

**PRELIMINARY ECOLOGICAL APPRAISAL AND IMPACT ASSESSMENT FOR  
PROPOSED 6 NEW DWELLINGS AT HIGH STREET, RISELEY, BEDFORDSHIRE,  
MK44 1DR**



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# 1. EXECUTIVE SUMMARY

*The following summary is an extract of the report. Please ensure the report is read in its entirety for detailed survey findings and recommendations:*

This report assesses the ecological value of the proposed development site at land off High Street, Riseley, Bedfordshire, MK44 1DR. The proposed development comprises the construction of up to 6 retirement bungalows across an area of improved and semi-improved grassland. The existing site access will be utilised and a new internal driveway, turning area and parking areas created. An existing site layout and proposal plan has been included in Appendix 1. The site survey included an assessment of the habitats found within the site and the likely impact of the proposed development and construction works on habitats of ecological value and protected and notable species.

## **Results:**

The habitats within and bordering the site include dry ditch, improved and semi-improved grassland, standing water, species poor hedging and trees and tall ruderal vegetation. The footprint of the development comprises entirely habitats considered to be of low/moderate ecological value i.e. rough grassland. The more valuable ditches, boundary trees and hedging are moderate to high value habitats and will be retained and subject to avoidance and mitigation measures. The site contains suitable habitat for the following protected species; foraging and commuting bats, badger, roosting bats (trees), small mammals, reptiles, amphibians and nesting birds. The site provides low potential for water vole, otter, white-clawed crayfish and hazel dormouse.

A single pond (P1) is situated close to the proposed development (<15m) and with good potential (0.78) for great crested newt. An eDNA test of the pond for great crested newts was undertaken, the results of which returned negative for GCN. A second small pond (P3) forming part of a ditch (D2) was also assessed and found to have below average potential for GCN (0.53), the ditch and pond were both dry by May 2019 and May 2020 and so unlikely to be used by GCN. The ditch has since been re-profiled and now forms only a seasonally wet ditch (D2).

The rough improved and semi-improved grassland habitat with boundary ditches and hedging and other features such as brash/timber/rubble piles provide good habitat for reptiles. A reptile survey was undertaken in September 2019 (Appendix 4) which returned no evidence of reptiles.

## **Desk Study**

The desk study identified records of 5 bat species, badger, water vole, otter and great crested newt. There are no records of reptiles within 2km in the last 10 years. Hedgehog and brown hare (UK/ BAP) have been recorded within the 2km search radius. There are also a number of UK Priority and Red/Amber List Bird Species as well as SoCC (Species of Conservation Concern) including barn owl, linnet, nightingale, corn bunting, grasshopper warbler, tree sparrow, grey partridge, lesser spotted woodpecker, kingfisher, reed bunting, skylark, spotted flycatcher, fieldfare, yellow wagtail and yellowhammer.

There are no statutory designated wildlife sites within a 2km radius. There are 3 County Wildlife Sites within 2km, with CWS- Coppice, Flint's, Lady Wood-TL038645, approximately 820m north-west.

Given that there are no statutory designated sites within 2km of the proposed development, no direct or indirect impacts to statutory designated sites are anticipated. No direct impacts are likely on the CWS subject to the avoidance and mitigation measures outlined.

## Recommendations:

**Avoidance:** Phased clearance of scrub, rough grassland and tall ruderal vegetation; retention of mature tree specimens; timing of vegetation clearance and ground works to avoid the bird nesting season 1<sup>st</sup> March to 15<sup>th</sup> September inclusive; log and brash piles and other refugia to be created within the site; trenches and excavations to be covered at night or a mammal ramp provided; no trees to be removed without a detailed bat roost assessment (PRA) being undertaken; tree protection measures and methods specified by a suitably qualified arborist are recommended in accordance with BS5837:2012; no groundworks or plant machinery within the RPA's of retained trees; building materials to be stored off the ground on pallets; grassland across the site interior should be kept regularly mown to maintain its unsuitability to reptiles and amphibians; sensitive lighting design in accordance with Bat Conservation Guidelines; measures to be taken to avoid killing/injuring of terrestrial mammals.

**Mitigation:** Landscape planting to include native fruit and berry bearing trees, hedging, shrubs and plants which provide a nectar source to improve resources for a range of invertebrate and bird species.

**Enhancement:** Erection of bird and bat boxes, installation of insect hotels, species rich amenity grassland seeding, new tree and hedge planting. creation of artificial refugia/hibernaculum along the pond and ditch edge habitats and maximizing the wildlife benefits of the proposed SUDS pond.

The expected residual impact with implementation of the above mitigation would be **minor-adverse neutral** upon breeding/nesting birds, foraging/commuting/roosting bats, common invertebrates and terrestrial mammals. The impact on great crested newt, reptiles, water vole, hazel dormouse, otter and white clawed-crayfish is considered to be **neutral**.

We suggest that any habitat loss associated with the clearance can be adequately mitigated through landscaping, planting and other biodiversity enhancement measures such as creating wildlife areas within the remaining land on the south and east boundaries, outside of garden areas and also managing the habitats along the site boundaries.

The overall impact assessment does not take into consideration those species for which further information is required. To fully assess the site for, and the impact of the proposed development upon, protected species, detailed surveys are recommended for the following species:

- Preliminary Tree Roost Assessment (PRA)- If semi-mature or mature trees are likely to be impacted upon, i.e where trees will be removed, root protection zones cannot be adhered to, or management is recommended by the appointed arborist, a Preliminary Tree Roost Assessment of the trees must be undertaken.

- Destruction of in-use nests or harm to adult birds caused by removal of trees/hedgerows on site during the main breeding bird season (1st March to 31st August). If works commence during this period a nesting bird survey must first be undertaken by a suitably qualified ecologist (SQE).

This report aims to establish an ecological baseline, identifying protected habitats and species that may be affected as a result of the proposed works. It aims to establish if further surveys are required and where possible make recommendations for design options that avoid significant effects on important ecological features and resources. The survey and assessment were completed by independent, qualified and experienced ecologists.

## 2. INTRODUCTION

### 2.1. Purpose of Survey

Eco-Check Ltd has been commissioned by Aragon Land and Planning Ltd to assess the ecological constraints of a proposed residential development at land off High Street, Riseley, Bedfordshire, MK44 1DR. The proposed development comprises the construction of up to 6 retirement bungalows across an area of improved and semi-improved grassland. The existing site access will be utilised and a new internal driveway, turning area and parking areas created.

This survey aims to highlight any evidence of (or potential for) protected species or habitats that could result in a constraint to the proposed development. The assessment follows guidelines produced by the Chartered Institute of Ecology and Environmental Management (CIEEM 2017). To provide information to support the ecological assessment, a preliminary bat roost assessment of the trees also been undertaken.

### 2.2. Site Location

The site comprises an area of land between houses to the south-west and north-east to the south side of High Street, Riseley. The site is situated approximately 12km north-west of St Neots and 11km north of Bedford within the village and civil parish of Riseley in the Bedfordshire District. The site is accessed from High Street to the north, central grid reference is TLO46631.

The site comprises a meadow which is cut once or twice per year for hay. The field is bordered by species poor hedging and trees on all boundaries with ditches along the east, north and west field boundaries. The wider landscape is dominated by large pasture and arable fields and blocks of woodland, scattered trees, hedgerows, residential and agricultural buildings, field studded ponds and roads. There are 3 ponds within a 250m radius, the nearest being P3 forming an extension of the wet ditch (D2) on the north boundary (now re-profiled into ditch D2). There is a further large pond/lake P1 approximately 15m east and pond P2 approximately 235m south. The application site and proposed layout is in Appendix 1.

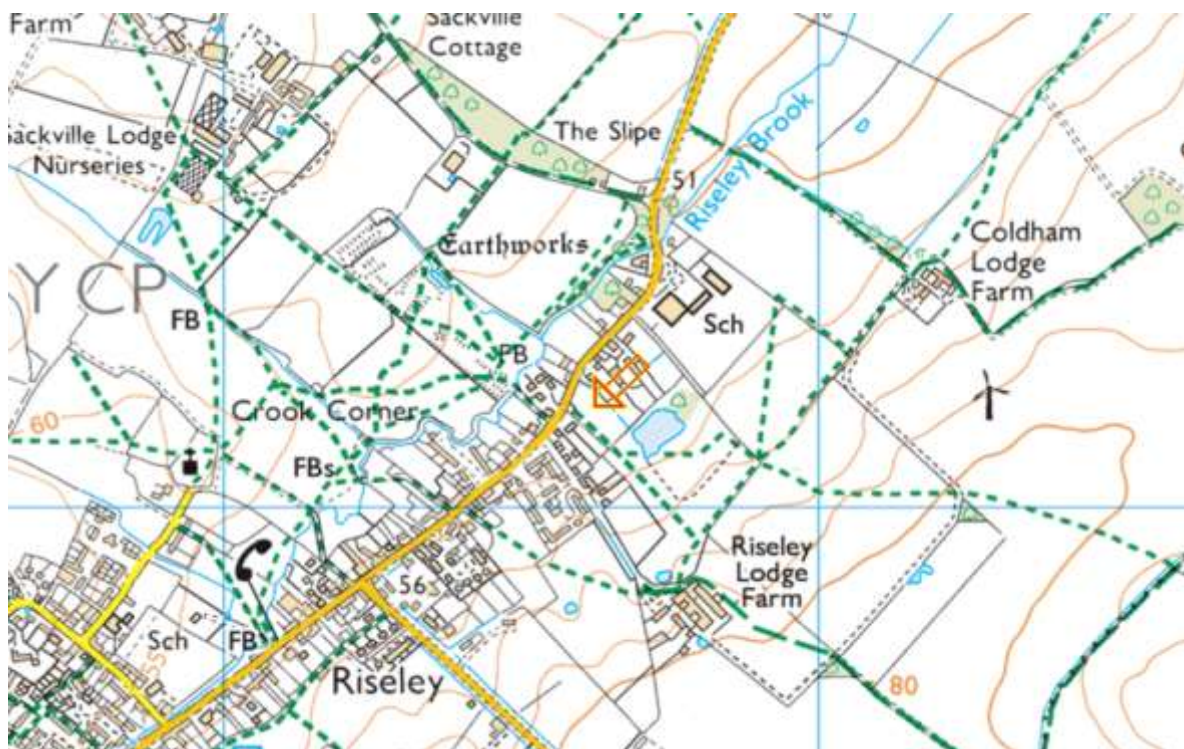


Figure.1.0 Site Location Map- Streetmap 2018

### **2.3. Site Description**

The site forms a roughly L-shaped plot of land measuring at its full extent approximately 80m by 110m covering approximately 0.7ha with a gently sloping aspect from east to west. The field comprises areas of managed mown and rough grassland habitats, with trees and hedging on all boundaries.

### **2.4. Proposed Works**

The proposal is to construct up to 6 retirement bungalows across an area of improved and semi-improved grassland. The existing site access will be utilised and a new internal driveway, turning area and parking areas created. The route of any service trenches for water, electricity and drainage are unknown at this time. It is not proposed to remove any of the boundary trees or hedging bordering the site apart from the south-east section of hedgerow H3 which will need to be removed between plots 4 and 7 on the revised layout and pipe in and reroute the seasonal open ditch (drain D2). A SUDS surface water storage pond/lagoon is proposed as part of the development. An existing site layout and proposal plan has been included in Appendix 1.

### **2.5. Scope of Survey**

The ecological investigations undertaken include:

1. A desk study to gather existing information on statutory and non-statutory sites of conservation interest, and any protected or notable species.
2. A survey to describe the vegetation and habitats of ecological importance utilizing the Handbook for Phase 1 Habitat Survey, (JNCC, 2010) and the National Vegetation Classification methodology as set out in the NVC Handbook (source: *“Handbook for using the National Vegetation Classification”* J.S.Rodwell, 2006 Joint Nature Conservation Committee).
3. A reconnaissance survey for evidence of protected species and identification of habitats suitable for such species. In particular the survey adopted the national survey methodologies for badgers, birds, reptiles, amphibians and bats.
4. Analysis of the data gathered from desk and field surveys and identification of any likely significant effects on protected species, including proposals for avoidance, reduction, compensation and enhancement measures.
5. Assessing the magnitude and nature of any impact the existing and proposed land use would make on the site, evaluate any residual effects of the land use and recommendations for further investigations where necessary.

The assessment aims to:

- Describe the baseline condition of the ecological features within the site;
- Assess the potential construction and operational impacts resulting from biophysical changes incurred by the land use;
- Identify the mitigations necessary to reduce the potential impact of the land use on designated sites, habitats, protected and notable species (i.e. ecological features) which occur within the site), and;
- Summarise the residual impacts of the land use on the ecology and nature conservation in the zone of influence.

The impact assessment presented in this report was undertaken in compliance with the Chartered Institute of Ecology and Environmental Management *Preliminary Ecological Appraisal* (CIEEM, 2017). Comments on the ecological value of the site as a wildlife resource and the significance of the change of land use follow the guidelines provided by Regini (2000).

## **2.6. Legal Framework**

The principal European and UK legislation relating to biodiversity and nature conservation relevant to the proposed development are:

- Conservation of Species and Habitats (Amendment EU Exit) Regulations 2019
- The EC Directive on the Conservation of Wild Birds (791409/EEC).
- The Wildlife & Countryside Act (1981) and subsequent amendments.
- The CROW Act 2000, particularly Section 74 habitats and species.
- The Protection of Badgers Act (1992).

The UK government is committed to a significant reduction of the current rate of biodiversity loss by 2020. This commitment is recognised in:

- The England Biodiversity Strategy
- UK Biodiversity Action Plan (UK BAP)
- Biodiversity 2020: A Strategy for England's Wildlife
- National Planning Policy Framework (Replacement of PPS9);
- BS 42020:2013- Code of Practice for Planning and Development

## 3. METHODS

### 3.1. Desk Study

A desk study for statutory and non-statutory wildlife sites and protected and priority species was undertaken using the Magic website and records supplied by Bedfordshire and Luton Biodiversity Recording and Monitoring Centre. 1:25000 scale maps and local satellite imagery was also reviewed prior to the field survey to identify features of potential interest including ponds, woodland, meadows and adjacent high-quality habitat.

The potential for protected rare and/or priority species to be on site has been assessed considering the nature of the site and the habitat requirement of the species in question. Absence of records does not constitute absence of a species. Habitats on-site may be suitable to support other protected/priority species that have not previously been recorded within the search area.

Bedfordshire and Luton Biodiversity Recording and Monitoring Centre does not allow its species records to be made publicly available, such as direct inclusion within this report. Species recorded have been taken into consideration for our impact assessment, however any accurate locations are determined to be sensitive and cannot be revealed. Previous survey work and records from the adjacent sites have been included where relevant.

### 3.2. Phase 1 Site Survey

The survey was undertaken on the 28<sup>th</sup> March 2019 by James Hodson of Eco-Check Ltd, an experienced ecological consultant with a BSc (Hons) in Environmental Sciences and MSc in Environmental Impact Assessment and licensed to undertake bat surveys and to disturb bats under Natural England Level 2 Bat Survey License 2017-30927-CLS-CLS and great crested newts 2018-36283-CLS-CLS. The weather was sunny, bright, 13°C and 5mph S.W. An updated site survey was undertaken on 29<sup>th</sup> May 2019 and eDNA sample taken of pond (P1). A further site survey was undertaken on the 29<sup>th</sup> May 2020 to incorporate an extra parcel of land to the south-east.

The vegetation and habitat types within the site were noted during the survey in accordance with the categories specified for a Phase 1 Vegetation and Habitat Survey (JNCC, 2010). Dominant plant species were recorded for each habitat present.

The site was inspected for evidence of and its potential to support protected or notable species, especially those listed under the *Conservation of Species and Habitats (Amendment EU Exit) Regulations 2019*, the *Wildlife & Countryside Act 1981* (as amended), including those given extra protection under the *Natural Environment and Rural Communities (NERC) Act 2006* and *Countryside & Rights of Way (CROW) Act 2000*, and listed on the UK and local Biodiversity Action Plans. Such species include amphibians, reptiles, bats, badgers, birds, dormice and water voles. Evidence of badgers was searched for throughout the site, including setts, footprints, feeding signs, hairs and droppings.

The site was searched for evidence of invasive plant species, such as Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*), giant hogweed (*Heracleum mantegazzianum*), horizontal/wall cotoneaster (*Cotoneaster horizontalis*) and floating pennywort (*Hydrocotyle ranunculoides*).

As the attributes of the site and its potential for protected, notable and invasive species may change over time, this report is broadly considered valid for a duration of two years, after which time it is



recommended that an update site assessment is undertaken. In some cases, protected or invasive species' use of a site may change over a shorter timescale, for instance the use of a badger sett by badgers, which may change month to month. In such cases, appropriate precautionary advice or recommendations for update surveys are given within this report

### 3.3 Protected and Key Species Survey

#### Amphibians (Including Great Crested Newts)

Any ponds, lakes, reservoirs or other water bodies on site, or within 250M (with good habitat connectivity) were assessed for their potential to support breeding populations of amphibians, specifically Great Crested Newts. Assessing potential suitability for Great Crested Newt is undertaken using the Habitat Suitability Index (HSI), a geometric mean of ten habitat suitability criteria (see table 2.0) (Oldham *et al.* 2000). The resulting HSI score should be interpreted as either; Excellent (>0.8), Good (0.7 – 0.79), Average (0.6 – 0.69), Below Average (0.5 – 0.59) potential for supporting Great Crested Newts (Oldham *et al.* 2000)

Table 1.0 – Habitat suitability criteria used to calculate (HSI), the suitability of a pond to support Great Crested Newts (based on Oldham *et al.* 2000)

Indices	Name:	Description:
Sl <sub>1</sub>	Geographic Location	Lowland England or upland England, Scotland and Wales
Sl <sub>2</sub>	Pond area	To the nearest 50m <sup>2</sup>
Sl <sub>3</sub>	Permanence	Number of years pond dry out of ten
Sl <sub>4</sub>	Water quality	Measured by invertebrate diversity
Sl <sub>5</sub>	Shade	Percentage shading of pond edge at least 1m from shore
Sl <sub>6</sub>	Fowl	Level of waterfowl use
Sl <sub>7</sub>	Fish	Level of fish population
Sl <sub>8</sub>	Pond count	Number of ponds within 1km divided by 3.14
Sl <sub>9</sub>	Terrestrial habitat	Quality of surrounding terrestrial habitat
Sl <sub>10</sub>	Macrophytes	Percentage extent of macrophyte cover

#### Badgers

A visual assessment for setts, latrines, prints and evidence of foraging activity was undertaken within the site boundaries.

#### Bats

A Preliminary Roost Assessment (PRA) was undertaken in accordance with methods outlined in the Bat Conservation Trusts "Bat Surveys for Professional Ecologists" (Collins, 2016) Including both a desk-based and field-based assessment. Details of these guidelines can be found in table 2.0.

Table 2.0 - Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape (Adapted from table 4.1 pp. 35 in Collins, 2016)

Suitability.	Description of Roosting habitats.	Description of Commuting and Foraging habitats.
Negligible	Negligible habitat features on-site likely to be used by roosting bats.	Negligible habitat features on-site likely to be used by commuting or foraging bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation.)</p> <p>A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.</p>	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.</p>
Medium	<p>A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).</p>	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	<p>A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.</p>	<p>Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved</p>

woodland, tree-lined watercourses and grazed parkland.  
Site is close to and connected to known roosts.

#### Birds

On-site habitats were assessed for their potential to support breeding (nesting) birds. All bird species observed during the two field surveys as well as the reptile survey visits were recorded. Birds observed were categorized based on both their RSPB and BAP status.

#### Dormice

An initial inspection for evidence of Dormice or habitats that could support Dormice was undertaken.

#### Invertebrates

Specific sampling for invertebrates falls outside of the remit of a Preliminary Ecological Assessment. However, any invertebrates observed incidentally during the survey were recorded.

#### Otters, Water voles, and White-Clawed Crayfish.

On-site habitats were assessed for their suitability to support Otters, Water Voles and White-Clawed Crayfish.

#### Reptiles

All on-site habitats were assessed for their potential to support reptiles and all any pre-existing refugia including discarded plastics, paving slabs, bricks and wood were carefully examined in search of live individuals.

