

WILD FRONTIER ECOLOGY

Proposed Residential Development at
land south-west of Bourne, Lincolnshire



Preliminary Ecological Appraisal Report

August 2023



Report produced by		Report submitted to
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The data which we have prepared and provided is accurate, and has been prepared and provided in accordance with the CIEEM's Code of Professional Conduct. We confirm that any opinions expressed are our best and professional bona fide opinions.



This report conforms to the British Standard 42020:2013 Biodiversity - Code of practice for planning and development.



Contents

1. Non-Technical Summary.....	3
2. Background and Objectives.....	4
3. Relevant Legislation and Policy	6
4. Preliminary Ecological Appraisal Methods	12
5. Results	14
6. Preliminary Ecological Appraisal	27
7. Mitigation.....	33
8. Ecological Enhancements	37
9. Summary of Key Ecological Advice	40
10. Conclusions	41
Appendix 1: Site Photographs.....	42



1. Non-Technical Summary

Wild Frontier Ecology Ltd. was commissioned to complete a Preliminary Ecological Appraisal Report of a proposed residential development site on land south-west of Bourne in Lincolnshire. Development plans for the site are not yet finalised. This PEAR is to be used to inform the scope of the ecological impact assessment and to guide the ongoing design of the development.

This PEAR is based on a desk study and an Extended Habitat survey of the site, both of which were completed in July/August 2023.

The desk study returned multiple biological records of species of conservation concern within the surrounding area. It also identified one statutory and three non-statutory designated nature conservation sites within 2km of the site. One of the non-statutory sites directly borders the proposed development site, and the others are located between 250-450m away. All these sites are well connected to the proposed development site by public footpaths.

The habitat survey found the proposed development site comprises a series of arable fields and modified grassland fields (used for silage). Fields are enclosed by hedgerows, ditches and fences. Some hedgerows are rich in native species, and most qualify as Priority Habitat. There are occasional trees along hedgerows, including some mature specimens, particularly in the north of the site. There is a disused railway line in the west of the site, which is classified as an area of semi-natural broadleaved woodland.

The impacts of development upon habitats cannot be assessed until development plans are available. However, retention of the disused railway line, along with hedgerows trees and ditches, wherever possible, will limit adverse impacts to valued habitats. The disused railway line has scope for enhancement and to become a principal green feature on the developed site.

The site will support some protected species. Nesting birds are certain to be present and an active badger sett was identified on the site boundary. It is possible that great crested newts are present in ponds on and bordering the site, and reptiles could occur alongside the disused railway line. It is also possible that roosting bats are present in some of the trees on the site, and foraging/commuting bats are certain to overfly the site. Further surveys for these protected species will be required to inform a full ecological impact assessment. However, at this early stage it is anticipated that impacts to protected species could be mitigated to acceptable levels assuming adequate mitigation efforts are made during site clearance and construction.

The site is also likely to support some Priority Species such as brown hare, hedgehog and common toad. Standard best-practice mitigation will likely be appropriate at reducing the risks of most impacts to these species, although key to this will be retention of key habitats as advised above.

The developed site would likely have capacity for a number of ecological enhancements. These would likely include creating new habitats, enhancing retained habitats, design of integrated green infrastructure across the site (to retain and enhance connectivity for wildlife), and installation of bird nest boxes and bat roost boxes within new buildings.

The precise details of the ecological mitigation and enhancement packages will need to be refined once development proposals for the site are finalised and all necessary ecological surveys have been completed.



2. Background and Objectives

2.1 Background

Wild Frontier Ecology Ltd. (WFE) was commissioned by BDW Cambridgeshire to conduct a preliminary ecological appraisal of a proposed residential development site located to the south-west of the town of Bourne in Lincolnshire, approximately centred on National Grid Reference TF 083 019. The site occupies an area of approximately 63 hectares (ha). It is bordered by the A151 road to its east and partly by the A6121 road to its north-west.

Development plans for the site have not yet been produced but it is expected that the majority of the site will accommodate residential development comprising houses, gardens, vehicular access and parking, along with some amenities such as open green spaces and recreational facilities. As there are no detailed plans available, a full ecological impact assessment is not yet possible; therefore this report comprises a Preliminary Ecological Appraisal Report (PEAR).

The site location and redline boundary are shown in Figure 1, below.

2.2 Report Objectives

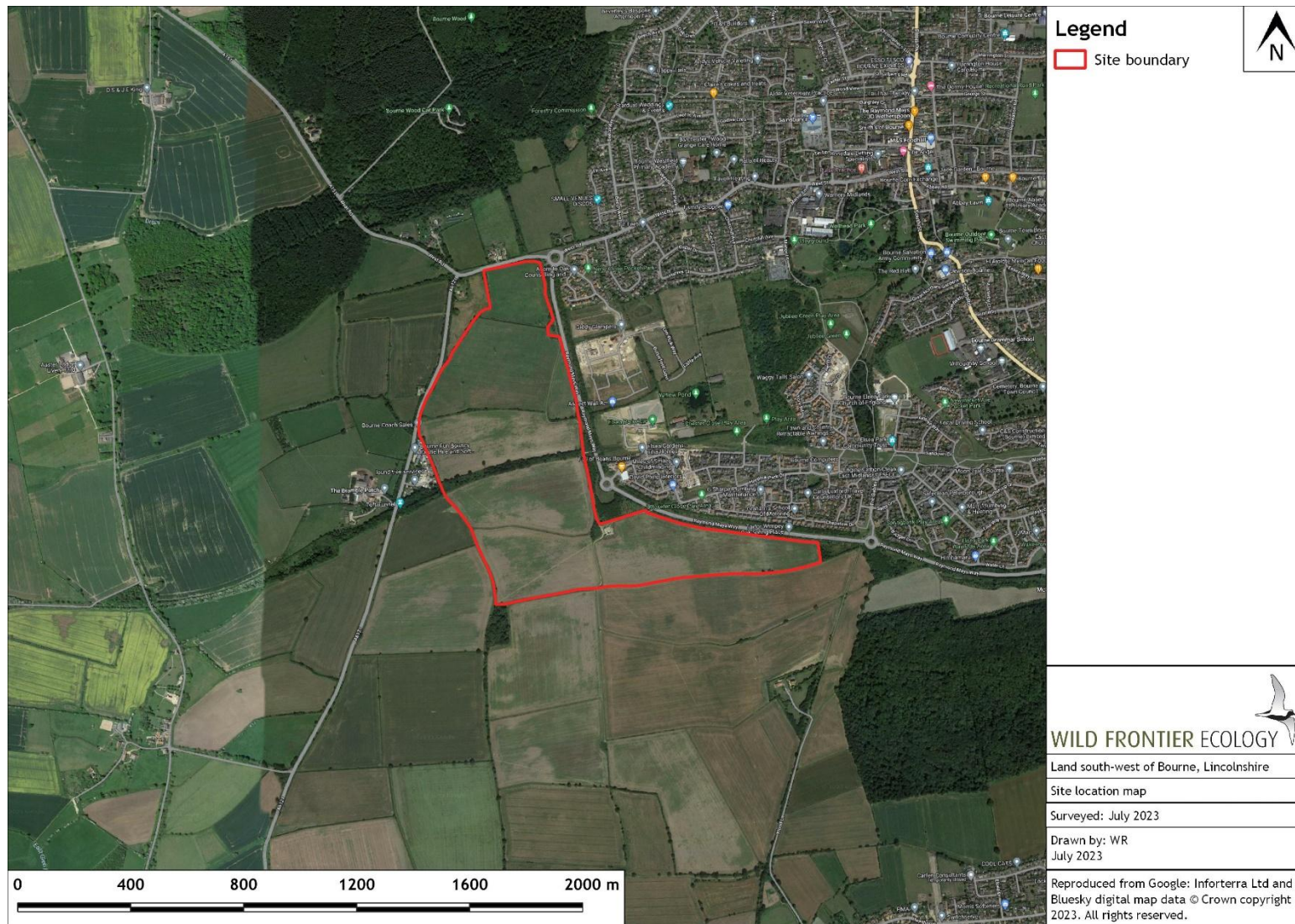
The purpose of this report is to outline the habitats, protected and valued species potential, any designated nature conservation sites, and any other ecological issues within the potential zone of influence of the proposed development. This has informed a preliminary ecological appraisal of the proposed development site. This PEAR is to be used to inform of the scope of the forthcoming ecological impact assessment (which would accompany a full planning application) as well as to inform the ongoing design of the development plans. **As the development plans are not finalised and further ecological surveys will be necessary, a full ecological impact assessment can only be provided once the plans are finalised and further surveys have been completed.**

This report includes preliminary advice on appropriate avoidance, mitigation and compensation measures, plus ecological enhancements, with the overall aim of achieving net gain as specified within the National Planning Policy Framework (NPPF). However, as this report is a PEAR and not a full impact assessment, the advice on mitigation and enhancement will need to be refined once all necessary ecological surveys have been completed and once the development plans are available.

2.3 Basis for Appraisal

This report is based on the redline boundary plan (i.e. Figure 1), which was provided by BDW Cambridgeshire in June 2023.

Figure 1: Site Location





3. Relevant Legislation and Policy

3.1 Statutory and Non-statutory Site Designations

3.1.1 Statutory Site Designations

The European Council Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC) as amended directs the designation of important wildlife sites through the European Community as Special Areas of Conservation (SACs), and gives statutory protection to habitats and species listed in the Directive as being threatened or of community interest. Sites identified as candidate SAC (cSAC) are provided with the same level of protection as SAC.

Annex I of 92/43/EEC as amended lists habitat types which are regarded as being of European importance. Included within these are a number of 'priority habitat types' which are habitats regarded as being in danger of disappearance and whose natural range falls broadly within the European Union. This European law had been transposed into UK legislation by The Conservation (Natural Habitats) &c Regulations 1994, now replaced by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

Habitats of European-wide importance for birds are listed under the EC Wild Birds Directive (79/409/EEC) as amended. Habitats designated under this Directive are notified as Special Protection Areas (SPAs) and are identified for holding populations > 1% of the reference population as defined in Appendix 4 of the SPA review of bird species listed in Annex 1 of the same Council Directive. Sites identified as potential SPA (pSPA) are provided with the same level of protection as SPA. This has also been transposed into UK legislation by the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019.

SACs and SPAs, post Brexit, are referred to as "National Site Network Sites" and retain the same level of protection as when the UK was an EU member state.

Wetlands of International Importance are designated under the Ramsar Convention. The collective term for the National Site Network Sites and Ramsar sites is "Habitats Sites".

National ecological designations, such as Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) 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 condition and rarity of the site and of the species or habitats supported by it.

3.1.2 Non-Statutory County Site Designations

Local authorities may designate certain areas as being of local conservation interest. The criteria for inclusion may vary between areas. Most individual counties have a similar scheme; within Lincolnshire such sites are designated as Local Wildlife Sites (LWS). Designation of such sites does not itself confer statutory protection, but they are a material consideration when planning applications are being determined.



3.2 Species Designation and Protection

3.2.1 Bats

All bat species are listed under Schedule 2 of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. Bats and their roosts also receive protection from disturbance from by the Wildlife and Countryside Act 1981 (as amended). 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.

3.2.2 Badgers

The Protection of Badgers Act 1992 makes it unlawful to knowingly kill, capture, disturb or injure an individual badger *Meles meles*, or to intentionally damage, destroy or obstruct an area used for breeding, resting or sheltering by badgers (i.e. a sett).

3.2.3 Riparian Mammals

The water vole *Arvicola amphibius* is protected in accordance with Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). It is an offence to intentionally damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection, or to disturb water voles whilst they are using such a place. It is also an offence to kill, injure, capture or possess water voles.

The otter *Lutra lutra* is protected in accordance with Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and under Schedule 2 of the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. It is an offence to intentionally kill, injure or take an otter from the wild, or to intentionally or recklessly damage, destroy or obstruct access to any habitat used by otters or to disturb the otters which make use of those habitats.

