



LIZARD

Landscape Design and Ecology

MR C HARRIS

The Old Cottage & Bridge Cottage, Lidsey

- Preliminary Ecological Appraisal Survey
- Preliminary Bat Roost Assessment
- HSI Assessment

Planning Issue

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LIZARD

Landscape Design and Ecology

The Old Bank, 34 South Street, Tarring, Worthing, West Sussex, BN14 7EH

SUMMARY

Lizard Landscape Design and Ecology has been commissioned by Mr C Harris to undertake a Preliminary Ecological Appraisal of land at The Old Cottage and Bridge Cottage, Lidsey Road, Lidsey (*Grid Reference: SU 939 031– hereafter referred to as 'the site'*). A Preliminary Ecological Appraisal (*PEA*) was undertaken of the site on 07th December 2017 and 11th January 2018.

The ecological survey has identified habitats of amenity grassland; tall ruderal; scattered trees and hard standing with hedging / tree lines to the boundaries. All of the above habitats are common and widespread.

The preliminary bat roost assessment of the buildings on site, revealed a small accumulation of bat droppings within the roof void of **Building B1 – The Old Cottage** (*confirmed via DNA analysis as belonging to Common Pipistrelle (Pipistrellus pipistrellus)*) while a small number of potential bat access points were recorded to the roof of **Buildings B2 and B6**. The findings on site are highly suggestive of the building supporting a small number of bats of a common species, which would categorise the roost as being of '*low conservation status*'. A proposed mitigation strategy is included in Section 7.0 below, the recommendations of which could easily be incorporated into the detailed scheme at a later date.

2 no. trees on site (**T01 and T02**) were considered to offer some level of bat roost suitability during the ground-level inspection. Should these trees require removal, it is recommended that an aerial inspection of these features is undertaken.

Small areas of suitable reptile habitat exist to the site boundaries. A reptile survey is recommended prior to development of the site to ascertain the presence / likely absence of reptiles on site. A proposed Mitigation Strategy (*should reptiles be found*) is included below.

No other ecological constraints exist on this site.

1.0 INTRODUCTION

- 1.1 Lizard Landscape Design and Ecology has been commissioned by Mr C Harris to undertake a Preliminary Ecological Appraisal of land at The Old Cottage and Bridge Cottage, Lidsey Road, Lidsey (*Grid Reference: SU 939 031– hereafter referred to as 'the site'*).
- 1.2 A Preliminary Ecological Appraisal (*PEA*) was undertaken of the sites on 07th December 2017 and 11th January 2018, to appraise the existing ecological resource within the site and the surrounding area. The *PEA* was comprised of a baseline survey conforming broadly to the *JNCC Ecology Phase 1 Habitat Survey protocol*, to identify the existing habitats. In addition, a protected species assessment was undertaken to identify the potential for European and nationally protected species within and adjacent to the site.
- 1.3 The field survey data and analysis contained in this report was undertaken and prepared by Catherine O'Reilly (*BSc; Project Ecologist; NE Class 2 Bat Licence Holder; Lizard Landscape Design and Ecology*). The report has been reviewed by Joe Jackson; (*Principal; Landscape Architect BA (Hons) LA DipLA CMLI; Lizard Landscape Design and Ecology*).

Site Information

- 1.4 The development site is located due east of Lidsey Road, within the hamlet of Lidsey. The site area is c. 6.00 metres above sea level and measures approximately 1.1 hectares, formed of amenity grassland, parking, access and 2 no. existing residential dwellings. The site is bounded by native hedging, tree lines and fencing to all aspects.
- 1.5 The site is bordered by arable land to the north, south and east, with a caravan site beyond Lidsey Road to the west. Soil on site is described as being freely draining, slightly acid, loamy soil. There are small ornamental ponds located on site.

Surrounding Landscape

- 1.6 A large caravan park lies beyond the A29 to the west while the remaining surrounding landscape is dominated by arable farmland delineated by mature hedge and tree lines. The area contains little in the way of surrounding woodland with the nearest area of woodland listed on the *National Forest Inventory* being a 0.31 hectare plot located 990.0 metres north-east.

Development Proposals

- 1.7 The proposals involve demolition of the existing properties followed by construction of new residential units.

2.0 SCOPE OF THE SURVEY

- 2.1 The aim of the preliminary ecological appraisal survey has been:
- *To identify and display the main habitat types and plant communities;*
 - *To provide a species list for the major habitats;*
 - *To identify habitats with potential for protected species;*
 - *To provide recommendations for surveys of protected species and / or ecological enhancement / compensation.*
- 2.2 The aims of the preliminary bat roost assessment survey were:
- *To identify the potential for roosting bats;*
 - *Identify areas where future detailed survey effort would be required and should be focused;*
 - *To establish whether other habitat features for different species groups exist to warrant further investigation.*
- 2.3 The aims of the HSI assessment was to:
- *Assess all waterbodies with 500.0m of the site against 10 no. criteria;*
 - *Assess the sites suitability for supporting a population of GCN;*
 - *Identify the need for further survey work if necessary.*
- 2.4 This report establishes the potential ecological resource within the site and outlines where any ecological constraints may occur.