Risk Category	Definition
PRESENT	Presence confirmed in the course of current survey or recent, confirmed records.
HIGH	On-site habitat of high quality for a given species/species group. Site within/peripheral to a national or regional population stronghold. Good quality surrounding habitat and good connectivity.
MODERATE	On-site habitat of moderate quality, providing most or all of the known key requirements of a given species/species group. Local returns from the data search, within national distribution, suitable surrounding habitat. Factors limiting the likelihood of occurrence may include small habitat area, habitat severance, disturbance etc.
LOW	On-site habitat of poor to moderate quality for a given species/species group. Few or no returns from data search but presence cannot be discounted on the basis of national distribution, nature of surrounding habitats, habitat fragmentation, recent on-site disturbance etc.
NEGLIGIBLE	While presence cannot be absolutely discounted, the site includes very limited or poor quality habitat for a particular species or species group. No local returns from a data search, outside or peripheral to known national range for a species, surrounding habitat considered unlikely to support wider populations of a species/species group.
UNKNOWN	Insufficient data to make a determination of the risk of a species presence or absence.

Table.3.0 Criteria for assessing presence of protected species

### 3.4 Impact Assessment

The assessment was undertaken in accordance with CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2<sup>nd</sup> Edition. Chartered Institute of Ecology and Environmental Management, Winchester.

In summary the impact assessment process involves:

- Assessing the value of ecological receptors at the site and those nearby that could be affected (e.g. designated sites, habitats, species);
- Identifying the unmitigated impacts of the development (magnitude, spatial extent, duration, timing/frequency, reversibility);
- Providing measures to avoid and mitigate for impacts;
- Assessing the significance of residual impacts after specified mitigation;
- Identifying appropriate compensation measures to offset significant residual effects, and;
- Identifying enhancement opportunities to provide a new benefit for biodiversity.

#### **Value/scale of ecological features:**

The value of ecological features uses conservation status (i.e. extent, relative abundance and distribution) to assign geographic levels at which the feature is considered to hold importance.

Ecological features should be evaluated within a defined geographical context (CIEEM, 2016). These are based upon criteria identified in the CIEEM (2016) guidance, which categorise the geographic context of ecological importance as within one of the following:

- International and European;
- National;
- Regional;
- County, or local authority; and,
- Local Importance/Parish (High or Low Value).

Only features deemed “important ecological features” (the term used in CIEEM, 2016) are carried forward into the assessment of potential impacts. Important ecological features are:

- Considered to be sufficiently valuable to the decision-making process; and specifically of “Local Importance (Higher value)” or higher using the geographic frames of reference in Appendix B and,
- Likely to be significantly affected by the project (CIEEM, 2016).

For habitats, this includes the structure and composition of plant communities, the species they may support, and over what distance the habitat may have influence over e.g. wetlands may attract wintering birds from hundreds of miles away, whereas a small block of scrub may only support fauna in the local area

For species, this includes the abundance and distribution within a given geographical area e.g. a small population of great crested newt may be assessed to be of ‘local’ importance in the south of England where populations are abundant but, but of ‘county’ importance in the north of England where the species is scarcer. In depth details of geographic values of importance are summarised in Appendix 3.

Ecological features valued at Local Importance (Lower Value) or of negligible value (as per the valuation criteria in Appendix 3) are not considered significant features and are scoped out of impact assessment.

It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to project impacts and will remain viable and sustainable (CIEEM, 2016). In some cases the data collected as part of the scoping process will be sufficient to inform the assessment of effects on a given feature. In other cases additional surveys will need to be undertaken.

Ecological features which are within the zone of influence of a development, but not considered important ecological features, can be ‘scoped out’ (excluded), with justification.

**Scale of impact and confidence levels:**

Impacts on ecological features can occur either directly (e.g. loss of habitats, habitat fragmentation, noise/light disturbance) or indirectly (e.g. water/air quality, noise and light pollution, recreational disturbance). The overall impact is subjectively assessed taking into consideration a range of factors, including conservation status of an ecological feature, magnitude, spatial extent, duration, timing/frequency and reversibility. Impacts can be both positive and negative. The guidance used to quantify the scale of impacts is provided below;

Major	Loss of over 50% of a site feature, habitat or population Adverse change to all of a site feature, habitat or population For benefits, an impact equivalent in nature conservation terms to gain of over 50% of a site feature, habitat or population
Intermediate	Loss affecting 20-50% of a site feature, habitat or population Adverse change to over 50% of a site feature, habitat or population For benefits, an impact equivalent in nature conservation terms to a gain of 20-50% of a site feature, habitat or population
Minor	Loss affecting 5-19% of a site feature, habitat or population Adverse change to 20-50% of a site feature, habitat or population For benefits, an impact equivalent in nature conservation terms to a gain of 5-19% of a site feature, habitat or population
Neutral	Loss affecting up to 5% of a site feature, habitat or population Adverse change to less than 20% of a site feature, habitat or population For benefits, an impact equivalent in nature conservation terms to a gain of up to 5% of a site feature, habitat or population

Table 4.0 – Definitions of impact magnitude

The assessment of these impacts are subjective and based on predictions based on the available evidence and therefore may be inaccurate if predicted activities change or scale/extent of the proposed development alters. Therefore, we provide an indication of confidence levels for our assessment using the following criteria:

- Certain                    probability estimated at above 95%
- Likely                     probability estimated above 50% but below 95%
- Possible                  probability estimated at above 5% but below 50%
- Unlikely                  probability estimated at less than 5%

Consideration is also given to the potential for the development proposal to give rise to significant negative impact in combination with other proposed development in the area, where relevant. An overall assessment of value and predicted impact is provided, and this is based upon the highest level of value of any of the features or species present or likely to be present on the site, and similarly the overall assessment would be the impact of greatest significance.

### 3.5 Legislation

#### Protected Species

##### Bats

All bat species are listed under Annex IV (and certain species also under Annex II) of the European Union's Council Directive 92/43/EEC (The Habitats Directive), and are given UK protected status by Schedule 2 of the Conservation of Species and Habitats (Amendment EU Exit) Regulations 2019.

Bats and their roosts also receive protection from disturbance from by the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000). This protection extends to both the species and roost sites. It is an offence to kill, injure, capture, possess or otherwise disturb bats. Bat roosts are protected at all times of the year (making it an offence to damage, destroy or obstruct access to bat roosts), regardless of whether bats are present at the time.

##### Birds

All bird species are protected under the Wildlife and Countryside Act 1981 as amended. This prevents killing or injuring any bird or damaging or destroying nests and eggs. Certain species (including barn owl *Tyto alba*) are also listed under Schedule 1 of the Wildlife and Countryside Act 1981, which prevents disturbance of the species or its nest and/or eggs at any time with protection by special penalties.

##### Reptiles

All native reptiles are listed on Schedule 5 of the Wildlife and Countryside Act 1981, and are afforded protection under Sections 9(1) and 9(5). For the reptile species occurring in Norfolk, adder *Vipera berus*, grass snake *Natrix natrix*, slow-worm *Anguis fragilis* and common lizard *Zootoca vivipara*, this protection prohibits deliberate or reckless killing and injury but does not include habitat protection.

##### Great Crested Newts

The great crested newt *Triturus cristatus* is fully protected in accordance with both national and international legislation. The species is listed under Annexes IV and II of European Directive 92/43/EEC, and Schedule 2 of Conservation of Species and Habitats (Amendment EU Exit) Regulations 2019. The species is also protected by Sections 9(4) and 9(5) of the Wildlife and Countryside Act 1981 as amended. It is an offence to knowingly or recklessly kill, injure, disturb, handle or sell the animal, and this protection is afforded to all life stages. It is unlawful to deliberately or recklessly damage, destroy, or obstruct the access to any structure or place used for shelter or protection; this includes both the terrestrial and aquatic components of its habitat.

##### Badger

Badgers *Meles meles* are protected under the Protection of Badgers Act 1992 and the Wildlife and Countryside Act 1981 (as amended). Under Section 1 of the Protection of Badgers Act 1992, it is a criminal offence, subject to certain mitigating circumstances, to wilfully kill, injure or take a badger, and under Section 3 of this legislation it is a criminal offence, in most circumstances, to destroy, damage or obstruct access a badger sett or part of it. A badger sett is defined in the 1992 Act as any

structure or place that displays signs indicating use by a badger. Although a sett may be empty at a particular time, it may be used as part of a regular cycle throughout the year, and can therefore be considered to be in use. Under certain conditions, activities that could otherwise give rise to an offence may be licensed by the Department for Environment, Food and Rural Affairs (Defra) (for agricultural or land drainage purposes) or Natural England (for development covered by planning permission). A sett which can be shown to have been unused for at least a full year is considered to fall outside of the provisions of the 1992 Act. The badger is listed under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended), which identifies animals that may not be killed or taken by certain methods.

#### Statutory Designated Conservation Sites

National ecological designations, such as Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR), are also afforded statutory protection. SSSIs are notified and protected under the jurisdiction of the Wildlife and Countryside Act 1981 as amended. SSSIs are notified based on specific criteria, including the general representativeness and rarity of the site and of the species or habitats supported by it.

#### Local Non-statutory Designated Conservation Sites

Local sites of importance to biodiversity, but falling below the criteria for SSSI selection, are designated in Bedfordshire as County Wildlife Sites (LWS). These sites have no statutory protection, but are normally given consideration within local plans.

#### Species and Habitats of Principal Importance

Other priority species and habitats which are a consideration under the National Planning Policy Framework (NPPF) 2012, placing responsibility on Local Planning Authorities to aim to conserve and enhance biodiversity and to encourage biodiversity in and around developments. There is a general biodiversity duty in the Natural Environment and Rural Communities (NERC) Act 2006 (Section 40) which requires every public body in the exercising of its functions to 'have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'. Biodiversity, as covered by the Section 40 duty, includes all biodiversity, not just the Habitats and Species of Principal Importance.

Section 41 of the NERC Act lists a number of species and habitats as being Species/Habitats of Principal Importance. These are species/habitats in England which had been identified as requiring action under the UK BAP, and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework. The protection of either Species of Principal Importance or Habitats of Principal Importance is not statutory, but "specific consideration"<sup>1</sup> should be afforded by Local Planning Authorities when dealing with them in relation to planning and development control. Also, there is an expectation that public bodies would refer to the Section 41 list when complying with the Section 40 duty.

## **4. LIMITATIONS**

### **4.1. Desk Study**

These results can only give an indication of species presence in this location. The absence of recent records for certain species in an area may be due to the lack of survey effort or the non-submission of records, rather than the absence of those species. Many species records are also at low resolution and do not indicate their exact location.

### **4.2. Field Survey**

The comprehensiveness of the ecological assessment was limited by the season in which the site visit was made. To confirm the presence or absence of all protected species usually requires multiple visits at suitable times of the year. Summer surveys between May and September are considered optimal. The site visit focussed on assessing the potential of the site to support species given protection under British or European law. In view of the above constraints this assessment cannot be considered to provide a comprehensive survey of the ecological interest of the site. It does however provide a “snapshot “of the ecological interest present on the day of the visit and highlights areas where further survey work may be required.



## 5. DESK STUDY RESULTS

### 5.1. Designated sites

#### Statutory Sites of Nature Conservation Significance

There are no statutory designated wildlife sites within a 2km radius.

#### Non-Statutory Sites of Nature Conservation Interest

There are 3 County Wildlife Sites within a 2km radius of the site:

- CWS- Keysoe Park- TL054622 Approximately 940m south-east
- CWS- Coppice, Flint's, Lady Wood-TL038645 Approximately 820m north-west
- CWS- Penn and Worley's Wood- TF947191 Approximately 1.85km north-west

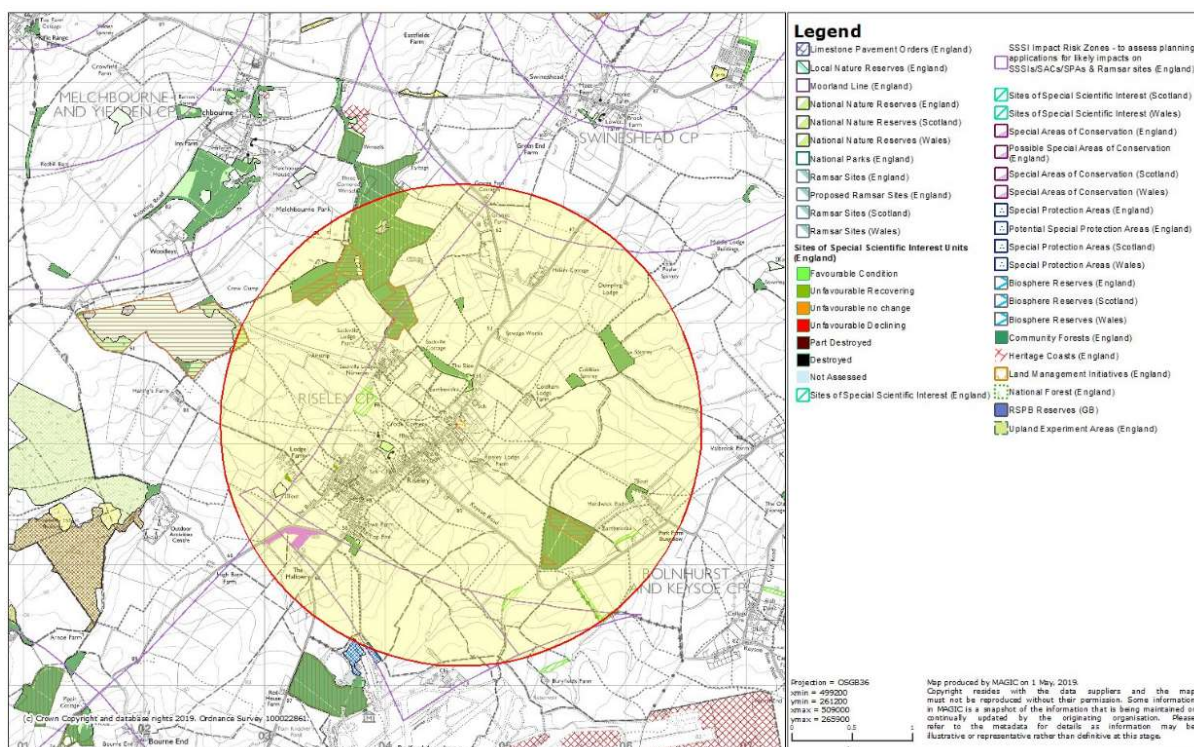


Figure.2.0- Magic Site Check-2km

#### Priority Habitats

There are no priority habitats within or adjacent to the site. Priority habitats within the 2km search radius included ancient woodland, broadleaved deciduous woodland and traditional orchards.

#### Pond and waterbodies:

A search for ponds and waterbodies within 250m was conducted using Ordnance Survey Data (OS Explorer Map 237 Scale 1:25,000) and publicly available Environment Agency data:

There are 3 ponds within a 250m radius, pond P1 is approximately 10m east of the site boundary, pond P2 is approximately 235m south-east of the site boundary and pond P3 is along the north-east boundary and forms an extension of a wet ditch D2 (now re-profiled into ditch). There is a wet ditch along the south-east boundary (D1) and majority of the length along the north boundary (D2) apart from a short-culverted section.



Figure 3.0- Map of Ponds and Waterbodies within 250m of site

## 5.2. Protected and Noteworthy Species

A search for relevant notable and protected species records within 2km of the site returned a number of priority and protected species records.

### Amphibians:

There are 2 records of great crested newt (*Triturus cristatus*) within the 2km search radius, which originates from Church Lane approximately 800m to the south-west (TL038628, 1990) and 1.8km south (TL041614, 2014) which was from a GCN license return. There are single records of common frog (*Rana temporaria*) and common toad (*Bufo bufo*) and smooth/palmate newt (*Lissotriton vulgaris/helveticus*). There are 3 ponds marked on maps within 250m, all of which are considered connected to the site.

### Bats:

There are 17 records of bats within 2 km of the site within the last 15 years. The records provided relate to; brown long-eared bat (*Plecotus auritus*); noctule bat (*Nyctalus noctua*); pipistrelle bat (*Pipistrellus spp.*); common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*). No details were provided regarding whether records relate to roosts or activity only. Common pipistrelle, soprano pipistrelle and brown long-eared bat have been observed roosting within bat boxes in woodland areas close to the site.

#### Badger:

There is a single record of badger (*Meles meles*) 2004, originating from Coppice Wood (CWS) approximately 1.5km north-west.

#### Birds:

88 species of bird were returned within the 2km search radius including a range of priority species and birds of conservation concern (BoCC) including barn owl, linnet, song thrush, corn bunting, grasshopper warbler, tree sparrow, grey partridge, lesser spotted woodpecker, nightjar, kingfisher, reed bunting, nightingale, mistle thrush, fieldfare, skylark, spotted flycatcher, yellow wagtail and yellowhammer.

#### Otter:

There are 8 records of otter (*Lutra lutra*) within 2km search radius. These are mostly from a lake 1.2km north-east

#### Reptiles:

There are no records of reptile species within the search radius within the last 20 years. Common lizard, slow worm and grass snake are protected from killing or injury under Schedule 5 (Section 9) and of the Wildlife and Countryside Act 1981 (as amended), it is also listed in the UK Biodiversity Action Plan as a species in need of conservation and greater protection.

#### Hedgehog, Harvest Mouse and Brown Hare:

There are 3 records for hedgehog (*Erinaceus europaeus*) within a 2km radius of the site, the nearest being approximately 1.2km north (2018). There are 4 records of brown hare (*Lepus europaeus*) within a 2km radius of the site, the nearest being 1.6km to the north-east. There is a single record of harvest mouse (*Micromys minutus*).

#### Water Vole:

A single water vole record was returned (1998) approximately 1.7km north-east.

#### Hazel Dormouse:

No records of hazel dormouse were returned.

#### Invertebrates

A small number of records were returned for species of moth and butterfly including black hairstreak (Keysoe Park), small heath, marbled clover, lunar yellow underwing and grey carpet.

#### Non-Native and Invasive Species:

There are records for muntjac (*Muntiacus reevesi*), Egyptian goose (*Alopochen aegyptiacus*), Canada goose (*Branta canadensis*) and common carp (*Cyprinus carpio*) within a 2km radius. There are no records for invasive species within a 2km radius, apart from Himalayan Balsam (*Impatiens glandulifera*), and none were observed on site.

## 6. RESULTS OF PHASE 1 HABITAT SURVEY

### 6.1. Habitats and Vegetation

Table 5.0 below details the habitats recorded on site, the dominant species present and their overall biodiversity value

Habitat	Description	Dominant Species	Biodiversity Value	Additional notes
<b>Dry Ditch J2.6</b>	A dry ditch (D3) runs along the north-west roadside boundary. The ditch appears to be dry for most of the year and contained leaf-fall and woody debris. The channel is approximately 1m wide and 0.5m deep.	Ground ivy ( <i>Glechoma hederacea</i> ), lesser celandine ( <i>Ficaria verna</i> ), Creeping ivy ( <i>Hedera helix</i> ) and wild arum ( <i>Arum maculatum</i> ).	Low	Low value to aquatic species as ephemeral in nature but provides some terrestrial habitat connectivity.
<b>Fence (J2.4)</b>	The site is bounded by post and wire fencing along the south boundary with the footpath, east boundary along the wet ditch (D1) and north boundary with the wet ditch (D2).		None	
<b>Improved Grassland B4/ Poor Semi-improved Grassland B6</b>	The field interior comprises a mixture of nutrient enriched improved grassland as well as species poor -semi improved grassland.  The grass within the application site had a variable height of approximately 10-40cm. At the time of survey there were also some short-mown tracks running through the field. The field is cut annually or bi-annually for hay.	The dominant grassland species included ryegrass ( <i>Lolium perenne</i> ), false oat-grass ( <i>Arrhenatherum elatius</i> ), cock's foot ( <i>Dactylis glomerata</i> ), yorkshire fog ( <i>Holcus lanatus</i> ), common nettle ( <i>Urtica dioica</i> ), timothy grass ( <i>Phleum pratense</i> ), cleavers ( <i>Galium aparine</i> ), broad-leaved dock ( <i>R. obtusifolius</i> ), creeping buttercup ( <i>Ranunculus repens</i> ), white clover ( <i>Trifolium repens</i> ), daisy ( <i>Bellis perennis</i> ), bristly ox-tongue ( <i>Helminthotheca echioides</i> ), creeping thistle ( <i>Cirsium arvense</i> ), ribwort plantain ( <i>Plantago lanceolata</i> ), vetch ( <i>Vicia</i>	Low/Moderate-	Rough Grassland provides suitable foraging and refuge habitat for amphibians, reptiles and small mammals.  The short-mown grassland has low ecological interest although provides some edge habitat adjacent to ditches, hedges and rough grassland meadow.