3.2.4 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 (as amended), which prohibits intentionally or recklessly disturbing the species at, on or near an 'active' nest.

The British Trust for Ornithology (BTO) lists Birds of Conservation Concern (BoCC), which fall into three categories: Red-listed - species of high concern; Amber-listed - species of medium concern; and Green-listed - species of lower concern¹. Species are placed on these lists based, among other criteria, on the percentage decline of breeding or wintering populations in recent years. These lists do not indicate rarity for the species concerned, and many listed species are currently common and widespread.

¹ Stanbury, A.J., Eaton, M.A., Aebischer, N.J., Balmer, D., Brown, A.F., Douse, A., Lindley, P., McCulloch, N., Noble, D.G. & Win, I. (2021). Birds of Conservation Concern 5: the status of our bird populations: the fifth birds of conservation concern in the United Kingdom, Channel Islands and Isle of Man and second IUCN Red List assessment of extinction risk for Great Britain, available online at https://britishbirds.co.uk/sites/default/files/BB_Dec21-BoCC5-IUCN2.pdf



3.2.5 Reptiles

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

3.2.6 Great Crested Newts

The great crested newt *Triturus cristatus* is listed under Schedule 2 of the Conservation of Habitats and Species (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.

3.2.7 White Clawed Crayfish

The white clawed crayfish *Austropotamobius pallipes* is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) but only receive protection under Sections 9(1) and 9(5). This makes it an offence to take or sell white-clawed crayfish. Section 9 applies to all stages in their life cycle.

3.2.8 Plants

Schedule 8 of the Wildlife and Countryside Act 1981 (as amended) lists plant species which are afforded special protection. It is an offence to pick, uproot or destroy any species listed on Schedule 8 without prior authorisation, and all plants are protected from unauthorised uprooting (i.e. without the landowner's permission) under Schedule 13 of the Wildlife and Countryside Act 1981 (as amended).

A Vascular Plant Red List for England² provides a measure of the current state of England's flora measured against standardised IUCN criteria. Any taxon that is threatened - Critically Endangered (CR), Endangered (EN), Vulnerable (VU) - or Near Threatened (NT) does not have statutory protection but should be regarded as a priority for conservation in England. It should be noted that 'threat' is not synonymous with 'rarity'; some of the species concerned remain relatively common and widespread.

It is an offence to plant or cause to spread in the wild of certain plant species under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Plant species relevant to the East of England are as follows:

Himalayan balsam *Impatiens glandulifera*
 Variegated yellow archangel *Lamium galeobdolon* ssp *argenteum*
 Virginia creeper *Parthenocissus quinquefolia*
 False acacia *Robinia pseudoacacia*
 Water fern *Azolla filiculoides*
 Giant hogweed *Heracleum mantegazzianum*

² Stroh, P.A., Leach, S.J., August, T.A., Walker, K.J., Pearman, D.A., Rumsey, F.J., Harrower, C.A., Fay, M.F., Martin, J.P., Pankhurst, T., Preston, C.D. and Taylor, I. (2014). *A Vascular Plant Red List for England*. Botanical Society of Britain and Ireland, Bristol.



Knotweed species including Japanese knotweed *Fallopia japonica*
Parrot's feather *Myriophyllum aquaticum*
Floating pennywort *Hydrocotyle ranunculoides*
Rhododendron *Rhododendron ponticum*
Giant rhubarb *Gunnera tinctoria*
New Zealand pigmyweed *Crassula helmsii*
Waterweeds *Elodea* spp.

All waste containing Japanese knotweed comes under the control of Part II of the Environmental Protection Act 1990 and is classified as controlled waste.

3.3 Biodiversity Net Gain

The principle of net gain has been enshrined in law within the Environment Act 2021. There will be a two year transitional period before net gain becomes mandatory; this is expected to mean implementation in winter 2023. The Act sets the minimum net gain at 10%, and makes provision for offsetting both on and off site. Sites where activity occurs, without planning permission, which lowers the biodiversity value of a site between 30th January 2020 and the implementation date will be expected to rely on the site's value prior to that activity. This is to avoid destruction of biodiverse sites in anticipation of the implementation of net gain. Calculations of net gain rely on a metric; there is a simplified metric for smaller sites.

3.4 Priority Species and Habitats

Other priority species and habitats are a consideration under the National Planning Policy Framework (NPPF) 2019, 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 (commonly known as Priority Habitats/ Species) 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 Priority Species or Habitats is not statutory, but "specific consideration"³ 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.

Widespread Priority Habitats of relevant to this part of Lincolnshire include:

Arable field margins
Traditional orchards
Hedgerows
Eutrophic standing waters

³ JNCC (2015). UK BAP priority species and habitats

<http://www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx>



Ponds
Rivers
Lowland calcareous grassland
Lowland dry acid grassland
Lowland meadows
Lowland fen
Coastal and floodplain grazing marsh
Reedbeds
Lowland mixed deciduous woodland
Wet woodland
Wood-pasture and parkland

Widespread Priority Species in East Anglia (which have no specific legal protection) include:

Common toad *Bufo bufo*
Hedgehog *Erinaceus europaeus*
Brown hare *Lepus europaeus*
Harvest mouse *Micromys minutus*
Small heath butterfly *Coenonympha pamphilus*
Wall butterfly *Lasiommata megera*
Cinnabar moth *Tyria jacobaeae*
Polecat *Mustela putorius*

Many red-listed bird species are also Priority Species.

3.5 National Policy

The overarching policy guidance for biodiversity is included within the NPPF. Section 15 of this document (Conserving and Enhancing the Natural Environment) outlines the approach that Local Authorities should adopt when considering ecological issues within the planning framework, including the principles of the Mitigation Hierarchy. This espouses that in addressing impacts on valued features, avoidance should be the first option considered, followed by mitigation (minimising negative impacts). Where avoidance and mitigation are not possible, compensation for loss of features can be used as a last resort. Paragraph 180(d) of the NPPF requires opportunities to incorporate biodiversity improvements in and around development as part of the design, especially where this can secure measurable **net gains** for biodiversity or enhance public access to nature where this is appropriate. Paragraph 179 specifies that plans should identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including locally designated sites (such as CWS). It also promotes the conservation, restoration and enhancement of priority habitats and ecological networks and the protection and recovery of priority species.

3.6 Local Policy

The Lincolnshire Biodiversity Partnership (LBP) has published Habitat and Species Action Plans for selected species occurring within the county. Each Action Plan lists current actions and defines objectives and targets.

The local authority (South Kesteven District Council) has adopted a Community Infrastructure Levy (CIL) policy which includes provision for the natural environment. *“In certain circumstances the Council may seek contributions towards the conservation of the natural environment and natural habitats. These may involve costs of mitigation for damage done or enhancement, including management of schemes which are outside*



the application site.” The council will assess whether the CIL (as it relates to the natural environment) needs to apply on an individual, case-by-case basis.



4. Preliminary Ecological Appraisal Methods

4.1 Desk Study

The Multi-Agency Geographic Information for the Countryside (MAGIC) website⁴, which is managed by Natural England, was reviewed for information on any statutory designated nature conservation sites within the 2 kilometre (km) area surrounding the site. Information on any identified sites was obtained from the Joint Nature Conservation Committee's website⁵. The MAGIC website was also used to identify any on-site or nearby Priority Habitats, any granted European Protected Species Mitigation Licences and any licensed records of great crested newts within the surrounding 2km area.

A data search was completed with the Lincolnshire Environmental Records Centre (LERC) in July/August 2023. The data requested from LERC comprised information on any non-statutory designated nature conservation sites and any biological records of species of conservation concern within 2km of the proposed development site.

In addition, in July 2023, the proposed development site and nearby surrounding area were reviewed using Ordnance Survey (OS) maps and publicly available aerial photographs (such as Google Earth™) with the aim of identifying potential ecological issues or sensitive habitats, such as nearby ponds or connected hedgerows. These sources, along with National Character Area profiles⁶ were also used to obtain information on the historical context of the site.

4.2 Extended Habitat Survey

An Extended Habitat survey of the site was undertaken on 18th July 2023 by WFE Senior Ecologist William Riddett BA ACIEEM. The survey was completed in accordance with UK Habitat classification methodology ('UKHab')⁷, with the methods being extended to include a general evaluation of potential habitats for any protected or valued species. Photographs were taken to record key features/views.

Hedgerows on the site were assessed for native species-richness per the Hedgerow Regulations (1997)⁸, and to determine whether they qualify as a Priority Habitat per the above UKHab criteria.

The criteria for species-richness per the Hedgerow Regulations are:

"Species-rich hedgerows may be taken as those which contain 5 or more native woody species on average in a 30 metre length, or 4 or more in northern England, upland Wales and Scotland. Hedges which contain fewer woody species but a rich basal flora of herbaceous plants should also be included but practical criteria for identifying them have yet to be agreed. Many of the thin straight hawthorn hedges which characterise later parliamentary enclosures, as well as most hedges which consist mainly of beech,

⁴ <https://magic.defra.gov.uk/magicmap.aspx>

⁵ <https://jncc.gov.uk/>

⁶ <https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making/national-character-area-profiles#ncas-in-the-east-of-england>

⁷ UKHab Ltd. (2023). *UK Habitat Classification 2.0* (at www.ukhab.org).

⁸ The Hedgerow Regulations 1997. Available at: <https://www.legislation.gov.uk/ukxi/1997/1160/contents/made>



privet or yew or non-native trees, are excluded. Recently planted species-rich hedges are included”.⁹

The criteria by which hedgerows qualify as a Priority Habitat are as follows:

“A hedgerow is defined as any boundary line of trees or shrubs over 20m long and less than 5m wide, and where any gaps between the trees or shrub species are less than 20m wide... Any bank, wall, ditch or tree within 2m of the centre of the hedgerow is considered to be part of the hedgerow habitat, as is the herbaceous vegetation within 2m of the centre of the hedgerow. All hedgerows consisting predominantly (i.e. 80% or more cover) of at least one woody UK native species are covered by this priority habitat, where each UK country can define the list of woody species native to their respective country. Climbers such as honeysuckle and bramble are recognised as integral to many hedgerows, however they require other woody plants to be present to form a distinct woody boundary feature, as such they are not included in the definition of woody species. The definition is limited to boundary lines of trees or shrubs, and excludes banks or walls without woody shrubs on top of them.

“...[I]t is estimated that 84% of countryside hedgerows in GB would be included.”¹⁰

4.2.1 Bat Tree Roost Appraisal

During the Extended UKHab survey, trees on and directly bordering the site were appraised from ground level for their bat roost potential, according to guidance from the Bat Conservation Trust (BCT)¹¹.

4.2.2 Great Crested Newt Habitat Suitability Index

A review of OS maps showed one waterbody within the site and a further five waterbodies within the surrounding 250 metres (m) (Figure 3, below). All accessible waterbodies were appraised for suitability as great crested newt (GCN) breeding ponds using the Habitat Suitability Index (HSI) as per Oldham *et al.* (2000)¹² and the classification guide defined by the Amphibian and Reptile Groups of the United Kingdom (2010)¹³. This appraisal was completed on the same date as the habitat survey, by W. Riddett (Natural England class licence reference 2015-10175-CLS-CLS).

The HSI is an indicative tool used to rate the suitability of waterbodies for GCN. A total of ten characteristics and features of waterbodies, such as their size, water quality, shading and vegetation cover are assessed and classified according to prescribed criteria. These scores allow the HSI to categorise waterbodies into one of five ratings which indicate their suitability for occupation by GCN. The five categories are *excellent, good, average, below average and poor*.

⁹ Biodiversity: The UK Steering Group Report - Volume II: Action Plans (December 1995, Tranche 1, Vol 2, p243).