3.0 METHODOLOGY

- 3.1 A Preliminary Ecological Appraisal was undertaken on 07th December 2017 and 11th January 2018 during which, the site was subjected to an ecology survey using guidelines set out in the *Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit (JNCC, 2003)*. This has resulted in a Site Habitat Plan (*Figure No. 01*), Species Lists for Habitat Parcels (*Table No. 04*) and Target Notes (*Table No. 05*).
- 3.2 Habitats within the site were classified and the presence, or potential presence, of certain protected and / or notable species of flora and fauna were identified. A summary description of the habitat within the site following the ecology phase 1 habitat survey methodology is presented in *Section 4.0*.
- 3.3 Due to the field survey consisting of only one site visit, certain species, particularly some of the flowering plants may not have been visible or may have been otherwise inconspicuous at the time of survey and hence overlooked. These are accepted constraints associated with the standard ecology phase 1 habitat survey methodology.
- 3.4 Habitats within and immediately adjacent to the site were assessed for their potential for uncommon and protected fauna including mammals; birds; reptiles; and amphibians. This involved identifying features that may be used by protected species, potential foraging areas and other signs of use. Water bodies were recorded, wherever possible within 500 metres of the proposed development site.
- 3.5 The results are summarised and accompanied in large part by photographic evidence contained in *Appendix A – Site Photographs*. Recommendations for further investigation and survey are made in the following report.

Preliminary Roost Assessment

3.6 A preliminary bat roost assessment of accessible buildings and trees was undertaken on 11th January 2018, by an experienced bat surveyor. Each building, which will be impacted by the development proposals was searched for features which could be used by bats or which indicate their presence such as:

- *Slipped / lifted roof or hanging tiles;*
- *Raised flashing;*
- *Gaps in brickwork;*
- *Gaps at the eaves;*
- *Droppings;*
- *Grease marks;*
- *Urine splashes.*

3.7 Each tree was searched for potential bat roost features such as:

- *Woodpecker Holes;*
- *Hazard Beams;*
- *Cracks / Splits;*
- *Bark Plates;*
- *Cavities from Knot Holes, Canker, or Pruning Wounds;*
- *Compression Forks;*
- *Ivy with stem diameter in excess of 50mm.*

3.8 Any bat droppings found were collected and sent to SureScreen Scientifics Ltd for DNA analysis to ascertain species.

- 3.9 Once features had been assessed, trees and buildings on site were categorised in accordance with *Table 4.1 of the Bat Conservation Trust's Good Survey Guidelines (2016)*:

Category	Building	Trees
Negligible	No suitable features identified.	No suitable features identified.
Low	A structure which, could be used opportunistically, however, are not likely to be used on a regular basis by a large number of bats.	Tree of sufficient size / age to support bat roost features; but with none identified from the ground.
Moderate	A building with features, which could be used regularly by a small number of bats.	Tree with features, which may support a bat roost of low conservation status.
High	A building with features suitable for use by a large number of bats on a regular basis.	A tree with several potential bat roost sites that are suitable for use by a large number of bats.

Great Crested Newt Habitat Suitability Index Assessment

- 3.10 The *Habitat Suitability Index (HSI)* was developed by *Oldham et al (2000)* as a way of providing a numerical index allowing a direct comparison to be made between different water bodies. This index assesses ponds against 10 no. different criteria, each of which have a bearing on the likelihood of great crested newts (*Triturus cristatus*) being present in the pond under consideration.

- 3.11 The 10 no. attributes against which ponds can be assessed are:

- *Geographic Location;*
- *Pond Area (at its highest level);*
- *Permanence;*
- *Water Quality;*
- *Perimeter Shading;*
- *Numbers of Wildfowl;*
- *Numbers of Fish Present;*
- *Pond Count (within a 1.0 km radius);*
- *Terrestrial Habitat (within 250.0 m);*
- *Macrophyte Coverage.*

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- 3.12 The *HSI* results in a score between 1 and 0; with 1 being optimal conditions and 0 being unlikely to support a population. However, the index merely gives an indication as to whether a pond has the potential to support great crested newts and is not a substitute for more detailed presence / absence surveys for protected species of amphibian.

4.0 RESULTS

4.1 Desk Study – Background Information

Designated Sites and Habitats

- 4.1.1 The following section outlines the ecological context of the development site, describing any designated nature conservation sites in the vicinity of the development site. The following designated sites and habitats are not necessarily representative of the existing site's ecology, but are indicative of the ecological context of the surrounding area; a factor that may be important when assessing the presence / absence potential of certain species groups.

Statutory Protected Sites

- 4.1.2 Statutory protected sites located within 2.0 km of the site are shown in *Table No. 01* below.

Table No. 01 – Statutory Protected Sites within 2.0km

Site	Reason for Designation	Location
The Brooks LNR.	A 19.11-hectare site providing a variety of habitats, which supports species including water vole (<i>Arvicola amphibious</i>); black poplar trees (<i>Populus nigra</i>); and a breeding population of skylark (<i>Alauda arvensis</i>).	1.5km SW

- 4.1.3 The development site is located within the *Impact Risk Zone* of *Bognor Reef SSSI*, however, development proposals do not meet the criteria which would trigger consultation with Natural England.

Non-Statutory Protected Areas

- 4.1.4 There are no non-statutory protected sites located within 2.0km of the site area.