		<p><i>sativa</i>), Flowering plants included white dead nettle (<i>Lamium album</i>), purple dead nettle (<i>Lamium purpureum</i>), common centaury (<i>Centaureum erythraea</i>), white campion (<i>Silene latifolia</i>), creeping cinquefoil (<i>Potentilla reptans</i>), lesser celandine, dove's foot cranes-bill (<i>Geranium molle</i>), primrose (<i>Primula vulgaris</i>), melancholy (<i>Cirsium heterophyllum</i>), (<i>Tripleurospermum inodorum</i>) and common mallow (<i>Malva neglecta</i>).</p>		
<b>Scattered Trees A3.1</b>	<p>A row of scattered trees is present along the south side of the field entrance and around the north-east boundary with the pond (P3).</p>	<p>The trees are predominantly silver birch (<i>Betula pendula</i>) and cherry (<i>Prunus avium</i>) with maple (<i>Acer spp</i>) and willow (<i>Salix spp</i>).</p>	<p>Moderate- Young or early mature specimens and lacking bat roosting features although some bird nests were evident.</p>	<p>Potential habitat for nesting birds and food source. Habitat for invertebrate species.</p>
<b>Standing Water (G1.2)</b>	<p>Approximately 15m east of the field boundary is a man-made pond (P1) created over 20 years ago. The pond is rectangular in shape with an estimated maximum depth of around 1m and has shallow margins with dense marginal aquatic and emergent vegetation. Water quality was moderate/good and the pond has not been known to dry out. The surrounding terrestrial habitat is good with rough grassland, ditches, hedges and scrub habitats.</p>	<p>Aquatic plants included soft rush (<i>Juncus effusus</i>), water mint (<i>Mentha aquatic</i>), reed-mace (<i>Typha latifolia</i>), common reed (<i>Phragmites australis</i>) and willow-herb (<i>Epilobium hirsutum</i>) and water lily (<i>Nymphaea spp</i>)</p> <p>The pond is bordered by hazel stands (<i>Corylus avellane</i>) and soft rush.</p>	<p>Moderate</p>	<p>Provides aquatic habitat for amphibian and reptile species, invertebrates, waterfowl and other small mammals and birds.</p>

	<p>Waterfowl were evident.</p> <p>Along the north-east corner of the site is a further area of standing water (P3) which forms an expansion of the wet ditch (D2) along the same boundary. The water quality was moderate and with aquatic vegetation and likely stays wet as connected to the wet ditch. The ditch and pond were both dry by May 2019.</p> <p>There is a further wet ditch (D1) running the length of the south-east boundary.</p>			
<p><b>Species poor hedgerow and trees J2.3</b></p>	<p>A managed double staggered hedgerow runs along the south boundary (H1) with the footpath. The hedge is approximately 1.5m high.</p> <p>Along the east and north-east boundary is an unmanaged hedgerow (H2) approximately 4-5m high with some tree specimens present.</p> <p>There is a further section of hedging (H3) along the north boundary adjacent to the garden of a dwelling which is managed and approximately 1-</p>	<p>Hawthorn (<i>Crataegus monogyna</i>), blackthorn (<i>Prunus spinosa</i>), field maple (<i>Acer campestre</i>), privet (<i>Ligustrum vulagre</i>) dog rose (<i>Rosa canina</i>), elder (<i>Sambucus nigra</i>), sycamore and ash (<i>Fraxinus excelsior</i>) are present within the hedgerows.</p>	<p>Moderate/High-</p>	<p>Hedgerows provide important habitat for nesting birds, bats, amphibians, reptiles and small mammals. Possible bat foraging/commuting corridor.</p>

	<p>3m in height.</p> <p>Along the west roadside boundary is a defunct hedge (H4) comprising predominantly semi-mature sycamore, ash and occasional hazel and alder.</p> <p>Along the south-east boundary is a managed hawthorn hedge approximately 2.5m high</p>			
<b>Tall Ruderal C3.1</b>	Tall ruderal vegetation is frequent around the periphery of the site margins, ditches, banks, fence lines, disturbed ground areas and interspersed with the rough grassland etc.	Nettle ( <i>Urtica dioica</i> ), yarrow ( <i>Achillea millefolium</i> ), cow parsley ( <i>Anthriscus sylvestris</i> ), teasel ( <i>Dipsacus fullonum</i> ), hogweed ( <i>Heracleum sphondylium</i> ), thistle ( <i>Cirsium spp.</i> ), cow parsnip ( <i>Heracleum maximum</i> ), fox-glove ( <i>Digitalis purpurea</i> ) and willow-herb ( <i>Epilobium angustifolium</i> ).	Low	Provides some additional cover for birds, small mammals and herpetofauna.

Table 5.0 – Habitats and Vegetation

## 6.2. Protected Species Potential

Faunal species observed or evidence of presence at the site or in close proximity to the site is presented in Table.6.0

Common Name	Scientific Name
Blackbird	<i>Turdus merula</i>
Black cap	<i>Sylvia atricapilla</i>
Great tit	<i>Parus major</i>
Green woodpecker	<i>Picus viridis</i>
Muntjac	<i>Muntiacus reevesi</i>
Pheasant	<i>Phasianus colchicus</i>
Rabbit	<i>Oryctolagus cuniculus</i>
Robin	<i>Erithacus rubecula</i>
Wood pigeon	<i>Columba palumbus</i>
Wren	<i>Troglodytes troglodytes</i>

Table.6.0 Faunal species recorded

Table 7.0, below, details the suitability of habitats within the site for key protected species. Species not detailed below are considered unlikely to be significantly impacted by the proposed works.

Species	General Habitat Requirements	Suitable habitat within site	Additional notes (e.g. evidence of species)
Reptiles	Long grass, scattered scrub, hedgerows	Frequent rough grassland on and adjacent to site, scrubby areas and basking areas. Ponds, wet ditches and hedges bordering wider field where reptiles most likely to be encountered.	No reptile records returned. Site is periodically mown such that it would only likely support a small population. Reptile survey in September 2019 recorded no reptiles as present.
Invertebrates	Species-dependent. High invertebrate diversity is favoured in sites with a mosaic of habitats and diverse plant assemblage.	Scattered trees and hedgerows, frequent deadwood.	The terrestrial and aquatic habitats present are likely to support a range of invertebrate species, it is unlikely that the proposing working area supports any rare or notable invertebrate populations or a diverse invertebrate assemblage.
Nesting birds	Trees, shrubs, scrub, hedgerows, cavities within buildings, waterbodies, arable fields, bare/stony ground.	Trees, hedging, brambles stand adjacent ponds/ditches.	Evidence of birds nesting in trees, hedging and bramble/scrub stands.
Badger	Woodland, dense scrub, meadows, field edges.	Some permanent grassland on and adjacent to the site.	No evidence of badgers was found during the survey, such as setts, footprints, latrines, feeding evidence or hairs.
Great crested newts	Breed in ponds and other waterbodies. Terrestrial habitat includes woodland and grassland.	Rough grassland, ponds, wet ditches, hedges.	Pond P1 is within 15m of the site boundary and Pond P3 is along the north-east boundary. The field habitats of rough grassland, tall herb and hedging which is a suitable terrestrial habitat for amphibians. There are 2 historical records of great crested newt within 2km. Refer to Section 7 of this report. EDNA test returned negative for GCN in Pond P1.
Bats	Roost in buildings, tree cavities and caves.	Roadside trees have some potential roost features and boundary hedges, ditches and grassland provide suitable habitat for foraging and commuting bats.	Refer to Section 6.3 and 7 of this report

Table 7.0– Protected and Priority Species

### 6.3 Preliminary Tree Roost Assessment-

A search was made of the trees within 15m of the proposed working areas which comprises approximately 7 multi-stem ash and sycamore trees forming a tree line along the west roadside boundary and some other scattered trees around the site entrance. A preliminary survey was made of these trees for features such as rot holes, fissures, tears, flaking bark, dense creeping ivy etc. The trees displayed no obvious signs of bat roost features; however, many were covered in creeping ivy



which may cover potential roost features. The ivy coverage could also provide some roosting opportunities. The trees in general have **low** roost potential although an elevated survey was not undertaken.

The roadside trees and within the hedges are to be retained and so in the event of bat presence will unlikely be disturbed or displaced. A sensitive lighting scheme is proposed to limit the impact on foraging and commuting bats. In the event that any works to any of the trees identified as having bat roosting potential is proposed then a further bat survey and inspection will be required prior to arboricultural or clearance works.

Subject to the protection and retention of the site trees in accordance with BS:5837: 2012- Trees in Relation to Design, Demolition and Construction no further works are required in respect of trees with bat roosting features. In the event that arboricultural works are required then a more detailed inspection of these trees must be first undertaken.

#### 6.4 Great Crested Newt HSI Assessment-

The OS 1:25,000 map shows 3 ponds within 250m of the site boundaries, see Figure 3. Pond P1 is beyond the application boundary however only 10m east of the site and considered to be connected. Pond P3 forms an opening of the wet ditch (D2) and is considered to also provide suitable habitat for great crested newts. An HSI assessment was undertaken to establish if further surveys may be required using a combination of eDNA (Appendix 3) and standard presence absence surveys. The two adjacent ponds P1 & P3 were assessed using the Categorisation of HSI scores; Lee Brady has developed a system for using HSI scores to define pond suitability for great crested newts on a categorical scale:

HSI Pond suitability:

- <0.5 = poor
- 0.5- 0.59 = below average
- 0.6-0.69 = average
- 0.7-0.79 = good
- >0.8 = excellent

HSI	P1	P3
S1- Geographic zone	1	1
S2- Pond area	0.8	0.06
S3- Pond drying	0.9	0.1
S4- Water quality	0.67	0.67
S5- Shade	1	1
S6- Fowl	0.67	1
S7- Fish	0.67	1
S8- Pond density	1	1
S9- Terrestrial habitat quality	1	1
S10- Macrophyte cover	0.41	0.41
HSI	0.78 (Good)	0.53 (Below Average)

Table 8.0– HSI Assessment

## 7. EVALUATION, IMPACT ASSESSMENT AND RECOMMENDATIONS

### 7.1. Designated Sites

No statutory designated sites of nature conservation interest are located within 2km of the proposed development site. There are 3 non-statutory sites (CWS) within 2km,

There is a footpath running along the south boundary of the site and which connects through to Keysoe Park (CWS). The new 6 residential units are likely to increase recreation pressure on the CWS. As such the LPA may consider some form of financial contribution for the management of the CWS as appropriate. Given the small scale of the proposed development there is unlikely to be any increase in recreational pressure on statutory sites. The impact of the development on statutory designated sites is considered to be **neutral** and on non-statutory sites **minor adverse-neutral** on account of temporary disturbance during development works and a potential small increase in recreational use.

### 7.2. Habitats and Vegetation

#### *Trees and Woodland*

No tree specimens are being removed to facilitate the development. Tree protection measures and methods specified by a suitably qualified arborist and recommended in BS5837:2012 will be adhered to. No ground excavations are proposed.

#### *Hedgerows*

Species poor intact hedging and trees (H1-H5) borders the site on all sides. The hedgerows may be protected or important hedgerows but will be retained and suitably protected throughout the development.

#### *Habitats*

The habitats within the site interior and particularly the proposed working area are of limited ecological value comprising improved and semi-improved grassland which is common and widespread and ultimately replaceable. The mature boundary trees and hedges are of moderate to high ecological value and will be retained and protected during construction. The adjacent wet ditches and ponds are also of moderate ecological value and will not be impacted directly by the proposal.

### 7.3. Protected and Notable Species

Please note that all evaluation and recommendations are based upon the findings of this preliminary ecological appraisal and on the proposals outlined in 2.4 above. If the site changes then the potential for protected species to use the site may change accordingly. If the proposals alter from those at present then it is possible that the likely impacts will also change.

#### **Bats**

#### *Roosting bats - trees*

The scattered and hedgerow trees lacked any obvious signs of bat use or high value PRF's. Whilst the proposed works are unlikely to have any direct impacts on bats, subject to retaining trees, mitigation has been suggested with regards to sensitive lighting to minimise disturbance to any roost entrances and foraging and commuting corridors.

The unmitigated impact of the proposed development on roosting bats is provisionally assessed as being **minor-adverse**. This would be reduced to **minor-adverse neutral** with the implementation of mitigation including tree retention, detailed inspections of trees prior to arboricultural works and low level-directional lighting.

### ***Foraging and commuting bats***

The site contains plentiful habitat for foraging bats across the site interior and along tree and hedge lines. Due to the habitats present within the site and the local landscape, it is considered highly likely that foraging or commuting bats use the site to a certain extent.

In order to avoid a detrimental impact on bats using the site, it is recommended that there should be no increased light spillage on to the hedges or boundary trees. Lighting should be restricted to the interior of the site and should be kept to a low level. The following measures should be implemented within the lighting scheme:

- Minimise light spill, through use of lighting hoods, and setting the height and angle appropriately;
- Reduce the light intensity to the minimum required for safety and security;
- Set lighting curfews, e.g. lights off at night
- Where security lamps are used these should use a trigger to illuminate them (e.g. infra-red detector), and switch off after a short period, rather than remaining on all night.

The layout of the buildings should be designed to limit windows adjacent to the hedgerows where possible and to minimise any light spillage onto the trees and hedges. The site is assessed as being of value at the **parish** scale for roosting, foraging and commuting bats. The unmitigated impact of the proposed development on foraging and commuting bats is provisionally assessed as being **moderate adverse** due to a likely increase in lighting across the site. This would be reduced to **minor adverse** with the implementation of a sensitive lighting scheme as detailed in Section 8.0.

### **Birds**

Several birds were observed during the survey including robin (*Erithacus rubecula*), dunnock (*Prunella modularis*), pigeon (*Columba palumbus*) and blackbird (*Turdus merula*) were observed on site during the survey. Dunnock is an Amber list species and listed under Section 41 (NERC Act 2006), 'Species of Principal Importance'.

The site includes trees and hedging, all of which are suitable for nesting birds during the nesting season (1<sup>st</sup> March to 15<sup>th</sup> September inclusive). The rough grassland may also be used by ground nesting birds such as skylark and so it is recommended therefore that vegetation clearance, hedge cutting and arboricultural works are only undertaken outside the nesting season to avoid destruction of active nests. Vegetation removal may only be undertaken during the nesting season if a careful check by a suitably experienced ecologist can confirm that no active nests are present. If bird nests are present within vegetation to be removed, they must be left *in situ* and not disturbed until all the young have fledged and cease to return to the nest.

The site is considered to be of value at the **parish** scale for breeding birds. The unmitigated impact of the proposed development is assessed as being **minor adverse** due to the small loss of suitable nesting/foraging habitat and temporary disturbance during the construction phase. Impacts would be reduced to **minor adverse-neutral** with the mitigation provided in Section 8.0.

**Neutral** effects are predicted for Schedule 1 bird species, as the habitats expected to be impacted by the development are believed to be unused by these species. Nesting birds are vulnerable to construction impacts including direct destruction of nests and indirect disturbance. Without best practice measures to reduce the risks, minor impacts on local populations of nesting birds would be probable, but not significant.

### **Great Crested Newts**

Two ponds on or adjacent to the site (P1 & P3) have good and below average potential respectively for supporting great crested newts. An eDNA test was undertaken on pond P1 on the 29<sup>th</sup> May 2019, the result of which was negative for GCN (See Appendix 3). P3 was actually just a widening in the ditch and during the resurvey in June 2020 was completely dry, this area has now been re-profiled.

The rough grassland habitats, wet ditches, ponds and banks provide good terrestrial habitats for GCN and the site had good connectivity to the wider landscape. It is recommended that safe working practices with regard to GCN are implemented to avoid the risk of individual GCN (if present) being harmed during site works. Such measures include a watching brief by an ecological clerk of works (ECOW) during ground works, phased vegetation clearance, non-destructive searches of potential refugia and hibernaculum and sensitive storage of materials. See report for full details.

Great crested newts may typically disperse up to 500m from their breeding ponds, although research undertaken by Natural England (Cresswell & Whitworth 2004) suggests that newts will rarely move further than 200-250m from breeding ponds, with much reduced distances recorded where adjacent habitats are of good quality.

A watching brief should be maintained during removal or potential refugia and search of the vegetation bordering the site should be undertaken prior to clearance (if required) to ensure any site works do not impact on foraging great crested newts and other amphibians.

The results of the eDNA test on P1 and management of the site (hay cut) suggests there is a Low risk of Great Crested Newt presence in the terrestrial habitats on site. The site is considered to be of value at a **site only** scale for great crested newt. The unmitigated impact of the proposed development is assessed as being **minor-adverse neutral**, this could be reduced to **neutral** by following the precautionary measures outlined in Section 8.

### **Reptiles**

There are no reptile records within the search radius. Reptiles are protected from killing or injury under Schedule 5 (Section 9) and of the Wildlife and Countryside Act 1981 (as amended), it is also listed in the UK Biodiversity Action Plan as a species in need of conservation and greater protection. Further details of avoidance of injury to reptiles are given in the recommendations below.

The sites patchy mosaic of grassland, open basking areas, tall herb, ditches, pond, hedges, banks and bramble stands make the site good quality habitat for reptiles. Given the suitable habitats is a fair assumption that reptiles could be present within the boundary habitats, although given the site is mown annually or bi-annually for hay is unlikely to support more than a small number of reptiles. A reptile survey of the site has been undertaken as detailed in Appendix 4; no reptiles were found to be present on the site.

The unmitigated impact of the proposed development is assessed as being **minor-adverse neutral** due to some loss of suitable habitat, this could be reduced to **neutral** by following the precautionary measures outlined in Section 8.

### **Badger**

There are records of badger (*Meles meles*) within the 2km search radius. No evidence of badgers was found during the survey, such as setts, footprints, latrines, feeding evidence or hairs. The permanent grassland and pasture fields provide habitat for foraging badgers and sett building and so cannot be excluded as the site has connectivity to the wider landscape. In the event that any badgers are found during the course of the proposed works, work should be halted immediately, Natural England should be informed and allowed time to advise on the best way to proceed.

Badgers receive specific protection under the Protection of Badgers Act 1992. This means that it is unlawful to knowingly kill, capture, disturb or injure any individual or intentionally damage, destroy or obstruct an area used for breeding, resting, or sheltering badgers. It is possible that badgers could cross the site during works if they are present within the wider area so recommendations as to best practice are given below. The site is considered to be of **parish** value for badger, subject to sensitive clearance and construction practices the impact is assessed as being **neutral**.

### **Invertebrates**

Due to the common habitats present within the site, it is considered unlikely that the proposed works will significantly impact important populations of invertebrates. Mature trees within and adjacent to the site may provide some suitable habitat for saproxylic invertebrates, as dead wood is evident in and around the mature boundary trees. However, mature trees with standing deadwood are confined to the outside the application area. The site lacks the required diversity of deadwood to support significant populations of saproxylic invertebrates and is therefore not considered to be of importance to saproxylic invertebrates outwith the zone of immediate influence.

Other habitats within the application area are not considered botanically or structurally diverse enough to support protected or nationally/locally rare invertebrate species and as such are not considered to be of importance to nature conservation outwith the immediate zone of influence. The mature trees, ponds, ditches, meadow and flowering plants are however valuable to a range of invertebrates including bees, damselfly, dragonfly, moths and butterflies.

Due to the common habitats present within the site, it is considered unlikely that the proposed works will significantly impact important populations of invertebrates. The site is considered to be of value at a **parish** scale for invertebrates, with a **minor adverse** impact foreseen due to ground disturbance, vegetation loss and permanent loss of a small area of foraging habitat. The impact would be reduced to **neutral** with implementation of mitigation as recommended in Section 8.0.