¹⁰ JNCC (November 2016). UK Biodiversity Action Plan Priority Habitat Descriptions. Available at: <https://jncc.gov.uk/our-work/uk-bap-priority-habitats/>

¹¹ Collins, J. (ed.) (2016). *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn.). Bat Conservation Trust, London.

¹² Oldham, R., Keeble, J., Swan, M. and Jeffcote M. (2000). Evaluating the suitability of Habitat for Great Crested Newt (*Triturus cristatus*). *Herpetological Journal* 10: 143-155.

¹³ ARG UK. (2010). ARG UK Advice Note 5, Great Crested Newt Habitat Suitability Index. Amphibian and Reptile Groups of the United Kingdom



5. Results

5.1 Desk Study

5.1.1 Local Landscape Description

The site is located to the south-west of the town of Bourne in southern Lincolnshire. The site is bordered by roads, residential development, arable farmland and areas of woodland.

The site is located entirely within National Character Area profile 75: Kesteven Uplands (although it closely borders profile 46: The Fens to the east). The area is described as follows:

“The Kesteven Uplands National Character Area (NCA) is a gently rolling, mixed farming landscape dissected by the rivers Witham and the East and West Glen. The area lies at the junction of Lincolnshire, Cambridgeshire, Northamptonshire, Leicestershire and Rutland. However, the majority falls within the historic Kesteven district of Lincolnshire which extends south to the impressive stone town of Stamford. This is a deeply rural landscape which has only a very small urban area.

This area is geologically varied with a wide range of soil types, from limestone through to heavy clays. The area’s well-drained calcareous loam soils support the cultivation of cereals, oilseeds and root crops. Wide road verges with herbs and wild flowers characterise the area, and individual hedgerow trees provide important woodland character. The origin of the word ‘Kesteven’ comes partly from the Celtic word ‘coed’ meaning woods, and much scattered woodland survives throughout the area with some important semi-natural and ancient woodlands.”

The MAGIC website shows one area of Priority Habitat within the site, which is part of the disused railway line in the west of the site, which is classified on the Priority Habitat Inventory as *Deciduous Woodland (England)*. The section of the disused railway line which borders to the site to the west is also classified as this same Priority Habitat type, as is Ogrey Spinney which borders the south-west corner of the proposed development site.

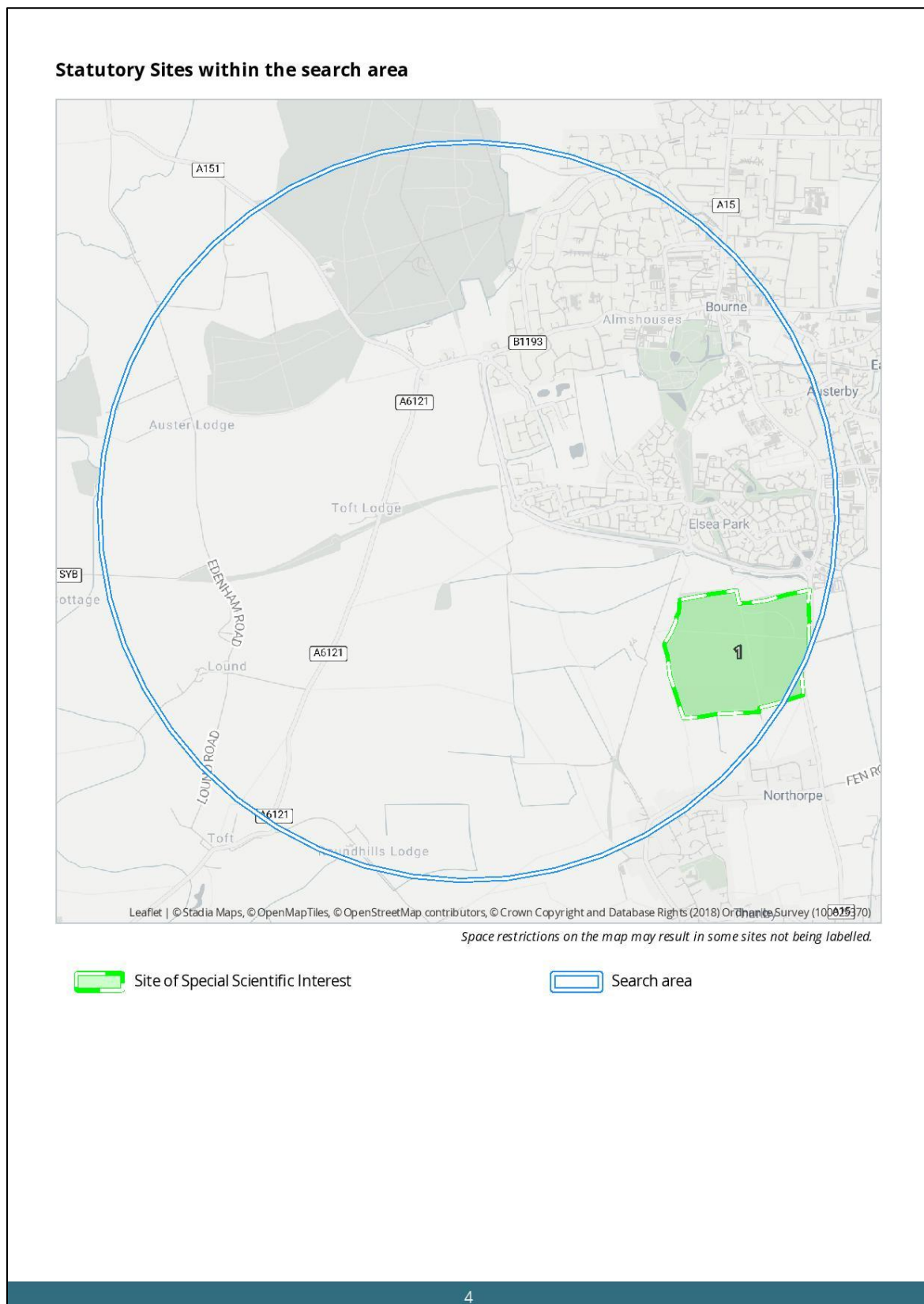
There are also some large areas of ancient woodland in the nearby surrounding area, specifically Math and Elsea Wood which is located approximately 250m to the south of the proposed development site, Bourne/Fox/Pillow Woods approximately 250m to the north, and Auster Wood approximately 450m to the north-west.

5.1.2 Statutory Designated Sites

The review of the MAGIC website revealed that there is one statutory designated nature conservation site within 2km of the proposed development site. Math and Elsea Wood SSSI is located approximately 250m south of the site at its closest point. This site is comprised of two adjoining ancient semi-natural woodlands. A review of OS maps show that this SSSI is publicly accessible, with footpaths running through and around the woodland. The location of the SSSI is shown in Figure 2, below. Figure 2 is the map provided by LERC, which shows a 2km buffer around the central point of the proposed development site, hence the SSSI appears to be closer to the 2km buffer and further from the site boundary than 250m.



Figure 2: Statutory Designated Sites Map (as provided by LERC)



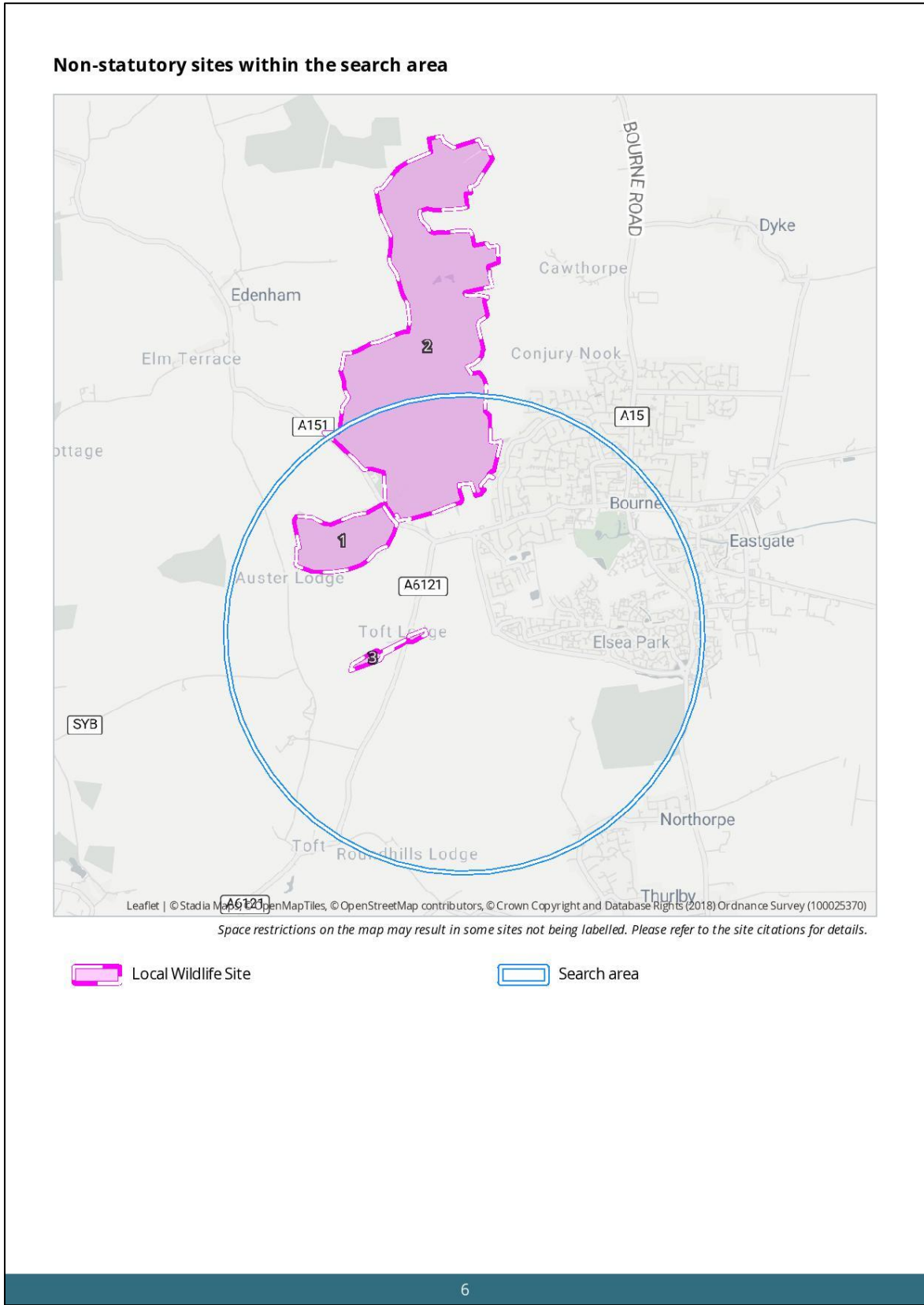


5.1.3 Non-Statutory Designated Sites

The data search with LERC revealed the following three CWSs within 2km of the proposed development site. The locations of these sites relative to the proposed development site is shown in Figure 3, below. As with Figure 2, Figure 3 shows the 2km buffer around a central point of the site.

- Toft Tunnel LWS (no.3 on Figure 3) is located directly adjacent to the proposed development site to its west. It occupies part of the same disused railway line as runs through the west of the site. The LWS covers the disused railway cutting either side of the tunnel openings and the area overhead of the tunnel. The habitats within the LWS include woodland, scrub, unimproved calcareous grassland, pond, marsh and drains. The site is also a Lincolnshire Wildlife Trust reserve.
- Auster Wood LWS (no.1 on Figure 3) is located approximately 450m north-west of the proposed development site at its closest point. This site is an ancient woodland with some boundary ditches.
- Bourne Wood LWS (no.2 on Figure 3) is located approximately 250m north of the proposed development site at its closest point. The site is an ancient woodland with some areas of scrub, bracken, grassland, ruderal vegetation, lakes and streams.

