Authorities and developers have a duty to comply with this legislation.

National planning policy

Paragraph 99 of the Government Circular 06/05: Biodiversity and Geological Conservation - Statutory Obligations and Their Impact Within the Planning System (this document has not been revoked by the recently published National Planning Policy Framework) states that:

‘It is essential that the presence or otherwise of protected species, and the extent that they may be affected by the proposed development, is established before the planning permission is granted, otherwise all relevant material considerations may not have been addressed in making the decision.’

As such, in line with national planning policy, most planning authorities will ask for this information to be provided before a planning decision is made and in many cases before it is registered.

Local planning policy

In addition to national planning policy, most councils have planning policies to protect biodiversity, and to enhance it where practicable within and adjacent to development sites.

European protected species

The United Kingdom hosts a number of European Protected Species (EPS) of animals (table 1) and plants (table 2). These species receive special protection under UK law and it is an offence under the Wildlife and Countryside Act 1981 (as amended) and the European Habitats and Species Directive (92/43/EC), enacted in the UK through The Conservation of Habitats and Species Regulations 2017, to deliberately or recklessly destroy or damage their habitat, or to disturb, kill or injure the species without first having obtained the relevant licence from Natural England.

Planning Authorities have a statutory duty under these regulations to have regard to the requirements of the Habitats Directive and need to be satisfied that the development is likely to receive a licence from Natural England, and therefore comply with the Habitats Directive, before granting planning permission.

Table 1 – European Protected Species of Animal found in the UK

Common name	Scientific name
Bats, Horseshoe (all species)	Rhinolophidae
Bats, Typical (all species)	Vespertilionidae
Butterfly, Large Blue	Maculinea arion
Cat, Wild	Felis silvestris
Dolphins, porpoises and whales (all species)	Cetacea
Dormouse	Muscardinus avellanarius
Frog, Pool	Rana lessonae
Lizard, Sand	Lacerta agilis
Moth, Fisher’s Estuarine	Gortyna borellii lunata
Newt, Great Crested (or Warty)	Triturus cristatus
Otter, Common	Lutra lutra
Snail, Lesser Whirlpool Ram’s-horn	Anisus vorticulus
Snake, Smooth	Coronella austriaca
Sturgeon	Acipenser sturio
Toad, Natterjack	Bufo calamita
Turtles, Marine	Caretta caretta
	Chelonia mydas
	Lepidochelys kempii
	Eretmochelys imbricata
	Dermochelys coriacea

Table 2 – European Protected Species of Plant found in the UK

Common name	Scientific name
Dock, Shore	Rumex rupestris
Fern, Killarney	Trichomanes speciosum
Gentian, Early	Gentianella anglica
Lady’s-slipper	Cypripedium calceolus
Marshwort, Creeping	Apium repens
Naiad, Slender	Najas flexilis
Orchid, Fen	Liparis loeselii
Plantain, Floating-leaved water	Luronium natans
Saxifrage, Yellow Marsh	Saxifraga hirculus

Nationally protected species

Many species of animal are protected under the 1981 Wildlife and Countryside Act (as amended). ‘Full protection’ applies to EPS and some non EPS species such as the water vole. This prohibits the intentional killing, injuring or taking (capture. etc); possession; intentional disturbance whilst occupying a ‘place used for shelter or protection’ and destruction of these places; sale, barter, exchange, transporting for sale and advertising to sell or to buy. Many species, such as common species of reptile and amphibian, are protected from intentional killing and injuring and trading.

Birds

All wild birds are protected under the Wildlife and Countryside Act 1981 (as amended), whilst they are actively nesting or roosting. Section 1 of this Act makes it an offence to kill, injure or take any wild bird, and to intentionally take, damage or destroy the nest of any wild bird while that nest is in use or being built. It is also an offence to take or destroy any wild bird eggs.

In addition, bird species listed under Schedule 1 of the Act receive extra protection. The Act states that ‘it is an offence to intentionally or recklessly disturb any wild bird listed in Schedule 1 while it is nest building, or at (or near) a nest containing eggs or young, or disturb the dependent young of such a bird’.

In practice this means that in areas where birds are likely to be nesting works should not be undertaken during the nesting season, which is generally considered to be March to September, although this very much depends on weather conditions, habitats and the species involved. If works cannot be avoided then areas should first be checked for nesting birds. Habitats likely to host nesting birds include trees, hedgerows and dense scrub, buildings, reedbeds and riverine habitats and open areas with tussocky vegetation.