### **Hedgehog and Brown Hare**

Hedgehogs are protected under Schedule 6 of the Wildlife and Countryside act (as amended) and is listed as a Priority Species under the UK Biodiversity Action Plan. It is probable that hedgehogs are present on this site, at least at times. There is suitable habitat within the rough grassland, tall herb as well as the adjacent pasture and farmland. No hedgehogs or droppings were observed during the site survey. There are records of brown hare (*Lepus europaeus*) within a 2km radius of the site. The site contains limited habitat for this species, the site is less likely to be used for a form than the margins and open arable land and pasture fields of the type which is present in the wider area. The site is considered to be of **parish** value for terrestrial mammals with the unmitigated impact

assessed as **minor adverse**, due to potential disturbance during construction works. Impacts would be reduced to **neutral** with the implementation of mitigation measures as detailed in Section 8.0.

### Otter, Water Vole and White-Clawed Crayfish

The ditches lack steep densely vegetated banks and with limited connectivity are less likely to support water voles. The onsite pond (P3) and ditches are also unsuitable for otters and white-clawed crayfish. Water voles however they rarely stray far from their burrows and so are unlikely to be encountered or disturbed by the proposed application if present.

### Invasive Plant Species

No invasive plant or animal species listed on Schedule 9 of the Wildlife and Countryside Act (1981) (as amended) were recorded on the day of the survey.

Ecological Feature	Scale of Value	Unmitigated Impact	Confidence Level	Residual or Long-Term Impact
Sites of International Importance	International	Neutral	Likely	-
Sites of National Importance	National	Neutral	Likely	-
Sites of Local Importance	District	Minor Adverse	Likely	Minor adverse-Neutral
Habitats	Parish	Minor Adverse	Likely	Minor adverse-Neutral
Green Infrastructure	Parish	Neutral	Likely	Neutral
Reptiles	Parish	Minor adverse-Neutral	Certain	Neutral
Great Crested Newts	Site Only	Minor adverse-Neutral	Certain	Neutral
Rare/Scarce Plant Species	Low	Neutral	Certain	Neutral
Veteran Trees	Negligible	Negligible	Certain	-
Invertebrates	Parish/District	Minor Adverse	Likely	Neutral
Amphibians (excluding GCN)	Negligible	Minor adverse-Neutral	Certain	Neutral/Minor Positive (New Pond)
Breeding Birds	Parish	Moderate Adverse	Likely	Minor Adverse
Wintering Birds	Negligible	Negligible	Certain	-
Aquatic Mammals	Negligible	Negligible	Certain	-
Terrestrial Mammals	Parish	Minor Adverse	Likely	Minor adverse-Neutral
Roosting Bats	Parish	Minor Adverse	Likely	Minor adverse-Neutral
Foraging/Commuting Bats	Parish	Moderate Adverse	Certain	Minor adverse

Table 9.0 – Summary of ecological features, unmitigated impact and residual impact with mitigation

## **8. AVOIDANCE AND MITIGATION**

### **8.1 Ground Clearance Works-**

- As per the recommendations above hedge and tree works across the site should ideally be performed outside of the active bird breeding season 1<sup>st</sup> March- 15<sup>th</sup> September inclusive. If this is not possible a bird surveyor should visit the site to check for evidence of nesting birds prior to any clearance works.
- Any artificial and natural refugia within the working areas (brash, rubble, wood piles) would be hand-searched for the presence of reptiles and amphibians prior to commencement of works.
- Any scrub, tall herb and rough grassland across or bordering the site will be strimmed by hand towards the edges of the site and to a height of 100mm initially to make the habitat less suitable for reptiles and amphibians. After 24-48 hours have elapsed, vegetation should be strimmed by hand to 50mm above ground level with cut material raked off. Existing areas of short and previously cleared vegetation should be maintained at a short height.
- Care will be taken with regards to vegetation clearance and earthworks due to potential disturbance to nesting birds, herpetofauna and small mammals.

### **8.2 Construction and Working Practices-**

- The timing of construction works will be sensitive to nesting birds. If possible, it is proposed that operations within the working area would preferably be started outside of the bird breeding season to minimise the risk of disturbance to breeding birds that have already commenced nesting. Once works commence birds are unlikely to start nesting within the working area. However, in order to avoid accidental harm to nesting birds, a 15m buffer zone will be marked around any nest using high visibility fencing to ensure that the nest is not disturbed, damaged or destroyed whilst in use.
- If any ground nesting birds are found to be nesting within or close to the working areas during the pre-inspection survey or clearance, a 25m standoff from the nest will be marked out and observed, within which no operational activity would be permitted until the breeding attempt had concluded.
- In the event that protected species are discovered within the site, works would need to stop until the situation has been further assessed, and if necessary, a mitigation strategy developed and an application made for a site license.
- The site manager and other relevant staff will be briefed (by suitably qualified ecologist) on the possible presence of protected species in the area (Toolbox talk). Staff will be provided with information relating to the legislation which protects species and habitats and briefed on the procedures to prevent disturbance or destruction of individuals or their habitats. Staff will also be briefed on the emergency procedures to be implemented should protected species be found during clearance and construction works.
- Habitats removed, wherever possible will be replaced at the earliest opportunity with native or wildlife attracting species.

- Trenches, pits or holes dug on site that are to be left over night will be covered over or have a ramp placed in them so that any wildlife that falls in can climb out safely;
- The proposed location of the site compounds and any material storage areas will not extend into more important habitats, notably the tree RPA's, ditches and pond area.
- Care should also be taken if lighting any bonfires as these may be potential hedgehog refugia/hibernation sites. Any brash and log piles on site will be searched by hand before removal/burning (see above) and if they are discovered they should be translocated to a suitable location.

### **8.3 Lighting-**

- Any new external lights will be set on a motion detector and positioned in such a way that they do not shine on the boundary habitats, tree canopies or hedges. Low intensity lighting should be used where possible in place of high intensity discharge or sodium lamps, this will minimize disturbance to foraging and commuting bats.

In accordance with the Bat Conservation Trust's publication *Bats and artificial lighting* (BCT, 2018) light pollution by artificial lighting will be kept to a minimum and light spillage avoided. The following specific mitigation will be put in place to minimize disturbance to bats caused by the lighting of the site. The following mitigation strategies have been taken from Bat Conservation Trust Landscape and Urban Design for Bats and Biodiversity (Gunnell et al., 2012) and other referenced sources:

- Minimise light spill by eliminating any bare bulbs and upward pointing light fixtures. The spread of light should be kept near to or below the horizontal plane, by using as steep a downward angle as possible and/or shield hood. Flat, cut-off lanterns are best;
- Use light sources that emit minimal ultra-violet light (van Langevelde and Feta, 2001) and avoid the white and blue wavelengths of the light spectrum, so as to avoid attracting insects and thus potentially reducing numbers in adjacent areas;
- Limiting the height of lighting columns to eight metres and increase the spacing of lighting columns (Fure, 2006) can reduce the spill of light into unwanted areas;
- Avoid using reflective surfaces under lights or light reflecting off windows (e.g. on to trees);
- Only the minimum amount of light needed for safety and access should be used and or turned off when the site is not in use;
- Artificial lighting proposals should not directly illuminate boundary habitats, which may be of value to foraging or commuting bats and birds (e.g. green corridors);
- Lighting that is required for security reasons should use a lamp of no greater than 2000 lumes (150 Watts) and be PIR sensor activated, to ensure that the lights are not on only when required (Jones, 2000; Collins, 2016);



#### **8.4 Tree Works-**

- All middle aged and mature trees where possible to be retained and protected in line with British Standard: 5837:2012 “Trees in Relation to Design, Demolition and Construction”
- If tree removal is scheduled between the months of 1<sup>st</sup> March and 15<sup>th</sup> September then a breeding/nesting bird survey should be first undertaken by the SQE.
- A search of any tree holes, cavities, flaking bark and dense creeping ivy will be undertaken to confirm the absence of any roosting bats, this is particularly important during the summer months when such features are used more frequently.
- In the event that any active nests are identified, no operational activity will be permitted within the stand-off zones until the breeding attempt had concluded.

#### **8.5 Pollution Control-**

Standard pollution prevention measures will be put in place including measures such as preventing dust by damping down bare ground and ensuring fuel is stored in bunded tanks. The Environment Agency PPG1 and PPG6 guidance on *General Guide to the Prevention of Pollution and Working at Construction and Demolition Sites* will be adhered to throughout the construction of the Proposed Development.

##### *Liquid-*

Many of the materials used in construction operations, such as oil, chemicals, cement, lime, cleaning materials and paint have the potential to cause serious pollution. All fuel, oil and chemical storage must be sited on an impervious base within a bund and secured. The base and bund walls must be impermeable to the material stored and of an adequate capacity.

Leaking or empty oil drums must be removed from the site immediately and disposed of via a licensed waste disposal contractor. The contents of any tank are to be clearly marked on the tank, and a notice displayed requiring that valves and trigger guns be locked when not in use. Concrete is highly alkaline and corrosive and can have a serious impact on groundwater, soil and watercourses. It is essential to take particular care with all works involving concrete and cement. Suitable provision is to be made for the washing out of concrete mixing plant or ready mix concrete lorries so that washings do not flow into any drains or watercourse or seep underground.

##### *Air, Noise and Vibration-*

Contractors will be expected to take measures to minimize the presence of air borne dust during clearance and construction. If possible any activities producing in excess of 70db should be avoided during the bird nesting season.

## 9. BIODIVERSITY ENHANCEMENT

The Natural Environment and Rural Communities Act 2006 (NERC) came into force on 1<sup>st</sup> October 2006. Under section 40 of the Act all public bodies have a duty to conserve biodiversity:

- “Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.”

Section 40(3) of the Act explains that:

- “Conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat”.

The duty applies to all local authorities and extends beyond just conserving what is already there to carrying out, supporting and requiring actions that may also restore or enhance biodiversity. This section sets out some measures which the developer should incorporate within the proposals to help maintain and improve the ecological value of the site generally during and after the proposed development.

### 9.1 Habitat Supplementation-

**9.1.1 Birds** – To increase nesting opportunities generally, nest boxes should be installed. Installation of the nest boxes will be supervised by ‘Eco- Check Ltd’ or an experienced ecologist to ensure the correct positioning for each species. The types of nest boxes will cover a range of species and will include at least 10 boxes;

- Weatherlite bird boxes (32mm)
- Weatherlite nest boxes (27mm)
- Weatherlite wren roundhouse boxes
- Weatherlite deep nest boxes for robins
- Weatherlite general nest boxes

**9.1.2 Bats**- At present the availability of bat roosts within the site is low although the combination of trees, hedges and grassland are valuable to foraging and commuting bats.

*Bat Boxes*- As a biodiversity enhancement and to compensate for the potential disturbance, areas for bats to roost in should be created and include at least 5 bat boxes and 1 bat brick per dwelling;

- Weatherlite Pentagon Bat Box
- Weatherlite Kent Box
- Weatherlite double chamber box
- Weatherlite bat bricks

These boxes are to be installed on the boundary trees within the site, ideally one on each elevation to provide the best variation in temperature, shelter and flight lines. If only one elevation is used this should be south-east facing as this provides the most shelter and warmth.

**9.1.3** Plant native broad-leaved trees. Suggested species include; blackthorn (*Prunus spinosa*), crab apple (*Malus sylvestris sens.str*), elder (*Sambucus nigra*), field maple (*Acer campestre*), guelder rose

(*Viburnum opulus*), hawthorn, honeysuckle (*Lonicera periclymenum*), holly (*Ilex aquifolium*) and English oak (*Quercus robur*) could be used to provide known benefit to wildlife.

**9.1.4** Any new hedging to be planted along the new boundaries of the site will include native species and/or species of known ecological value including hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), hazel (*Corylus avellana*), field maple (*Acer campestre*), beech (*Fagus sylvatica*) and dogwood (*Cornus sanguinea*). Any new hedge planting should be double row staggered at 0.5m spacings with spiral guards and supports and maintained until established.

**9.1.5** Relaxing the grassland mowing regime and establishing 3m vegetated buffers strips along the margins of the ditches and hedges and fencing off from the new gardens will reduce the impacts of disturbance and provide a valuable corridor for wildlife.

**9.1.6** Creation of artificial refugia and hibernacula for reptiles along the ditch margins and hedgerow bases in the form of log piles, grass cuttings, rubble/brush piles etc.

**9.1.7** It is recommended that areas of species rich wildflower grassland (Emorsgate EM4) are created within the site such that, in combination with new native landscape planting, opportunities for biodiversity will be maximised under the proposals. Consideration should be given to the laying of wildflower turfs, comprising locally appropriate native species, to establish wildflower grassland. This would ensure rapid establishment of these habitats, and reduce the timeframe for delivering the range of ecological benefits that are proposed.

**9.1.8** There are also a number of records of Hedgehog, a UK Priority Species, in the surrounding area. To maintain connectivity for this species, all boundaries (including garden boundaries) should be made permeable to hedgehogs. This can be achieved by using hedgerow boundaries or gaps of 13x13cm, at ground level, in fences and walls.

**9.1.9 Great crested Newt-** A surface water drainage attenuation pond is proposed which should be constructed to maximise its benefit to wildlife. The pond should be excavated with varying depths and shallower marginal shelves for aquatic plants. Once the water has reached its desired level and has settled (i.e. become clear) aquatic vegetation should be introduced. Aquatic vegetation has a number of functions from producing a habitat where invertebrates (prey species) can flourish. Whilst plants such as Lilies produce a degree of shading necessary to limit summer algal growths.

The soft leaved plants such as Water Mint and Water Forget-me-not are important species as they are used by newts for egg laying. As GCN only use the aquatic environment for approximately 4 months a year other habitat are necessary around the perimeter such as rough grassland and a hibernacula for shelter especially through the harsh winter months although it can be used at other times of the year from which to forage. The hibernacula shown in the guide can be modified to include clean brick rubble and topped with soil to vegetate over. The removal of existing concrete slabs and piles of concrete rubble should be under the supervision of a qualified ecologist.

## 10. Ecological Conditions and Recommendations for Further Surveys

The overall impact assessment does not take into consideration those species for which further information is required. To fully assess the site for, and the impact of the proposed development upon, protected species, detailed survey is recommended for the following species:

- If works commence during the bird nesting season a pre-works site checks should be undertaken to confirm no nesting birds are present on or immediately adjacent to the working areas.
- Preliminary Tree Roost Assessment (PRA)- If trees with bat roost features are likely to be impacted upon, i.e where trees will be removed, root protection zones cannot be adhered to, or management is recommended by the appointed arborist, a detailed Tree Roost Assessment of the trees must be undertaken.
- An Ecological Constraints and Opportunities Plan (ECOP) would highlight the boundary habitats as a moderate (and ultimately replaceable) constraint on development. Before the start of construction, it is recommended that in line with the British Standard 42020:2013 Biodiversity – Code of practice for planning and development - that a Construction Environment Management Plan (CEMP) is submitted and approved. The role of the CEMP is to ensure that the identified risks to biodiversity are assessed and that suitable methods are adopted on site to minimise the risks through the production of a method statement. The CEMP is also to ensure that biodiversity protection zones are enforced.

As the boundary trees, ditches, ponds and hedging are the principle valuable habitats it is important that these are retained throughout the construction and operational phase of the site.

An Ecological Constraints and Opportunities Plan (ECOP) would highlight the boundary habitats as a moderate (and ultimately replaceable) constraint on development.

The suggested condition below is based on BS42020:2013 and in terms of biodiversity net gain, the enhancements proposed will contribute to this aim. Recommended condition:

### **PRIOR TO COMMENCEMENT: COMPLIANCE WITH ECOLOGICAL REPORT RECOMMENDATIONS**

“All ecological mitigation and enhancement measures and/or works shall be carried out in accordance with the details contained within the report (Eco-Check, August 2020), as submitted with the planning application and agreed with the local planning authority prior to determination.”

Reason: To conserve and enhance Protected and Priority species and allow the LPA to discharge its duties under the UK Habitats Regulations, the Wildlife & Countryside Act 1981 as amended and s40 of the NERC Act 2006 and s17 Crime & Disorder Act 1998.

It is advised that if a period of more than 18 months passes between the date of this survey and the commencement of clearance and construction works then a further site survey should be made in addition to the pre-works checks outlined above.

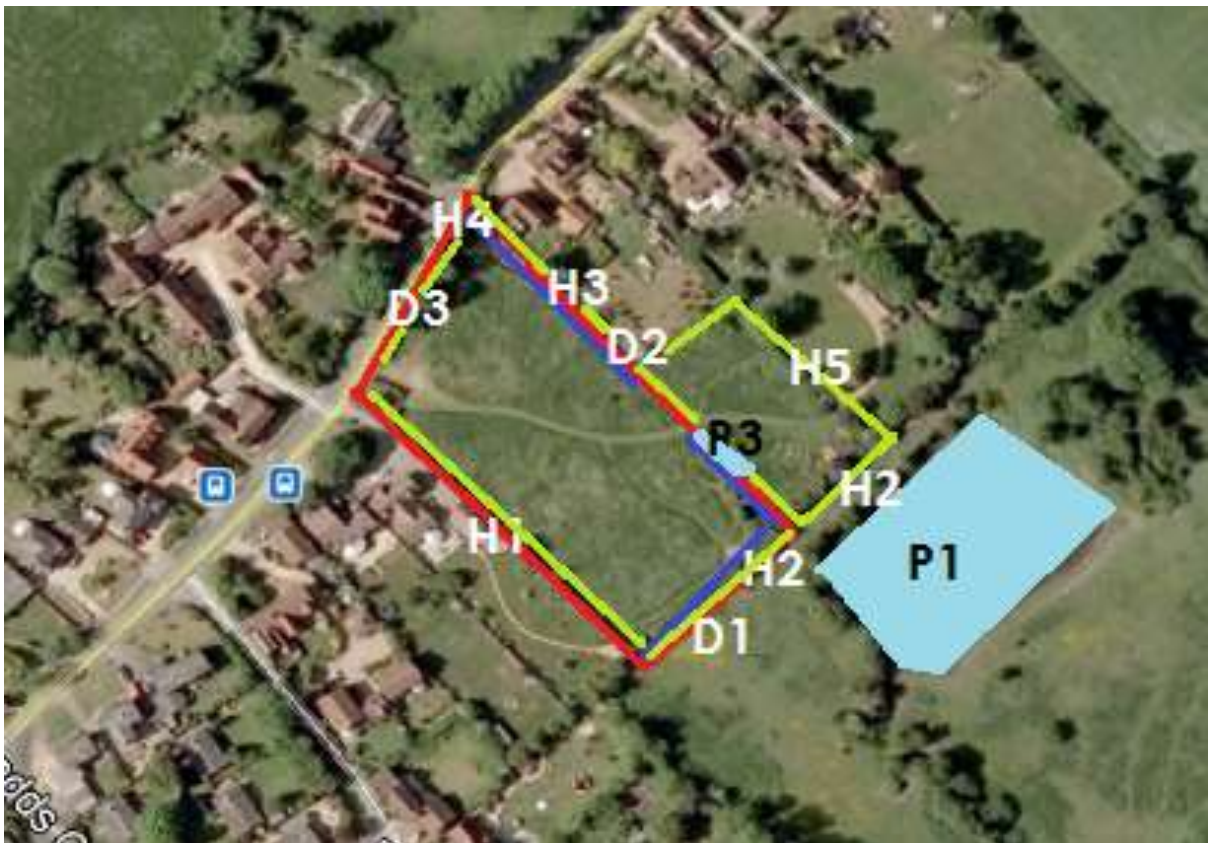
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# APPENDIX 1



Site location Map – NTS



Aerial view of site



- Rev 01: 08.07.20: Original arrangement
- Rev 02: 17.08.20: Plot 1 amended
- Rev 03: 12.09.20: Revised arrangement
- Rev 04: 09.09.20: Revised arrangement
- Rev 05: 12.09.20: Revised arrangement
- Rev 06: 14.09.20: Plot 1 & 2 added, vehicle layout amended
- Rev 07: 02.10.20: Plot 1 & 2 added, driveway, driveway and parking
- Rev 08: 20.10.20: Revised arrangement
- Rev 09: 23.10.20: Revised arrangement and plot 10 storage
- Rev 10: 26.10.20: Revised arrangement and plot 10 storage
- Rev 11: 28.10.20: Plot 2 updated, 10 added plot
- Rev 12: 28.10.20: Plot 2 updated, 10 added plot
- Rev 13: 28.10.20: Plot 2 updated, 10 added plot
- Rev 14: 28.10.20: Plot 2 updated, 10 added plot
- Rev 15: 28.10.20: Plot 2 updated, 10 added plot
- Rev 16: 28.10.20: Plot 2 updated, 10 added plot
- Rev 17: 28.10.20: Plot 2 updated, 10 added plot
- Rev 18: 28.10.20: Plot 2 updated, 10 added plot
- Rev 19: 28.10.20: Plot 2 updated, 10 added plot
- Rev 20: 28.10.20: Plot 2 updated, 10 added plot







All measurements and dimensions should be verified before construction. All drawings remain Copyright © Aragon Land and Planning Ltd.