UK Priority Habitats

- 4.1.5 Within 2.0 kilometres of the site there are *UK Priority Habitats of Deciduous Woodland and Coastal and Floodplain Grazing Marsh*. The surrounding landscape is primarily formed of arable land with a 'low' percentage of *Priority Habitat* present.

UK Priority Species

- 4.1.6 UK Priority and other protected species relevant within Sussex include terrestrial mammals such as brown long eared bats (*Plecotus auritus*) and common pipistrelle bats (*Pipistrellus pipistrellus*). Both of these species have previously been recorded within 5.0 kilometres of the site.
- 4.1.7 All species of bat and their roosts are protected under *Regulation 41* of the *Conservation of Habitats and Species Regulations 2010* and *Section 9* of *The Wildlife and Countryside Act 1981*. It is an offence for anyone intentionally to kill, injure or handle a bat, to possess a bat (*whether live or dead*), disturb a roosting bat, or sell or offer a bat for sale without a licence. It is also an offence to damage, destroy or obstruct access to any place used by bats for shelter, whether they are present or not.
- 4.1.8 Recent records of grass snake (*Natrix helvetica*) and slow worm (*Anguis fragilis*), exist within 2.0km of the site. All UK reptile species are protected against killing / injuring under *The Wildlife and Countryside Act 1981 (As amended)*.

4.2 Field Survey

4.2.1 The following habitats and features were recorded within the development site and the extended survey area. The general site character has been described along with a brief description of the habitat's physical characteristics. These are shown on the Site Habitat Plan in *Figure No. 01* with Species Lists for Habitat Parcels listed in *Table No. 05* and *Target Notes* in *Table No. 06*.

4.2.2 Habitats within and adjacent to the development site area include:

- *Amenity Grassland;*
- *Tall Ruderal / Rough Grassland;*
- *Intact Species-poor Hedge;*
- *Scattered Trees;*
- *Introduced Shrub;*
- *Orchard;*
- *Hard / Bare Ground.*

Site Description (Refer to Appendix A – Site Photographs)

4.2.3 The site is formed of 2 no. large residential plots, dominated by amenity grassland and scattered trees with the existing dwellings to the centre of the gardens.

Amenity Grassland

4.2.4 The site is dominated by well-maintained amenity grassland, regularly mown to a height of c. 10cm. Composition of the sward is typical of the habitat type; grasses such as perennial rye-grass (*Lolium perenne*) and fescue (*Festuca* sp.) dominate the sward interspersed with occasional forbs including daisy (*Bellis perennis*); dandelion (*Taraxacum officinale*); and creeping buttercup (*Ranunculus repens*).

Tall Ruderal / Rough Grassland

- 4.2.5 Artificial mounds and bunds within the Old Cottage site are dominated by tall ruderal species between 20 - 60cm in height. Species present include occasional Bristly ox-tongue (*Picris echinoides*); hogweed (*Heracleum sphondylium*); Canadian fleabane (*Conyza canadensis*); and smooth-sow thistle (*Sonchus oleraceus*); with cocks-foot (*Dactylis glomerata*); and yorkshire fog (*Holcus lanatus*); grasses dominating.
- 4.2.6 Small areas of tall ruderal and rough vegetation exists to the boundaries of the Bridge Cottage section of the site, particularly to the northern and eastern boundaries. These areas are interspersed with areas of scrub, log and compost piles.

Intact Species-Poor Hedge

- 4.2.7 The northern and eastern boundaries of the site are delineated by hedgelines while numerous other formal hedges compartmentalise areas of the site. The eastern boundary is formed of Leyland hedgeline while the north-eastern section of boundary is native hedging comprising Hawthorn (*Crataegus monogyna*); Elder (*Sambucas nigra*); Cypress (*Cupressus* sp.); Dog Rose (*Rosa canina*); and Bramble (*Rubus fruticosus*) leading to Poplar (*Populus* sp.) treeline to the north-western section.
- 4.2.8 Formal hedging within the main body of the Old Cottage section of the site includes tightly clipped Yew (*Taxus baccata*) hedging and pleached Beech (*Fagus sylvatica*) trees.

Scattered Trees

- 4.2.9 Numerous scattered native and ornamental trees are located throughout the eastern section of the site. Species such as Sycamore (*Acer pseudoplatanus*); Cherry (*Prunus* sp.); and Willow (*Salix* sp.); dominate the less-formal southern section of the site while the garden areas have been planted with non-native species including Eucalyptus (*Eucalyptus gunnii*); Turkey Oak (*Quercus cerris*); sorbus sp., Empress Tree (*Paulownia tomentosa*); and Holm Oak (*Quercus ilex*).

- 4.2.10 Scattered trees within the western section of the site are more limited, with Cypress sp. (*Cupressus* sp.) and Poplar sp. tree lines to the boundaries and scattered Cypress trees within the main body of the site.

Introduced Shrub

- 4.2.11 Small formal shrub beds surround the existing buildings.

Orchard

- 4.2.12 A small number of fruit trees including Apple (*Malus* sp.) and Pear (*Pyrus* sp.) varieties are growing within the northern section of the site. The ground flora within these areas is well-maintained amenity grassland which is regularly mown.