Figure 3: Non-Statutory Designated Sites Map (as provided by LERC)





5.1.4 Protected and Valued Species Records

The review of the MAGIC website shows no granted European Protected Species Mitigation Licence within 2km of the proposed development site, and no records of GCN from Natural England's database of licensed survey results within this range. The closest record of confirmed GCN presence is located approximately 5.4km from the site.

The data search with LERC also returned a number of biological records of note for the 2km area surrounding the site.

There are no records of GCN but there are records of three other amphibian species including common toad. There are three records of grass snake and two of slow worm.

Avian records of note (i.e. records of species of conservation concern which could potentially occur on or close to the site) include 68 records of barn owl, 51 records of bullfinch *Pyrrhula pyrrhula*, one record of Cetti's warbler *Cettia cetti*, 50 records of corn bunting *Emberiza calandra*, 41 records of cuckoo *Cuculus canorus*, 51 records of fieldfare *Turdus pilaris*, 14 records of grasshopper warbler *Locustella naevia*, 24 records of grey partridge *Perdix perdix*, 92 records of house sparrow *Passer domesticus*, 54 records of lapwing *Vanellus vanellus*, 47 records of linnet *Linaria cannabina*, 47 records of skylark *Alauda arvensis*, 96 records of song thrush *Turdus philomelos*, 13 records of spotted flycatcher *Muscicapa striata*, 124 records of starling *Sturnus vulgaris*, 89 records of swift *Apus apus*, 19 records of tree sparrow *Passer montanus*, 39 records of turtle dove *Streptopelia turtur* and 94 records of yellowhammer *Emberiza citrinella*.

Mammalian records include records of 11 records of brown hare, 44 records of badger, 62 records of hedgehog, one record of Brandt's bat *Myotis brandtii*, 39 records of brown long-eared bat *Plecotus auritus*, 24 records of common pipistrelle *Pipistrellus pipistrellus*, nine records of Daubenton's bat *Myotis daubentonii*, six records of Leisler's bat *Nyctalus leisleri*, 28 records of Natterer's bat *Myotis nattereri*, 24 records of noctule *Nyctalus noctula*, seven records of soprano pipistrelle *Pipistrellus pygmaeus*, 32 records of barbastelle bat *Barbastella barbastellus* and one records of whiskered bat *Myotis mystacinus*.

5.2 Extended Habitat Survey

The results of the habitat survey are mapped in Figure 4, below. Photographs of the site are provided in Appendix 1.

The survey found that the majority of the site comprises a series of arable fields in the south, west and centre of the site, and three smaller fields of modified grassland (thought to be used for silage) in the north. Fields are enclosed by ditches and hedgerows, with occasional trees also present along most field boundaries. There is also a disused railway line within a shallow cutting, which is now a wide linear belt of broadleaved woodland, located in the west of the site. Near the central/eastern part of the site is a small area of dense scrub adjacent to a large concrete pad used for storing farm produce and materials.

The three grassland fields in the north of the site (Photos 1-4) had been subject to a vegetation cut consistent with a silage harvest, fairly recently prior to the survey. The swards in these fields are dominated by palatable grass, namely perennial rye grass *Lolium perenne*, with smaller amounts of cocksfoot *Dactylis glomerata*, Yorkshire fog *Holcus lanatus*, prickly sow thistle *Sonchus asper*, creeping thistle *Cirsium arvense*,



common knapweed *Centaurea nigra*, meadow buttercup *Ranunculus acris* and broadleaved dock *Rumex obtusifolius* also present, particularly around the edges of the fields. These three fields are classified to the UKHab primary code of **g4: Modified grassland** with a secondary code of **110: Silage and hay**.

All other fields on the site are arable (Photos 5 & 16), although one field near the centre of the site (which is bisected by a footpath) was fallow at the time of the survey (Photos 11 & 12). All fields are classified to the UKHab category of **c1c: Cereal crops** or **c1d: Non-cereal crops** (depending on the cropping at the time of the survey, which likely varies as crops are rotated). The fallow field has an additional secondary code of **604: Whole field fallow**.

The arable fields have no clear field margins other than narrow verges 1-2m wide alongside some of the boundary hedgerows and ditches. In accordance with UKHab definitions (which define minimum mapping units for linear and area habitats), there are considered to be no field margin habitats on the site due to their narrow width.

The hedgerows on the site are mostly species-rich (with five or more native woody species), intact (with gaps amounting to less than 10% of their length) and with integral trees (Photos 1, 9 & 16). In general, hedgerows are comprised of hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, dog-rose *Rosa canina*, field maple *Acer campestre* and elm *Ulmus sp.*, with bramble *Rubus fruticosus* agg. also abundant. There are also smaller amounts of dogwood *Cornus sanguinea*, elder *Sambucus nigra*, goat willow *Salix caprea*, ivy *Hedera helix* and black bryony *Discoidea communis* in some of the hedges. Oak *Quercus robur* and ash *Fraxinus excelsior* are the most commonly occurring hedgerow trees, but there are occasional field maple and willow *Salix sp.* trees along some field boundaries. The hedgerows are classified to either **h2a5: Species rich native hedgerow** or **h2a6: Other native hedgerow** with secondary codes (where relevant) of **11: Hedgerow with trees** and **50: Ditch** where a ditch is an integral feature of the same boundary as the hedgerow (note that the UKHab guidelines specify that ditches should not be mapped separately where they align with a hedgerow). There is also one hedgerow on the western boundary of the site on top of a bank (Photo 22); this hedgerow has an additional secondary code of **111: Hedgebank** applied. Most of the hedgerows on the site qualify as Priority Habitats. The only hedgerows which are not clearly Priority Habitats are the hedgerow in the south-east of the site and the hedgerow bordering the A151 near the north-west of the site (south of Pond 3); both these hedgerows have gaps in excess of 20m between some of the trees and shrubs, which disqualifies them from being Priority Habitats.

Some field boundaries are comprised of shallow, seasonal ditches (Photo 10), and many of the boundary hedgerows have similar ditches running parallel to the hedge. All ditches were found to be dry at the time of the survey in July, but the presence of some marginal species such as great willowherb *Epilobium hirsutum*, teasel *Dipsacus fullonum* and bulrush *Typha latifolia* in and around some of the ditches indicate they are likely to hold water at wetter times of year. These ditches are classified to the UKHab categories of **r1g: Other standing water** with a secondary code of **50: Ditch**.

The disused railway line which runs through east-west through the western part of the site is a wide (30-40m across) linear belt of broadleaved woodland (Photos 5-8). The woodland is essentially level with the surrounding land at the eastern boundary of the site (close to the A151 road), but gradually grades into a cutting (as the land around it rises) towards the west of the site. This linear feature is very densely overgrown and was only partially accessible for survey. The canopy of this belt of woodland is comprised of ash, oak, field maple and goat willow, with an understorey of dense hawthorn, bramble, blackthorn, dog-rose, elder and small amounts of spindle *Euonymus*



europaeus and bittersweet nightshade *Solanum dulcamara*. The ground flora, where visible in the more open patches of the woodland belt is dominated by dense stands of stinging nettle *Urtica dioica*, hogweed *Heracleum sphondylium* and alexanders *Smyrnium olusatrum* with patches of greater burdock *Arctium lappa*, comfrey *Symphytum officinale*, teasel and lords-and-ladies *Arum maculatum*. One of the more open patches within the woodland (just to the west of the site boundary, within the deeper part of the cutting) appears to flood at certain times of year, judging by the boggy ground and absence of woody vegetation, although it was dry during the July survey. This disused railway line is classified to the primary UKHab code of **w1f: Lowland mixed deciduous woodland**, with secondary code of **31: Secondary woodland**. The area which appears to be seasonally wet is offsite so is not classified, although it is classed as a pond within the GCN HSI appraisal (see below).

The area of scrub and ruderal vegetation surrounding a small pond near the eastern/central part of the site (Photos 13 & 14) is seemingly an abandoned pocket of land adjacent to a large concrete pad used for storing farm materials (Photo 15). The scrub is dominated by oak, hawthorn and bramble, and this vegetation densely overshadows the pond, which was not accessible for survey. There is a tall bank (approximately 4-5m tall) along the south side of this area of scrub which is densely overgrown with stinging nettle, hedge bindweed *Calystegia sepium* and a brassica crop which has self-sown here. This small area is classified to the UKHab category of **h3h: Mixed scrub** with secondary codes of **16: Tall forbs** and **519: Abandoned**. The pond is too small to be mapped but would qualify as **r1g: Other standing water** with a secondary code of **41: Pond (non-priority habitat)**.

The concrete pad is classified as **u1b: Developed land; sealed surface**; no secondary codes are applicable. There is also a small strip of ruderal vegetation surrounding the concrete pad, which has been heavily disturbed by storage of materials, vehicular movements and likely runoff from stored materials on the concrete pad. The area is partially vegetated with common arable weeds and ruderal species such as stinging nettle, false oat grass *Arrhenatherum elatius*, ragwort *Senecio jacobaea* and broadleaved dock *Rumex obtusifolius*. It is classified as **g4: modified grassland** with a secondary code of **81: Ruderal and ephemeral**.

There is also a farm track running north-south through the centre of the site (Photos 3 & 13). This is approximately one vehicle width wide, with bare, gravelly ground tyre ruts, a central grassy strip with narrow grassy margins either side of the track. In accordance with UKHab classifications, the area is categorised to the primary classification of **u1c: Artificial unvegetated - unsealed surface** with a secondary classification of **839: Track**.

5.2.1 Bat Tree Roost Appraisal

The survey identified two oak trees which were classified as having Moderate bat roost potential (in accordance with BCT classification guidelines) located in the north of the site. Both these trees are located within farmed fields; they do not form part of a boundary feature. The northernmost tree has extensive canopy deadwood with multiple lateral cracks, crevices and rots holes (Photos 18 & 19). The tree nearer the disused railway line has a large hazard beam on its south-west side and exposed deadwood on the north side (Photos 20 & 21).

The survey also identified two oak trees with Low bat roost potential located along the western boundary of the site just north of the disused railway line (Photos 22 & 23). The only tree with notable bat roost potential to the south of the disused railway line is a crack willow *Salix fragillis* (which has Low bat roost potential) (Photo 24) located just



north of Ogrey Spinney in the south-west corner of the site. Ogrey Spinney itself also has some trees with at least Low bat roost potential, but this woodland is outside the site boundary. The locations of trees with Moderate or Low bat roost potential are mapped in Figure 4, below, and photographs are provided in Appendix 1.

Most trees on the site were classified as having Negligible bat roost potential.

5.2.2 Great Crested Newt Habitat Suitability Index

The results of the HSI appraisal of the suitability of ponds as breeding GCN habitat are provided in full within Table 1, below, the pond locations are shown in Figure 5 and photographs of the accessible ponds are provided in Appendix 1.

Ponds 4 and 5 (offsite to the north-west) were not accessible so could not be appraised. Ponds 2, 3 and 6 were dry at the time of the survey so some values (such as water quality) have been estimated. Pond 1 was densely overgrown so could not be directly accessed meaning some values have also been estimated.

5.2.3 Other Protected and Notable Species Appraisal

An active badger sett was identified on the site boundary. The location of badger setts is confidential so cannot be provided in this report; a separate confidential badger appendix is provided which shows the sett location. The sett was found to have two active holes and there were extensive signs of feeding in a verge and wooded area nearby.

During the survey, skylarks were heard and seen across the site, particularly in the large arable fields in the south of the site.

The majority of ditches within and bordering the site are suboptimal for water voles given their small size and seasonal nature. However, some of the larger ditches could support the species (although no signs were observed during the extended habitat survey). In particular, the wet ditch which runs parallel to the A151 along much of the eastern side of the site may support the species. The section of ditch parallel to a hedgerow located south-west of the disused railway line (see Figure 4) may also provide a small amount of suitable water vole habitat if/when the ditch holds water.