Title	<b>PROPOSED SITE PLAN</b>	
Site	160B High Street, RISLEY	
Date	April 2019	
Scale	1:500 @ A3	
Dwg No.	13 - 002 - 1020 Zb	
	T: 01234 360655 e: francis@aragonland.co.uk w: aragonland.co.uk LAND AND PLANNING LTD	

**SITE PLAN.** (1:500)



## APPENDIX 2

<b>Photo 1 – Mown and rough grassland</b>	<b>Photo 2 – South-west hedgerow H1</b>
	
<b>Photo 3 – North-east wet ditch and culvert D2</b>	<b>Photo 4 – Roadside hedge and dry ditch H4 and D3</b>
	
<b>Photo 5 – Pond P1</b>	<b>Photo 6 – Pond P3- Now dry and profiled into ditch</b>
	



**Photo 7- Spoil pile in south-east corner of site**



**Photo 8 – Wet ditch (D1)**



**Photo 9 – Young scattered trees**



**Photo 10 – Rough grassland**



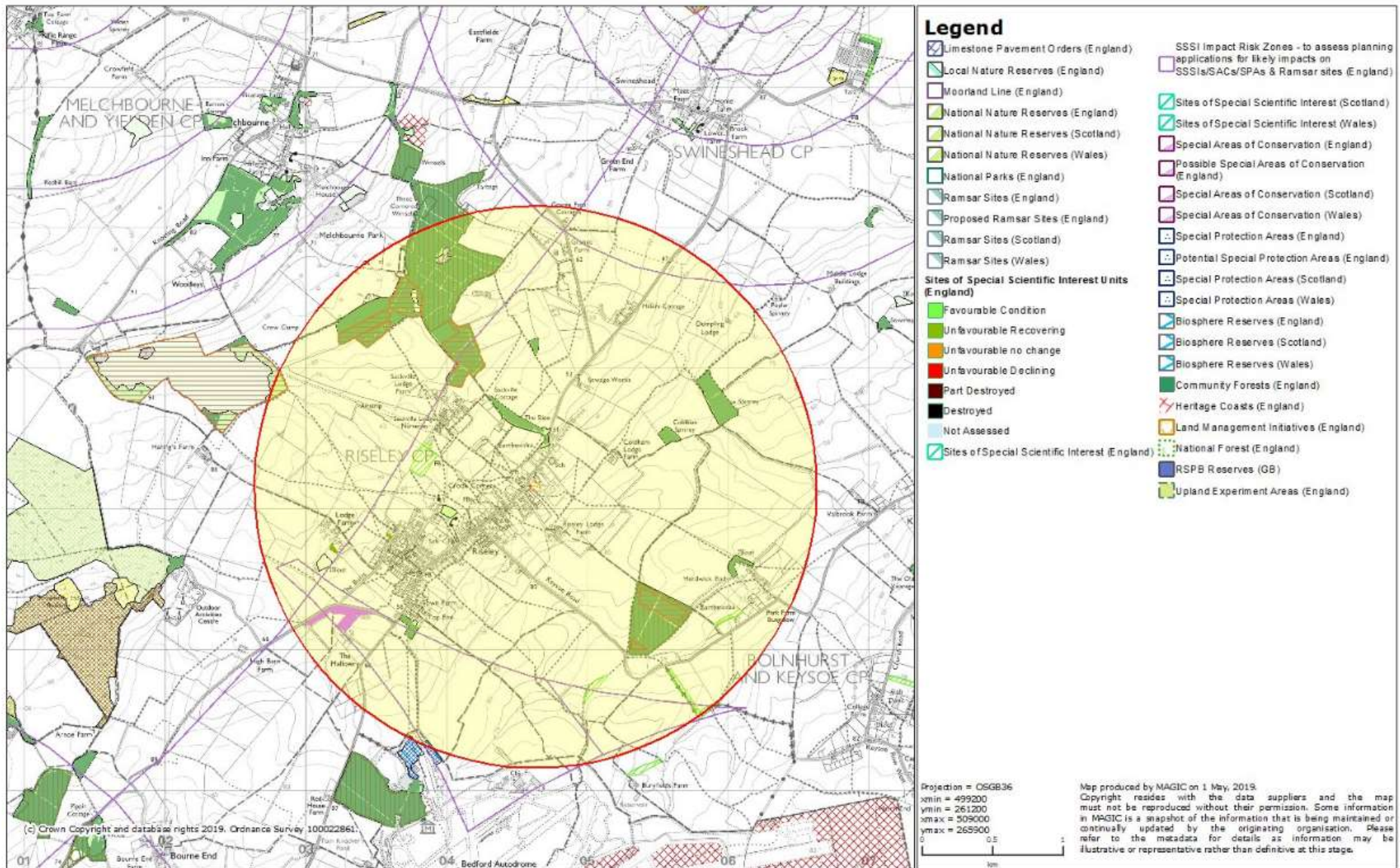
**Photo 11 – Hedge H3 and spoil pile**



**Photo 12 – Unmanaged east hedgerow H2**



## APPENDIX 3



Report No:  
Order No: 11062019  
Client: ECO-CHECK LTD  
Contact: James Hodson  
Contact Details: ecocheckconsultancy@gmail.co  
m  
Date: 25/06/2019

## TECHNICAL REPORT

### ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS

**Date sample received at Laboratory:** 12/06/2019  
**Date Reported:** 25/06/2019  
**Matters Affecting Results:**

#### RESULTS

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
1532	Pond P1. Risely	n/a	Pass	Pass	Pass	Negative	0

#### SUMMARY

When Great Crested Newts (GCN); *Triturus cristatus* inhabit a pond, they deposit traces of their DNA in the water as evidence of their presence. By sampling the water, we can analyse these small environmental DNA (eDNA) traces to confirm GCN habitation, or establish GCN absence.

The water samples detailed below were submitted for eDNA analysis to the protocol stated in DEFRA WC1067 (Latest Amendments). Details on the sample submission form were used as the unique sample identity.

#### RESULTS INTERPRETATION

Lab Sample No.- When a kit is made it is given a unique sample number. When the pond samples have been taken and the kit has been received back in to the laboratory, this sample number is tracked throughout the laboratory.

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Page 1 of 3

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Site Name- Information on the pond.

O/S Reference - Location/co-ordinates of pond.

SIC- Sample Integrity Check. Refers to quality of packaging, absence of tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to results errors. Inspection upon receipt of sample at the laboratory. To check if the Sample is of adequate integrity when received. Pass or Fail.

DC- Degradation Check. Analysis of the spiked DNA marker to see if there has been degradation of the kit since made in the laboratory to sampling to analysis. Pass or Fail.

IC- Inhibition Check- PCR inhibitors can cause false results. Inhibitors are analysed to check the quality of the result. Every effort is made to clean the sample pre-analysis however some inhibitors cannot be extracted, An unacceptable inhibition check will cause an indeterminate sample and must be sampled again.

Result- NEGATIVE means that GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as no evidence of GCN presence. POSITIVE means that GCN eDNA was found at or above the threshold level and the presence of GCN at this location at the time of sampling or in the recent past is confirmed. Positive or Negative.

Positive Replicates- To generate the results all of the tubes from each pond are combined to produce one eDNA extract. Then twelve separate analyses are undertaken. If one or more of these analyses are positive the pond is declared positive for the presence of GCN. It may be assumed that small fractions of positive analyses suggest low level presence but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive.

## METHODOLOGY

The laboratory testing adheres to strict guidelines laid down in WC1067 Analytical and Methodological Development for Improved Surveillance of The Great Crested Newt, Version 1.1

The analysis is conducted in two phases. The sample first goes through an extraction process where all six tubes are pooled together to acquire as much eDNA as possible. The pooled sample is then tested via real time PCR (also called q-PCR). This process amplifies select part of DNA allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines PCR amplification and detection into a single step. This eliminates the need to detect products using gel electrophoresis. With qPCR, fluorescent dyes specific to the target sequence are used to label PCR products during thermal cycling. The accumulation of fluorescent signals during the exponential phase of the reaction is measured for fast and objective data analysis. The point at which amplification begins (the Ct value) is an indicator of the quality of the sample. True positive controls, negatives and blanks as well as spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared so they act as additional quality control measures.

The primers used in this process are specific to a part of mitochondrial DNA only found in GCN ensuring no DNA from other species present in the water is amplified. The unique sequence appropriate for GCN analysis is quoted in DEFRA WC 1067 and means there should be no detection of closely related species. We have tested our system exhaustively to ensure this is the case in our laboratory. We can offer eDNA analysis for most other species including other newts.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. Kits are manufactured by SureScreen Scientifics to strict quality procedures in a separate building and with separate staff, adopting best practice from WC1067 and WC1067 Appendix 5. Kits contain a 'spiked' DNA marker used as a quality control tracer (SureScreen patent pending) to ensure any DNA contained in the sampled water has not deteriorated in transit. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

Forensic Scientists and Consultant Engineers  
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## **Wildlife site legislation**

A variety of sites are designated in the UK, under various Conventions, Directives and Regulations, for their nature conservation importance and interest. The general aim of these designations is to conserve and protect ecological resources in addition to raising awareness and understanding. Other non-statutory sites are afforded some protection through local plans.

### ***RAMSAR Sites***

Wetlands of international importance. Ramsar Sites are effectively protected, through the planning system, under the Wildlife and Countryside Act 1981, as amended, and the Countryside and Rights of Way Act 2000 through their notification as SSSIs and through other regulatory systems addressing water, soil and air quality.

### ***Special Protection Areas (SPAs)***

SPAs are the most important habitats for rare and migratory birds within the European Union. The Birds Directive, adopted by the UK in 1979, provides for the protection, management and control of all species of naturally occurring wild birds in the European territory of Member States, including the UK. The provisions of the Birds Directive are transposed into English law by the Conservation of Natural Habitats and Species Regulations 2010.

### ***Special Areas of Conservation (SACs)***

SACs are sites that are chosen to conserve the natural habitat types and species of wild flora and fauna listed in Annex I and II of the Habitats Directive. They are the best areas to represent the range and variety of habitats and species within the European Union. The provisions of the Habitats Directive were transposed into English law by the Conservation of Natural Habitats and Species Regulations 2010.

### ***Sites of Special Scientific Interest (SSSIs)***

SSSIs are nationally important sites for wildlife, geological and geomorphological features in England. They are designated and protected under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981, as amended. They receive additional protection under the Countryside and Rights of Way Act 2000.

### ***National Nature Reserves (NNRs)***

NNRs are nationally important areas of wildlife habitat and geological formations in Britain. NNRs are designated and protected under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981, as amended. They receive additional protection under the Countryside and Rights of Way Act 2000. They are managed for the benefit of nature conservation.

### ***Local Nature Reserves (LNRs)***

LNRs are similar to NNRs but they apply to the local context. They are sites of value to nature conservation and are designated under the National Parks and Access to the Countryside Act 1949. They are managed for the benefit of nature conservation.

### ***Hedgerows***

Hedgerows are a very significant wildlife habitat over large parts of Britain. They provide essential refuge for a great many woodland and farmland plants and animals. Hedgerows are given protection under The Hedgerows Regulations 1997. As a result, since 1 June 1997, it has been against the law to remove most countryside hedgerows (or parts of them) without first notifying the local planning authority.

### ***Ancient Woodland***

Ancient woodlands are woodlands that have been established since or before 1600AD. They are non-statutory sites and are not legally protected but they may be afforded some protection in, for example, structure and local plans.

### ***County Wildlife Sites***

These non-statutory sites are sites designated by a local authority as being of County nature conservation value but may not be notified as SSSIs. These selected sites are known as wildlife sites (WS), sometimes called SINC or SNCIs.

### ***Local Sites***

These non-statutory sites may be designated by a local authority as being of local nature conservation value but are not notified as SSSIs. They have a variety of titles dependent upon the designating authority.

### ***Regionally Important Geological / Geomorphological Sites (RIGS)***

Regionally Important Geological and Geomorphological Sites (RIGS) are designated by locally developed criteria and are currently the most important places for geology and geomorphology outside statutorily protected land such as Sites of Special Scientific Interest (SSSI). The designation of RIGS is one way of recognising and protecting important earth science and landscape features.

## **Species Legislation and Protection**

The legislation which protects various species within the British fauna or flora is outlined below:

### ***Birds***

#### ***The Birds Directive (1979)***

The European Community Council Directive on the Conservation of Wild Birds (79/409/EEC) sets out general rules for the conservation of all naturally occurring wild birds, their nests, eggs and habitats.

#### ***Wildlife and Countryside Act 1981***

Sections 1 to 8 of the Wildlife and Countryside Act relate to the protection of birds. All birds, their nests and eggs are protected by law and it is thus an offence, with certain exceptions to:

- intentionally kill, injure or take any wild bird
- intentionally take, damage or destroy the nest of any wild bird whilst it is in use or being built
- intentionally take or destroy the egg of any wild bird
- have in one's possession or control any wild bird, dead or alive, or any part of a wild bird, which has been taken in contravention of the Act or the Protection of Birds Act 1954
- have in one's possession or control any egg or part of an egg which has been taken in contravention of the Act or the Protection of Birds Act 1954
- use traps or similar items to kill, injure or take wild birds
- have in one's possession or control any bird of a species occurring on Schedule 4 of the Act unless registered, and in most cases ringed, in accordance with the Secretary of State's regulations (see Schedules)

#### ***Countryside and Rights of Way Act 2000***

This act strengthens the existing provisions of the Wildlife and Countryside Act 1981 for the enforcement of wildlife legislation, including a new offence of "recklessly" disturbing any wild bird listed on Schedule 1 while it is nest building, or at a nest containing eggs or young, or recklessly disturbing the dependent young of such a bird.

#### ***UK Biodiversity Action Plan Priority Species***

A number of British Birds are UK Priority Species for Conservation under the UK Biodiversity Action Plan and a National Species Action Plan has been produced. The protection of UK BAP Priority Species is implemented through Local Planning Policy.

## **Bats**

### *The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)*

The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention or CMS) was adopted in Bonn, Germany in 1979 and came into force in 1985. Contracting Parties work together to conserve migratory species and their habitats by providing strict protection for endangered migratory species (listed in Appendix 1 of the Convention), concluding multilateral Agreements for the conservation and management of migratory species which require or would benefit from international cooperation (listed in Appendix 2), and by undertaking co-operative research activities.

The European Community is a party to CMS. In general it undertakes activities under the Convention involving issues where the Community has 'competence' (the authority to act as a Community rather than as the member states individually or collectively as the Union). Thus the Community is a Party to the Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS) as this agreement has significant relevance to fishing activities, over which the Community has authority within the Union.

The UK ratified the Convention in 1985. The legal requirement for the strict protection of Appendix I species is provided by the Wildlife & Countryside Act (1981 and as amended). The UK has currently ratified three legally binding Agreements under the Convention: the Agreement on the Conservation of Populations of European Bats (EUROBATS); the African-Eurasian Migratory Waterbird Agreement (AEWA); and ASCOBANS. An Agreement on the Conservation of Albatrosses and Petrels is currently in the process of being ratified; as of May 2002, eight countries including the UK had so far signed, and the Agreement will enter into force after five countries have ratified. The UK has also ratified the Memorandum of Understanding (MoU) on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia, in respect of the British Indian Ocean Territory.

### *The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) 1979*

The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) was adopted in Bern, Switzerland in 1979, and came into force in 1982. The principal aims of the Convention are to ensure conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species) (listed in Appendix 3). To this end the Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1000 wild animal species.

To implement the Bern Convention in Europe, the European Community adopted Council Directive 79/409/EEC on the Conservation of Wild Birds (the EC Birds Directive) in 1979, and Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the EC Habitats Directive) in 1992. Among other things the Directives provide for the establishment of a European network of protected areas (Natura 2000), to tackle the continuing losses of European biodiversity on land, at the coast and in the sea to human activities.

### *The Habitats Directive (1992)*

The European Community Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) aims to protect the European Union's biodiversity. It requires member states to provide strict protection for specified flora and fauna (i.e. European Protected Species) outside of designated sites.

### *The Conservation of Habitats and Species Regulations 2010*

The Conservation of Habitats and Species Regulations 2010 formally transpose the requirements of the Habitats Directive into national law (replacing the Conservation (Natural Habitats &c) Regulations 1994). They build on existing nature conservation legislation for the protection of habitats and species by introducing requirements for assessing plans and projects affecting European designations and licensing certain activities affecting European Protected Species. All bats are listed as 'European protected species of animals'.

Licences are required for checking known roosts or for carrying out work that may disturb bats, such as the management or disturbance of features that are known to be used as roosting sites.

### *Wildlife and Countryside Act 1981*

This act provides varying degrees of protection for the listed species of flora and fauna. All UK native species of Bat are listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). The legislation protects bats and their roosts under Section 9 of the Act, such that it is an offence to:

- Intentionally kill, injure or take a bat
- Possess, control or sell any live or dead specimen or anything derived from a bat
- Intentionally damage, destroy or obstruct access to any structure or place used for shelter or protection (i.e. a roost) by a bat
- Deliberately, or intentionally disturb a bat while it is occupying a roost

### *Countryside and Rights of Way Act 2000*

This act strengthens the existing provisions of the Wildlife and Countryside Act 1981 for the enforcement of wildlife legislation, including a new offence of "recklessly" disturbing bats or recklessly damaging, obstructing or destroying their roosts.

### *UK Biodiversity Action Plan Priority Species*

Several species of bat are UK Priority Species for Conservation under the UK Biodiversity Action Plan and a National Species Action Plan has been produced for these species. The protection of UK BAP Priority Species is implemented through Local Planning Policy.

## **Otter**

### *The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) 1979*

The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) was adopted in Bern, Switzerland in 1979, and came into force in 1982. The principal aims of the Convention are to ensure conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species as listed in Appendix III of the Convention). To this end the Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1000 wild animal species.

To implement the Bern Convention in Europe, the European Community adopted Council Directive 79/409/EEC on the Conservation of Wild Birds (the EC Birds Directive) in 1979, and Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the EC Habitats Directive) in 1992. Among other things the Directives provide for the establishment of a European network of protected areas (Natura 2000), to tackle the continuing losses of European biodiversity on land, at the coast and in the sea to human activities.

### *The Habitats Directive (1992)*

The European Community Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) aims to protect the European Union's biodiversity. It requires member states to provide strict protection for specified flora and fauna (i.e. European Protected Species) outside of designated sites.

### *The Conservation of Habitats and Species Regulations 2010*

The Conservation of Habitats and Species Regulations 2010 formally transpose the requirements of the Habitats Directive into national law (replacing the Conservation (Natural Habitats &c) Regulations 1994). They build on existing nature conservation legislation for the protection of habitats and species by introducing requirements for assessing plans and projects affecting European designations and licensing certain activities affecting European Protected Species.

Licences are required for carrying out work that may disturb or injure Otter or destroy breeding sites.

### *Wildlife and Countryside Act 1981*



This act provides varying degrees of protection for the listed species of flora and fauna. Otter is a Schedule 5 species and is fully protected under Section 9 of the Wildlife and Countryside Act (as amended) under which it is an offence to:

- intentionally kill, injure or take an Otter
- deliberately capture or kill an Otter
- possess or control any live or dead specimen or anything derived from an Otter
- intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by an Otter
- deliberately, intentionally or recklessly disturb an Otter while it is occupying a structure or place which it uses for that purpose

#### *UK Biodiversity Action Plan Priority Species*

Otter is a UK Priority Species for Conservation under the UK Biodiversity Action Plan and a National Species Action Plan has been produced. The protection of UK BAP Priority Species such as Otter is implemented through Local Planning Policy.