Appendix 6 – Bat ecology and conservation status

Background

Bats are the only true flying mammals and belong to their own taxonomic group, the Chiroptera. Worldwide there are almost 1,000 species, with 16 in the UK. All species in the UK are insectivorous. They have a highly sophisticated echolocation system that allows them to avoid obstacles and catch invertebrates, either in flight or by picking them off water, the ground or foliage.

Bat species in the UK

There are 16 species of bat that are known to exist in the UK mainland, with a further two - the greater mouse eared bat *Myotis myotis*, and the parti-coloured bat *Vespertilio murinus* - that are thought to occur as rare migrants or to have small populations in the UK. Bats in the UK belong to one of two taxonomic families, the Rhinolophidae (horseshoe bats) and the Vespertilionidae (all other UK bats).

Bat Conservation Status

Bat populations have undergone a significant decline in the past sixty years. For example, estimates from the National Bat Colony Survey suggest that the UK pipistrelle population (one of our commonest bat species), declined by approximately 70% between 1978 and 1993. Factors contributing to this decline include:

- Loss of, and damage to, roosting sites, including buildings, trees, and underground structures (mines, tunnels, ice-houses, cellars, etc).
- Loss and fragmentation of suitable insect-rich feeding habitats such as wetlands and deciduous woodland.
- Reduction in the abundance and diversity of insect prey due to intensive agriculture, particularly over-grazing and the use of pesticides.
- Loss of linear features such as tree-lines and hedgerows, depriving bats of commuting routes between roosts and feeding areas.
- Loss of winter roosting sites in buildings and old trees.
- Disturbance and destruction of roosts, including the loss of maternity roosts due to the use of toxic timber treatment chemicals.

Roosts

Bats use a variety of roosts of different types including trees, buildings, caves, mines and other structures. Most species are colonial and roost in groups. This can make populations particularly vulnerable to loss of roosts as the loss of a single roost may affect the whole population. Some species hang in obvious locations, such as the timbers near to the apex of a roof, others roost in cracks and crevices, such as the gaps under tiles, and as such can be very difficult to locate.

During the winter (November to February), when there is a reduction in insect numbers, bats hibernate to conserve energy. They prefer sites with a constant low temperature and a high relative humidity. On mild winter's nights, bats may wake up and feed. However, bats are particularly vulnerable to disturbance at this time of year, as flying in winter uses up large quantities of energy that cannot easily be replaced.

In the spring, after emerging from hibernation, bats often move from site to site and may congregate in small groups. Female bats gather together in the summer (approximately May to August dependant on species) in maternity roosts. Once the young have stopped suckling, and the baby is independent, bats

tend to disperse and use other roosts. Maternity roosts are particularly vulnerable to disturbance, as bats may have come from a wide geographical area, and have a strong tradition of returning to the same roost year after year.

During the late summer and early autumn males occupy mating roosts which are visited by several females. After mating some species gather together at swarming sites to fatten up prior to hibernation.

Habitat associations

In addition to roosts, bats also need foraging habitats to find suitable food resources, and commuting routes to get to these areas. As would be expected, the highest numbers of bats are found in areas with abundant invertebrates. Some species specialise in catching small invertebrates in flight, whilst others specialise in catching larger invertebrates such as moths and beetles. The distances that bats travel to foraging areas varies between species; records have shown some greater horseshoe bats travel up to 22km to forage, although many species will typically feed within 1km of a roost.

Bats, especially the smaller species, tend to follow linear features (such as hedgerows and tree lines) to their foraging habitats and will often not cross open spaces. A gap of 10m in a linear feature will often not be crossed by bats, and it is important that developments do not create such gaps if linear features are used by bats.

Appendix 7 – Reptile ecology and legal status

There are six native terrestrial species of reptile in Great Britain (Table 1). All receive legal protection, most are declining in numbers, and all can be a constraint to development or land use change.