The disused railway line is densely overgrown and so surveyor access was limited. However, it is possible that there are additional features of ecological note within this area, possibly including additional trees with bat roost potential, areas used by badgers and extensive breeding bird habitat. This area is considered likely to be a relatively high ecological value feature in comparison with most of the rest of the proposed development site. The most effective way to address the uncertainty over protected species/Priority Species presence within this area would be to retain it.

Figure 4: Extended UKHab Map

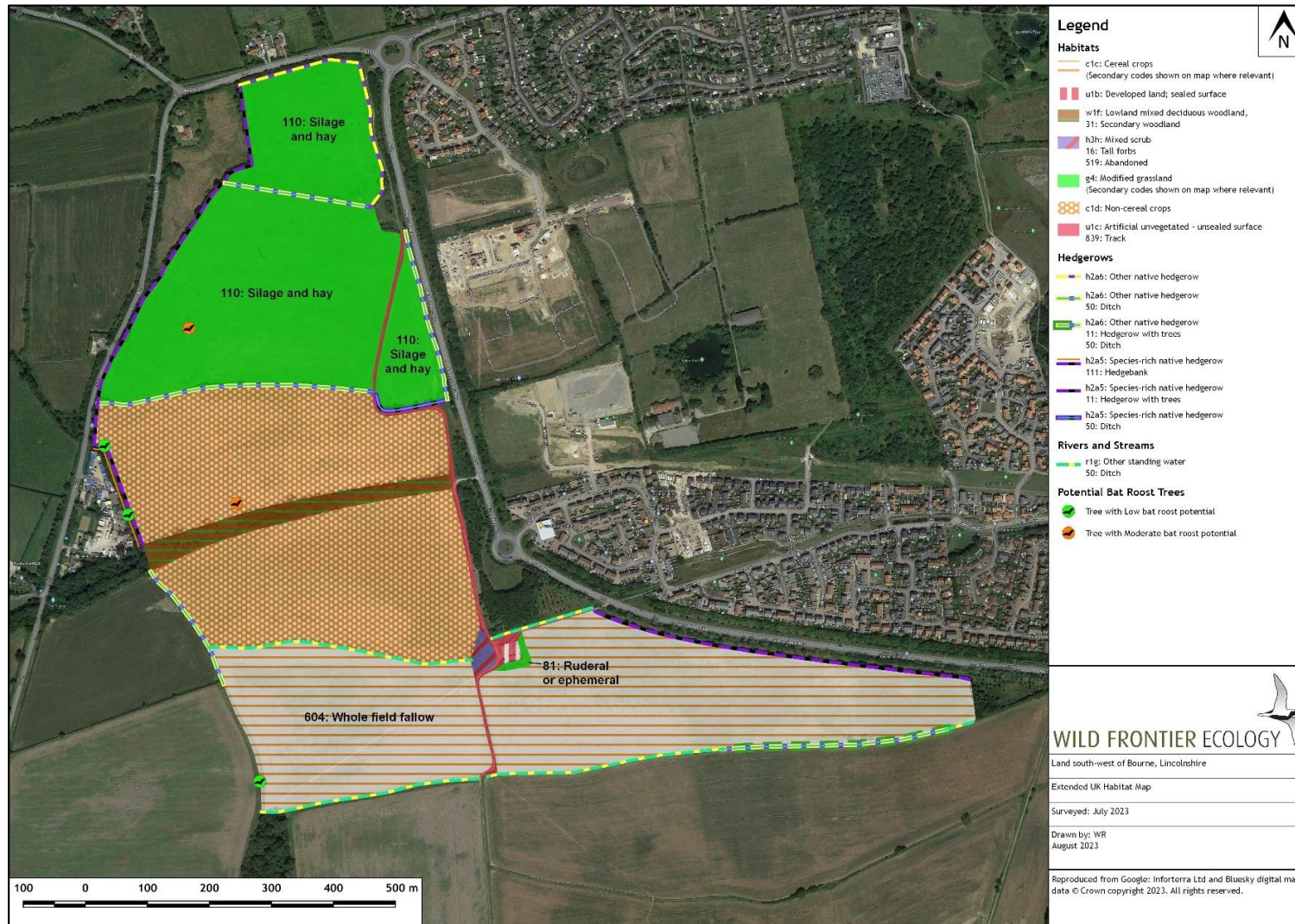


Figure 5: Pond Map

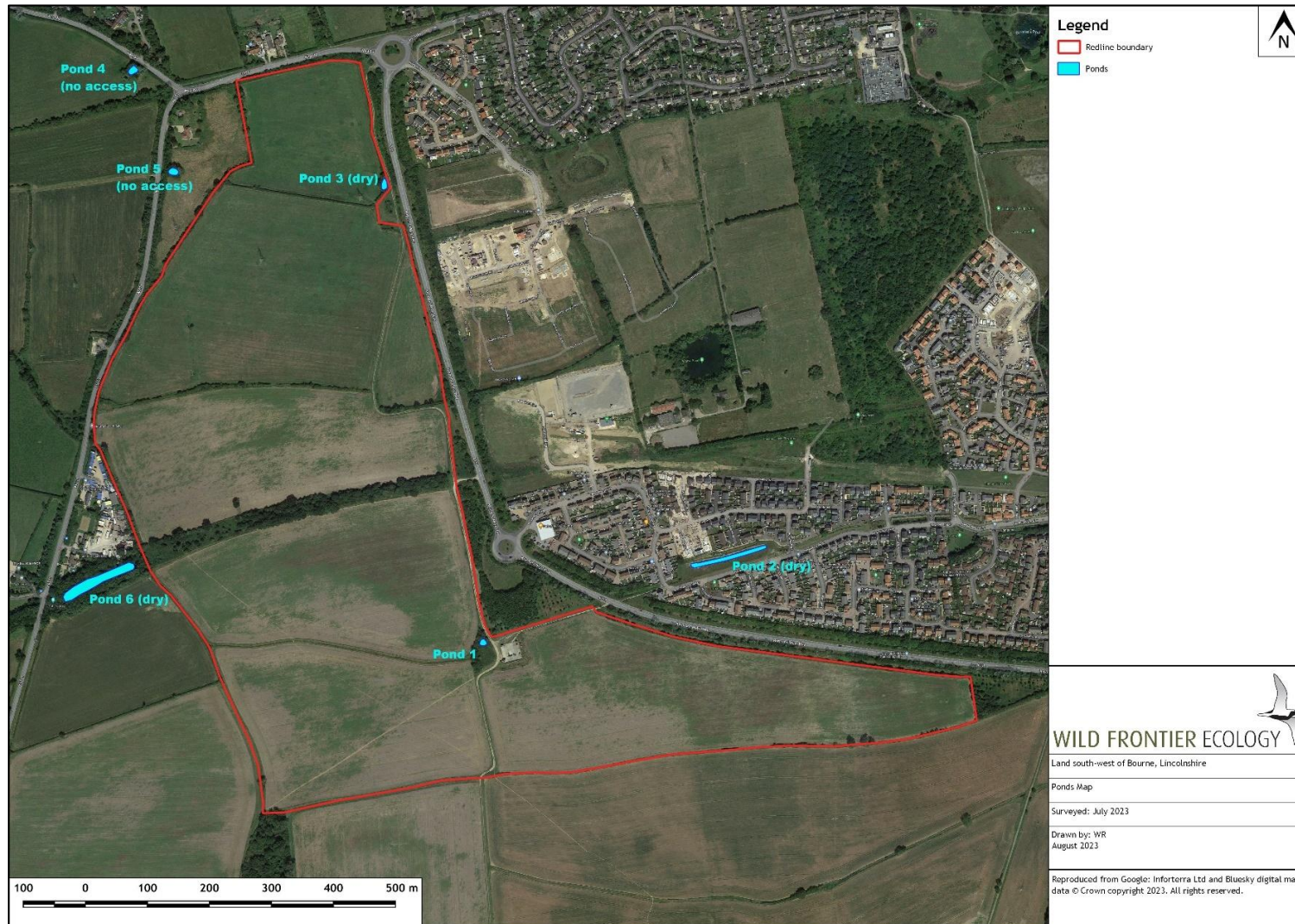


Table 1: GCN Habitat Suitability Index Appraisal Results

Pond Ref.	Geographic area of UK (in terms of suitability for GCN)	Size (m ²)	Desiccation rate	Water quality	Percentage of shoreline shaded	Waterfowl presence	Fish presence	Quality of terrestrial habitat	Number of ponds within surrounding 1km area	Percentage macrophyte cover	HSI Score	HSI Classification
1	A (1.00)	30 (0.06)	Rarely (1.00)	Poor (0.33)	100% (0.20)	Absent (1.00)	Absent (1.00)	Moderate (0.67)	6 (0.82)	0% (0.30)	0.48	Poor
2	A (1.00)	750 (1.00)	Annually (0.10)	Moderate (0.67)	0% (1.00)	Absent (1.00)	Absent (1.00)	Poor (0.33)	9 (0.92)	95% (0.85)	0.67	Average
3	A (1.00)	36 (0.08)	Annually (0.10)	Moderate (0.67)	75% (0.70)	Absent (1.00)	Absent (1.00)	Moderate (0.67)	7 (0.86)	50% (0.80)	0.53	Below average
4	No access										Unknown	
5	No access										Unknown	
6	A (1.00)	1,400 (0.90)	Annually (0.10)	Poor (0.33)	95% (0.30)	Absent (1.00)	Absent (1.00)	Good (1.00)	7 (0.86)	40% (0.70)	0.59	Below average

*Grey-shaded cells indicate estimated values, where a pond was dry or the characteristic was not fully observable/identifiable.



5.3 Constraints and Limitations of Surveys

None of the surveys or desk study experienced any significant constraints. The following minor constraints were noted.

The bat roost appraisal of the trees on the site experienced the inherent constraints related to appraising the roost potential of trees from ground level and during summer. These include the potential for some features with bat roost potential to not be visible from ground level or be obscured by foliage. However, a tree's bat roost classification takes account of any residual uncertainty over its potential, meaning where the tree is of a size, age, condition and species which may be associated with bat roost features but views are limited, such a tree would typically be assigned a Low bat roost potential classification as a precaution.

The HSI appraisals of the ponds were constrained due to limited access or because the ponds were dry. This is not considered significant because further surveys are advised to confirm whether GCN are present or are likely to be absent from these ponds.

The disused railway line was largely inaccessible due to the density of the vegetation. While this is an inherent constraint for dense woodland habitat, it is possible there may be protected species issues within this habitat which have not been identified.

5.4 Further Survey Requirements

A summary of the further ecological surveys likely to be necessary to inform a full ecological impact assessment of the proposed development is provided in Table 2, below. At present, no further desk study or habitat surveys are considered necessary, but the data obtained from these sources will remain valid for around one year, after which time it would be advisable to update them.