#### **Water Vole**

##### *Wildlife and Countryside Act 1981*

This act provides varying degrees of protection for the listed species of flora and fauna. Since April 2008 the water vole has received full legal protection through its inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 in respect of Section 9. Full legal protection under the Act makes it an offence to:

- Intentionally kill, injure or take water voles.
- Possess or control live or dead water voles or derivatives
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection
- Intentionally or recklessly disturb water voles whilst occupying a structure or place used for that purpose.
- Sell water voles or offer or expose for sale or transport for sale.
- Publish or cause to be published any advertisement which conveys the buying or selling of water voles.

##### *Countryside and Rights of Way Act 2000*

This act strengthens the existing provisions of the Wildlife and Countryside Act 1981 for the enforcement of wildlife legislation, including a new offence of "recklessly" destroying or damaging the habitats of certain protected species, including water vole, or recklessly disturbing water vole.

#### *UK Biodiversity Action Plan Priority Species*

Water vole is a UK Priority Species for Conservation under the UK Biodiversity Action Plan and a National Species Action Plan has been produced. The protection of UKBAP Priority Species such as water vole is implemented through Local Planning Policy.

#### **Brown hare**

##### *UK Biodiversity Action Plan Priority Species*

Brown hare is a UK Priority Species for Conservation under the UK Biodiversity Action Plan and a National Species Action Plan has been produced for this species. The protection of UK BAP Priority Species is implemented through Local Planning Policy.

#### **Hedgehog**

##### *UK Biodiversity Action Plan Priority Species*

Hedgehog is a UK Priority Species for Conservation under the UK Biodiversity Action Plan and a National Species Action Plan has been produced for this species. The protection of UK BAP Priority Species is implemented through Local Planning Policy.

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

#### *The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) 1979*

The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) was adopted in Bern, Switzerland in 1979, and came into force in 1982. The principal aims of the Convention are to ensure conservation and protection of all wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to afford special protection to the most vulnerable or threatened species (including migratory species) (listed in Appendix 3). To this end the Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1000 wild animal species.

To implement the Bern Convention in Europe, the European Community adopted Council Directive 79/409/EEC on the Conservation of Wild Birds (the EC Birds Directive) in 1979, and Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the EC Habitats Directive) in 1992. Among other things the Directives provide for the establishment of a European network of protected areas (Natura 2000), to tackle the continuing losses of European biodiversity on land, at the coast and in the sea to human activities.

#### *The Habitats Directive (1992)*

The European Community Council Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC) aims to protect the European Union's biodiversity. It requires member states to provide strict protection for specified flora and fauna (ie European Protected Species) outside of designated sites.

#### *The Conservation of Habitats and Species Regulations 2010*

The Conservation of Habitats and Species Regulations 2010 formally transpose the requirements of the Habitats Directive into national law (replacing the Conservation (Natural Habitats &c) Regulations 1994). They build on existing nature conservation legislation for the protection of habitats and species by introducing requirements for assessing plans and projects affecting European designations and licensing certain activities affecting European Protected Species.

Licences are required for carrying out work that may disturb or injure Great Crested Newts or destroy breeding sites.

#### *Wildlife and Countryside Act 1981*

This act provides varying degrees of protection for the listed species of flora and fauna. Great Crested Newt is a Schedule 5 species and is fully protected under Section 9 of the Wildlife and Countryside Act (as amended) under which it is an offence to:

- Intentionally kill, injure or take a Great Crested Newt
- Deliberately capture or kill a Great Crested Newt
- Possess or control any live or dead specimen or anything derived from a Great Crested Newt
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a Great Crested Newt
- Deliberately, intentionally or recklessly disturb a Great Crested Newt while it is occupying a structure or place which it uses for that purpose
- Deliberately take or destroy the eggs of a Great Crested Newt

#### *UK Biodiversity Action Plan Priority Species*

Great Crested Newt is a UK Priority Species for Conservation under the UK Biodiversity Action Plan and a National Species Action Plan has been produced. The protection of UKBAP Priority Species such as Great Crested Newt is implemented through Local Planning Policy.

#### ***Reptiles (Adder, Grass Snake, Slow worm, Common Lizard)***

##### *Wildlife and Countryside Act 1981*

This act provides varying degrees of protection for the listed species of flora and fauna. All UK native reptiles are protected under Schedule 5 (Section 9) of the Wildlife and Countryside Act 1981 (as amended). Common lizard, Slow Worm, Grass snake and Adder receive partial protection under the Act. Only part of sub-section 9(1) and all of sub-section 9(5) apply; these prohibit the intentional killing and injuring and trade (i.e. sale, barter, exchange, transporting for sale and advertising to sell or to buy).

##### *Countryside and Rights of Way Act 2000*

This act strengthens the existing provisions of the Wildlife and Countryside Act 1981 for the enforcement of wildlife legislation, including a new offence of "recklessly" killing or injuring the above-listed species.

##### *Biodiversity Action Plan Priority Species*

Common Lizard, Grass Snake, Adder and Slow Worm are listed on the UK Biodiversity Action Plan as they are priority species for conservation. The protection of UKBAP Priority Species is implemented through Local Planning Policy.

#### ***Common Toad***

##### *UK Biodiversity Action Plan Priority Species*

Common Toad is a UK Priority Species for Conservation under the UK Biodiversity Action Plan and a National Species Action Plan has been produced for this species. The protection of UK BAP Priority Species is implemented through Local Planning Policy.

#### ***Stag Beetle***

##### *UK Biodiversity Action Plan Priority Species*

Stag Beetle is a UK Priority Species for Conservation under the UK Biodiversity Action Plan and a National Species Action Plan has been produced for this species. The protection of UK BAP Priority Species is implemented through Local Planning Policy.

#### ***Plants***

##### *Wildlife and Countryside Act 1981*

The Wildlife and Countryside Act (as amended) provides protection to a number of species of plant as listed in Schedule 8. Section 13 identifies measures for the protection of wild plants. It prohibits the unauthorised intentional uprooting of any wild plant species and forbids any picking, uprooting or destruction of plants listed on Schedule 8. It also prohibits the sale, etc, or possession for the purpose of sale of any plants on Schedule 8 or parts or derivatives of Schedule 8 plants. It provides certain defences, e.g. provision to cover incidental actions that are an unavoidable result of an otherwise lawful activity.

##### *UK Biodiversity Action Plan Priority Species*

Several species of plant found in the area are UK Priority Species for Conservation under the UK Biodiversity Action Plan, for which National Species Action Plans have been produced.

## Impact Assessment Methodology

### Scale Level

#### County/ Metropolitan

- Designated or qualifying features within Local Nature Reserves or Wildlife Sites, selected on county/metropolitan criteria, or features that meet the published selection criteria for designation.
- Semi-natural ancient woodland greater than 0.25 ha in area.
- Significant and viable areas of habitat identified in County BAPs as requiring site protection.
- Species populations of county/metropolitan importance.
- Significant populations of a county/metropolitan important species (i.e. listed in a County/Metropolitan Red Data Book or BAP on account of their regional rarity or localisation).

#### • District/Borough

- Biological features within Local Nature Reserves, etc., selected on District/Borough ecological criteria.
- Areas of habitat identified in a sub-County (District/Borough) BAP or in the relevant Natural Area profile, and other features that are scarce within the District/Borough or that appreciably enrich the District/Borough habitat resource.
- Diverse and/or ecologically valuable hedgerow networks.
- Semi-natural ancient woodland smaller than 0.25 ha in area.
- Species populations of District/Borough importance.
- Significant populations of a District/Borough important species (i.e. listed in a local BAP on account of their local rarity or localisation).

#### Parish/Neighbourhood

Areas of habitat considered to appreciably enrich the habitat resource within the context of the Parish or Neighbourhood, e.g. species-rich hedgerows.

Valuable biological features within Local Nature Reserves selected on Parish ecological criteria.

Scale	Level of Value
International	Very High
National	High
Regional	Medium
County/ Metropolitan	Medium
District/ Borough	Lower
Parish/ Neighbourhood	Lower

Table 1.2 Definitions of impact magnitude

Major	Loss of over 50% of a site feature, habitat or population Adverse change to all of a site feature, habitat or population For benefits, an impact equivalent in nature conservation terms to gain of over 50% of a site feature, habitat or population
Intermediate	Loss affecting 20-50% of a site feature, habitat or population Adverse change to over 50% of a site feature, habitat or population For benefits, an impact equivalent in nature conservation terms to a gain of 20-50% of a site feature, habitat or population
Minor	Loss affecting 5-19% of a site feature, habitat or population Adverse change to 20-50% of a site feature, habitat or population For benefits, an impact equivalent in nature conservation terms to a gain of 5-19% of a site feature, habitat or population
Neutral	Loss affecting up to 5% of a site feature, habitat or population Adverse change to less than 20% of a site feature, habitat or population For benefits, an impact equivalent in nature conservation terms to a gain of up to 5% of a site feature, habitat or population

Table 1.3 Impact significance

Value of Receptor	Major Negative	Intermediate Negative	Minor Negative	Neutral	Minor Positive	Intermediate Positive	Major Positive
International (Very High)	Severe Adverse	Severe Adverse	Major Adverse	Neutral	Major Beneficial	Major Beneficial	Major Beneficial
National (High)	Severe Adverse	Major Adverse	Moderate Adverse	Neutral	Moderate Beneficial	Major Beneficial	Major Beneficial
Regional (Medium)	Major Adverse	Moderate Adverse	Minor Adverse	Neutral	Minor Beneficial	Moderate Beneficial	Major Beneficial
County/Metropolitan (Medium)	Moderate Adverse	Minor Adverse	Minor Adverse	Neutral	Minor Beneficial	Minor Beneficial	Moderate Beneficial
District/Borough (Lower)	Moderate Adverse	Minor Adverse	Minor Adverse	Neutral	Minor Beneficial	Minor Beneficial	Moderate Beneficial
Parish/Neighbourhood (Lower)	Minor Adverse	Minor Adverse	Minor Adverse	Neutral	Minor Beneficial	Minor Beneficial	Minor Beneficial
Negligible	Neutral	Neutral	Neutral	Neutral	Minor Beneficial	Minor Beneficial	Minor Beneficial

# Hedgerow Woody Species

From Schedule 3 of Hedgerow Regulations 1997

Alder (*Alnus glutinosa*)  
Apple, crab (*Malus sylvestris*)  
Ash (*Fraxinus excelsior*)  
Aspen (*Populus tremula*)  
Beech (*Fragus sylvatica*)  
Birch, downy (*Betula pubescens*)  
Birch, silver (*Betula pendula*)  
Black-poplar (*Populus nigra sub-species betulifolia*)  
Blackthorn (*Prunus spinosa*)  
Box (*Buxus sempervirens*)  
Broom (*Cytisus scoparius*)  
Buckthorn (*Rhamnus cathartica*)  
Buckthorn, alder (*Frangula alnus*)  
Butcher's-broom (*Ruscus aculeatus*)  
Cherry, bird (*Prunus padus*)  
Cherry, wild (*Prunus avium*)  
Cotoneaster, wild (*Cotoneaster integerrimus/ cambricus*)  
Currant, downy (*Ribes spicatum*)  
Currant, mountain (*Ribes alpinum*)  
Dogwood (*Cornus sanguinea*)  
Elder (*Sambucus nigra*)  
Elm (*Ulmus species*)  
Gooseberry (*Ribes uva-crispa*)  
Gorse (*Ulex europaeus*)  
Gorse, dwarf (*Ulex minor*)  
Gorse, western (*Ulex gallii*)  
Guelder Rose (*Viburnum opulus*)  
Hawthorn (*Crataegus monyogyna*)  
Hawthorn, midland (*Crataegus laevigata*)  
Hazel (*Corylus avellana*)  
Holly (*Ilex aquifolium*)  
Hornbeam (*Carpinus betulus*)  
Juniper, common (*Juniperus communis*)  
Lime, large-leaved (*Tilia platyphyllos*)  
Lime, small-leaved (*Tilia cordata*)  
Maple, field (*Acer campestre*)  
Mezereon (*Daphne mezereum*)  
Oak, pedunculate (*Quercus robur*)  
Oak, sessile (*Quercus petraea*)  
Osier (*Salix viminalis*)  
Pear, Plymouth (*Pyrus cordata*)  
Pear, wild (*Pyrus pyrastra*)  
Poplar, grey (*Populus x canescens*)  
Poplar, white (*Populus alba*)  
Privet, wild (*Ligustrum vulgare*)  
Rose (*Rose species*)  
Rowan (*Sorbus aucuparia*)  
Sea-buckthorn (*Hippophae rhamnoides*)  
Service-tree, wild (*Sorbus torminalis*)  
Spindle (*Euonymus europaeus*)  
Walnut (*Juglans regia*)  
Wayfaring-tree (*Viburnum lantana*)  
Whitebeam (*Sorbus species*)  
Willow (*Salix species*)  
Yew (*Taxus baccata*)

**Table 6.1 Guidance on the optimal timing for carrying out specialist ecological surveys and mitigation**

This is not definitive and is intended to provide an indication only. The timing of surveys and animal activity will be dependent on factors such as weather conditions. Please consult the *species briefing sheets* for more detailed information, including species distribution.

KEY	
	Recommended survey time
	No surveys
	Mitigation conducted at these times
	Mitigation works restricted

- \* Where survey techniques involve the capture, handling or disturbance of *protected species* then only licensed persons can undertake surveys; personal *survey and monitoring* licences are obtained from English Nature, Countryside Council for Wales, Environment and Heritage Service (NI) or Scottish Natural Heritage
- \*\* Where mitigation involves the killing, capture, injury and/or disturbance of *protected species* and/or the damage, destruction or obstruction of their *habitats*, a *development licence* must be obtained from the Department for Food and Rural Affairs (England), Scottish Executive's Environment and Rural Affairs Department, Welsh Assembly (Countryside Division) or the Environment and Heritage Service Northern Ireland. Licences will be granted only to persons who have proven competence in dealing with the species concerned. Development licence applications need to be submitted considerably earlier.

take approximately 30 days to be processed by government departments. Where mitigation works need to be conducted under licence before works begin, licence applications will need to be submitted considerably earlier.

		Licence required?	J	F	M	A	M	J	J	A	S	O	N	D
Habitats / vegetation	Surveys	N	Mosses and lichens No other detailed plant surveys – Phase 1 surveys only (least suitable time)			Detailed habitat assessment surveys Surveys for higher plants and ferns Mosses and lichens in April, May and September only						Mosses and lichens. No other detailed plant surveys – Phase 1 surveys only (least suitable time)		
	Mitigation	N	Planting and translocation		No mitigation for majority of species						Planting and translocation			
Birds	Surveys	N	Winter birds		Breeding birds / migrant species			Breeding birds		Breeding birds / migrant species		Winter birds		
	Mitigation	N	Clearance works may be conducted at this time, but must stop immediately if any nesting birds are found		No clearance or construction works Bird nesting season						Clearance works may be conducted at this time, but must stop immediately if any nesting birds are found			
Badgers	Surveys	*	All survey methods – best time is in spring and early autumn / winter											
	Mitigation	**	Building of artificial setts No disturbance of existing setts						Stopping up or destruction of existing setts					
Bats	Surveys	*	Inspection of hibernation, tree and building roosts			No surveys	Activity surveys and inspection of building roosts. Emergence counts,				No surveys	Inspection of hibernation, tree and building roosts		
	Mitigation	**	Works on maternity roosts	Works on maternity roosts until mid-May. Works on hibernation roosts from mid-March		Works on hibernation roosts only			Hibernation roosts until November. Maternity roosts from mid-September		Works on maternity roosts only			

\* Applies in Northern Ireland only

**Table 6.1** Guidance on the optimal timing for carrying out specialist ecological surveys and mitigation (continued)

		Licence required?	J	F	M	A	M	J	J	A	S	O	N	D
Dormice	Surveys	*	Nut searches (sub-optimum time)		Nest searches (April sub-optimum time)		Cage traps and hair tube surveys to mid-October Nut searches from September (optimum time September to December) Nest searches (optimum time September to March)						Nut searches and nest searches (optimum time)	
	Mitigation	**	No clearance works				Clearance works (sub-optimum time)		No clearance works			Clearance works to early October (optimum time)		No clearance works
Otters	Surveys	*	Surveys for otters can potentially be conducted all year round, though vegetation cover and weather conditions may limit the times at which surveys can be carried out											
	Mitigation	**	Mitigation can potentially be conducted in any month, but is likely to be restricted where otters are found to be breeding											
Pine martens	Surveys	*	Surveys may be conducted all year round weather permitting Optimum time is spring and summer. Surveys for breeding dens from March to May.											
	Mitigation	**	Works in areas of pine marten habitat and dens		Avoid all works in pine marten habitat								Works in areas of pine marten habitat and dens	
Red squirrels	Surveys	*	Surveys may be conducted all year round weather permitting Optimum time is spring and summer. Surveys for breeding females from December to September.											
	Mitigation	**	Avoid all works in red squirrel habitat										Works should preferably be conducted at this time	
Water voles (n/a in NI)	Surveys	*	Reduced activity	Initial surveys possible	All survey methods can be used during this period, though vegetation cover and weather conditions may limit the times at which surveys can be carried out. (Optimum time: March to June)							Initial surveys possible	Reduced activity	
	Mitigation	N <sup>2</sup>	Avoid all works in water vole habitat			Works in water voles habitat possible		Avoid all works in water vole habitat			Works in water vole habitat possible		Avoid all works in water vole habitat	
Sand lizards, smooth snakes (n/a in NI) <sup>1</sup> and common lizards	Surveys	*	No surveys – reptiles in hibernation		Activity surveys from March to June and in September / October. Surveys are limited by high temperatures during July and August. Peak survey months are April, May and September.						No surveys – reptiles in hibernation			
	Mitigation	**	Scrub clearance		Capture and translocation programmes can only be conducted whilst reptiles are active (March to June and September / October). Trapping is limited by high temperatures during July / August. Scrub clearance							Scrub clearance		

<sup>2</sup> The extent of legal protection of the water vole is currently under review; it has been proposed to fully protect water voles, as well as their habitats.



**Table 6.1** Guidance on the optimal timing for carrying out specialist ecological surveys and mitigation (continued)

		Licence required?	J	F	M	A	M	J	J	A	S	O	N	D
Other reptiles	Surveys	N	No surveys – reptiles in hibernation	Activity surveys from March to June and in September / October. Surveys are limited by high temperatures during July and August. Peak survey months are April, May and September.									No surveys – reptiles in hibernation	
	Mitigation	N	Scrub clearance	Capture and translocation programmes can only be conducted whilst reptiles are active (March to June and September / October). Trapping is limited by high temperatures during July / August. Scrub clearance									Scrub clearance	
Great crested newts (n/a in NI)	Surveys	*	No surveys – newts in hibernation	Pond surveys for adults: mid-March to mid-June. Surveys must include visits undertaken between mid-April and mid-May. Egg surveys April to mid-June. Larvae surveys from mid-May. Terrestrial habitat surveys				Larvae surveys to mid-August. Terrestrial habitat surveys		Terrestrial habitat surveys		No surveys – newts in hibernation		
	Mitigation	**	No trapping of newts. Pond management only	Newt trapping programmes in ponds and on land				Newt trapping on land only				No trapping of newts. Pond management only		
Natterjack toads	Surveys	*	No surveys – toads in hibernation	Surveys of breeding ponds for adults. Surveys for tadpoles from May onwards. Surveys for adults on land				Surveys for adults on land.		No surveys – toads in hibernation				
	Mitigation	**	Pond management works	Trapping of adults in ponds from April to July. Trapping of adults on land. Trapping of tadpoles from May to early September				Pond management works						
White-clawed crayfish	Surveys	*	Reduced activity	Surveys can be undertaken		Avoid surveys (females are releasing young)		Optimum time for surveys				Reduced activity		
	Mitigation	***	Avoid capture programmes (low activity levels may lead to animals being easily missed)	Exclusion of crayfish from construction areas		Avoid capture programmes		Exclusion of crayfish from construction areas				Avoid capture programmes (low activity levels may lead to animals being easily missed)		
Fish	Surveys	*	For coastal, river and stream-dwelling species, the timing of surveys will depend on the migration pattern of the species concerned. Where surveys require information on breeding, the timing of surveys will need to coincide with the breeding period, which may be summer or winter months, depending on the species.											
	Mitigation	**	Mitigation for the protection of watercourses is required at all times of year. Mitigation for particular fish species will need to be timed so as to avoid the breeding season. This varies from species to species.											