Table 1 - Status and Distribution of the UK's Native Terrestrial Reptile Species

Common Name	Scientific name	Group	UK Distribution	Status
Common Lizard	<i>Zootoca vivipara</i>	Lizard	Widespread in England, Scotland and Wales	Declining but locally common
Sand Lizard	<i>Lacerta agilis</i>	Lizard	A few isolated populations mainly in southern England and Wales	Endangered and very rare
Slow-worm	<i>Anguis fragilis</i>	Lizard (legless)	Widespread in England, Scotland and Wales	Declining but locally common
Adder	<i>Vipera berus</i>	Snake	Widespread in England, Scotland and Wales	Declining but locally common
Grass Snake	<i>Natrix natrix</i>	Snake	England, Wales, rare in Scotland	Declining but locally common
Smooth Snake	<i>Coronella austriaca</i>	Snake	A few isolated populations mainly in southern England and Wales	Endangered and very rare

Legal Protection

The legislation relating to the protection of reptiles in Britain is contained mainly within the Wildlife and Countryside Act (1981) as amended and the EU Habitats and Species Directive enacted in the UK through The Conservation of Habitats and Species Regulations 2010. In summary, the legislative protection of reptiles in Britain is as follows:

Common lizards, slow-worms, adders and grass snakes - it is illegal to intentionally or recklessly kill or injure these species. In practice this means that the reasonable avoidance measures must be taken to avoid harm to these animals during works.

Sand lizards and smooth snakes – these are European Protected Species and it is illegal to kill, capture, handle or disturb them, or to damage, destroy or obstruct access to breeding or resting areas, or their places of shelter or protection. However derogation from this legislation can be granted if the relevant licence from the Statutory Nature Conservation Organisation (Natural England in England) is obtained.

Biology, ecology and habitat requirements

Reptiles are ectotherms and regulate their body temperature by taking in heat from their surroundings. As a result they tend to be found in habitats where they are able to bask without being at risk from predation, are less active during cold periods and hibernate during the winter months.

Mating occurs in spring with live young being produced by the adder, smooth snake, common lizard and slow worm and eggs by the grass snake and sand lizard. Young are born or hatch between August and October.

The three species of lizard feed upon invertebrates. The snakes feed on larger prey, including small mammals, amphibians or lizards. The adder is Britain's only poisonous snake, and although bites to humans are rare and deaths extremely rare, medical attention should always be sought if a bite should occur.

The following list summarises habitat features that are important for Britain's reptile species:

Basking: Basking sites that contain features that heat up quickly in the sun and variation in cover to provide varied shade and protection against predators.

Sheltering: Shelter, such as rocks, dense scrub tree roots, etc., provide places where reptiles may seek refuge from extremes of temperature, bad weather and predators.

Foraging: Feeding areas that contain good populations of prey species

Hibernating: Frost-free, dry conditions, inaccessible to predators. Examples may include rabbit burrows, or gaps under tree trunks or rocks.

Appendix 8 - Great crested newts: ecology and legislation

The great crested newt (*Triturus cristatus*) can grow up to 18cm in size. It is Britain's largest newt. The body can have a warty appearance and the skin is normally dark brown or black, the belly is predominantly bright orange with black markings. During the breeding season the males develop a crest on their back and tail which they use to attract a mate.

The species is widely distributed in Britain but is absent from Cornwall, Devon, and parts of Wales. It is uncommon but locally abundant. The population has undergone a severe decline in the last 50 years due to the loss of breeding ponds and a decline in the quality of foraging habitat.

The species can be found in northern Europe part of West Siberia. The edge of the northern range extends from northern France, Great Britain, southern Scandinavia to the north of Russia, and the southern edge from central France to south-western Romania into central European Russia. Britain is one of the last strongholds for the species.

Great crested newts spend the majority of their lives on land, returning within up to 500m, but more usually 250m, of their breeding ponds. The mainstay of their diet is invertebrates.

They return to waterbodies, usually ponds, in the spring to breed. Adults enter the ponds from February onwards with the courtship and egg-laying period being from mid-March to mid-June. Eggs are laid in the folds of debris or the leaves of submerged aquatic plants. A female lays up to 200 eggs per season.

Eggs take 3 weeks to hatch and the larvae take 2 to 3 months to develop. Adults begin to leave breeding ponds gradually from late May. However they can over-winter in ponds and also sometimes return to feed. Young start to emerge from the pond in August and will not normally return until they have reached sexual maturity 2 – 4 years later.

Great crested newts receive special protection under UK law and it is an offence under the Wildlife and Countryside Act 1981 (as amended) and the European Habitats and Species Directive (92/43/EC), enacted in the UK through The Conservation of Habitats and Species Regulations 2010 (The Habitat Regulations) to deliberately or recklessly, to destroy or damage their habitat, or to disturb, kill or them without first having obtained the relevant licence for derogation from the regulations from the Statutory Nature Conservation Organisation (the SNCO - Natural England in England).