Table 2: Further Ecological Survey Requirements

Ecological Receptor	Advised Survey Effort	Notes
Badger	No further survey required if the badger sett can be suitably protected.	This will involve adopting a 30m buffer around the sett in which there will be no construction or associated disturbance.
	If the sett cannot be adequately protected and needs to be removed, further surveys would be required to inform a Natural England-licensed sett closure.	The sett is not thought to be a main sett but further surveys would be necessary to confirm this, comprising automated trail camera monitoring of the sett within 3-12 months of licensed sett closure (note that setts can only be closed under licence between July and November inclusive).
	If clearance works are required within or close to the disused railway line woodland, a more thorough inspection of this area will be required to check for badger setts.	This survey requirement would need to apply if any ground works are proposed within 30m of the disused railway line. Further badger checks will likely need to be preceded by targeted vegetation clearance to allow surveyor access.
Bats (activity)	Automated bat detector and transect surveys at the rate of one per month from April	The site is considered to have Moderate suitability for foraging and commuting bats, in accordance with BCT guidelines. Accordingly, it should have automated detector and transect surveys



	to October inclusive.	completed at the rate of once per month from April to October inclusive.
Bats (roosting)	If any trees with Moderate bat roost potential are to be removed, further surveys would be required involving monitoring the tree at dusk/dawn for bats emerging from or returning to roost, or by carrying out aerial inspection of features using a digital endoscope. Typically, two surveys are required between May and August inclusive.	Trees with Low bat roost potential can be felled without requiring further surveys, although precautions would need to be taken comprising soft-felling of any such trees. It would be advisable to retain any trees with bat roost potential wherever possible given the typically high ecological value of such trees.
Breeding birds	One set of six breeding bird surveys to characterise breeding bird activity across the site. Surveys would need to take place between March/April and June/July.	Six individual surveys are required to ascertain breeding bird territories.
Great crested newts	Environmental DNA (eDNA) surveys of all ponds within 250m of the proposed development site, to be completed during the accepted survey window of mid-April to end of June.	Environmental DNA surveys are advised over conventional presence/absence surveys because they are much lower cost and involve less disturbance of the pond.
Reptiles	Presence/absence survey, to be completed during suitable weather conditions between March/April and September/October.	Surveys would focus on the small area of potentially suitable habitat bordering the south side of the disused railway line.
Water voles	No further surveys are thought to be necessary unless ditches are to be impacted, such as through culverting or adding to inflow pipes. If so, any affected ditches should be surveyed twice between April and September.	The shallow, dry ditches across most of the site would not need to be surveyed, but larger ditches would need to be checked for water voles if they were to be impacted. The ditch south-west of the disused railway line, and the ditch which runs parallel to the A151 along the east side of the site (but which is outside the site boundary) would warrant checks for water voles if they are to be impacted.

At the time of writing, there is no finalised tree removal plan. The classification of the bat roost potential of trees remains valid for one year, after which time, any tree removal will need to be informed by an updated assessment of the tree's bat roosting status. This is because the availability of roost features in trees can change over short periods of time, particularly if there are high winds or storms.



6. Preliminary Ecological Appraisal

While this is a PEAR, the terms of the Ecological Impact Assessment (EclA) process (with reference to the CIEEM EclA Guidelines¹⁴) are applied where possible, as follows:

6.1 Potential Impacts on Ecological Receptors

6.1.1 Geographical Context

The following geographical frame of reference will be used to describe the ecological impacts and effects, or adapted to suit local circumstances:

- International and European
- National
- Regional
- County
- District*
- Local

*District level is not listed in the EclA guidance but is included within WFE reports as it is a useful and readily identifiable geographic unit.

The local geographical context for the proposal site is defined here as the civil parish of Bourne, in which the site is situated. The district context is South Kesteven, the county context is Lincolnshire and the region is East Midlands.

6.1.2 Impact Magnitude

The EclA guidelines espouse a quantification of impact/effect magnitude where possible. Where this is not available or uncertain, impact magnitude categories and criteria are defined based on Byron (2000)¹⁵. These categories are often also used as shorthand to summarise magnitude.

- *Major negative* - that which has a harmful effect on the integrity of a conservation site or the conservation status of a population of a species within a defined geographical area; e.g., fundamentally reduces the capacity to support wildlife for the entirety of a conservation site, or compromises the persistence of a species' population at a defined locality.
- *Intermediate negative* - that which has no adverse effect on the integrity of a conservation site or the conservation status of a species' population, but does have an important adverse effect in terms of achieving certain ecological objectives; e.g., sustaining target habitat conditions and levels of wildlife for a conservation site, or maintaining population growth for a species.
- *Minor negative* - some minor detrimental effect is evident, but not to the extent of the above.
- *Neutral* - that which has no predictable effect.

¹⁴ CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: 3rd edition*. Chartered Institute of Ecology and Environmental Management, Winchester

¹⁵ Byron, H. (2000). *Biodiversity Impact - Biodiversity and environmental impact assessment: a good practice guide for road schemes*. The RSPB, WWF-UK, English Nature and the Wildlife Trusts, Sandy



6.1.3 Positive or Negative Impacts/Effects

The nature of a predicted impact is as per CIEEM definition:

“Positive impact - a change that improves the quality of the environment e.g. by increasing species diversity, extending habitat or improving water quality. Positive impacts may also include halting or slowing an existing decline in the quality of the environment.”

Negative impact - a change which reduces the quality of the environment e.g. destruction of habitat, removal of species foraging habitat, habitat fragmentation, pollution.”

6.2 Duration of Impact/Effect

Impacts/effects are described as short-term, medium-term or long-term, and as either permanent or temporary.

6.3 Impact/Effect Reversibility

Reversibility is judged per the CIEEM Guidelines for Ecological Impact Assessment description:

“An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.”

6.4 Impact/Effect Significance

The CIEEM Guidelines for Ecological Impact Assessment provide a working definition of ‘significant effects’ which includes the statements:

“For the purpose of EclA, ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general.” and “In broad terms, significant effects encompass impacts on structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution).”

In this assessment, a significant impact is not attributed to any effect on a receptor which is predicted to occur at no greater than minor negative magnitude. Similarly any impact, regardless of magnitude, is not regarded as significant if its geographic scale of importance is lower than a local/parish level.

6.5 Description of Impacts/Effects

A number of impacts/effects on ecological receptors may result from the proposed development.

6.5.1 Change of Land Use

The proposed development would inevitably remove much of the areas of existing habitats and replace them with built environment and possibly some new green infrastructure. The change of land use will also likely impact a range of animal species; some may be permanently displaced from the site, others may alter their level of



presence or type of activity here (such as cease to nest on-site but continue to forage here, for example). Some other animal species may be attracted to the developed site, particularly those species which thrive in and amongst the built environment. In the absence of a development plan, the change of land use impact cannot be considered in detail.

6.5.2 Construction Activities

The activity, noise and other general disturbance associated with movements of construction machinery and personnel could disturb animal species using the site or immediately adjacent areas. These works also have the potential to result in harm or mortality to animal species on the site, particularly during the initial stage of site preparation and ground clearance.

Construction related disturbance impacts to wildlife in the surrounding area should be viewed in the context of the existing baseline of the site, where there is an existing level of human activity, particularly from farming, use of the footpaths on the site and from vehicular traffic on surrounding roads. Therefore, any wildlife present in this area will be habituated to a degree of human activity.

6.5.3 In-Use Impacts

Once constructed and occupied, there is potential for disturbance impacts from the increased human presence on-site. This would include noise, lighting, littering, increased vehicular use, impacts from domestic pets and recreational activity. It is likely that nearby areas would be used for recreation, possibly including any publicly accessible designated nature conservation sites. However, as with construction related impacts, the baseline levels of human activity at and around the site will be a relevant consideration when assessing in-use impacts from new development; essentially, the development would comprise an extension to the town of Bourne where all these impacts already exist and so the development would add to existing impacts rather than create wholly new ones. These impacts cannot be quantified until development plans are finalised, including the number of new residential units.

6.6 Appraisal of Unmitigated Impacts of the Proposed Development

6.6.1 Designated Sites

A number of nearby designated nature conservation sites are publicly accessible and so it would be reasonable to expect that the development would lead to increased recreational pressures on such sites. The scale of impact would partly depend on the scale of residential development, which is not yet defined. The local planning authority should be consulted to ascertain whether the CIL (see Section 3.6) would need to be applied to the development to mitigate for recreational impacts on nearby designated sites.

It is thought that the CIL applies only to statutory designated sites, meaning the LWSs may need additional mitigation measures applied to account for increased recreational pressures, particularly since all three nearby LWSs are publicly accessible. This issue should be clarified with the council.

Incorporating on-site green infrastructure such as public greens and retained or new footpaths will also have the effect of absorbing recreational pressures within the site itself, thereby limiting such pressures on off-site areas such as designated sites.



There is potential for offsite designated sites (i.e. Toft Tunnel LWS) to also be incorporated with the site's green infrastructure. Advice on possible enhancement is outlined below.

6.6.2 Habitats

Development at the site would likely result in the loss of much of the arable and modified grassland habitat. It is also likely that some of the boundary features would be removed. Without a development plan, impacts cannot be assessed. However, it is advised that the following habitats and features are prioritised for retention on the basis of their relatively high ecological value:

- The disused railway line. This area of woodland could form the centrepiece of on-site green infrastructure. There is scope for enhancement of this area through thinning and management of the overgrown woodland to create a more diverse woodland structure. The area may (pending the findings of further protected species surveys) also be suitable for creation of public access in the form of new footpaths or similar. Enhancement and management could tie in with that of the adjacent Toft Tunnel LWS (advised below).
- Hedgerows, particularly the larger, more established and species-rich hedgerows in the north of the site and around most of the peripheries of the site. Retaining these hedgerows would have the effect of incorporating an established ecological network within and around the developed site, to which new green infrastructure can be connected.
- The two isolated (within farmed fields) mature oak trees in the north of the site. These trees provide a valuable ecological resource in the form of retained deadwood with niches for a range of invertebrates, birds and possibly small mammals. Retaining these trees as a feature of the site's green infrastructure would also add landscape maturity to the newly developed site.
- The screening planting and ditch alongside the A151 to the east of the site is outside the redline boundary, but it is advised that this is retained because of its value as a habitat in its own right and also because of its interconnectedness with other habitats including the disused railway line, hedgerows and areas of woodland offsite. This linear habitat appears to form one of the few remaining, mostly intact connections between the ancient woodlands to the north (Bourne Wood and Auster Wood) and south (Math and Elsea Woods) of the site.

Precise impacts will depend on the scale and nature of habitat clearance associated with the project, and so can only be assessed once development plans are available. However, habitat compensation for any lost hedgerows and trees would be advised to ensure no net loss of these valued habitats. This type of habitat compensation would also be necessary to avoid/minimise losses and achieve gains in future BNG metric calculations (see section 3.3). Some generic best-practice advice on habitat creation is provided below. This would need to be expanded upon within a full ecological impact assessment once development plans for the site are available.

6.6.3 Badger

The site surveys recorded a badger sett with two active holes on the boundary of the site (precise location is given in a separate confidential appendix). If the sett can be appropriately protected and retained, then direct loss of the sett would be avoided, but a minor to intermediate negative impact to the site badger population may result



from the loss of foraging habitat and disturbance from the new residents of the site. Impacts can be fully assessed once a development plan is available and any further badger surveys which may be necessary have been completed.

A number of best-practice mitigation measures would be advised during site clearance and construction to avoid and mitigate risks to terrestrial animals such as badgers which may occur on the site (see below).

6.6.4 Bats (Roosting)

Impacts to roosting bats cannot be assessed until a tree removal plan has been produced, and until any necessary further bat surveys have been completed on any trees which are targeted for removal. The nature of any impact would very much depend on the species and numbers of bats roosting in affected trees. Any removal of trees with confirmed bat roosts would only be legally permissible under the terms of a Natural England granted European Protected Species mitigation licence.

6.6.5 Bats (Non-Roosting)

The site likely supports a moderate level of bat flight activity, with habitats such as the disused railway line, hedgerows, ditches and the small area of scrub around the pond likely to be the focus of bat activity. However, as no targeted bat surveys have yet been completed, and a development plan for the site is not available, it is not possible to assess the likely impacts to bats of a development on this site.

Best-practice mitigation for bats will be necessary; preliminary advice is provided below.

6.6.6 Breeding Birds

Proposed development at the site would likely remove much of the habitat used by nesting birds or render it unsuitable due to increased proximity to human disturbance. In particular, skylark would likely be permanently displaced from the site due to loss of arable field nesting habitat. However, impacts cannot be assessed until the necessary surveys have been completed and until a development plan is available.

Best-practice mitigation for avoiding impacts to nesting birds will be necessary; preliminary advice is provided below.

