



# Elite Ecology

Passionate about Ecology

**58 Mill Road,  
Knighton**



## **Preliminary Ecological Appraisal**

**September 2020**

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## 0. Executive Summary

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This report has been prepared at the request of Mr. Robert Thomas (Proprietor). Elite Ecology were commissioned to undertake a Preliminary Ecological Appraisal at 58 Mill Road, Knighton, Powys, LD7 1RT (Central OS Grid Reference: SO 28156 72030). This survey effort involved both a desktop study and field survey being undertaken.

Under the current proposals, the existing house is to be extended and the outbuildings will be knocked down. This will result in both the permanent and temporary loss and/or alteration of some of the habitats located on the proposed re-development site.

Service for Powys & Brecon Beacons National Park (BIS) was commissioned to carry out an ecological data search of all protected species and sites recorded within a 2km radius of the site.

The preliminary ecological appraisal survey revealed multiple habitats on site. The phase 1 habitat map, habitat codes and target notes for the site are located within Appendix C. The following habitats were recorded on site (in habitat code order):

- A3.3 – Mixed Scattered Trees
- J1.2 - Amenity Grassland
- J3.6 – Buildings
- J4 – Bare Ground

No designated sites that were revealed by the Ecological Data Search provided by BIS fell on the proposed re-development site itself. Therefore, the proposed re-development will have no impact upon any local designated sites as the works are due to remain within the site boundary.

No habitats of conservation concern were located on the site itself. Therefore, the proposed scheme of works will not impact upon any rare or valuable habitats.

**Bats:** Due to the proposed works on the structures and the low bat roosting classification of the main house, a minimum of one activity survey is required during the optimal bat survey season of June to August. The other structures on site are of 'negligible' potential. Therefore, no further surveys are necessary in relation to these structures.

**Birds:** As a precautionary measure, it is recommended that any tree removal is undertaken outside of the bird breeding season (the bird breeding season runs from March to August, inclusive). If these features are required to be altered during the bird breeding season, then a further inspection by a suitably qualified ecologist is required no more than 24 hours before this process commences is necessary. This is to ensure that no active nest site is illegally destroyed, due to the protection afforded to all active bird nests under the Wildlife and Countryside Act 1981. If an active nest is found by a site inspection, an exclusion zone around the nest will be necessary to preserve this feature until the chicks have fledged the nest.

**Hedgehogs:** If shrubs and trees are cleared between the 1<sup>st</sup> of November and 31<sup>st</sup> March, then an inspection by a suitably qualified ecologist is required to ensure no hibernating hedgehogs (*Erinaceus europaeus*) are present on site. As a purely precautionary measure, it is recommended that provisions are incorporated if construction is undertaken at other times of the year. This will be to create provisions for hedgehogs (*Erinaceus europaeus*) to escape in the form of creating slopes or the inclusion of ramps at the end of each working day from all trenches dug into the ground. Additionally, any pipework left on site that is greater than 150mm in diameter will need to be planked off. Should this information be strictly adhered to, then the development works will not negatively impact on the local mammal populations.

Biodiversity Net Gain:

Biodiversity Net Gain needs to be ensured within the scheme of works and this will be devised once the desktop study has arrived. This will allow measures to be targeted towards species known to be in the area.

Site Enhancements:

For the proposed site enhancements, please see section 5.5 of this report.

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## **1 Introduction**

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### **1.1 Report rationale**

This report has been prepared at the request of Mr. Robert Thomas (Proprietor). Elite Ecology were commissioned to undertake a Preliminary Ecological Appraisal at 58 Mill Road, Knighton, Powys, LD7 1RT (Central OS Grid Reference: SO 28156 72030). This survey effort involved both a desktop study and field survey being undertaken.

The main purpose of this assessment was to identify the broad habitats (as stated in the JNCC Phase 1 Handbook) and the flora species present within the survey area, with any further evidence of protected species usage and/or features of potential ecological interest also included. The field survey was carried out on the 1<sup>st</sup> September 2020 by Mr. Adam Levesley (MRes, BSc (Hons) Ecologist).

### **1.2 Site description and works**

The site is situated in a rural setting in the small town of Knighton in Powys, Wales. The site contains numerous habitat types. These come in the form of scattered trees, hard standing ground, amenity grassland and buildings. Some of these habitats could be utilised by protected species. Photographs of the site are found within **Appendix D**.

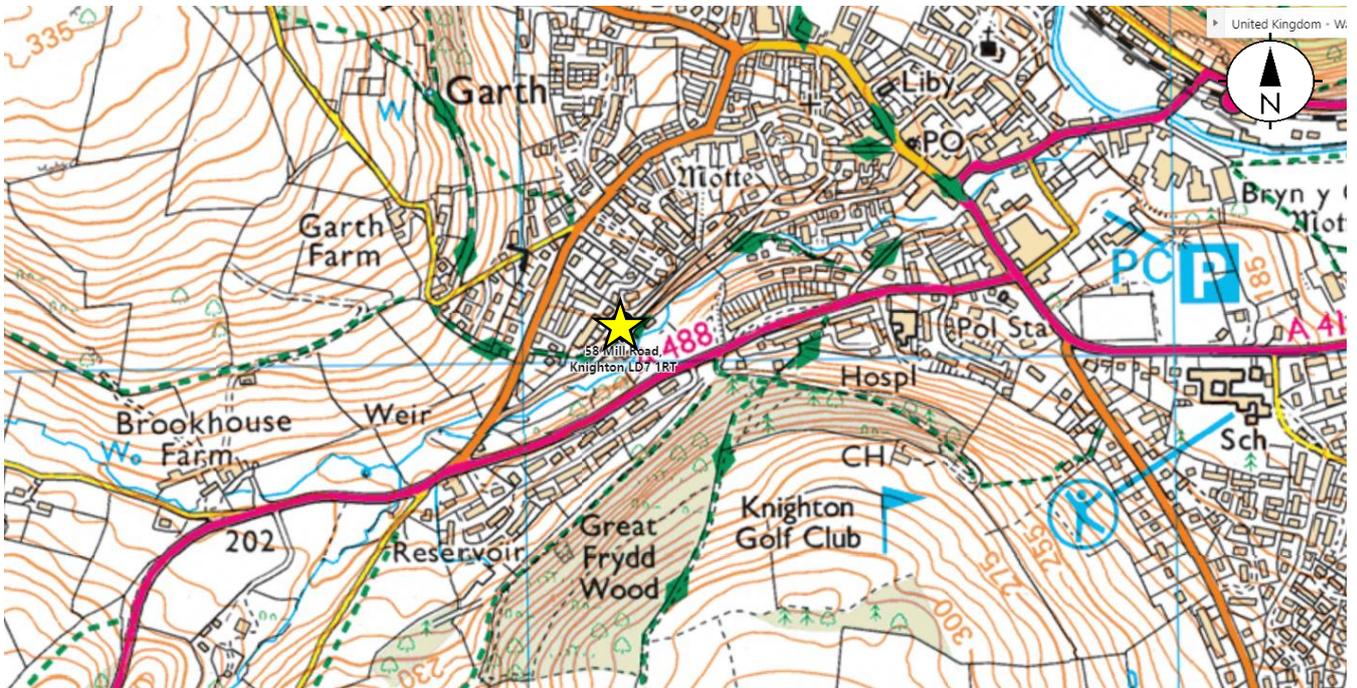
Within the wider landscape, further habitats are present. These come in the form of agricultural land, hedgerows, residential structures (and their associated gardens/land) and woodland. The habitats that surround the site also have the potential to be utilised by a variety of protected species.

Under the current proposals, the existing house is to be extended and the outbuildings will be knocked down. This will result in both the permanent and temporary loss and/or alteration of some of the habitats located on the proposed re-development site.