In order to obtain such a licence the SNCO must apply the requirements of Regulation 535 of the Regulations and, in particular, the three tests set out in sub-paragraphs (2)(e), (9)(a) and (9)(b)6. These are as follows:

- (1) Regulation 53(2)(e) states: a licence can be granted for the purposes of “preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment”.
- (2) Regulation 53(9)(a) states: the appropriate authority (the SNCO) shall not grant a licence unless they are satisfied “that there is no satisfactory alternative”.
- (3) Regulation 53(9)(b) states: the appropriate authority (the SNCO) shall not grant a licence unless they are satisfied “that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.”

Newts are likely to be disturbed by any work that involves altering their breeding ponds (e.g. by introducing fish, deepening or altering its size) or works that involve clearing land up to 500m around

ponds, and in such cases a licence for derogation from the provisions of the habitat regulations may need to be obtained.

Appendix 9 – Badgers

Badger ecology

The European Badger (*Meles meles*) is one of Britain's most well loved and charismatic mammals. They can grow to a metre in length and weigh up to 14 kilos. They are Britain's largest meat eating mammal, having a diverse omnivorous diet consisting of a wide variety of foodstuffs from fruit and cereals to small mammals and invertebrates, though the mainstay of their diet is earthworms and insect larvae.

Badgers belong to the Mustelidae family and close relatives include otters, mink, weasels and stoats. They are found throughout Britain and historically have been persecuted by badger baiters and diggers, which is unfortunately still the case.

Badgers are creatures of habit, with most living in a social group (or family) occupying a distinct territory. Social groups are normally around 5 or 6 adults in size; however groups of more than 20 animals have been recorded, and in areas where badger numbers are low, pairs of animals or single individuals may be encountered.

Badgers are territorial and a social group's territory is normally well defined and demarcated by dung pits. Territory size depends on habitat quality and ranges from 25 – 150 hectares, with a typical territory being around 60 hectares.

Badger cubs are born between December and July; the majority in March and April. Most social groups produce one litter per year although larger groups may produce more. Normally 3 -4 young are born per litter with around 40% surviving to adulthood.

Badgers sleep and rear their young in underground complexes known as setts. Setts may be used for decades and the large piles of excavated earth and soil can significantly alter the local landscape. Settle entrance holes are approximately 25cm in diameter and can be mistaken for holes used by rabbits or foxes; indeed badgers will sometimes co-habit with other species. Each sett comprises tunnels and chambers and can have several entrance holes. Badger setts can extend to 20m from the entrance holes and several metres underground.

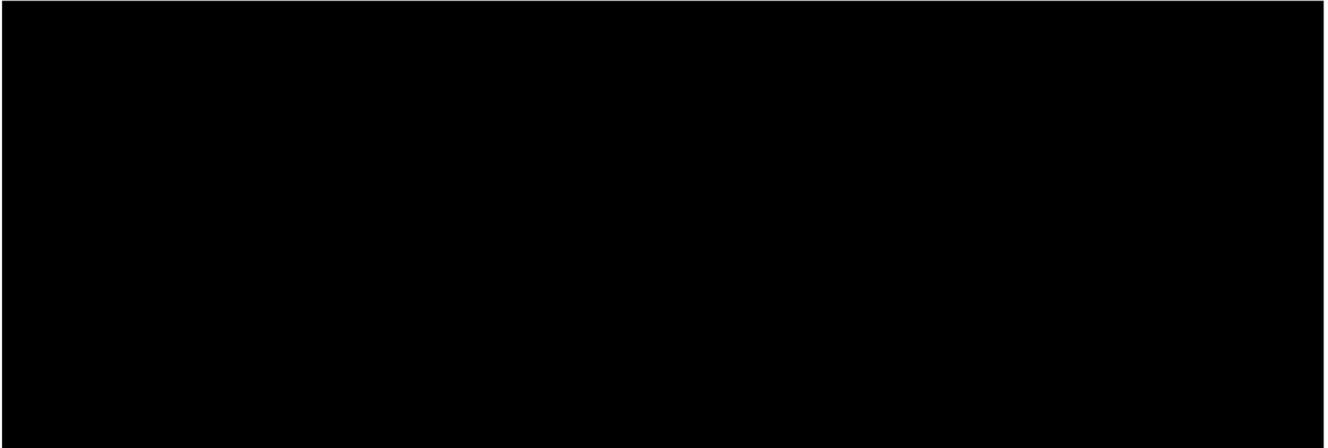
Social groups have a number of setts throughout their territory with each sett performing a different function. They can be classified as follows:

Main setts: These are continuously used, well established and often have extensive piles of spoil at their entrance. There is usually only one main sett per social group, which tends to be located close to the centre of the group's territory and is likely to have well-worn paths leading to it. The number of entrance holes can vary between 3 and 180, however a typical main sett has between 7 and 20 entrance holes. The majority of cubs are born in the main sett.