4.3 Preliminary Bat Roost Assessment

Existing Trees

- 4.3.1 A small number of trees on site were identified as offering some bat roost suitability, these are shown in Table No. 2 below.

Table No. 02 – Trees which offer Bat Roost Suitability

Tree Ref.	Description	Category
T01	A semi-mature poplar tree to the northern site boundary with 2 no. woodpecker holes to the southern aspect at approximately 6m and 7m height.	‘Moderate’
T02	A pollarded Willow tree with single woodpecker hole located to the north-eastern aspect at approximately 3m height.	‘Low’

Buildings

- 4.3.2 The Old Cottage (**Building B1**) is a two-storey cottage of flint and brick construction with clay tile roof complete with eyebrow dormers to the north-eastern aspect. The oldest section of the cottage is believed to date from the 15th century, with a small Victorian addition to the northern gable end and a more recent extension (*approximately 15 years*) to the north-east. 2 no. chimneys are present, one to the centre of the building and one to the north-western gable end. The existing property was re-roofed 4 years ago.

- 4.3.3 Internally, 2 no. roof voids exist within the property. The roof void to the older cottage section is fully boarded and used for the storage of boxes. A central chimney stack and water tank effectively divide the space into 2 no. compartments. A very light scattering of bat droppings of a size and shape indicative of Brown Long-eared bats (*Plecotus auritus*) and pipistrelle sp. bats were recorded to the south-eastern section of the building while an accumulation of bat droppings was recorded to the southern aspect of the northern chimney (*confirmed through DNA analysis as being Common Pipistrelle (Pipistrellus pipistrellus)*).
- 4.3.4 Further scatterings of small numbers of bat droppings were recorded within the roof void of the more recent extension. These droppings were also of a size and shape indicative of pipistrelle bats.
- 4.3.5 **Building B2** is a single-storey double garage of brick construction with clay tile roof. Tiles are backed by roofing membrane while the void is open to the room below. The garage is used for storage and as such not all areas were accessible. No evidence of bats was recorded internally, however, a number of slipped / lifted roof tiles were noted which could allow access into the fabric of the building.
- 4.3.6 **Building B3**; a large L-shaped single-storey garage is located approximately 20.0m north-west of **Building B1**. This building is of recent construction with a zinc roof complete with skylights. No evidence of bats or any potential access points were recorded anywhere within this building.
- 4.3.7 **Building B4** is a disused stable block of typical wooden construction with felt roof. The building is in poor condition and is considered to be too wet and thermally instable to support a bat roost.
- 4.3.8 **Building B5** is a wooden stable building with corrugated roof which is currently used as a wood store. The building is considered to be too light internally and thermally instable to support a bat roost.

- 4.3.9 Bridge Cottage (**Building B6**) is a two-storey painted brick building with thatched roof. Windows and brick work appeared to be in good condition. 2 no. recent extensions exist to the northern and north-western sections of the site, these are of brick construction with tile roof in good condition. Small gaps were recorded between wooden panels at the eaves of the main house. No evidence of bats was recorded with the roof voids of the building.
- 4.3.10 **Building B7** is a detached double garage with small lean-to constructed to the north-east. The building is of block construction with flat felt roof.

Table No. 03 – Summary of Preliminary Bat Roost Assessment

No.	Internal	External	Category
B1	A small number of bat droppings scattered throughout the void with an accumulation to the north-western chimney.	Potential access points beneath tiles and at flashing around chimney for Bats.	'Confirmed'
B2	No evidence.	Small number of slipped / lifted roof tiles.	'Low'
B3	No evidence. High levels of ambient light.	No potential access points.	'Negligible'
B4 & B5	No evidence.	Potential access points however, the construction of the building is not conducive to supporting a bat roost.	'Negligible'
B6	No evidence. Dense cobwebs throughout.	Small crevices at the eaves.	'Low'
B7	No evidence.	No evidence.	'Negligible'

4.4 Pond Inspection

- 4.4.1 Ponds within 250.0 metres of the proposed development site (*and on the near-side of any barriers*) were appraised for their potential to support protected species.

4.4.2 **Pond P1** is a small ornamental pond located to the north-western sector of the proposed development site. The pond measures c. 50m² with a depth of around 50cm. The pond was well stocked with goldfish with macrophytes including water lily and hornwort with 2 no. stands of reedmace. The pond is surrounded by formal yew hedging and amenity grassland.

4.4.3 **Pond P2** is a small defunct pond c. 3.0 x 5.0 m located to the western section of the site. The pond was holding approximately 10cm of water at the time of the survey. The pond usually contains fish, however, these were recently removed when the pond began leaking. No macrophytes or emergence vegetation was noted.

4.4.4 **Pond P3**, located 15m north of the proposed development site, is an ephemeral water body coving an area of approximately 700m². This contained numerous willow trees with a layer of leaf litter to the base. The pond lacked any macrophyte coverage bar a small area of duckweed to the east and therefore, is considered to only hold water during periods of extended rainfall.

Habitat Suitability Index Assessment of Surrounding Ponds

4.4.5 A *HSI* assessment of all waterbodies was undertaken to assess their suitability for supporting a population of *GCN*. A table summarising the *HSI* results is shown in *Table No. 04*.