**Figure 1:** An aerial map showing the location of the land proposed for re-development at 58 Mill Road, Knighton (yellow star) in relation to some of the local landscape.



**Figure 2:** An OS map obtained from Bing showing the location of the survey site 58 Mill Road, Knighton (yellow star).



## **2 Survey Methodology**

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### **2.1 Desktop Survey**

A variety of resources were independently consulted to assess the known local records within the nearby area and the importance of the site within the local landscape from an ecological perspective. The resources used were the Local Records Centre, [www.naturalengland.org.uk](http://www.naturalengland.org.uk), [www.ordnancesurvey.co.uk](http://www.ordnancesurvey.co.uk), Google Maps, Google Earth and Bing Maps. A search of other relevant nature conservation information was made through the use of the Multi-Agency Geographic Information for the Countryside (MAGIC) database.

The local records centre was contacted to provide data on all protected species and designated sites within 1 km of the proposed development site. Biodiversity Information Service for Powys & Brecon Beacons National Park (BIS) was the relevant local record centre for this project.

### **2.2 Field Survey**

A Preliminary Ecological Appraisal (previously referred to as an Extended Phase 1 Habitat Survey) was carried out using the method outlined in the JNCC Handbook for *Phase 1 Habitat Survey: a technique for environmental audit (2010)*. This method aims to map and describe the broad habitat types and notable features present on the surveyed site.

As part of the field survey, the floral species will be identified and noted down. This will consider the dominant, abundant, frequent, occasional and rare (DAFOR) species within each habitat on the survey site. The impacts of the proposed development scheme will be assessed by this report.

Each habitat will be assessed for the presence and/or the potential presence of protected species. The impacts of the proposed scheme of works on all potential protected species on site will be assessed. From this, either remedial action or recommended phase 2 presence/absence surveys will be devised.

Some of the classification codes and colours listed within the JNCC handbook may have been slightly modified for this project.

Habitat Surveys can be carried out at any time of the year, with the optimal time period falling between the months of April through until September. This survey was carried out in September 2020, which is inside of the optimal time period for flora surveys. Elite Ecology feels confident that the majority of the floral species located on the site were competently identified during the survey effort. In addition to this, Elite Ecology feels confident that this report reflects an accurate representation of the site's suitability for protected species to be present.

All sites surveyed by Elite Ecology will be run against the relevant Local Wildlife Site Criteria to assess whether or not they meet the required standards.

### **3 Desktop Survey Results**

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#### **3.1 Statutory Sites**

The ecological data received from BIS confirmed the presence of one statutory protected site (e.g. LNR, SSSI, SPA, SAC or Ramsar) within the 2km search radius. This is as follows:

- River Teme (SSSI)

#### **3.2 Non-Statutory Sites**

The ecological data received from BIS revealed one non-statutory site within the 2km search radius. This is as follows:

- Knighton Railway Station Meadow (LWS)

#### **3.3 Woodland Sites**

The information provided by BIS revealed multiple ancient natural or semi-natural woodland sites within the 2km search radius.

#### **3.4 Regionally Important Geological Sites (RIGS)**

The information provided by BIS revealed no RIGS within the 2km search radius.

#### **3.5 Species Records**

##### **3.5.1 Amphibians**

Within the ecological data search provided by BIS, no records of amphibian were revealed by the search. The species recorded are common frog (*Rana temporaria*), common toad (*Bufo bufo*), great crested newt (*Triturus cristatus*), palmate newt (*Lissotriton helveticus*) and smooth newt (*Lissotriton vulgaris*).

##### **3.5.2 Birds**

Within the ecological data search provided by BIS, multiple bird species were detected within the 2km search radius. A total of approximately 118 records were revealed. A table with the collated flora species can be found in Appendix B.

##### **3.5.3 Crustacean**

Within the ecological data search provided by BIS, one crustacean was revealed within the 2km search radius. This was of white-clawed crayfish (*Austropotamobius pallipes*).

##### **3.5.4 Fish**

Within the ecological data search provided by BIS, three fish records were revealed within the 2km radius. These were of Eel (*Anguilla anguilla*) and Brown/sea trout (*Salmo trutta*).

### 3.5.5 Flora

Within the ecological data search provided by BIS, two floral species were revealed. This includes five records of bluebell (*Hyacinthoides non-scripta*). A table with the collated flora species can be found in Appendix B.

### 3.5.6 Invertebrates

Within the ecological data search provided by BIS, no invertebrate species were revealed within 2km of the site.

### 3.5.7 Mammals

Within the ecological data search provided by BIS, multiple mammal species were detected within the 2km search radius of the site. This includes records of badger (*Meles meles*) and multiple bat (*Chiroptera*) specimens.

### 3.5.8 Molluscs

Within the ecological data search provided by BIS, no molluscs were revealed within the 2km search radius.

### 3.5.9 Reptiles

Within the ecological data search provided by BIS, two reptile species were revealed within 2km of the site. These were of adder (*Vipera berus*) and slow worm (*Anguis fragilis*).

## **4 Field Survey**

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### **4.1 Habitats**

The preliminary ecological appraisal survey revealed multiple habitats on site. The phase 1 habitat map, habitat codes and target notes for the site are located within Appendix D. The following habitats were recorded on site (in habitat code order):

#### **4.1.1 A3.3 – Mixed Scattered Trees**

This habitat can be found around the boundary of the survey site. This includes scots pine (*Pinus sylvestris*) and silver birch (*Betula pendula*). This habitat is anticipated to be retained but could be used by nesting birds and has **moderate** protected species potential.

#### **4.1.2 J1.2 – Amenity Grassland**

Amenity grassland that hasn't been mown for a while was found throughout the survey site. The dominant species are typical turf grasses such as annual meadow grass (*Poa annua*) and perennial ryegrass (*Lolium perenne*). This habitat has **negligible** protected species potential.

#### **4.1.4 J3.6 - Buildings**

##### External Inspection:

On site, there is one residential dwelling and three outbuildings. The main house has pebbledash walls and a pitched, slate tile roof. There is also an adjoining single-storey section, also with a slate tile roof. The structure has wooden fascia boards. Some gaps were identified around the wooden fascia boards which could facilitate access for roosting bats. No raised or missing roof tiles are apparent. No cracks or crevices in the external walls suitable for roosting bats are apparent. All doors and windows are intact. No evidence of nesting birds was identified externally.

On site, there are also two wooden sheds on site, one with a corrugated steel roof and one with a timber roof. Some gaps are apparent in the timber walls but these are unsuitable for bats.

There is a steel structure on site. This was not deemed to have any features suitable for roosting bats and is therefore of 'negligible' potential.

##### Internal Inspection:

The structure was inspected for any evidence of bats and birds. The loft space of the main house was inspected. The inspection revealed a bitumen felt underlay which was found to be in good condition and timber beams supporting the roof. All the other rooms in the house are not suitable for roosting bats. Within the loft space, a number of cobwebs are apparent.

The other structures due to be removed are currently in use for storage purposes. No nesting birds were found within any of the structures.

#### 4.1.5 J4 - Bare Ground

A patch of bare ground is present in the bottom section of the garden. No plants grow here. This habitat is of **negligible** protected species potential.

#### 4.2 Species

The preliminary ecological appraisal survey revealed that the habitats that have been outlined for the proposed development area do contain protected species potential. The following assessment has also taken into account the adjacent habitats and connectivity to the wider landscape for all protected and rare species.

##### 4.2.1 Amphibians (including Great Crested Newts (*Triturus cristatus*))

The site itself does not have the potential to support amphibians. Therefore, no further action is required. This is because of a lack of suitable habitat on site and no known ponds within a 500m radius of the site.