Annexe setts: These are usually located within 150m of the main sett and linked by well used paths. They consist of several holes, but are not necessarily in use all the time. Cubs are sometimes born and raised in these setts.

Subsidiary setts: These usually have more than three holes, are usually at least 50m from a main sett, and do not have an obvious path connecting them with another sett. They are not continuously active but are often well used.

Outlier setts: These usually only have one or two holes, have no obvious path connecting them with another sett, and are not usually in constant use.



For badgers, with their powerful claws and legs for digging and moving earth, opening up new setts and maintaining and extending old setts is a constant occupation, with bursts activity at certain times of the year. Although the pattern of sett use by badgers usually remains constant it can also change: either slowly, over a period of years, or suddenly, in response to changes in the environment such as drought or flood, in which situation new setts can be opened up relatively quickly (sometimes in a matter of days).

Legislation

The legislation relating to the protection of badgers is mainly contained within the Protection of Badgers Act 1992 ('The Act'), with some protection also given under the 1981 Wildlife and Countryside Act [as amended]. The Act fully protects badgers and their setts and makes it an offence to kill, injure or take a badger, to cruelly ill-treat a badger or to interfere with a badger sett (defined "any structure or place that displays signs indicating current use by a badger.'). Under The Act Natural England has the authority to issue licences to interfere with badger setts for the following purposes:

For development purposes;

To prevent serious damage to land, crops, poultry or any other form of property (e.g. house, garden, road etc);

Any agricultural or forestry operation;

Any operation to maintain or improve any existing watercourse or drainage works, or to construct new works required for the drainage of land, including works of defence against sea or tidal water;

To prevent the spread of disease.

Licences will only be issued where it is demonstrated that all three of the following tests are met:

A licence is required (e.g. the badgers or their setts subject to the application are causing or are likely to cause a serious problem or are preventing legitimate operations);

There is no alternative to issuing a licence (e.g. other methods of managing the problem or carrying out the operation have been shown to be ineffective or impractical and not just difficult to implement)

The activity to be licensed is likely to resolve or to contribute to resolving the matter for which it has been issued.

Sett closures

Under certain circumstances badger setts may be excluded and destroyed under licence from Natural England as long as certain tests are met (see above). Sett closure involves fitting one-way gates over entrance holes with galvanised wire pinned to the ground around the gate, sometimes backed up by electric fencing to stop animals entering the exclusion area. Once fitted the gate is left open to allow animals to become accustomed to it and then closed so that animals can leave but not-re-enter the sett. After a period of no activity (usually 3 weeks) the setts are filled in and the sett can be considered closed. Sett closures can only be carried out between 1 July and 1 December, and a period of 6 weeks (to allow for any unforeseen circumstances) should be set aside for sett exclusion. In certain circumstances (where a main, annexe or subsidiary sett is being closed) it may be necessary to provide an artificial sett prior to the sett exclusion

Appendix 10 - About GS Ecology

Established in 2009, GS Ecology is an independent ecological consultancy in Berkshire. We carry-out surveys and ecological consultancy services for public and private sector clients including in Berkshire, Oxfordshire and Hampshire, London and the south of England. We can advise you on cost effective sustainable solutions for your project, whether it be a bat survey to inform a planning application, the ecology chapter of an Environmental Statement or a Woodland Management Plan.

Our work is undertaken by experienced and qualified ecologists, who are members of the Chartered Institute of Ecology and Environmental Managers. Our services include:

Ecology surveying and reporting to inform planning applications, e.g.

Preliminary Ecological Appraisal

Extended Phase 1 Habitat Survey

Protected species surveys, e.g. badgers, dormouse, great crested newts

Bat surveys in Oxfordshire, Berkshire, Hampshire, London and Southern England

BREEAM ecology assessments – to demonstrate the sustainability of a new building

Protected species licensing such as bat and great crested newt licences for development sites after planning permission has been obtained

Providing advice to land managers and writing ecological management plans, such as woodland management plans and farm environmental plans for England woodland Grant Scheme and Environmental Stewardship applications

Providing ecology advice to Local Authorities and Local Planning Authorities