\*\*\* Where mitigation involves the capture of white-clawed crayfish, a mitigation licence must be obtained from English Nature, Countryside Council for Wales, Environment and Heritage Service (NI) or Scottish Natural Heritage. Licences will be granted only to persons who have proven competence in dealing with the species concerned.

# Wildlife & Construction Best Practice Guidance



## Habitat Protection

Where retained habitat is adjacent an area of development, what should you do?

- An exclusion zone should be put in place, consisting of barriers separating construction activities from wildlife areas.
- No polluting materials should be used near rivers.
- Care should be taken to prevent the introduction or spread of invasive plants such as Japanese Knotweed or Giant Hogweed.
- 'Keep out wildlife exclusion zone' signs to be secured to barriers.



## Trees and Hedgerows

- The contractor should follow the specific requirements of the Local Authority in relation to Tree Preservation Orders.
- Trees should be fenced off by no less than the width of the canopy spread until all development work is complete.
- Do not use a tree for external fixtures or fittings.
- Nothing should be stored against the trunks of trees.
- There should be no change in soil depth within 2m of the trunks, unless it has been approved by an arboriculturist.
- Site Compounds should be erected outside of the tree canopy.



## Phased Clearance In Relation to Reptiles and Amphibians

- Any site clearance should be undertaken in a phased and controlled manner and under ecological supervision. This gives a chance to reptiles and amphibians to move out the way to somewhere safe before a site is cleared.
- All clearance work should be undertaken during April - August in order to coincide with the reptile and amphibian active seasonal period and should be undertaken within a temperature range of 16°C - 24°C.
- Strim grass to a height of 100mm and the cut material to be hand raked to the sides of the area. All strimming should commence in the centre of the site working outwards towards the periphery of the development footprint to where the habitat is to be retained.

## Protected Species

### Birds and their Nests

- All species of wild bird in the UK are protected during the breeding season.
- They are protected against intentional killing, injuring or taking, damaging or destroying nests in use or being built, and taking or destroying eggs.
- Birds can nest in places, such as scrub, hedgerows, trees, in or on buildings, ledges, cliffs and on the ground, depending on the species. In the UK they typically build their nests and lay their eggs between March and the end of July.

### What if you find a bird nesting on site?

- All works in the area must stop until the birds have completed breeding.
- An exclusion zone around the nests area should be put up by an ecologist.
- **DO NOT** undertake scrub clearance during the bird-nesting season (March - end of July) if at all possible.
- **DO NOT** undertake scrub clearance during the bird-nesting season without an experienced ecologist being present.

## Reptiles

- Reptiles are protected, which makes it an offence to intentionally and recklessly kill, injure or take any species of reptile.

### Where are they found?

- Grass snake, slow worm and common lizard are fairly widespread and may be found within dense vegetation on sites that are directly next to open areas of rubble / rocks and / or short grassland.
- Clearance works should be undertaken in a phased manner and supervised by an ecologist.

### What to do if you find a reptile?

- **STOP!** If you think you have found a reptile on site, stop all works and consult an ecologist immediately.

## Amphibians

- Amphibian species include the common toad, common frog, smooth (or common) newt and palmate newt, there is also the fully protected great crested newt.
- Common amphibians are protected, which makes it an offence to intentionally and recklessly kill, injure or take them. Great crested newts are further protected for disturbance and/or damaging or obstructing their habitats.

### Where are they found?

- Amphibians can be found in or near ponds or other water bodies on development sites, including temporary pools. Most amphibians will hibernate on land during the winter months.

### What should you do if you find an amphibian and are unsure of the identity?

- **STOP!** and consult an ecologist immediately.
- **STOP!** if you think you have found a great crested newt on site and consult an ecologist immediately.

## Bats and their Roosts

- All bat species and their roosts are protected, it is an offence to intentionally kill, injure or take a bat. It is also an offence to intentionally or recklessly damage, destroy or obstruct access to any place that a bat uses for shelter or protection (even if bats are not currently present).

- Places you may find them? Holes, and cracks in trees, in roofs and walls of houses and buildings, under bridges, in underground caves or old railway tunnels. Every building and mature tree is a potential bat roost.

### Things to look out for?

- Below bat roost entrances: Dark stains on walls, tree trunks or bat droppings on the ground.
- Bat droppings are dark brown or black and about half a centimetre long - they crumble when crushed.

### What should you do if you think you have found a bat roost?

- **STOP!** all works in the area and contact an Ecologist immediately.



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# Wildlife and Construction Best Practice Guidance



## BIRDS AND THEIR NESTS

- All species of wild bird in the UK are protected during the breeding season.
- They are protected against intentional killing, injuring or taking, damaging or destroying nests in use or being built, and taking or destroying eggs.
- Birds can nest in places, such as scrub, hedgerows, trees, in or on buildings, ledges, cliffs and on the ground, depending on the species. In the UK they typically build their nests and lay their eggs between March and the end of July.
- What if you find a bird nesting on site?
- All works in the area must stop until the birds have completed breeding.
- An exclusion zone around the nest/s area should be put up by an ecologist.
- **DO NOT** undertake scrub clearance during the bird-nesting season (March – end of August) if at all possible.
- **DO NOT** undertake scrub clearance during the bird-nesting season without an experienced ecological being present.



## HABITAT PROTECTION

- Where retained habitat is adjacent an area of development, what should you do?
- An exclusion zone should be put in place consisting of barriers separating construction activities from wildlife areas.
- No polluting materials should be used near rivers.
- 'Keep out wildlife exclusion zone' signs to be secured to barriers.



## REPTILES AND AMPHIBIANS

- Reptiles and amphibians are protected, which makes it an offence to intentionally and recklessly kill, injure or take any species of reptile.
- Amphibians can be found in or near ponds or other water bodies on development sites, including temporary pools. Most amphibians will hibernate on land during the winter months.
- What should you do if you find an amphibian or reptile and are unsure of the identity?
- Reptiles and amphibians are fairly widespread and may be found within dense vegetation on sites that are directly next to open areas of rubble / rocks and / or short grassland.
- Clearance works should be undertaken in a phased manner and supervised by an ecologist.
- **STOP!** if you think you have found a reptile or amphibian on site, stop all works and consult an ecologist immediately.

## TREES AND HEDGEROWS

- Trees should be fenced off by no less than the width of the canopy spread until all development work is complete.
- Do not use a tree for external fixtures or fittings.
- Nothing should be stored against the trunks of trees.
- There should be no change in soil depth within 2m of the trunks, unless it has been approved by an arboriculturist.
- Site Compounds should be erected outside of the tree canopy.



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## Artificial lighting and wildlife

### Interim Guidance: Recommendations to help minimise the impact artificial lighting

Wherever human habitation spreads, so does artificial lighting. This increase in lighting has been shown to have an adverse effect on our native wildlife, particularly on those species that have evolved to be active during the hours of darkness. Consequently, development needs to carefully consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. When the impacts on different species groups are reviewed, the solutions proposed have commonalities that form the basis of good practice. These are outlined in the following document.

#### Overview of impacts

##### Invertebrates

Artificial light significantly disrupts natural patterns of light and dark, disturbing invertebrate feeding, breeding and movement, which may reduce and fragment populations. Some invertebrates, such as moths, are attracted to artificial lights at night. It is estimated that as many as a third of flying insects that are attracted to external lights will die as a result of their encounter.<sup>1</sup> Insects can become disoriented and exhausted making them more susceptible to predation. In addition, the polarisation of light by shiny surfaces attracts insects, particularly egg laying females away from water. Reflected light has the potential to attract pollinators and impact on their populations, predators and pollination rates. Many invertebrates natural rhythms depend upon day-night and seasonal and lunar changes which can be adversely affected by artificial lighting levels.

It is not always easy to disentangle the effects of lighting on moths from other impacts of urbanisation. However, it is known that UV and green and blue light, which have short wavelengths and high frequencies, are seen by most insects and are highly attractive to them. Where a light source has a UV component, male moths in particular will be drawn to it. Most light-induced changes in physiology and behaviour are likely to be detrimental. They discern it to be 'light', so they do not fly to feed or mate.<sup>2</sup>

##### Birds

There are several aspects of changes to bird behaviour to take into account. The phenomenon of robins and other birds singing by the light of a street light or other external lighting installations is well known, and research has shown that singing did not have a significant effect on the bird's body mass regulation. However, it was felt that the continual lack of sleep was likely to be detrimental to the birds' survival and could disrupt the long-term circadian rhythm that dictates the onset of the breeding season<sup>3</sup>. Many species of bird migrate at night and there are well-documented cases of the mass mortality of nocturnal migrating birds as they strike tall lit buildings. Other UK bird species that are particularly sensitive to artificial lighting are long-eared owls, black-tailed godwit and stone curlew.<sup>4</sup>

<sup>1</sup> Bruce-White C and Shardlow M (2011) A Review of the Impact of Artificial Light on Invertebrates - See more at: <http://www.buglife.org.uk/advice-and-publications/publications/campaigns-and-reports/review-impact-artificial-light#sthash.s7GPA1vL.dpuf>

<sup>2</sup> As above

<sup>3</sup> Pollard A. (2009) Visual constraints on bird behaviour. University of Cardiff

<sup>4</sup> Rodriguez A., Garcia A.M., Cervera F. and Palacios V. (2006) Landscape and anti-predation determinants of nest site selection, nest distribution and productivity in Mediterranean population of Long-eared Owls, *Asio otus*. *Ibis*, 148(1), pp. 133-145

## Mammals

A number of our British mammals are nocturnal and have adapted their lifestyle so that they are active in the dark in order to avoid predators. Artificial illumination of the areas in which these mammals are active and foraging is likely to be disturbing to their normal activities and their foraging areas could be lost in this way. It is thought that the most pronounced effect is likely to be on small mammals due to their need to avoid predators. However, this in itself has a knock-on effect on those predators.

The detrimental effect of artificial lighting is most clearly seen in bats. Our resident bat species have all suffered dramatic reductions in their numbers in the past century. Light falling on a bat roost exit point, regardless of species, will at least delay bats from emerging, which shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed. At worst, the bats may feel compelled to abandon the roost. Bats are faithful to their roosts over many years and disturbance of this sort can have a significant effect on the future of the colony. It is likely to be deemed a breach of the national and European legislation that protects British bats and their roosts.

In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats and their use of commuting routes. There are two aspects to this: one is the attraction that short wave length light (UV and blue light) has to a range of insects; the other is the presence of lit conditions.

As mentioned, many night-flying species of insect are attracted to lamps that emit short wavelength component. Studies have shown that, although noctules, serotines, pipistrelle and Leisler's bats, take advantage of the concentration of insects around white street lights as a source of prey, this behaviour is not true for all bat species. The slower flying, broad-winged species, such as long-eared bats, barbastelle, greater and lesser horseshoe bats and the *Myotis* species (which include Brandt's, whiskered, Daubenton's, Natterer's and Bechstein's bats) generally avoid external lights.

Lighting can be particularly harmful if it illuminates important foraging habitats such as river corridors, woodland edges and hedgerows used by bats. Studies have shown that continuous lighting along roads creates barriers which some bat species cannot cross<sup>5</sup>. It is also known that insects are attracted to lit areas from further afield. This could result in adjacent habitats supporting reduced numbers of insects, causing a further impact on the ability of light-avoiding bats to feed.

These are just a few examples of the effects of artificial lighting on British wildlife, with migratory fish, amphibians, some flowering plants, a number of bird species, glow worms and a range of other invertebrates all exhibiting changes in their behaviour as a result of this unnatural lighting.

## Recommendations

### Survey and Planning

The potential impacts of obtrusive light on wildlife should be a routine consideration in the Environmental Impact Assessment (EIA) process<sup>6</sup>. Risks should be eliminated or minimised wherever possible. Some locations are particularly sensitive to obtrusive light and lighting schemes in these areas should be carefully planned.

In August 2013, Planning Minister Nick Boles launched the new National Online Planning Guidance Resource aimed at providing clearer protection for our natural and historic environment. The guidance looks at when lighting pollution concerns should be considered and is covered within one of the on line planning practice

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<sup>5</sup> Stone E. L., Jones G and Harriss (2009) Street lighting disturbs commuting bats. *Current Biology*, 19, pp 1-5

<sup>6</sup> See also: Institution of Lighting Professionals - Professional Lighting Guide (PLG 04) Guidance on undertaking lighting environmental impact assessments)

guides<sup>7</sup>. The guide provides an overview for planners with links to documents that aim to give planners an overview of the subject through the following discussion points:

1. When is obtrusive light / light pollution relevant to planning?
2. What factors should be considered when assessing whether a development proposal might have implications for obtrusive lighting / light pollution?
3. What factors are relevant when considering where light shines?
4. What factors are relevant when considering how much the light shines?
5. What factors are relevant when considering possible ecological impact?

This can help planners reach the right design through the setting of appropriate conditions relating to performance and mitigation measures at the planning stage.

The Institution of Lighting Professionals (ILP) recommends that Local Planning Authorities specify internationally recognised environmental zones for exterior lighting control within their Development Plans<sup>8</sup>. In instances lacking classification, it may be necessary to request a Baseline Lighting Assessment/Survey conducted by a Lighting Professional in order to inform the classification of areas, particularly for large-scale schemes and major infrastructure projects.

When assessing or commissioning projects that include the installation of lighting schemes, particularly those subject the EIA process, the following should be considered and relayed to applicants:

- *Ecological consultants should confirm the presence of any sensitive fauna and flora, advising the lighting designers of bat routes and roosts and other areas of importance in order to ensure that reports correspond with each other.*
- *Ecological consultants should consider the need for quantitative lighting measurements. In some instances it may be necessary for further lighting measurements to be taken. For example, outside an important bat roost. These should follow best practice guidance from the ILP and would ideally be conducted by a Lighting Professional.*
- *Where appropriate, professional lighting designers should be consulted to design and model appropriate installations that achieve the task but mitigate the impacts. This should be done at the earliest opportunity. Early decisions can play a key role in mitigating the impact from lighting.*
- *Reports submitted should outline the impacts of lighting in relation to ecology, making clear reference to the ecological findings, highlighting any sensitive areas and detail proposed mitigation. Consideration should also be given to internal lighting where appropriate.*
- *Post -installation checks and sign off upon commissioning should be carried out by the lighting designer to ensure that the lighting installation has been installed in accordance with the design, that predictions were accurate and mitigation methods have been successful.*

## Principles and design considerations

### *Do not*

- *provide excessive lighting. Use only the minimum amount of light needed for the task.*
- *directly illuminate bat roosts or important areas for nesting birds*

### *Avoid*

- *installing lighting in ecologically sensitive areas such as: near ponds, lakes, rivers, areas of high conservation value; sites supporting particularly light-sensitive species of conservation significance (e.g. glow worms, rare moths, slow-flying bats) and habitat used by protected species.*
- *using reflective surfaces under lights.*

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<sup>7</sup><http://planningguidance.planningportal.gov.uk/blog/guidance/light-pollution/when-is-light-pollution-relevant-to-planning/>

<sup>8</sup> Institution of Lighting Professionals (2011) Guidance Notes for the Reduction of Obtrusive Light GN01:2011.

## APPENDIX 4- Reptile Survey September 2019

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<b>ANNEX 1</b>	<b>SUPPLEMENTARY MITIGATION INFORMATION AND REPTILE PILES/BANKS</b>

## 1.0 Objectives of the Study

The objectives of the reptile survey were to:

- determine the presence / likely absence of reptiles/amphibians in suitable areas within the areas to be affected by the proposed clearance and landscaping works associated with the proposed residential development.
- to provide recommendations in terms of mitigation which may be required to safeguard reptile populations present within the site.

## 2.0 Scope of Survey Habitats

2.1 Key things to consider when assessing habitat suitability for reptiles are:

- **Vegetation structure** – ideal reptile habitat has a variable structure with a mixture of vegetation heights, tangled or thorny areas, mosaics, bare patches, lots of edges ('ecotones') and good basking places.
- **Extent** – must be big enough area to support a population. Small habitat patches can be sufficient for lizards, whereas snakes need larger areas (although grass snakes can cross unsuitable habitat).
- **Aspect** – sunny, sheltered locations, unshaded, south-facing
- **Topography** - undulating topography, banks, hummocks, hollows, south-facing slopes; generally not north-facing slopes.
- **Connectivity** – essential to allow colonisation when habitat is created, and recolonisation after local extinctions. For example, if an area of good habitat is surrounded by intensive arable farmland, reptiles might not be able to colonise it.
- **History** – habitat that has been recently created might look deceptively good, but it takes time for reptiles to colonise, and there must be connectivity with neighbouring areas where they are present.

2.2 The preliminary ecological survey aimed to identify within the site areas of suitable habitat. The on-site habitats of interest to reptiles consist of the following:

- banks, hollows,
- bare ground patches/other basking areas,
- boundary trees,
- bramble,
- brash and wood piles,
- dense herbage,
- long grass,
- scrub,
- uneven edges,
- varied height structure,
- vegetation mosaics,

2.3 On the basis of the habitats present a presence/absence reptile survey was recommended. The desk study results from Bedfordshire and Luton Biodiversity Recording and Monitoring Centre returned no records of reptiles within the 2km search radius.



2.4 Eco-Check Ltd put down 22 ACO's on the 20<sup>th</sup> August 2019 and commenced the reptile surveys between the 2<sup>nd</sup> September and 27<sup>th</sup> September 2019 with 5 site visits in total. The surveys were undertaken within the reptile survey season of April to September and during suitable times and weather conditions in line with Natural England and recommended survey guidelines in the '*Herpetofauna Workers Manual*'.

### **3.0 Legislation**

#### *3.1 Legislation Relating to Reptiles:*

Common lizards, slow worms, grass snakes and adders are listed in schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are therefore protected from intentional killing or injury. The Countryside and Rights of Way Act 2000 (CRoW) introduces a new offence of 'reckless' disturbance which is punishable by a fine of up to £5000 per animal.

#### *3.2 Legislation Relating to Amphibians:*

Great crested newts and their habitat (resting-places, hibernation sites and places of shelter, breeding sites) receive protection under the Wildlife and Countryside Act 1981. This protection makes it illegal to intentionally kill, injure or take a great crested newt, to possess or control any live or dead specimen, to intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a great crested newt, and to intentionally or disturb a great crested newt while it is occupying a structure or place which it uses for that purpose.

Additionally, great crested newts are protected under the Conservation (Natural Habitats &c.) Regulations 2017 (as amended). This legislation makes it illegal to deliberately capture or kill a great crested newt, to deliberately disturb a great crested newt, deliberately take or destroy the eggs of a great crested newt and to damage or destroy a breeding site or resting place of a great crested newt. This applies to all great crested newt life stages. Common frog, common toad and other newts do not have any statutory protection.

Licences can be obtained from Natural England to permit activities such as surveys or development to take place which would otherwise result in the above prohibited effects. Great crested newts are the subject of a UK Biodiversity Action Plan (BAP). Under the Wildlife and Countryside Act 1981, other amphibians, including smooth and palmate newts and common frogs cannot be deliberately harmed, sold or be offered for sale. The habitats of these amphibians are not legally protected.

The clearance and construction stages of the development has the potential to have an impact on reptiles (lizards, slow worms and snakes), which could be injured during plant movement and earthworks. In addition, there are a number of areas which provide good refuges and hibernaculum for herpetofauna and so should be cleared in a sensitive manner as outlined under the mitigation section of this report.

## **4.0 Methodology**

### *4.1 Desk Study- Habitats*

#### 4.2 Desk Study- Protected and Priority Species

A desk study was undertaken which returned no reptile records within the search radius.