##### 4.2.2 Badgers

During the field survey, no evidence of badger (*Meles meles*) presence was found on the survey site or within the zone of influence from the proposed scheme of works.

##### 4.2.3 Bats

Some of the buildings on site have suitable roosting features for bats. Furthermore, the habitats on site are likely to support foraging bats. Therefore, further survey effort is required (please see section 5.3).

##### 4.2.4 Birds

The proposed re-development site contains a number of habitats that have been deemed suitable to support nesting birds. This comes in the form of scattered trees. Due to this, further precautionary measures are necessary if any are to be removed (please see section 5.3).

##### 4.2.5 Hazel Dormouse

The habitats on site are not suitable for supporting any hazel dormouse (*Muscardinius avellanarius*) specimens.

##### 4.2.6 Hedgehogs

The survey site could support the local hedgehog (*Erinaceus europaeus*) populations. Therefore, further precautionary measures are required for the site.

##### 4.2.7 Invertebrates

The site is not deemed to be of high value to invertebrates. Therefore, no further assessment is required.

#### 4.2.8 Reptiles

The habitats on site do not have the potential to support the local reptilian populations. Therefore, no further action is required (please see section 5.3).

#### 4.3 **Potential impacts of the works**

Based upon the results from the desktop survey, field survey and using a degree of academic supposition, the uncompensated development impacts have been summarised as follows:

- Amphibians – **Negligible**
- Badgers – **Negligible**
- Bats – **Unknown**
- Birds – **Moderate**
- Flora – **Negligible**
- Hazel Dormouse – **Negligible**
- Hedgehogs – **Low**
- Invertebrates – **Negligible**
- Reptiles – **Negligible**

## **5 Recommendations**

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### **5.1 Designated Sites**

No designated sites that were revealed by the Ecological Data Search provided by BIS fell on the proposed re-development site itself. Therefore, the proposed re-development will have no impact upon any local designated sites as the works are due to remain within the site boundary.

### **5.2 Habitats**

No habitats of conservation concern were located on the site itself. Therefore, the proposed scheme of works will not impact upon any rare or valuable habitats.

### **5.3 Species**

The site was found to contain the potential to support protected and/or rare species. Therefore, the following recommendations are required for the site:

#### **5.3.1 Bats:**

Due to the proposed works on the structures and the low bat roosting classification of the main house, a minimum of one activity survey is required during the optimal bat survey season of June to August.

The other structures on site are of 'negligible' potential. Therefore, no further surveys are necessary in relation to these structures.

#### **5.3.2 Birds**

As a precautionary measure, it is recommended that any tree removal is undertaken outside of the bird breeding season (the bird breeding season runs from March to August, inclusive). If these features are required to be altered during the bird breeding season, then a further inspection by a suitably qualified ecologist is required no more than 24 hours before this process commences is necessary. This is to ensure that no active nest site is illegally destroyed, due to the protection afforded to all active bird nests under the Wildlife and Countryside Act 1981. If an active nest is found by a site inspection, an exclusion zone around the nest will be necessary to preserve this feature until the chicks have fledged the nest.

### 5.3.3 Hedgehogs

If shrubs and trees are cleared between the 1<sup>st</sup> of November and 31<sup>st</sup> March, then an inspection by a suitably qualified ecologist is required to ensure no hibernating hedgehogs (*Erinaceus europaeus*) are present on site.

As a purely precautionary measure, it is recommended that provisions are incorporated if construction is undertaken at other times of the year. This will be to create provisions for hedgehogs (*Erinaceus europaeus*) to escape in the form of creating slopes or the inclusion of ramps at the end of each working day from all trenches dug into the ground. Additionally, any pipework left on site that is greater than 150mm in diameter will need to be planked off. Should this information be strictly adhered to, then the development works will not negatively impact on the local mammal populations.

### 5.4 **Biodiversity Net Gain**

Biodiversity Net Gain needs to be ensured within the scheme of works and this will be devised once the desktop study has arrived. This will allow measures to be targeted towards species known to be in the area.

### 5.5 **Site Enhancements**

For the proposed development works, the following site enhancement measures could be incorporated into the site post-development. These measures are optional but are bespoke to the site surveyed for the enhancement of biodiversity.

#### 5.5.1 Bats

It is an option to install [Eco Bat Boxes](#) or [Integrated Eco Bat Boxes](#) on the trees and structures located within the proposed scheme of works. This will enhance the roosting opportunities within the area for the local bat populations.

The site can be enhanced by introducing a bat friendly planting scheme in the soft landscaping plan. The table below outlines species recommended by the Bat Conservation Trust, all of which could be incorporated into the site post development.

Additional compensation, enhancement and mitigation measures will be devised following the additional survey effort.

## Preliminary Ecological Appraisal

Flowers for borders	Trees, shrubs & climbers
Aubretia	Bramble
Candytuft	Buddleia
Cherry pie	Common alder
Corncockle	Dogrose
Corn marigold	Elder
Corn poppy	English oak
Echniacea	Gorse
English bluebell	Guelder rose
Evening primrose	Hawthorn
Field poppies	Hazel
Honesty	Honeysuckle (native)
Ice plant 'pink lady'	Hornbeam
Knapweed	Ivy
Mallow	Jasmine
Mexican aster	Pussy willow
Michaelmas daisy	Rowan
Night-scented stock	Silver birch
Ox-eye daisy	<b>Herbs</b>
Phacelia	Angelica
Poached egg plant	Bergamot
Primrose	Borage
Red campion	Coriander
Red valerian	English marigolds
Scabious	Fennel
St. John's Wort	Feverfew
Sweet William	Hyssop
Tobacco plant	Lavenders
Verbena	Lemon balm
Wallflowers	Marjoram
Wood forget-me-not	Rosemary
Yarrow	Sweet Cicely
	Thyme

## 5.5.2 Birds

The site could be enhanced for birds by installing a variety of [Bird Boxes](#) on site, such as an [Apex Bird Box](#) and an [Apex Robin Box](#).

## 5.5.3 Flora

At present, the site is not considered to have a diverse range of flora. Therefore, it is recommended that a small section of the site is converted into a 'wild meadow' that uses native wildflower seed mixes. A variety of these can be found on the [Meadowmania](#) or [Wildflower Turf](#) webpages.

To enhance the site for the local bat and bird populations several native shrubs and herbs could be included within the 'wild meadow' which will provide excellent foraging habitat. More information on shrubs for bats can be found on the [wildlife trust website](#) and more information on shrubs for birds can be found on the [rspb website](#). There are several different shrubs to choose from but it is important to avoid invasive species such as buddleia, more information on invasive flora can be found on the [rspb website](#).

#### 5.5.4 Hedgehogs

The site could be enhanced for the local hedgehog population by installing at least two [Eco Hedgehog Nest Boxes](#) around the site. This will create more opportunities for hedgehogs within the local landscape.