Table No. 04 – Full Results of Habitat Suitability Index Assessment

<i>HSI Category</i>	<i>P1</i>	<i>P2</i>	<i>P3</i>
Location	1	1	1
Pond Area	0.1	0.05	1
Pond Drying	0.9	0.1	0.5
Water Quality	0.67	0.33	0.33
Shade	1	1	0.6
Fowl	1	1	1
Fish	0.33	0.01	1
Surrounding Ponds	0.4	0.4	0.4
Terrestrial Habitat	0.67	0.67	0.33
Macrophyte Coverage	0.8	0.3	0.3
Score:	<i>0.57</i>	<i>0.25</i>	<i>0.57</i>
Suitability:	<i>'Below Average'</i>	<i>'Poor'</i>	<i>'Below Average'</i>

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5.0 EVALUATION

- 5.1 The ecological survey has identified habitats of amenity grassland; tall ruderal; scattered trees and hard standing with hedging / tree lines to the boundaries. All of the above habitats are common and widespread.
- 5.2 Botanical interest on the site at the time of survey was very limited with the vast majority of the site area comprised of well-maintained amenity grassland. The habitat in general is very uniform and lacks significant structural variation. It is suggested therefore, that the bulk of the development site area be considered of '*low ecological value*'.
- 5.3 The small areas of tall ruderal and rough grassland to the boundaries of the site could provide some suitable reptile habitat. The surrounding landscape is arable and as such is unlikely to act as a source population for reptiles within the site; any reptiles present are likely to be an isolated remnant population therefore, the site is not expected to harbour large numbers of reptiles (*if at all*).
- 5.4 All UK reptile species are protected against killing / injuring under *The Wildlife and Countryside Act 1981 (As Amended)*. Should the development propose to remove areas of suitable reptile habitat, a full reptile survey will be recommended prior to works beginning on site. The survey will consist of 7 no. survey visits undertaken during the reptile active season (*mid-March – October*). The results will be used to formulate a mitigation strategy (*should reptiles be found*), which will include the incorporation of 'buffer strips' to act as a reptile receptor zone followed by translocation / staggered vegetation clearance as appropriate. A suggested mitigation strategy is included in Section 7.0 below.
- 5.5 All ponds 250m of the site were subject to a full HSI assessment, which found them to offer '*below-average*' – '*poor*' habitat suitability. Given the generally poor terrestrial in the wider area; and the lack of connectivity to suitable waterbodies; the site is considered to have '*negligible*' potential to support a population of great crested newts.

- 5.6 2 no. trees on site were considered to offer some level of bat roost suitability during the ground-level inspection. Should these trees require removal / be subject to disturbance it is recommended that an aerial inspection of the features identified from the ground is undertaken. Should these features then be found to contain evidence of a bat roost, further emergence surveys will be required to assess whether the trees support an active bat roost. Should a bat roost be found, a licence from Natural England will be required prior to removal of these trees.
- 5.7 The preliminary bat roost assessment of the buildings on site revealed a small number of bat droppings confirmed as belonging to Common Pipistrelle and very few, old droppings belonging to Brown Long-eared bats within the roof void of **Building B1**. In addition to this, a small number of potential access points for bats were recorded to the roofs of **Building B2** and **Building B6**. *Buildings B3, B4, B5 and B7* are all considered to offer '*negligible*' bat roost suitability.
- 5.8 The evidence found on site is indicative of a small day bat roost of single male / non-breeding females of a common species. Bat roosts such as these are classed as being of '*low conservation status*'. In order to assess how, and in what numbers (*if at all*) bats are currently using the buildings on site, full emergence surveys will be required before detailed design of the site. Data obtained will be used to apply for an EPSM licence from Natural England to allow destruction of the roost (*should an active bat roost be present*), a likely mitigation strategy is included in Section 7.0 below.
- 5.9 The site was searched extensively for signs of other protected species, particularly badger (*Meles meles*), and no evidence was found.

6.0 PROTECTED SPECIES – CONCLUSIONS AND RECOMMENDATIONS

Reptiles

- 6.1 As all suitable reptile habitat on site is likely to be lost as part of this development, a full reptile survey is recommended to ascertain the presence / absence and numbers of any reptile species present. The survey will consist of 7 no. survey visits undertaken during the reptile active season (*mid - March – October*).

GCN

- 6.2 The ponds within 250m of the site considered to offer '*poor*' - '*below-average*' habitat suitability. The site is considered to have '*negligible*' potential to support a population of amphibian.

Birds

- 6.3 All active birds' nests are protected against damage / destruction under *The Wildlife and Countryside Act 1981 (as amended)* therefore, it is advised that clearance of any trees / dense shrubs take place outside of the bird nesting season (*Season: March-August*) or after careful inspection to ensure no active birds' nests are present.

Bats

- 6.4 A total of 1 no. dawn and 2 no. dusk emergence / re-entry surveys should be undertaken of **Building B1** during the optimal survey season (*May - September with at least 2 no. surveys during the peak months of May - August*) and in suitable weather conditions (*+10°C, dry, calm*) in accordance with best practice guidelines. **Buildings B2 and B6** require 1 no. dawn or dusk survey visit between May – August. Should an active roost be found a licence from NE will be required post planning approval.