6.6.7 Great Crested Newts

The desk study results suggest GCN are unlikely to be present in the vicinity of the site. However, until the necessary pond surveys have been completed to confirm the status of GCN at and around the site, and until a development plan becomes available, an impact assessment is not possible.

6.6.8 Reptiles

The majority of habitats on the site are suboptimal for reptiles. The only area which provides the suitable combination of cover, basking habitats and foraging opportunities in close proximity to each other is the southern border of the disused railway line. Further surveys are advised to confirm the presence or likely absence of reptiles from this part of the site. As an additional precaution, a number of best-practice mitigation measures would need to be adopted within the few areas where there is a very low but conceivable risk of low numbers of transient reptiles occurring.



6.6.9 Water Vole

The ditches within the site boundaries are considered suboptimal for water vole because of their small size, seasonal nature and general absence of suitable emergent vegetation (which water voles feed on). The data search also returned no records of the species within 2km of the proposed development site. However, the possibility of occasional, transient presence cannot be fully excluded, particularly for the eastern boundary ditch bordering the A151, and a short section of ditch to the south-west of the disused railway line (on the western boundary of the site). If all works can avoid these ditches by at least 5m, there would be considered to be a negligible risk of impacts to water voles. If works need to come within 5m of these ditches, further surveys would be required, and the impact assessment would depend on the survey results.

6.6.10 Otters and White-Clawed Crayfish

There is no suitable habitat on the proposed development site for otter or white-clawed crayfish. As these species are expected to be absent, development at the site would be anticipated to lead to a neutral impact to these species.

6.6.11 Priority Species

Biological records confirm that brown hare, hedgehog and common toad occur locally, and all are likely to be present to some degree on the site.

The development would likely remove the majority of habitat used by brown hare, meaning the species would likely be permanently displaced from the site. While there is abundant suitable habitat for brown hare in the surrounding area, it is possible this habitat already supports the species and therefore may not have capacity to accommodate displaced animals. Overall, a permanent, minor negative impact to the local brown hare population would likely be the outcome of development of this site, although this partly depends on the scale of losses of arable and grassland habitat.

Hedgehog presence on this site is likely restricted to the hedgerows, field boundaries and the disused railway line. The impact to hedgehogs will therefore depend largely on losses of these habitats; if most can be retained then impacts would be of a lower magnitude than if most were lost. There is scope for the development to lead to habitat enhancement for hedgehog, in the form of creating new hedgerows, gardens and areas of green space that could be suitable for the species. The impact assessment will therefore only be possible once development plans for the site are finalised.

Common toad may also be present locally, as confirmed by biological records of the species returned by the data search. As with hedgehog, the impacts to common toad will likely correlate with habitat losses, but there is scope for some enhancement. The creation of new waterbodies on the site, such as flood attenuation lagoons, could provide new aquatic habitat for amphibians, and new hedgerows and other green infrastructure could provide enhanced terrestrial habitat. The impact assessment will only be possible once development plans are finalised.

A number of best-practice mitigation measures will be advisable during site clearance and construction to address some of the risks posed to wildlife during these phases of the project. Measures can also be taken to ensure the developed site remains suitable (or even enhanced) for small terrestrial species. Preliminary advice is provided below.



7. Mitigation

7.1 General Principles

The Mitigation Hierarchy is a key principle, with the sequential strategies given in order. This is interpreted by WFE, as it applies to built development, in Table 3, below.

Table 3: Mitigation Hierarchy

Action and sequential number	Description
1. Avoidance	The first stage is to seek options that avoid impacts/effects on ecological receptors, for example through adjusting the development footprint to avoid valued/sensitive features, or confining works to certain times of the year or the day when a receptor would not be impacted. An example would be adjusting a development footprint to avoid a hedgerow, thereby allowing it to be retained.
2. Mitigation	Where potential adverse impacts cannot be avoided, the next stage is to use measures aimed at reducing/ameliorating the magnitude and/or likelihood of impacts/effects. This can typically be done through the design of the project or adoption of specific working practices. An example would be restricting hedgerow removal to those sections which are of lower ecological value, thereby allowing relatively higher value sections of hedgerow to be retained; this reduces the magnitude of the adverse impact on hedgerow habitat.
3. Compensation	Where significant residual adverse impacts cannot be satisfactorily avoided or mitigated, the next stage is to use appropriate measures which subsequently offset, repair, reinstate or compensate for the predicted impact/effect. An example would be replanting a hedgerow after it has been removed.
Enhancement	The final stage of the Mitigation Hierarchy is distinct in that it does not seek to solely address adverse impacts; it goes over and above requirements for avoidance, mitigation and compensation. In accordance with the NPPF, developments should achieve net gains in biodiversity even if adverse impacts are not anticipated. Enhancement measures are those which seek to provide net benefits for biodiversity, and are advised wherever appropriate; this may include enhancements for receptors which are otherwise expected to experience adverse impacts. An example might be planting an additional hedgerow.

7.1 Construction Environment Management Plan

Precise mitigation requirements for the site will need to be outlined in detail within a Construction Environment Management Plan (CEMP), once a finalised development plan is available and all necessary further surveys have been completed. CEMPs should conform to The British Standard for Biodiversity BS42020:2013, and can be obligated as planning conditions. The CEMPs will likely need to include, as a minimum, the following measures (although the following measures will inevitably need to be refined depending on the results of further surveys):



7.1.1 Habitats

Areas of woodland, scrub and individual trees which are due to be retained on the site will need to be protected in accordance with the advice of an arboriculturist, in line with BS5837:2012. This will need to ensure construction activities do not encroach into the Root Protection Areas of trees and shrubs, and ensure that other construction related effects on these habitats are suitably mitigated.

Any losses of trees and shrubs would need to be compensated for by replacement planting at a ratio of 3:1. Hedgerow replanting would need to ensure at least an equivalent length of hedgerow was replanted relative to that lost. Replanting would use native species of trees and shrubs which are mostly nectar producing and/or fruiting, to provide food sources for wildlife. A list of suitable species is provided below.

7.1.2 Bats (Non-Roosting)

Artificial lighting is known to disrupt the nocturnal behaviours of bats and insects¹⁶. Therefore, in order to mitigate disturbance impacts to bats flying over and around the site it will be necessary to either avoid, minimise or sensitively design all night lighting to be used during construction and eventual use of the site. In particular, the disused railway line, hedgerows and the woodlands bordering the site will all need to be retained as dark habitats (i.e. unaffected by new sources of light pollution) overnight.

Measures to minimise the disruptive impacts of lighting on bats includes sensitive positioning of lighting and use of physical screening, use of movement sensors on lights,, use of low-level lighting (such as bollards) in preference to high-level lighting (such as streetlights), positioning light fittings to face directly downwards, use of Light-Emitting Diode (LED) lighting rather than other bulb types, use of hoods or cowls over light fittings to reduce lateral light pollution. Configuration of lighting equipment will also need to be sensitively designed within the CEMP, once a precise development layout is available, and will follow guidance from the Bat Conservation Trust and Institute of Lighting Professionals¹⁷.

If night lighting is required on the developed site (such as security lighting around car parks, building entrances and walkways), Passive Infra-Red (PIR) controlled lighting will be used, as it senses human movement which activates lights only when needed rather than having lights on for prolonged periods.

The impact to bats from loss of foraging habitat can be partially addressed by adopting the above lighting controls, as this will ensure that bats can continue to forage across the site, such as amongst any retained and any newly created habitats. The impact will need to be further addressed by ensuring that new green infrastructure provides suitable foraging resources for bats.

7.1.3 Breeding Birds

Any removal of woody vegetation (hedgerows, shrubs, trees, brambles etc.) will be completed between September and February inclusive, so as to avoid the main bird nesting season which runs from 1st March to 31st August. This will ensure that these clearance works do not accidentally disturb and destroy active birds' nests.

¹⁶ Stone, E.L. (2013). Bats and lighting: Overview of current evidence and mitigation guidance

¹⁷ Guidance Note 08/23. Bats and Artificial Lighting at Night. Bat Conservation Trust and Institute of Lighting Professionals, 2023.



If removal of woody vegetation cannot be timed to occur outside of the main bird nesting season, the affected vegetation will need to be thoroughly checked by an ecologist for any active birds' nests (no more than 72 hours before clearance of the vegetation is scheduled), and clearance works will then only be permissible if this check confirms the absence of such nests. If active nests are found, these will need to be retained in-situ and allowed to reach their natural conclusion without disturbance or interference. In this scenario, the ecologist would be able to advise on appropriate stand-off distances (i.e. buffer zones around any nests) and the period for which the nest needs to be allowed to reach its conclusion before a return visit by the ecologist to recheck the vegetation.

As skylarks are confirmed nesting on-site, clearance of the arable fields will also need to be timed to avoid the main bird nesting season, as outlined above.

In order to mitigate for the loss of skylark nesting habitat, it will be necessary to provide replacement nesting or foraging opportunities for the species in the surrounding area. This will likely take the form of skylark nest plots, which can be created amongst arable fields nearby. These plots are not actually used for nesting but provide foraging habitat which enables local skylark pairs to increase their breeding productivity by creating a vital feeding resource, especially in late spring/summer when much of the land is under dense crops. This may require consultation and agreement with offsite landowners. The scale of mitigation is not yet known, but can be determined following the breeding bird surveys.

7.1.4 Best Practice Mitigation Measures during Site Clearance and Construction

All building materials and waste materials will be stored above the ground, such as on pallets or in skips respectively. This measure will ensure that such materials do not provide a sheltering opportunity, attractive to invertebrates and other small animals.

Excavations will not be left open overnight, or else will be fitted with egress boards sloped at a shallow angle ($<40^\circ$) or have shallow battered/sloped edges (also $<40^\circ$) to allow any animals which fall in to climb out. Preferably all excavations will be backfilled at the end of each day or covered overnight to prevent animals falling in.

Between the months of March and October inclusive, works will be restricted to daylight hours only to limit the risk of disturbance or accidental harm to nocturnal animals such as badgers and hedgehogs. Ideally night lighting of the site will be minimised to reduce disturbance to other nocturnal animals such as bats and moths. Night working between November and February would be permissible given most terrestrial animals would be much less active or hibernating at this time of year.

In the unlikely event that a protected species is encountered during any stage of the development, works within the vicinity of the animal (a minimum of 20m) will cease and an ecologist will be consulted with the aim of resolving the situation, such as by translocating the animal or revising the mitigation approach. Works will only recommence once the ecologist has confirmed in writing that it will be acceptable to do so.

7.1.5 Priority Species

Hedgehogs and common toads, amongst other Priority Species, could remain in retained habitats and newly created habitats on the developed site in the long-term. However, this will require habitat connectivity to be retained throughout the site in order that these animals have sufficient habitat. Therefore, any fences or walls erected on the



site will need to have ground-level gaps measuring approximately 13cm x 13cm so that hedgehogs and other small terrestrial animals can move amongst the site, particularly around any green infrastructure. A map detailing the locations of all necessary boundary gaps can be included within the CEMP, once the development plans are finalised.

Roadside kerbs will be sensitively designed so as to not form impenetrable barriers to movements of terrestrial animals; this measure also reduces the risk of road traffic injury and mortality as animals are able to move away from roads more quickly. This will comprise installing dropped kerbs or roadways level with the pavement (such as where the road raises to a speed hump). Any kerbs adjacent to road gulleys and drainage openings will have shallow recesses at road level running parallel to the drain (i.e. the drain will be slightly set back, away from the kerb), in order that any small animals (such as amphibians) following the kerb line do not walk over the drain grate and fall through it. Kerb stones designed specifically for this purpose are commercially available and should be used on the site.

All green infrastructure will be designed with Priority Species such as hedgehog and common toad in mind. This can include ensuring that there is a range of habitat types and structures which provide the necessary opportunities for foraging and sheltering for these and various other animals.