## 6 References

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## **7 Appendices**

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**Appendix A:** Site Plans

**Appendix B:** Desktop Study Table

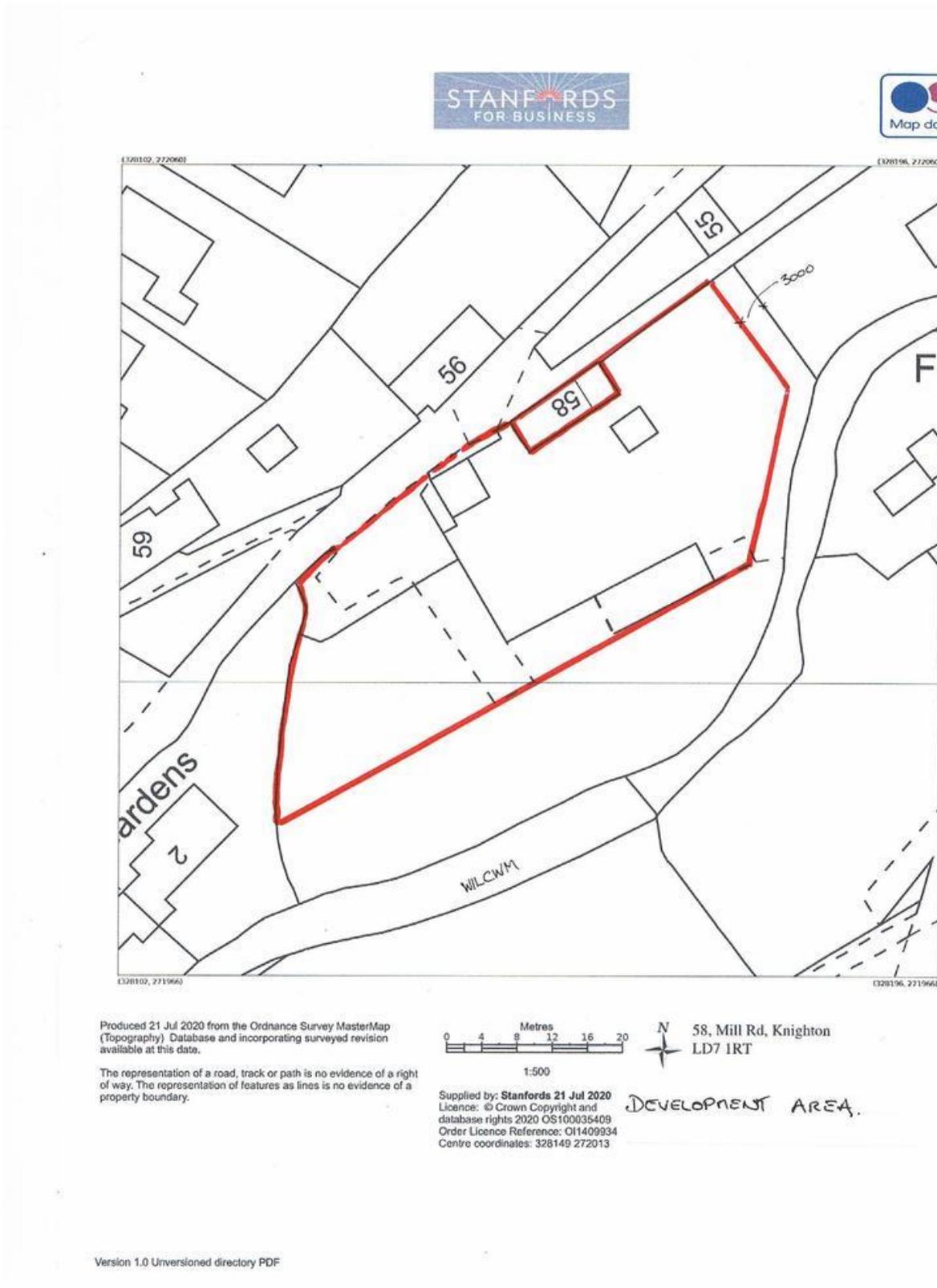
**Appendix C:** Phase 1 Habitat Map

**Appendix D:** Site Photographs

**Appendix E:** Biodiversity Legislation and Policy

**Appendix F:** Bat and Artificial Light

**Appendix A: Site Plans**



**Appendix B: The Ecological Data Tables**

<b>Amphibians</b>	
<b>Common Name</b>	<b>Latin Name</b>
Common Frog	<i>Rana temporaria</i>
Common Toad	<i>Bufo bufo</i>
Great Crested Newt	<i>Triturus cristatus</i>
Palmate Newt	<i>Lissotriton helveticus</i>
Smooth Newt	<i>Lissotriton vulgaris</i>
<b>Birds</b>	
<b>Common Name</b>	<b>Latin Name</b>
Barn Owl	<i>Tyto alba</i>
Blackbird	<i>Turdus merula</i>
Blackcap	<i>Sylvia atricapilla</i>
Blue Tit	<i>Cyanistes caeruleus</i>
Bullfinch	<i>Pyrrhula pyrrhula</i>
Buzzard	<i>Buteo buteo</i>
Chiffchaff	<i>Phylloscopus collybita</i>
Coal Tit	<i>Periparus ater</i>
Common Sandpiper	<i>Actitis hypoleucos</i>
Coot	<i>Fulica atra</i>
Cormorant	<i>Phalacrocorax carbo</i>
Curlew	<i>Numenius arquata</i>
Dipper	<i>Cinclus cinclus</i>
Duncock	<i>Prunella modularis</i>
Fieldfare	<i>Turdus pilaris</i>
Garden Warbler	<i>Sylvia borin</i>
Goldcrest	<i>Regulus regulus</i>
Golden Plover	<i>Pluvialis apricaria</i>
Goldfinch	<i>Carduelis carduelis</i>
Goshawk	<i>Accipiter gentilis</i>
Great Crested Grebe	<i>Podiceps cristatus</i>
Great Spotted Woodpecker	<i>Dendrocopos major</i>
Great Tit	<i>Parus major</i>
Green Woodpecker	<i>Picus viridis</i>
Greenfinch	<i>Chloris chloris</i>
Grey Heron	<i>Ardea cinerea</i>
Grey Wagtail	<i>Motacilla cinerea</i>
Hen Harrier	<i>Circus cyaneus</i>
Herring Gull	<i>Larus argentatus</i>
House Martin	<i>Delichon urbicum</i>

## Preliminary Ecological Appraisal

House Sparrow	<i>Passer domesticus</i>
Kestrel	<i>Falco tinnunculus</i>
Kingfisher	<i>Alcedo atthis</i>
Lesser Black-backed Gull	<i>Larus fuscus</i>
Lesser Redpoll	<i>Acanthis cabaret</i>
Lesser Whitethroat	<i>Sylvia curruca</i>
Linnet	<i>Linaria cannabina</i>
Little Egret	<i>Egretta garzetta</i>
Little Grebe	<i>Tachybaptus ruficollis</i>
Long-tailed Tit	<i>Aegithalos caudatus</i>
Mallard	<i>Anas platyrhynchos</i>
Marsh Tit	<i>Poecile palustris</i>
Meadow Pipit	<i>Anthus pratensis</i>
Mistle Thrush	<i>Turdus viscivorus</i>
Nuthatch	<i>Sitta europaea</i>
Pied Flycatcher	<i>Ficedula hypoleuca</i>
Pied Wagtail	<i>Motacilla alba</i>
Pied Wagtail	<i>Motacilla alba subsp. yarrellii</i>
Raven	<i>Corvus corax</i>
Red Kite	<i>Milvus milvus</i>
Redstart	<i>Phoenicurus phoenicurus</i>
Redwing	<i>Turdus iliacus</i>
Sand Martin	<i>Riparia riparia</i>
Siskin	<i>Spinus spinus</i>
Skylark	<i>Alauda arvensis</i>
Snipe	<i>Gallinago gallinago</i>
Song Thrush	<i>Turdus philomelos</i>
Sparrowhawk	<i>Accipiter nisus</i>
Starling	<i>Sturnus vulgaris</i>
Stock Dove	<i>Columba oenas</i>
Stonechat	<i>Saxicola rubicola</i>
Swallow	<i>Hirundo rustica</i>
Swift	<i>Apus apus</i>
Teal	<i>Anas crecca</i>
Tree Sparrow	<i>Passer montanus</i>
Treecreeper	<i>Certhia familiaris</i>
Wheatear	<i>Oenanthe oenanthe</i>
Whitethroat	<i>Sylvia communis</i>
Willow Warbler	<i>Phylloscopus trochilus</i>
Wood Warbler	<i>Phylloscopus sibilatrix</i>
Yellowhammer	<i>Emberiza citrinella</i>
<b>Crustacean</b>	
<b>Common Name</b>	<b>Latin Name</b>