Dormouse

- 6.5 Hedges and treelines on site are considered to lack the required complexity and species composition to support a population of dormice. In addition, the site is not directly connected to any area of suitable woodland. The site is considered to offer no suitable dormouse habitat.

Badger

- 6.6 Nothing indicative of a badger sett nor any foraging signs were identified on site. Should any holes indicative of a sett be found during site clearance all works in the vicinity should cease while a suitably qualified ecologist is contacted.

Water Vole / Otter

- 6.7 No suitable water courses flow within or adjacent the site, the site is considered to offer no suitable habitat for otter or water vole.

Flora

- 6.8 All habitats types and plant species on site are common and widespread with no rarities noted.

7.0 MITIGATION STRATEGY***Bats***

- 7.1 DNA analysis has confirmed the likely presence of a small roost of Common Pipistrelle bats to the southern aspect of the north-western chimney. The evidence found on site is highly suggestive of the roost being of '*low conservation status*' (small numbers of a common species).
- 7.2 Should an active bat roost be found within the building during the emergence surveys the data obtained will be used to apply for an EPSM licence from Natural England post planning approval should this be required.
- 7.3 Should a licence be required, temporary bat boxes (*such as Double crevice bat box*) will be installed to a mature tree in the vicinity of the site. Following granting of the mitigation licence, features of the building surrounding bat access points will be soft stripped by hand under ecological supervision. Once the building has been declared free of bats it will be demolished to make way for development. Based upon the assumption that the roost is of '*low conservation status*', there are minimal timing constraints relating to the demolition of the roost.

- 7.4 Integrated bat boxes (*such as Schwegler bat tube or similar*) would be incorporated into the new buildings at a location and aspect which most closely matches that of the original. These bat boxes will provide long-term mitigation for the loss of the potential bat roost within the existing building on site.
- 7.5 Given the evidence found on site, the building is likely to support a small bat roost of male / non-breeding females. No evidence which would indicate the presence of a maternity colony was recorded. Given the likely low conservation status of the roost it is felt that any mitigation could easily be incorporated into the design of the scheme at a later date.

Reptiles

- 7.6 Prior to development taking place, a reptile presence / absence survey should be undertaken on site. Should reptiles be found, the following mitigation will be implemented.
- 7.7 A receptor zone will be identified within the site. This will be roughly equivalent to the size of reptile habitat which will be lost, while also providing connectivity to suitable off-site habitat. The receptor zone will be allowed to develop into suitable reptile habitat prior to any works taking place on site, the area will be further enhanced with compost heaps, log piles and hibernaculum.
- 7.8 Temporary Reptile Fencing (TRF) will be installed to the boundaries of the construction zone by a suitable contractor under the supervision of a suitably qualified ecologist.
- 7.9 Additional artificial refugia will be laid to all areas of suitable habitat. These will be left to 'settle' for 14 days prior to commencement of the reptile translocation. Site visits will be undertaken in suitable weather conditions (*9-18°C, warm, dry*) during which any reptiles encountered will be stored in a cloth bag prior to being released within the receptor zone. Site visits will continue until 5 no. days have passed where no reptiles have been found.

- 7.10 Following completion of the translocation exercise, a destructive search under ecological supervision will be undertaken to ensure no reptiles remain within the construction zone. Upon completion the site will be declared free of reptiles and released for construction.

8.0 ECOLOGICAL ENHANCEMENTS

- 8.1 The design of the proposed development should consider ecological enhancements for the benefit of wildlife in line with the *National Planning Policy Framework* and *Local Planning Policy*. Recommendations for ecological enhancements that could be considered as part of development proposals could include:

- *The use of plants listed within the RHS 'Perfect for Pollinators' plant list to provide year-round interest for invertebrates;*
- *Planting of a new native species-rich hedgerows (such as hawthorn; blackthorn; guelder rose; holly; spindle; and dogwood) to the boundaries of the development along with native, seed / fruit bearing trees.*
- *The provision of bird nest boxes to matures existing trees;*
- *The installation of a suitable bat box to mature trees;*
- *Use of a sympathetic lighting scheme across the site, with lighting angled down and away from hedge / tree lines and bat boxes;*
- *The use of pale and night-scented species around the site will increase bat foraging potential. Species could include jasmine; michaelmas daisy; and evening primrose.;*
- *Use of wildflower seeding within areas of open space / habitat creation areas. A matrix of native trees, scrub and rough grassland will provide habitat for invertebrates in turn providing a foraging resource for birds, bats and reptiles. Log piles and compost heaps should be provided for refuge;*
- *Use of hedgehog friendly gravel boards to allow easy passage of hedgehogs around the site. These should be signed with 'hedgehog highway' signs (available from PTES) or similar to prevent their closure;*
- *Installation of a hedgehog house within areas of scrub;*
- *Digging a new replacement pond to compensate for the 2 no. which will be lost. The pond should be 15-50cm deep with shallow sloping sides.*