### *4.3 Reptiles-*

The reptile survey method followed standard practice for reptile surveying as outlined in the Herpetofauna Workers Manual and Froglife Advice Sheet 10: Reptile Survey: An Introduction to planning, conducting and interpreting surveys for snake and lizard conservation (Froglife, undated). The field survey was conducted by James Hodson MSc of Eco-Check Ltd, an experienced field ecologist and herpetofauna surveyor.

### *4.4 Field Survey-*

In order to undertake the reptile survey, artificial refuges or artificial cover objects (ACO's) were put down across the area's most likely to support reptiles. These artificial reptile refugia consisted of 22 x 50cm<sup>2</sup> squares of corrugated tin sheets and felt sheets of similar size.

These artificial refuges increase the chances of observing otherwise elusive reptiles, which are attracted to these 'refuges' as they can bask on top or regulate their body temperature below the refuges, out of sight from predators. The refuges were placed in sunny areas (south facing where possible) along the areas of rank grassland, margins, ditches, boundary trees and hedging and tall ruderal areas, away from bare ground (existing basking spots), as this creates a variety of thermal microhabitats and gives any reptile species present areas to shelter or bask.

In accordance with guidelines these cover objects were put down at a density in excess of 25/ha. These artificial objects were positioned primarily within and bordering the proposed working areas and left to bed down for a period of approximately 2 weeks and were then checked regularly during September 2019. These visits were undertaken during the reptile survey season and in suitable weather conditions, e.g. sun and temperatures exceeding 9°C, dry, not too windy etc. and following the guidelines as set out in the 'Herpetofauna Workers' Manual.

For presence/absence purposes, a recent study (Sewell et al. 2012) has shown that four-five survey visits (depending on species) are usually sufficient to detect 95% of occupied sites, at least for the commoner British reptile species, providing a combination of both tins and other artificial ACOs are used in addition to transects.

In addition to checking the ACO's a reptile survey was conducted within the site which consisted of slowly and quietly walking along a transect between a variety of natural and artificial refugia which have been on site for some time and checking each for the presence of reptiles.

All other natural open areas and piles of timber and brash were also checked for the presence of reptiles, and in particular adder which do not always utilise ACO's, and a general visual check of the site was undertaken to check for any signs of reptiles such as skin sloughs.

#### 4.5 Limitations-

There were no limitations to the survey.

#### 5.0 Survey Results

DATE	TEMPERATURE C°	WEATHER	TRANSECT COUNTS	ACO's COUNT
20/08 /2019 <u>AM</u>	22 ACO`S PUT DOWN			
2/09/2019 AM	18	Cloudy, dry and still 5mph S/W	0	0
10/09/2019 PM	15	Overcast, Cloudy, 10 mph S/W	0	0
13/09/2019 PM	17	Bright, Clear, light breeze 5mph S/W	0	0
20/09/2019 AM	15	Overcast, dry, 8mph S/W	0	0
27/09/2019 PM	15	Cloudy, sunny and stiff breeze 15mph S/W	0	0

**Table 2-** Survey Results 2019

No reptiles were seen or recorded during the surveys. Field voles were frequently found beneath the tin sheets during the surveys. The survey areas covering the proposed working areas contain a good mosaic of short and long grassland, dwarf shrub, trees, ditches and some brash. These habitats will be impacted either by direct loss or disturbance during clearance and landscaping works and so works will need to be undertaken in accordance with the mitigation section of this report (Section 6.0).

#### 6.0 Evaluation and Recommendations

##### 6.1 Reasonable Avoidance Measures-

The survey results indicate that there is not a reptile population present within the proposed working areas but due to the habitats present and the inaccessibility of some sections of the wider site such as the margins along hedges and ditches, there remains a possibility of reptiles using these adjacent habitats.

The time of year during which clearance and landscaping work is undertaken is relevant in terms of the measures that are most appropriate to protect reptiles on site. Reptiles are active during the warmer months and hibernate in winter, often in rubble, brash and timber piles where sheltered crevices exist as well as the root systems of trees and hedges.

They should not be disturbed from their place of shelter during the winter, as in their hibernating state any movement of their hibernacula will cause great disturbance. This seasonal aspect of their behaviour is taken into account in the Reasonable Avoidance Measures outlined below.

The proposed layout plan indicates that the boundary habitats and adjacent habitats will not be impacted by the proposed clearance and construction works. The location of the access and dwellings is less likely to fragment or prevent dispersal of reptiles to other adjacent areas of suitable habitat. It is likely that reptiles can be displaced from the proposed working areas by changing the vegetation structure.

#### *6.2 Creation and Management of Spoil Piles-*

The management of the existing and future creation of piles of spoil and brash as a result of any ground clearance, earthworks and/or arboricultural works should be carefully considered in areas of good quality reptile habitat;

- Piles of brash and timber represent ideal hibernacula for reptiles which generally begin hibernation between the final week of October and early November, depending on local weather conditions and temperatures. These reptile habitats should not be disturbed during the winter months when reptiles are hibernating and therefore vulnerable;
- Clearance of any potential refuges within the working areas should ideally be undertaken during the summer months on a warm (above 13°C), dry day with little wind. Widespread reptiles would be active at this time and so could escape harm's way were they present;
- Any existing brash, logs or spoil piles or which is created during the course of clearance should be removed from the site or moved away from the working areas in the event that they are to remain on site for any length of time. These measures will ensure that no hibernating animals are killed or injured during the winter period (November to March) when they are too sluggish to escape machinery.

#### *6.3 Execution of Earthworks:*

The vegetation clearance and associated earthworks and movement of machinery should be undertaken in a manner which minimises possible risks to reptiles;

- The areas of rough grassland, brambles and tall ruderal vegetation within the working areas should be mown short during the summer/spring months when reptiles are more active and able to escape from machinery. Cutting should commence from the south side moving north and west towards the ponds, ditches and rough scrub areas along the margins. All grassland/scrub/ habitat should initially be cut to no less than 100mm and then left for 48 hours before cutting to ground level or exposing top soil. The vegetation should then be maintained at a short height in order to discourage reptiles for the duration of the construction period;
- For the duration of any earthworks, any trenches or excavations which are left open overnight should have a ramp placed in them so that any wildlife that falls in can climb out safely and be visually inspected for reptiles before being in-filled, if dug during the active period (generally accepted as being end of March until the end of October). Any reptiles should be allowed to escape before work starts in order to prevent them becoming trapped;

- Piles of rubble /hardcore/timber represent ideal refugia for reptiles. These must not be stored for lengthy periods on site, or should be secured using barrier fencing to prevent reptiles using them as refugia. Commencing earthworks during the inactive period (November to March) lessens the chance of amphibians and reptiles seeking shelter in excavations and earthworks;
- Loose aggregate, piles of spoil and spaces between stacked materials represent ideal hiding places for reptiles and may be used as such if they are stored on site during the months when active. Potential harm to reptiles can be avoided if any material piles stored on site during the winter months are ring fenced to prevent reptile hibernation in these areas. During the summer the movement of material piles is generally not a problem as reptiles are not hibernating and able to move out of these areas;
- Any clearance of potential bird nesting habitats should ideally be undertaken outside of the bird breeding season (generally March – August inclusive).

#### *6.4 Construction:*

The following measures will be implemented prior to and during landscaping and associated works:

- A pre-works inspection will take place and an ecologist will maintain a watching brief during vegetation clearance works in the event that reptiles or other protected species are found within the areas of works;
- A code of construction practice will be implemented to prevent adverse effects on herpetofauna, including the clearance of brash and wood piles by hand and minimising disturbance to any marginal habitats bordering the site which may be valuable for reptiles and other priority species;
- All construction personnel will be briefed by the appointed ecological clerk of works ECoW (Toolbox Talk) as to the reptile species which may be present, the significance of their presence, the statutory protection they are afforded, where they are likely to be encountered, identification features, and what to do if any are found during works;

#### *6.5 Habitat Creation, Restoration or Enhancement*

- Prior to the clearance of any potential reptile and refuge sites, two new habitat/hibernaculum piles and banks will be created within the site away from the proposed working areas, such as around the proposed pond or along the ditch/hedge margins. These can be created at any time of year and would provide potential refuge in which any animals found during clearance works can be placed;
- These habitat piles should be created following the guidelines provided in **Annex 1** and should be built in locations where the habitat/hibernaculum piles could remain unharmed throughout the proposed works and in to the future (See Fig.1). The shape of these habitat piles is not important but should cover an area of approximately 4m<sup>2</sup>.

In addition to the measures set out above, landscape and ecological mitigation proposals will be implemented to promote the occurrence of reptiles. Specific measures will include:

- Occasional piles of dead tree trunks, branches and grass cuttings will be created to provide hibernaculum and refuge areas.
- Any underutilized grassland areas within the site could also be removed from the cutting regime and less intensively managed to promote the occurrence of acid semi-improved grassland. These grassland areas will be mown annually between August-September and cutting piles created.

### **Habitat/Hibernaculum Pile Construction**

The following guidelines are taken from the Great Crested Newt Conservation Handbook (Langton, T.E.S *et al.*, 2001) but were considered to be equally successful at providing potential refuge habitat for widespread reptiles:

- habitat piles/hibernaculum should be located on the marginal habitats away from the proposed clearance and landscaping works;
- for the first two habitat/hibernaculum piles, dig a hole approximately 50cm deep covering an area of approximately 4m<sup>2</sup>, preferably with one longer side facing south;
- for the habitat/hibernaculum bank, dig a trench approximately 50cm deep, 2m wide and approximately 10m in length so that it covers an area of approximately 20m<sup>2</sup>;
- create a layer of stone, rubble and wood on the floor of the dug hole;
- continue to add to the pile using soil from site excavation to spread over and between stones, rubble and wood;
- stone, rock, clean brick rubble (without cement residues) and old or misfired bricks can be used with split logs or fallen wood;
- cover the edges of the bricks with paving slabs or large pieces of concrete to create gaps that allow reptiles into the mound. Cover these in a thin layer of soil and brash, taking care not to block off any gaps.

### **6.6 Licensing and Mitigation**

Based on the survey results which indicates absence of reptiles from both the application site and adjacent land (previous surveys) a mitigation license is unlikely to be required for translocation of any reptiles encountered although the proposed methodology for vegetation clearance and altering habitat structure would likely be sufficient to displace reptiles from the proposed working areas.

## 7.0 References

- **Bennett, D.** (1999). Reptiles and Amphibians. Expedition Field Techniques.
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- **Herpetofauna Groups of Britain and Ireland.** Evaluating Local Mitigation/Translocation Programmes: Maintaining best practice and lawful standards.
- **Langton, T.** (1989). Snakes and lizards. Whittet Books. London.
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- **Arnold, H.R** (1995) *Atlas of amphibian and reptiles in Britain*. HMSO. London.
- **Gent, A.H and Gibson, S.D** eds (2003) *Herpetofauna Workers Manual*. Joint Nature Conservation Committee, Peterborough.
- **HM Government** (1994 et seq) *Biodiversity: The UK Action Plan*. JNCC, Peterborough.
- **Froglife.** (1999) Reptile Survey: An Introduction to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation, Froglife Advice Sheet 10. Froglife, Halesworth.

## ANNEX 1

### Reptile survey protocols

<b>Purpose</b>	<b>Methods</b>	<b>Materials</b>	<b>No. Surveys required</b>	<b>Timings</b>	<b>Analysis methods</b>
Presence/Absence	Visual surveys by transect, searches of natural refugia and artificial cover objects. All methods required, if some are not possible additional surveys required. In practice there may be variation according to species and time of year.	For artificial cover objects a mixture of corrugated tin and roofing felt maximises the chances of detection in variable weather conditions, although tin is often better for snakes. A minimum of 30 artificial cover objects should be used.	For NARRS type surveys 3-5, depending on which species are anticipated. For mitigation surveys on more marginal land for reptiles 7 surveys (11 if sand lizards are possible) required due to lower detection rates.	Main effort in April – May, surveys carried out at other, sub-optimal, times of year require additional effort. September is also a good time in most years. March may be useful for hibernation sites.	At the landscape level occupancy analysis can be carried out for areas with multiple sites using programs such as PRESENCE.
Counts and Densities	Visual surveys by transect, searches of natural refugia and artificial cover objects. All methods required, if some are not possible additional surveys required.	For artificial cover objects a mixture of corrugated tin and roofing felt maximises the chances of detection in variable weather conditions. However, be aware that in some situations snakes prefer tins to felts and larger counts are therefore likely when all refugia are metallic. Transects are also essential, sand lizards rarely use refugia,	6-10, spread over the periods when highest counts are likely	Highest counts are likely in April-May (adults) and September (adults plus young of the year). If comparing counts from these two periods young should be considered separately from adults.	Both counts and densities should be prepared, as either can be misleading in some circumstances. Neither is easy to defend statistically, but they may be useful when a rapid population assessment is required. For reptiles, a count is probably less misleading than a density estimate. Counts can be classified using the HGBI (1998) guidelines for reptiles.

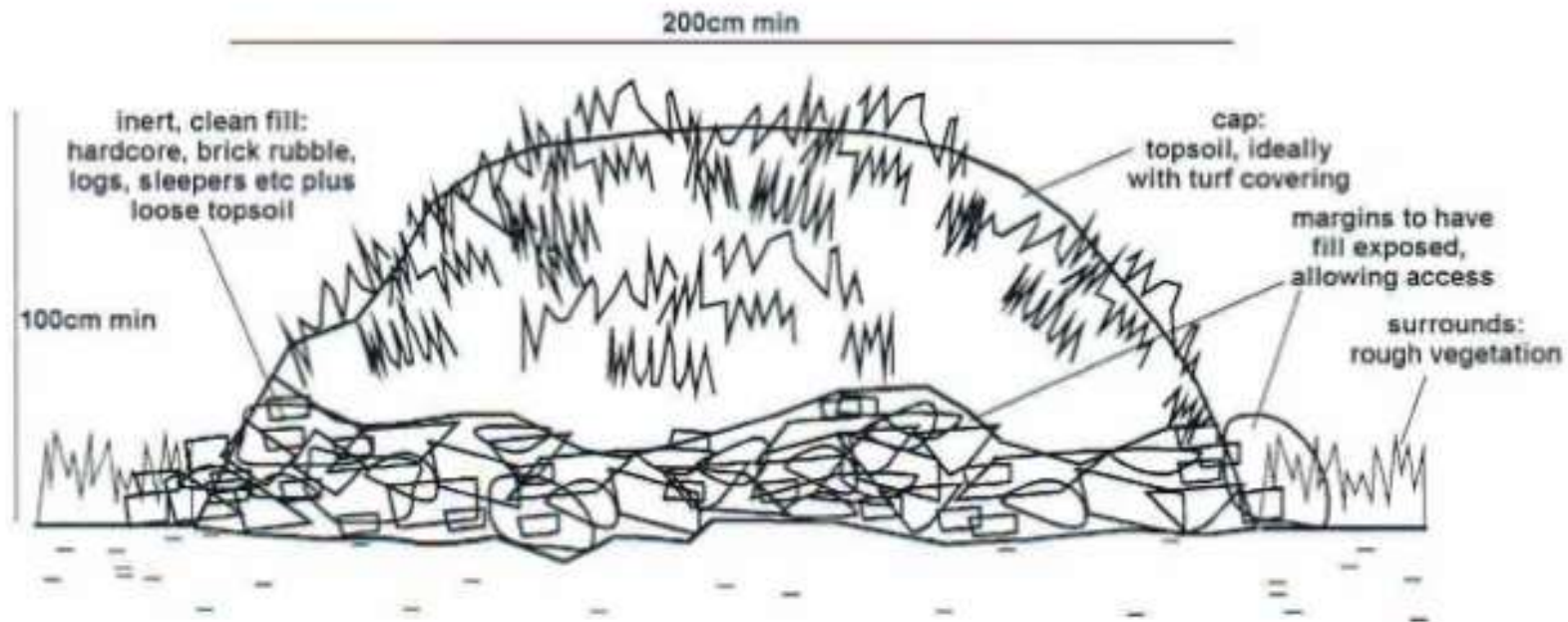


## Habitat/Hibernaculum Pile Construction

The following guidelines are taken from the Great Crested Newt Conservation Handbook (Langton, T.E.S *et al.*, 2001) but were considered to be equally successful at providing potential refuge habitat for widespread reptiles:

- habitat piles/hibernaculum should be located on the marginal habitats away from the proposed areas of ground works;
- for the first two habitat/hibernaculum piles, dig a hole approximately 50cm deep covering an area of approximately 4m<sup>2</sup>, preferably with one longer side facing south;
- for the habitat/hibernaculum bank, dig a trench approximately 50cm deep, 2m wide and approximately 10m in length so that it covers an area of approximately 20m<sup>2</sup>;
- create a layer of stone, rubble and wood on the floor of the dug hole;
- continue to add to the pile using soil from site excavation to spread over and between stones, rubble and wood;
- stone, rock, clean brick rubble (without cement residues) and old or misfired bricks can be used with split logs or fallen wood;
- cover the edges of the bricks with paving slabs or large pieces of concrete to create gaps that allow reptiles into the mound. Cover these in a thin layer of soil and brash, taking care not to block off any gaps.

This design mimics artificial and natural conditions in which great crested newts have frequently been found overwintering. Dimensions should not be below 2m length x 1m width x 1m height. The illustrated design would be suitable for locating on an impermeable substrate. On free-draining substrates, the design is largely similar but the bulk of the fill is sited in an excavated depression in the ground. Hibernacula should ideally be positioned across a site, both close to and distant from breeding ponds, always in suitable terrestrial habitat and above the flood-line.



Source: English Nature (2001) *Great Crested Newt Mitigation Guidelines*, Peterborough.

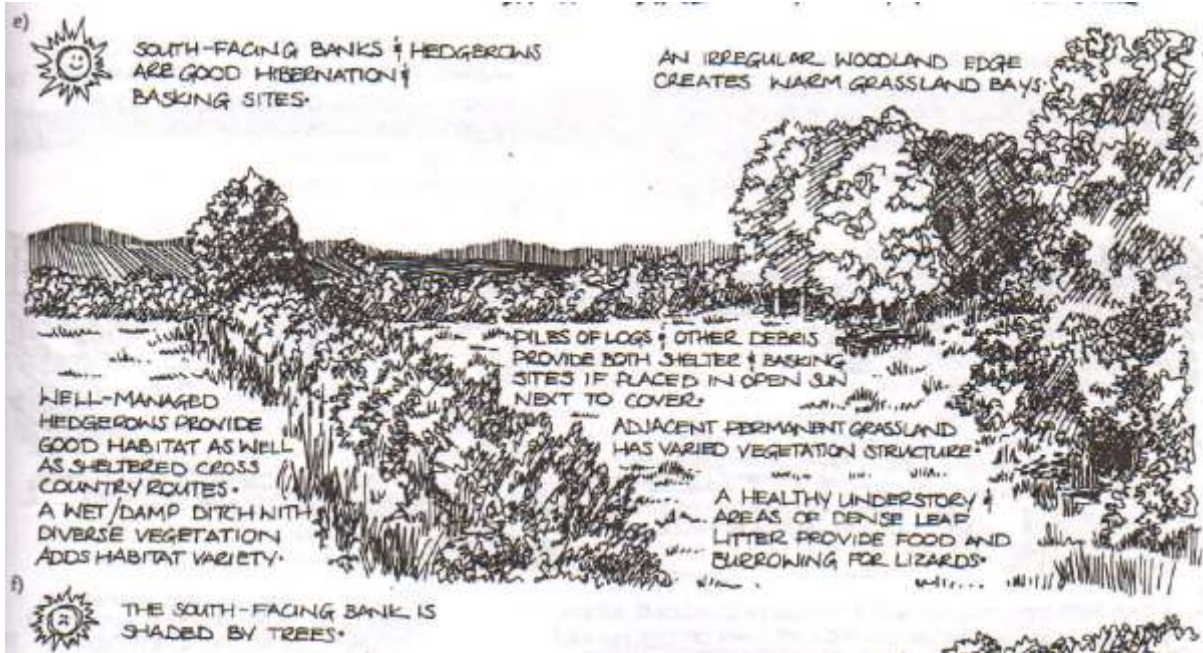


Illustration of positive landscape and habitat features for reptiles and amphibians