White-clawed Crayfish	<i>Austropotamobius pallipes</i>
<b>Fish</b>	
<b>Common Name</b>	<b>Latin Name</b>
Brown/Sea Trout	<i>Salmo trutta</i>
Bullhead	<i>Cottus gobio</i>
Eel	<i>Anguilla anguilla</i>
Minnnow	<i>Phoxinus phoxinus</i>
Stone Loach	<i>Barbatula barbatula</i>
Three-spined Stickleback	<i>Gasterosteus aculeatus</i>
<b>Flora</b>	
<b>Common Name</b>	<b>Latin Name</b>
Aspen	<i>Populus tremula</i>
Betony	<i>Stachys officinalis</i>
Bilberry	<i>Vaccinium myrtillus</i>
Bird Cherry	<i>Prunus padus</i>
Bitter-vetch	<i>Lathyrus linifolius</i>
Blue Fleabane	<i>Erigeron acris</i>
Bluebell	<i>Hyacinthoides non-scripta</i>
Broad-leaved Helleborine	<i>Epipactis helleborine</i>
Brook-side Feather-moss	<i>Hygroamblystegium fluviatile</i>
Buckthorn	<i>Rhamnus cathartica</i>
Bud-headed Groove-moss	<i>Aulacomnium androgynum</i>
Butterbur	<i>Petasites hybridus</i>
Common Cow-wheat	<i>Melampyrum pratense</i>
Common Feather-moss	<i>Kindbergia praelonga</i>
Corn Mint	<i>Mentha arvensis</i>
Crosswort	<i>Cruciata laevipes</i>
Curled Pondweed	<i>Potamogeton crispus</i>
English Elm	<i>Ulmus procera</i>
Field Maple	<i>Acer campestre</i>
Fool's Parsley	<i>Aethusa cynapium</i>
Giant Spear-moss	<i>Calliergon giganteum</i>
Goat's-beard	<i>Tragopogon pratensis</i>
Good-King-Henry	<i>Chenopodium bonus-henricus</i>
Great Wood-rush	<i>Luzula sylvatica</i>
Greater Burdock	<i>Arctium lappa</i>
Greater Fork-moss	<i>Dicranum majus</i>
Green-tufted Stubble-moss	<i>Weissia controversa</i>

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Hairy Bindweed	<i>Calystegia pulchra</i>
Hairy Wood-rush	<i>Luzula pilosa</i>
Hard Shield-fern	<i>Polystichum aculeatum</i>
Heath Milkwort	<i>Polygala serpyllifolia</i>
Heath Speedwell	<i>Veronica officinalis</i>
Heath Wood-rush	<i>Luzula multiflora</i>
Hedge Bedstraw	<i>Galium mollugo</i>
Herb-paris	<i>Paris quadrifolia</i>
Hoary Plantain	<i>Plantago media</i>
Hybrid Monkeyflower	<i>Mimulus guttatus x luteus = M. x robertsii</i>
Intermediate Lady's-mantle	<i>Alchemilla xanthochlora</i>
Intermediate Water-starwort	<i>Callitriche hamulata</i>
Japanese Knotweed	<i>Fallopia japonica</i>
Keeled-fruited Cornsalad	<i>Valerianella carinata</i>
Large-flowered Hemp-nettle	<i>Galeopsis speciosa</i>
Lesser Celandine	<i>Ranunculus ficaria subsp. bulbifer</i>
Little Mouse-ear	<i>Cerastium semidecandrum</i>
Many-fruited Leskea	<i>Leskea polycarpa</i>
Marsh Woundwort	<i>Stachys palustris</i>
Mistletoe	<i>Viscum album</i>
Monkeyflower	<i>Mimulus guttatus</i>
Musk	<i>Mimulus moschatus</i>
Narrow-leaved Bird's-foot-trefoil	<i>Lotus tenuis</i>
Nettle-leaved Bellflower	<i>Campanula trachelium</i>
Pale Glaucous Thread-moss	<i>Pohlia wahlenbergii</i>
Pale Willowherb	<i>Epilobium roseum</i>
Red Bartsia	<i>Odontites vernus</i>
Red Goosefoot	<i>Chenopodium rubrum</i>
River Water-crowfoot	<i>Ranunculus fluitans</i>
Rustyback	<i>Ceterach officinarum</i>
Silver-moss	<i>Bryum argenteum</i>
Skullcap	<i>Scutellaria galericulata</i>
Slender St John's-wort	<i>Hypericum pulchrum</i>
Small-leaved Lime	<i>Tilia cordata</i>
Smith's Pepperwort	<i>Lepidium heterophyllum</i>
Square-stalked Willowherb	<i>Epilobium tetragonum</i>
Stag's-horn Clubmoss	<i>Lycopodium clavatum</i>
Stream Water-crowfoot	<i>Ranunculus penicillatus</i>
Stream Water-Crowfoot	<i>Ranunculus penicillatus subsp. pseudofluitans</i>
Three-nerved Sandwort	<i>Moehringia trinervia</i>
Tufted Forget-me-not	<i>Myosotis laxa</i>
Wall Lettuce	<i>Mycelis muralis</i>
Water Figwort	<i>Scrophularia auriculata</i>
Water Mint	<i>Mentha aquatica</i>