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9.0 REFERENCES

- *JNCC: Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit*; (2003);
- *Collins J (ed): Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd ed.) The Bat Conservation Trust (2016);*
- *Mitchell-Jones and McLeish: Bat Workers Manual; JNCC, 3rd Edition (2004);*
- *Streeter, D.: The Most Complete Guide to the Flowers of Britain and Ireland; Harper Collins, London (2010);*
- *English Nature (2001) Great Crested Newt Mitigation Guidelines, English Nature;*
- *Froglife (2001) Great Crested Newt Conservation Handbook. Froglife;*
- *Joint Nature Conservation Committee, (1998) Herpetofauna Workers' Manual. JNCC, Peterborough;*

Table No. 05 – Species List for Habitat Parcels**Tall Ruderal**

Common Name	Scientific Name	DAFOR
Bristly Oxtongue	<i>Picris echioides</i>	O
Canadian Fleabane	<i>Conyza canadensis</i>	LF
Cleavers	<i>Gallium aparine</i>	LF
Cocks Foot	<i>Dactylis glomerata</i>	D
Cow Parsley	<i>Anthriscus sylvestris</i>	LF
Daisy	<i>Bellis perennis</i>	O
Dock	<i>Rumex obtusifolius</i>	F
Dovesfoot Cranesbill	<i>Geranium molle</i>	O
Fescue	<i>Festuca sp.</i>	LD
Ground Elder	<i>Aegopodium podagraria</i>	O
Hogweed	<i>Heracleum sphondylium</i>	F
Lesser Celandine	<i>Ranunculus ficaria</i>	LA
Nettle	<i>Urtica dioica</i>	O
Prickly Sowthistle	<i>Sonchus asper</i>	O
Primrose	<i>Primula sp.</i>	O
Ribwort Plantain	<i>Plantago lanceolata</i>	O
Thistle	<i>Cirsium sp.</i>	R
White Dead Nettle	<i>Lamium alba</i>	O
Willowherb	<i>Chamerion angustifolium</i>	LA

Amenity Grassland

Common Name	Scientific Name	DAFOR
Chives	<i>Allium schoenoprasum</i>	LO
Clover	<i>Trifolium repens</i>	O
Creeping Buttercup	<i>Ranunculus repens</i>	O
Daisy	<i>Bellis perennis</i>	O
Dandelion	<i>Taraxacum officinale</i>	O
Ground Ivy	<i>Glechoma hederacea</i>	O
Hogweed	<i>Heracleum sphondylium</i>	O
Mosses	<i>Moss sp.</i>	LD
Perennial Ryegrass	<i>Lolium perenne</i>	D

Table No. 05 – Species List for Habitat Parcels (Continued)**Intact Hedge**

Common Name	Scientific Name	DAFOR
Ash	<i>Fraxinus excelsior</i>	O
Bramble	<i>Rubus fruticosus</i>	LD
Dog Rose	<i>Rosa canina</i>	O
Elder	<i>Sambucus nigra</i>	O
Hawthorn	<i>Crataegus monogyna</i>	A
Leyland Cypress	<i>Cupressus × leylandii</i>	LD

Scattered Trees / Tree Lines

Common Name	Scientific Name	DAFOR
Cherry	<i>Prunus sp.</i>	F
Cypress sp.	<i>Cupressus sp.</i>	LD
Empress Tree	<i>Paulownia tomentosa</i>	R
Eucalyptus	<i>Eucalyptus gunnii</i>	R
Field Maple	<i>Acer campestre</i>	R
Fig	<i>Ficus carica</i>	R
Goat Willow	<i>Salix caprea</i>	LF
Holm Oak	<i>Quercus ilex</i>	R
Horse Chestnut	<i>Aesculus hippocastanum</i>	F
Lombardy Poplar	<i>Populus nigra 'italica'</i>	LD
Magnolia	<i>Magnolia sp.</i>	R
Maidenhair Tree	<i>Ginkgo bilboa</i>	R
Oak	<i>Quercus robur</i>	R
Sycamore	<i>Acer pseudoplatanus</i>	A
Weeping Willow	<i>Salix babylonica</i>	LF
White Poplar	<i>Populus alba</i>	O

Table No. 06 – Target Notes

No.	Feature	Description
TN01	Tall Ruderal Vegetation.	Small areas of tall ruderal / rough grassland vegetation, which offers ' <i>low - moderate</i> ' suitability for supporting reptiles.
TN02	Bat Droppings.	Small accumulation of bat droppings to the southern aspect of the northern chimney of Building B1.
TN03	Bat Droppings.	Scattered droppings indicative of pipistrelle and brown long-eared bats located within the small Victorian extension of Building B1.
TN04	Bat Droppings.	Scattered droppings indicative of pipistrelle bats located within the most recent extension of Building B1.
TN05	Potential Bat Access Point.	Small number of lifted / missing roof tiles which could allow bat access into the fabric of the building.
TN06	Potential Bat Access Point.	Small gaps at the eaves between wooden boards to the south-eastern aspect.
TN07	Potential Refugia.	Compost heaps and log piles which increase the suitability of reptile habitat on site.

Appendix A – Site Photographs

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APPENDIX A - SITE PHOTOGRAPHS



Photograph No. 1 - View of the south-western aspect of Building B1. - The Old Cottage



Photograph No. 2 - View of the north-eastern aspect of Building B1. - The Old Cottage

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Photograph No. 3 - Small accumulation of bat droppings to the southern aspect of the northern chimney of Building B1. - The Old Cottage.