8. Ecological Enhancements

8.1 Landscape and Ecology Management Plan

Post-construction, the ongoing management of the site will be guided by a Landscape and Ecology Management Plan (LEMP) which will advise on the habitat creation and management of any green infrastructure. Effective management of the available habitats has the potential to create positive biodiversity effects over the medium to long term. The LEMP should be produced by a suitably qualified ecologist, ideally in conjunction with a landscape architect. It can only be produced once the development plans are finalised. Suitable enhancements for the site will likely include the following:

8.1.1 Habitat Enhancement

In order to benefit pollinator species such as bees, butterflies and hoverflies, green spaces will be seeded with a diverse mixture of species to include at least four species of grass and eight species of herbs, such as a flowering lawn seed mixture. These areas will be managed in accordance with the seed supplier's instructions for successful long-term maintenance of this habitat.

Planting a network of new hedgerows and/or tree-lines across the site would enhance connectivity and provide a foraging and nesting/sheltering habitat in its own right. It is therefore advised that new hedgerow and tree planting is incorporated within the development plans. Hedgerows will need to be comprised of at least five native woody species such as hawthorn, field maple, hazel *Corylus avellana*, dogwood, elder, oak, dog rose and others. Hedgerows should also have integral wide verges or margins running alongside them (ideally on both sides) to increase their wildlife value. Further advice on hedgerow planting and management can be provided within the LEMP.

If new trees or hedges are proposed it is advised that a Tree Planting Plan is produced detailing the number, location and species of trees to be planted. This plan should have input from an arboriculturist in addition to members of the design team such as a landscape architect, particularly where planting is proposed near to hard surfacing. Suitable tree species should be planted in appropriate locations to ensure that the tree can thrive, reach its full potential and achieve its mitigation purpose (if applicable) in the long-term.

Trees provide a wide variety of benefits such as visual amenity, habitat, shade, carbon capture, improved air quality and many more. For the purposes of this ecological report the focus is on maximising the habitat value of the trees to wildlife; therefore the following native flowering and fruiting species are advised:

Bird cherry *Prunus padus*
 Cherry plum *Prunus cerasifera*
 Crab apple *Malus sylvestris*
 Dogwood *Cornus sanguinea*
 Field maple *Acer campestre*
 Guelder rose *Viburnum opulus*
 Holly *Ilex aquifolium*
 Hornbeam *Carpinus betulus*
 Oak *Quercus robur*
 Rowan *Sorbus aucuparia*
 Silver birch *Betula pendula*
 Small-leaved lime *Tilia cordata*
 Wayfaring tree *Viburnum lantana*

Whitebeam *Sorbus aria*
 Wild cherry *Prunus avium*
 Wild service tree *Sorbus torminalis*

Commonly used non-native species such as Leyland cypress *Cupressus x leylandii* and cherry laurel *Prunus laurocerasus* will not be used because they can have ecologically detrimental impacts such as acidification of underlying soils and overshadowing native vegetation.

The scale of habitat enhancement will be factored into the project's future BNG calculations, to provide a readily quantifiable assessment of the habitat losses or gains resulting from the development.

8.1.2 Designated Sites and Green Infrastructure

The Toft Tunnel LWS would benefit from enhancement and management, given the current condition of the area referred to in the citation as a pond (currently very overgrown and overshadowed); options to pursue this could be explored with Lincolnshire Wildlife Trust which manages the site. This LWS may be a suitable candidate for incorporating within the site's green infrastructure, given its proximity and direct connection to the on-site disused railway line.

8.1.3 Nesting Birds

It is advised that integral boxes (i.e. boxes incorporated into the fabric of the buildings) are installed on new buildings at the ratio of one box for every two houses. These boxes can be used for nesting or year-round roosting. Nest boxes and chambers are more likely to be used by birds if installed in suitable positions on the buildings. Boxes intended for swifts are well used by other species of conservation concern and can therefore be considered a universal nest chamber^{18,19}.

In general, bird boxes and chambers should be sited in or on gable ends, or under overhanging eaves, overlooking green spaces, and with a clear/unobstructed flight line for easier access and egress. Exposed locations should be well insulated against overheating, by using integrated designs or suitably insulating material such as woodcrete. A plan showing the precise locations of boxes to be installed can be provided within the LEMP, once the development plans are finalised. Boxes will be situated at least one metre apart as there is evidence that chambers situated too close together will not be used²⁰.

Nest box designs are commercially available and will be provided with instructions for appropriate installation.

8.1.4 Roosting Bats

It is advised that a minimum of one bat roost box for every five new houses is installed across the site. Integral boxes are strongly advised due to their relatively superior longevity and thermal insulation, plus their minimal visual impact.

¹⁸ Martins, T (2021). Duchy Report on the Big Duchy Bird Box Survey 2021.
<https://nansledan.com/duchy-nest-brick-project-boosts-endangered-wild-birds/>

¹⁹ Barlow, C., Priaux, M. et al (2020). Swift Bricks - the "universal" nest brick.
<https://actionforswifts.blogspot.com/p/sln.html>

²⁰ Martins, T (2021). Duchy Report on the Big Duchy Bird Box Survey 2021.
<https://nansledan.com/duchy-nest-brick-project-boosts-endangered-wild-birds/>



Bat boxes are more likely to be used by bats if installed on warmer aspects of the buildings, such as south, west or east sides. Installing boxes on a range of different building aspects provides a range of thermal conditions for bats to use throughout the year. Bat roost boxes will provide superior roosting opportunities if installed in close proximity to gardens and other green spaces, and away from sources of disturbance such as roads, parking spaces and any exterior lighting. Any of the following bat boxes suitable for general use, or similar models (in terms of lifespan and demonstrated effectiveness) will be used:

- Habibat boxes
- Ibstock enclosed bat boxes
- Built-in woodstone bat box

A plan showing the preferred locations for the installation of bat roost boxes across the site can be provided within the LEMP, once development plans are finalised.



9. Summary of Key Ecological Advice

The following key issues and measures should be taken into account when finalising the design of the project:

1. Further surveys for protected species will be required, as outlined in Table 2 (section 5.4), above. Surveys need to be completed in certain seasons; these will need to be factored into the project timeline to ensure the seasonal windows for these surveys are not missed.
2. The council should be consulted over the possible application of the CIL charge (section 6.6.1). The potential for residents of the developed site to visit nearby designated sites (the various woodlands) nearby will be a key factor in any such obligations. Provision of on-site green infrastructure should help mitigate recreational impacts to offsite designated sites.
3. Retaining and protecting areas of ecological value such as the disused railway line, hedgerows, mature trees and ditches will limit the negative ecological impacts of development of this site (section 6.6.2). Retaining these features will also be likely to limit impacts to protected and valued species.
4. Mitigation measures (section 7) will need to be outlined within a CEMP, to be produced once all necessary further surveys have been completed. The CEMP will need to include, amongst other measures, advice on protection of habitats, compensatory replanting for removed habitats, lighting controls, offsite skylark mitigation, best-practice construction methods and retention of habitat connectivity for small animals such as hedgehog.
5. Ecological enhancement measures (section 8) will need to be outlined within a LEMP, to be produced once all necessary further surveys have been completed and the project design is finalised. The finalised enhancement package and development layout will allow the project's Biodiversity Net Gain values to be calculated. Preliminary enhancement advice includes habitat enhancement (planting areas of grassland, hedgerows and trees) and installation of integrated bird nest boxes and bat roost boxes within the new buildings. There may be scope for ecological enhancement of the disused railway line, possibly incorporating the adjacent Toft Tunnel LWS.



10. Conclusions

This PEAR has appraised the site of proposed residential development on farmland south-west of Bourne. A full ecological impact assessment cannot yet be provided because development plans are not finalised. There are a number of further survey requirements and issues for potential consideration that will need to be addressed before a full impact assessment can be completed.

Further consideration of potential impacts on designated sites is advised. Further surveys for various protected species will also be necessary. Advice provided within this PEAR should be used to inform the scope of the forthcoming ecological impact assessment. The advice and principles outlined in this report should also be used to guide the design of the development (such as determining which land is suitable for development plots and which should be retained), and the design of green infrastructure.

Based on currently available information, there are not expected to be any insurmountable ecological issues with developing the site, although this assumes that the key measures outlined in this PEAR are adhered to (such as retention of the area of woodland along the disused railway line). Further surveys are likely to confirm that various mitigation measures are essential to ameliorate impacts and comply with protected species legislation, but such mitigation measures are expected to be achievable and effective.

There is scope for ecological enhancement of the site. Some preliminary advice is provided in this PEAR, which can be expanded upon once all necessary surveys have been completed and once a development plan for the site is finalised. It is anticipated that, with careful design and effort, the ecological enhancements could lead to permanent positive impacts for a number of valued ecological receptors. This may include some habitat types; the net change in the value of habitats at the site is due to be quantified using the Biodiversity Net Gain metric once finalised plans for the site are developed.



Appendix 1: Site Photographs



Photo 1: Northernmost boundary hedgerow enclosing one of the fields of modified grassland, as viewed looking east.



Photo 2: The largest field of modified grassland on the proposed development site, as viewed looking south.



Photo 3: The northern end of the farm track which runs north-south through the proposed development site, as viewed looking south (with fields on modified grassland on either side of the track).



Photo 4: Defunct hedgerow and parallel ditch bordering the A151 road to the east of the proposed development site, as viewed looking south.



Photo 5: Northern side of the disused railway line, as viewed looking south-west.



Photo 6: Southern side of the disused railway line, as viewed looking east.



Photo 7: Part of the interior of the woodland which has grown up over the disused railway line, showing the density of the vegetation. Pond 6 is located within this overgrown area.



Photo 8: Part of the south side of the disused railway line, as viewed looking west.



Photo 9: Example of hedgerow and parallel ditch which is fairly common on the site. This one section of ditch (located south-west of the disused railway line) is the only section directly bordering the site which would warrant water vole surveys, if the ditch was to be impacted.



Photo 10: Example of a dry/seasonal ditch field boundary, located south of the disused railway line, as viewed looking east.



Photo 11: Fallow field in the south-west corner of the proposed development site, as viewed looking east.



Photo 12: One of the footpaths on-site, running through the fallow field in the south-west of the proposed development site. Ogrey Spinney (offsite) is visible in the background.



Photo 13: Area of scrub and ruderal vegetation surrounding a densely overgrown pond (Pond 1) in the east of the site, as viewed looking north-west.



Photo 14: Large mound of material (overgrown with ruderal vegetation) adjacent to the area of scrub in the east of the site.



Photo 15: Large agricultural concrete pad with surrounding ruderal vegetation in the east of the proposed development site.



Photo 16: Part of the long, species-rich hedgerow with trees bordering the eastern side of the proposed development site, running alongside the A151 road.



Photo 17: Part of the ditch (offsite) bordering the A151, on the far side of a public footpath and the species-rich hedgerow (visible to the right) which borders the proposal site to its east.



Photo 18: Oak tree with Moderate bat roost potential, location within a grassland field in the north-west of the proposal site.



Photo 19: Some of the features with bat roost potential (circled) within the oak tree in the grassland field.



Photo 20: Oak tree with Moderate bat roost potential located within arable field north of the disused railway line.



Photo 21: Hazard beam (circled) within the oak tree in the arable field. The tree also has other features with bat roost potential, such as lateral crevices in the trunk.



Phot 22: Mature oak tree with Low bat roost potential located on a hedgebank to the north of the disused railway line.



Photo 23: Mature oak tree with Low bat roost potential, located at the base of the hedgebank to the north of the disused railway line.



Photo 24: Willow tree with Low bat roost potential located along field boundary north of Ogrey Spinney.



Photo 25: One of the active badger holes comprising the sett within one of the site boundaries (exact location given within the confidential badger appendix). A4 clipboard included for scale.



Photo 26: Badger feeding signs (snuffle holes) in margin adjacent to an area of woodland close to the badger sett.



Photo 27: Pond 2 (dry)



Photo 28: Pond 3 (dry)