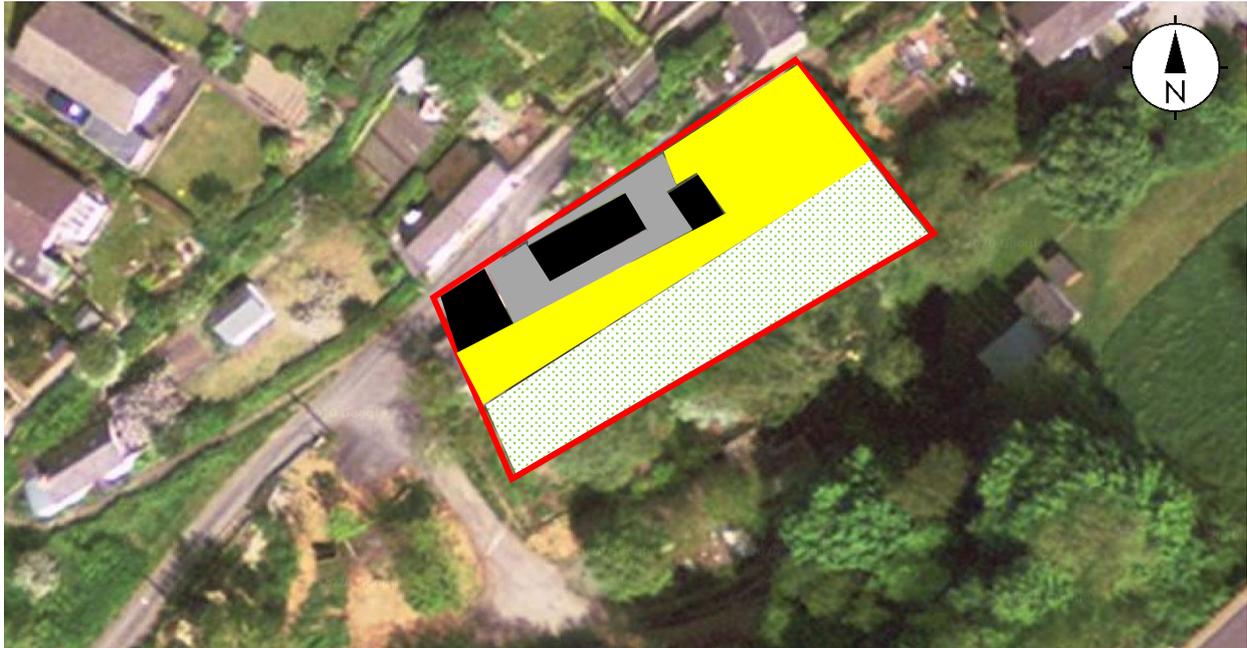
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Welsh Poppy	<i>Meconopsis cambrica</i>
Wetted Thistle	<i>Carduus crispus</i>
Western Gorse	<i>Ulex gallii</i>
Wild Marjoram	<i>Origanum vulgare</i>
Winter-cress	<i>Barbarea vulgaris</i>
Wood Anemone	<i>Anemone nemorosa</i>
Wood Crane's-bill	<i>Geranium sylvaticum</i>
Wood Horsetail	<i>Equisetum sylvaticum</i>
Wood Melick	<i>Melica uniflora</i>
Wood Speedwell	<i>Veronica montana</i>
Woodruff	<i>Galium odoratum</i>
Wood-sorrel	<i>Oxalis acetosella</i>
Yellow Loosestrife	<i>Lysimachia vulgaris</i>
Yellow Pimpernel	<i>Lysimachia nemorum</i>
Yellow-rattle	<i>Rhinanthus minor</i>
Zigzag Clover	<i>Trifolium medium</i>
Invertebrates	
Common Name	Latin Name
August Thorn	<i>Ennomos quercinaria</i>
Banded Demoiselle	<i>Calopteryx splendens</i>
Beautiful Demoiselle	<i>Calopteryx virgo</i>
Beautiful Plume	<i>Amblyptilia acanthadactyla</i>
Beautiful Yellow Underwing	<i>Anarta myrtilli</i>
Black Arches	<i>Lymantria monacha</i>
Broad-bodied Chaser	<i>Libellula depressa</i>
Centre-barred Sallow	<i>Atethmia centrago</i>
Chimney Sweeper	<i>Odezia atrata</i>
Common Purple & Gold	<i>Pyrausta purpuralis</i>
Dusky Thorn	<i>Ennomos fuscantaria</i>
Galium Carpet	<i>Epirrhoe galiata</i>
Glow-worm	<i>Lampyris noctiluca</i>
Golden-ringed Dragonfly	<i>Cordulegaster boltonii</i>
Green Hairstreak	<i>Callophrys rubi</i>
Grey Mountain Carpet	<i>Entephria caesiata</i>
Holly Blue	<i>Celastrina argiolus</i>
Jenkins' Spire Snail	<i>Potamopyrgus antipodarum</i>
Large Red Damselfly	<i>Pyrrhosoma nymphula</i>
Marbled White	<i>Melanargia galathea</i>
Pearl-bordered Fritillary	<i>Boloria euphrosyne</i>
Purple Hairstreak	<i>Favonius quercus</i>
Scarce Silver Y	<i>Syngrapha interrogationis</i>
Scarlet Tiger	<i>Callimorpha dominula</i>

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Silver-washed Fritillary	<i>Argynnis paphia</i>
Small Argent & Sable	<i>Epirrhoe tristata</i>
Small Blue	<i>Cupido minimus</i>
Small Heath	<i>Coenonympha pamphilus</i>
Small Pearl-bordered Fritillary	<i>Boloria selene</i>
Small Phoenix	<i>Ecliptopera silaceata</i>
Small Purple & Gold	<i>Pyrausta aurata</i>
Southern Hawker	<i>Aeshna cyanea</i>
Southern Iron Blue	<i>Baetis niger</i>
Wall	<i>Lasiommata megera</i>
Wasp Beetle	<i>Clytus arietis</i>
White-clawed Freshwater Crayfish	<i>Austropotamobius pallipes</i>
White-letter Hairstreak	<i>Satyrium w-album</i>
Wood White	<i>Leptidea sinapis</i>
Mammals	
Common Name	Latin Name
American Mink	<i>Neovison vison</i>
Badger	<i>Meles meles</i>
Brown Long-eared Bat	<i>Plecotus auritus</i>
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>
Grey Squirrel	<i>Sciurus carolinensis</i>
Hare	<i>Lepus europaeus</i>
Hazel Dormouse	<i>Muscardinus avellanarius</i>
Hedgehog	<i>Erinaceus europaeus</i>
Otter	<i>Lutra lutra</i>
Pipistrelle agg.	<i>Pipistrellus pipistrellus agg.</i>
Pipistrellus Bat Species	<i>Pipistrellus</i>
Polecat	<i>Mustela putorius</i>
Unknown Bat	<i>Chiroptera</i>
Water Shrew	<i>Neomys fodiens</i>
Reptiles	
Common Name	Latin Name
Adder	<i>Vipera berus</i>
Slow-worm	<i>Anguis fragilis</i>

**Appendix C: Phase 1 Habitat Map**



KEY	
	Survey Site Boundary
	A3.3 – Mixed Scattered Trees
	J1.2 – Amenity Grassland
	J3.6 – Buildings
	J4- Bare Ground

**Appendix D: Site Photographs**

**Plate 1:** View of the house due to be extended.



**Plate 2:** A view of the roof tiles of the main house.



**Plate 3:** A photo of the wooden shed due to be removed.



**Plate 4:** An overview photo of the habitat adjacent to the buildings on site.



**Plate 5:** An image of one of the outbuilding due to be removed.



**Plate 6:** A photograph of the interior loft space of the main house.



## **Appendix E: Biodiversity Legislation and Policy**

### **General Legislation and Policy:**

The framework of legislation and policy which underpins nature conservation in England. This is a material consideration in the planning process in England.

#### Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2010 as amended)

The Conservation of Habitats and Species Regulations 2017 consolidate and update the Conservation Regulations 1994 and the conservation of habitats and species regulations 2010 (and all their amendments). The Conservation of Habitats and Species Regulations 2017 are the principal means by which the EEC Council Directive 92/43 (The Habitats Directive) as amended is transposed into English and Welsh law.

The Conservation of Habitats and Species Regulations 2017 place duty upon the relevant authority of government to identify sites which are of importance to the habitats and species listed in Annexes I and II of the Habitats Directive. Those sites which meet the criteria are, in conjunction with the European Commission, designated as Sites of Community Importance, which are subsequently identified as Special Areas of Conservation (SAC) by the European Union member states. The regulations also place a duty upon the government to maintain a register of European protected sites designated as a result of EC Directive 79/409/EEC on the Conservation of Wild Birds (The Birds Directive). These sites are termed Special Protection Areas (SPA) and, in conjunction with SACs, form a network of sites known as Natura 2000. The Habitats Directive introduces for the first time for protected areas, the precautionary principle; that is that projects can only be permitted having ascertained no adverse effect on the integrity of the site. Projects may still be permitted if there are no alternatives, and there are imperative reasons of overriding public interest.

The Conservation of Habitats and Species Regulations 2017 also provide for the protection of individual species of fauna and flora of European conservation concern listed in Schedules 2 and 5 respectively. Schedule 2 includes species such as otter and great crested newt for which the UK population represents a significant proportion of the total European population. It is an offence to deliberately kill, injure, disturb or trade these species. Schedule 5 plant species are protected from unlawful destruction, uprooting or trade under the regulations.