Photograph No. 4 - Building B2, assessed as providing 'low' bat roost suitability - the Old Cottage.

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APPENDIX A - SITE PHOTOGRAPHS



Photograph No. 5 - Internal view of Building B2. - The Old Cottage.



Photograph No. 6 - Building B3, assessed as providing 'negligible' bat roost suitability. - The Old Cottage.

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APPENDIX A - SITE PHOTOGRAPHS



Photograph No. 7 - Building B4, assessed as providing 'negligible' bat roost suitability.



Photograph No. 8 - Building B6, assessed as providing 'low' bat roost suitability.

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APPENDIX A - SITE PHOTOGRAPHS



Photograph No. 9 - Building B7, assessed as providing 'negligible' bat roost suitability. - Bridge Cottage.



Photograph No. 10 - Pond P1, assessed as providing '*below average*' habitat suitability for Great Crested Newts. - Bridge Cottage.

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APPENDIX A - SITE PHOTOGRAPHS



Photograph No. 11 - Pond P2, assessed as providing 'poor' habitat suitability for Great Crested Newts.



Photograph No. 12 - Pond P3, assessed as providing '*below average*' habitat suitability for Great Crested Newts.

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APPENDIX A - SITE PHOTOGRAPHS



Photograph No. 13 - Small areas of tall ruderal / rough grassland on site which are considered to offer 'low – moderate' reptile suitability.



Photograph No. 14 - Tree T01, assessed as offering '*moderate*' bat roost suitability.

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Appendix B – DNA Results

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LAND AT THE OLD COTTAGE & BRIDGE COTTAGE, LIDSEY
PRELIMINARY ECOLOGICAL APPRAISAL SURVEY
LLD1349-ECO-PEA-00-180122

Folio No: E1895
Report No: 1
Order No: LLD1312
Client: Lizard Landscape Design
Contact: Catherine O'Reilly
Contact Details: [REDACTED]
Date: 20/12/2017

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA FOR THE DETECTION OF BAT SPECIES

Date sample received at Laboratory: 11/12/2017
Date Reported: 20/12/2017
Matters Affecting Results: none

RESULTS

Lab Sample ID.	Site Name	O/S Reference	Genetic Sequence	Common Name	Result	Sequence Similarity
E1895	Old Cottage	SU939031	CACTAATAATTGGAGCCCTGACATGG CATTCNCTCGTATAAATAATATAAGTT TTTGACTCCTTCCTCTCTTTTACT ACTCCTGGCCTCATCTATAGTANAAGC GGGAGCGGTACAGGTTGAACAGTTT ATCCCCCTTAGCCGAAACCTTGCN C	Common pipistrelle	Pipistrellus pipistrellus	93%%

METHODOLOGY

First, the DNA from a single bat dropping is extracted and purified. Then, a short fragment of a mitochondrial gene is amplified using polymerase chain reaction (PCR). If the analysis is unassigned the first time, the reaction is performed with different primer. The amplified product is analysed on a gel to confirm that the expected product size was amplified. It then goes through one more purification step before being Sanger sequenced. The sequence results are aligned against a library of known bat reference sequences using bioinformatics software, and we are able to confirm that the dropping sample came from a certain bat species with the reported percent sequence similarity.

INTERPRETATION

Degradation: Samples are extracted following protocol. If DNA is unsuccessfully amplified with SFF primers, specific to bat genome, the reserve samples are then extracted following protocol yet this time with a restorase enzyme which helps repair degraded DNA. If the reserve samples are amplified unsuccessfully, then the sample is amplified with universal 16S primers, these universal primers will amplify the most prolific DNA in the sample so will detect Bat mitochondrial DNA if it is there, or

mouse DNA or bacterial DNA. If bacterial DNA is found this is an indicator that the sample has degraded to such an extent that the SFF primers can no longer detect Bat DNA. If no DNA is amplified whatsoever then the sample has long been degraded as the technique is ultra sensitive. We get few samples with DNA degradation. DNA degrades with time and expedited with the environmental conditions it is exposed to such as sunlight and temperature and moisture, therefore we recommend samples are taken out of direct sunlight, away from moisture and away from warmth where possible. If the sample with the freshest appearance, on top of the surface, is collected taking in to account these environmental parameters then it is likely that the sample has degraded due to the sample being there a long time and Bats may no longer be present. We analyse a sample up to three times to achieve a result. If no DNA is detected after three times, we are confident, there is no longer any DNA in the sample to detect.

Genus: A sample goes through DNA extraction, PCR to amplify, electrophoresis and then genetically sequenced to give the genetic code for that sample GCTATATACGCGC etc. The genetic sequence obtained is used to cross reference against millions of known genomes to find the closest match. If the sample sequence is not long enough due to sample degradation, or if a non specific part of the genetic code is obtained, then the results may indicate the precise genus but not the precise species. This is especially important for *Myotis* species as there are so many similar *Myotis* species with very similar genetic coding. If the results come back as non specific for a species, then the sample resubmitted through the entire analysis again to see if a better quality sequence, a longer sequence or a sequence in a different area of the genome could have been obtained so that we were able to differentiate between the species.

Reported by: Emily Ziegler

Approved by: Sam Humphrey

End Of Report