#### **The Wildlife and Countryside Act (WCA) 1981 (As amended)**

The WCA, as amended, consolidates and amends pre-existing national wildlife legislation in order to implement the Bern Convention and the Birds Directive. It complements the Conservation (Natural Habitats. & c.) Regulations 1994 (as amended), offering protection to a wider range of species. The Act also provides for the designation and protection of national conservation sites of value for their floral, faunal or geological features, termed Sites of Special Scientific Interest (SSSIs).

Schedules of the act provide lists of protected species, both flora and fauna, and detail the possible offences that apply to these species.

#### **The Countryside and Rights of Way (CROW) Act 2000**

The CROW Act, introduced in England and Wales in 2000, amends and strengthens existing wildlife legislation detailed in the WCA. It places a duty on government departments and the National Assembly for Wales to have regard for biodiversity, and provides increased powers for the protection and maintenance of SSSIs.

The Act also contains lists of habitats and species (Section 74) for which conservation measures should be promoted, in accordance with the recommendations of the Convention on Biological Diversity (Rio Earth Summit) 1992.

**The Natural Environment and Rural Communities (NERC) Act 2006**

Section 40 of the NERC Act places a duty upon all local authorities and public bodies in England and Wales to promote and enhance biodiversity in all of their functions. Sections 41 (England) and 42 (Wales) list habitats and species of principal importance to the conservation of biodiversity. These lists supersede Section 74 of the CRoW Act 2000. These species and habitats are a material consideration in the planning process.

**The Hedgerow Regulations 1997**

The Hedgerow Regulations make provision for the identification of important hedgerows which may not be removed without permission from the Local Planning Authority.

**UK Biodiversity Action Plan**

The United Kingdom Biodiversity Action Plan (UKBAP), first published in 1994 and updated in 2007, is a government initiative designed to implement the requirements of the Convention of Biological Diversity to conserve and enhance species and habitats. The UKBAP contains a list of priority habitats and species of conservation concern in the UK, and outlines biodiversity initiatives designed to enhance their conservation status. Lists of Broad and Local habitats are also included. The priority habitats and species correlate with those listed on Section 41 and 42 of the NERC Act.

The UKBAP requires that conservation of biodiversity is addressed at a County level through the production of Local BAPs. These are complementary to the UKBAP, however are targeted towards species of conservation concern characteristic of each area. In addition, a number of local authorities and large organisations have produced their own BAPs. UKBAP and Local BAP targets with regard to species and habitats are a material consideration in the planning process.

**Planning Policy (England) and National Planning Policy Framework**

In early 2012, the National Planning Policy Framework (NPPF) replaced much previous planning policy guidance, including Planning Policy Statement 9: Biological and Geological Conservation. The government circular 06/05: Biodiversity and Geological Conservation - Statutory Obligations and Their Impact within the Planning System, which accompanied PPS9, still remains valid. A presumption towards sustainable development is at the heart of the NPPF. This presumption does not apply however where developments require appropriate assessment under the Birds or Habitats Directives. The latest National Planning Policy Framework was updated in February 2019, with the section in relation to conserving the natural environment being located within section 15.

Section 15, on conserving and enhancing the natural environment, sets out how the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and, where possible, provide net gains in biodiversity. Opportunities to incorporate biodiversity gains into a development should be encouraged.

If a proposed development would result in significant harm to the natural environment which cannot be avoided (through the use of an alternative site with less harmful impacts), mitigated or compensated for (as a last resort) then planning permission should be refused.

## Species Specific Legislation

This section contains a summary of legislation with relation to the species present or potentially present in the survey area. The reader should refer to the original legislation for definitive interpretation.

### Nesting and Nest Building Birds

Nesting and nest building birds are protected under the Wildlife and Countryside Act WCA 1981 (as amended). Some species (listed in Schedule 1 of the WCA) are protected by special penalties.

Subject to the provisions of the act, if any person intentionally:

- kills, injures or takes any wild bird;
- takes, damages or destroys the nest of any wild bird while that nest is in use or being built; or
- takes or destroys an egg of any wild bird, he shall be guilty of an offence.

'Reckless' offences with regard to the disturbance of nesting wild birds included in Schedule 1 of the Wildlife and Countryside Act were added by the Countryside and Rights of Way Act 2000.

The Natural Environment and Rural Communities (NERC) Act 2006 places a duty on Government Departments to have regard for the conservation of biodiversity and maintains lists of species and habitats which are of principal importance for the purposes of conserving biodiversity in England and Wales. These lists include a number of bird species.

The reader is referred to the original legislation for the definitive interpretation.

### Badger

The main legislation protecting badgers in England and Wales is the Protection of Badgers Act 1992 (the 1992 Act). Under the 1992 Act it is an offence to:

- wilfully kill, injure, take or attempt to kill, injure or take a badger;
- possess a dead badger or any part of a badger;
- cruelly ill-treat a badger;
- use badger tongs in the course of killing, taking or attempting to kill a badger;
- dig for a badger;
- sell or offer for sale or control any live badger;
- mark, tag or ring a badger; and
- interfere with a badger sett by:
  - damaging a sett or any part thereof;
  - destroying a sett;
  - obstructing access to a sett;
  - causing a dog to enter a sett; and
  - disturbing a badger while occupying a sett.

The 1992 Act defines a badger sett as: "any structure or place which displays signs indicating current use by a badger".

**Bats**

All species of bat are fully protected under a variety of domestic, European and international legislation and conventions. These include:

- Bern Convention (Appendix II)
- Bonn Convention (Appendix II)
- Conservation Regulations (Northern Ireland) 1995
- Conservation of Habitats and Species Regulations 2010
- Countryside Rights of Way Act 2000
- Eurobats Agreement
- Habitats Directive (Annexes IV and II)
- Habitats Regulations 1994 (as amended) Scotland
- NERC Act 2006
- Wildlife and Countryside Act 1981 (as amended)
- Wild Mammals Protection Act

In addition to this, some species have additional protection by being listed on the UK Biodiversity Action Plan (UKBAP).

The legislation afforded to bats makes it illegal to possess or control any live or dead specimens, to damage, destroy or obstruct access to any structure or place used for shelter, protection or breeding, and to intentionally disturb a bat while it is occupying a structure or place which it uses for that purpose.

All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which protects birds, nests, eggs and nestlings from harm. In addition to this, some rarer species, such as barn owls are afforded extra protection.

**National Planning Policy Framework, Section 15:**

The published framework in 2018 replaces the previous Planning Policy Statement 9 and National Planning Policy (dated 2012).

Section 15: Conserving and enhancing the natural environment reaffirms the government's commitment to maintaining green belt protections and preventing urban sprawl, retains the protection of designated sites and preserves wildlife. It also aims to improve the quality of the natural environment and halt declines in species and habitats, protects and enhances biodiversity and promotes wildlife corridors.

**Biodiversity 2020:**

This sets out to halt overall biodiversity loss and support healthy well-functioning ecosystems by establishing coherent ecological networks, with more and better places for nature, to the benefit of wildlife and people. The government's policy is aimed at individuals, communities, local authorities, charities, business and government, which all have a role to play in delivering Biodiversity 2020.

**Freshwater White-clawed Crayfish**

The white-clawed crayfish is partially protected under Wildlife and Countryside Act 1981 (as amended). It is listed on schedule 5 and therefore afforded protection under Section 9 (1 and 5). Therefore, it is an offence to take white-clawed crayfish and to sell, or attempt to sell, any part of the species, alive or dead, or intend to buy or sell.

### Great Crested Newt

The great crested newt (*Triturus cristatus*) is fully protected under a variety of legislation and conventions. These include:

- Bern Convention (Appendix II)
- Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)
- Conservation of Habitats and Species Regulations 2010
- EU Habitats Directive (Annex II and IV)
- Nature Conservation (Scotland) Act 2004
- NERC Act 2006 (Section 41 England; Section 42 Wales)
- Wildlife and Countryside Act 1981 (as amended)

In addition to this, the great crested newt has been listed as a priority species on the UK Biodiversity Action Plan (UKBAP).

This legislation covers all aspects of newt life stages (eggs, efts and adult newts) and makes it illegal to damage, destroy or obstruct access to any structure or place used for shelter, protection or breeding, and to intentionally disturb a great crested newt while it is occupying a structure or place which it uses for that purpose.

Licenses can be obtained from Natural England (DEFRA) under the Conservation (Natural Habitats etc.) Regulations 1994, to permit activities for the purposes of:

- Regulation 44(2)(e): 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, or
- Regulation 44(2)(f): Preventing the spread of disease
- Regulation 44(2)(g): Preventing serious damage to any form of property or fisheries

Or

- If there is no satisfactory alternative.

The above regulations allow people to carry out activities which would otherwise be illegal.

### Hazel Dormouse

Hazel Dormouse and their habitats are protected by:

- Wildlife and Countryside Act 1981 (as amended)
- Countryside Rights of Way (CROW) 2000
- The Natural Environment and Rural Communities Act 2006
- Conservation of Habitat and Species Regulations 2010

These make it an offence to:

- Capture, injure or kill a Hazel Dormouse
- Disturb a Hazel Dormouse
- Damage or destroy breeding or nesting sites in use by Hazel Dormice
- Disturb a Dormouse whilst it is occupying a structure or place that they use for shelter or protection
- Obstruct access to any structure or place that the Dormouse uses for shelter and protection.
- To possess or control any live or dead specimens.

**Otter**

Otters are fully protected by the European Habitats Directive (92/43/EEC) by being incorporated in annex II of the legislation. In addition to this, otters are listed on schedule 5 of the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:

- To intentionally kill, injure or take an otter.
- To possess or control any live or dead specimens.
- To intentionally or recklessly damage, destroy or obstruct access to any structure, feature or place of shelter in use by otters.
- To intentionally or recklessly disturb an otter whilst it is in occupation of a feature or structure.
- To sell, possess or transport for the purpose of sale or publicly declare the desire to buy or sell otters.

**Reptiles**

All six native reptiles within Great Britain are legally protected, with the extent of protection varying dependent upon their rarity and conservation importance.

Those that receive full protection under the Wildlife and Countryside Act 1981 (as amended) are the rare sand lizard and smooth snake. These species also receive protection under the Conservation (Natural Habitats &c.) Regulations 1994 (also referred to as the Habitats Directive). This means that they are protected from deliberate disturbance, killing, injury or capture and the habitat in which they live is also fully protected against damage or destruction. Any activity involving disturbance or damage to habitats utilised by sand lizards or smooth snakes would require a licence issued by the Department of the Environment, Food and Rural Affairs (DEFRA) following consultation with the statutory nature conservation organisation (Natural England).

The remaining four reptile species are 'partially protected' under the Wildlife and Countryside Act 1981 (as amended), with these species being slow-worm, common lizard, grass snake and adder. This means that these species are protected against intentional killing, injuring and against sale, but their habitat is not protected. In planning terms this means that the presence of these species is a material consideration and there is a requirement to ensure that any reptile interest is safeguarded. If a proposed development is likely to have an impact on these reptiles, then the statutory nature conservation organisation must be notified, particularly if capture and translocation is being proposed. In some parts of the UK, sites that support common reptile species such as common lizards and slow-worms can qualify as County Wildlife Sites. Sites of this designation may receive protection in planning policy.

**Water Voles**

Water Voles are fully protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to:

- To intentionally kill, injure or take a water vole.
- To possess or control any live or dead specimens.
- To intentionally or recklessly damage, destroy or obstruct access to any structure, feature or place of shelter in use by water voles.
- To intentionally or recklessly disturb a water vole whilst it is in occupation of a feature or structure.
- To sell, possess or transport for the purpose of sale or publicly declare the desire to buy or sell water voles.

**Non-Native Floral Species**

It is an offence under schedule 9 of the Wildlife and Countryside Act 1981 (as amended) to plant or otherwise cause non-native flora to grow in the wild. This includes the transportation of earth that has previously had non-native species growing and includes the spread of the species.

All stands of non-native floral species need to be disposed of safely at a licenced landfill site according to the Environmental Protection Act (Duty of Care) Regulations 1991.

## **Appendix F: Bats and Artificial Light**

Artificial lighting is known to affect bat's roosting and foraging behaviour, with lighting resulting in a range of impacts that includes roost desertion (BCT, 2009), delayed emergence of roosting bats (Downs et al., 2003), increased activity of some bat species and decreased activity by others (Stone et al., 2012).

An experimental approach using LED units, demonstrated that relatively fast-flying bat species, including the common pipistrelle, showed no significant impacts as a result of new artificial lighting, even when lighting was set at relatively high levels close to 50 lux.

In contrast, slow flying bats such as the myotis bats (*Myotis* spp.) showed sharp reductions in presence, even at low light levels of 3.6 lux (Stone et al., 2012).

### **Current recommendations for all bat species specifies that no bat roost should be directly illuminated.**

Due to the impacts of lighting, mitigation and sensitive lighting design schemes are required for projects where bats are present. These should include bat friendly lighting plans that should aim to avoid lighting wherever possible. If this is not possible, then the minimisation of any lighting impacts is required by adopting the following measures:

➤ **To introduce lighting curfews or use of PIR sensors.**

Lighting curfews can be an effective way of avoiding impacts on bats. These curfews may involve either turning off lighting or dimming light units at specific times of the night, dimming units at key times of the year, providing the luminaire allows for this option via a control unit. Lighting to be triggered by PIR sensors can be expected to be illuminated only when required and for a low proportion of time.

➤ **To consider no lighting solutions where possible.**

Options such as white lining, good signage and LED cats eyes should be considered as preferable. Reflective fittings may help make use of headlights to provide any necessary illumination in some areas.

➤ **To use only high pressure sodium or warm white LED lamps where possible.**

High pressure sodium and warm white LED lamps emit lower proportions of insect attracting UV light than mercury, metal halide lamps and white LED lighting. Generally, lamps should have a lower proportion of white or blue wavelengths, with a colour temperature <4200 kelvin recommended (BCT, 2014).

➤ **To minimise the spread of light.**

The light spread should be kept at or near horizontal to ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Baffles, hoods, louvres and shields should be used where necessary to reduce light spill.

➤ **To consider the height of the lighting column.**

While downward facing bollard lighting is often preferable, it should be noted that a lower mounting height does not automatically reduce impacts to bats as bollard lighting can often be designed to provide up-lighting. Where bollard lighting is considered to be the most appropriate system, bollard spacing or unit density should be kept to a minimum and units should be fitted with the appropriate hoods/deflectors to reduce any up-lighting.

➤ **To avoid reflective surfaces below lights.**

The polarisation of light by shiny surfaces attracts insects increasing bat activity (BCT, 2012). Consequently, surface materials around lighting require consideration.

## **8 Notice to Readers: Conditions of this Report**

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All reports are certified products and cannot be shown, copied or distributed to third parties without the written permission of Elite Ecology. No liability is accepted for the contents of the report, other than to that of the client(s). If any part of this report is altered without the written permission of Elite Ecology, then the whole report becomes invalid.

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The survey results purport the current status of the site and its potential for protected species utilisation at the time of surveying. It should not be viewed as a complete list of the possible flora and fauna species that could be using the site at different times of the year.

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No reliance should be made on any such comments in relation to the structural integrity of the features located on the surveyed site. All information within the report is based solely on evidence that has been found on site during the service provided. No individual opinion or inference will be made other than that of the suitably qualified ecologist appointed to the project.