

LOCKWOOD ROAD, GOLDTHORPE

Ecological Impact Assessment

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1.0 Introduction

SLR Consulting Limited (SLR) was commissioned by Gleeson Developments Limited (Gleeson) to produce an Ecological Impact Assessment (EcIA) for a site known as Lockwood Road, Goldthorpe. The EcIA has been completed in order to inform a planning application for residential development.

This EcIA has been informed by the following ecological survey work, undertaken between December 2020 and April 2021:

- Desk study;
- Habitat survey;
- Preliminary protected species appraisal;
- Great crested newt (GCN) (*Triturus cristatus*) eDNA survey;
- Reptile presence/ absence survey; and
- Spring season bat activity survey.

1.1 Site Description

The application site (herein referred to as the “Site”) is located on the north-eastern outskirts of the village of Goldthorpe, South Yorkshire (approximate OS central grid reference: SE 464 046). The Site is situated approximately 10 km north-west of Doncaster, 11 km south-east of Barnsley and 20 km north-east of Sheffield.

The Site comprises a large species-poor grassland field in the north-western section, a series of small horse paddocks and allotments with sheds and horse shelters in the central section, and an unmanaged species-poor grassland field in the southern section of the Site, interspersed with scrub and tall ruderal vegetation. The horse paddocks and allotments vary from short-sward heavily grazed grassland to unmanaged tussocky grassland with scrub and tall ruderals. An area of dense bramble (*Rubus fruticosus* agg.) scrub with broad-leaved woodland margins forms the eastern-most end of the Site. The fields and allotments are divided by a series of fences, scattered elder (*Sambuccus nigra*) scrub and defunct hedgerows.

The northern margin of the Site is bounded by woodland and the A635 road, beyond which lies an extensive area of publicly accessible woodland and grassland, known as Phoenix Park. A mosaic of arable land and woodland lies to the east of the Site, and the residential area of Goldthorpe lies adjacent to the Site to the south-east, south, and west. Dearne Goldthorpe Primary School, Saint John and St Mary Magdelene Goldthorpe, and Goldthorpe Parish Hall abut the Site to the south and west. Phoenix Park, a community sculpture park with woodland and grassland managed by The Land Trust lies to the north and north-west of the Site beyond the A635, and the village of Thurscoe lies further beyond. The wider landscape is made up of open agricultural land with scattered villages and pockets of woodland. The River Dearne corridor lies approximately 2.4 km to the south.

1.2 Details of the Proposed Development

The proposed Site layout is provided in Appendix 1.

Proposals involve the construction of 137 residential units, along with associated infrastructure such as driveways and residential gardens. An area of Public Open Space is proposed in the northern portion of the Site, along with a Sustainable Drainage System (SuDS) basin. Access would be via East Street to the south.

1.3 Purpose of Report

The purpose of this EclA is to:

- Describe the baseline data collection and assessment methodologies used;
- Summarise the baseline ecological conditions;
- Identify important ecological receptors, and describe all potentially significant ecological effects associated with the proposed development;
- Set out the design, mitigation and compensation measures required to ensure compliance with nature conservation legislation and to address any potentially significant ecological effects;
- Identify how mitigation and compensation measures will/ could be delivered;
- Provide an assessment of the significance of any residual effects; and
- Identify opportunities for ecological enhancement and describe how these would be delivered.

1.4 Evidence of Technical Competence and Experience

This report has been prepared by Mrs Hazel Douglas MBiolSci, Associate Ecologist with SLR Consulting. The technical review has been undertaken by SLR Principal Ecologist Mr Gary Oliver MSc BSc Cenv MCIEEM.

Hazel has over seven years of professional ecological consultancy experience. Hazel has extensive experience in EclA, habitat and protected species survey, and holds numerous Natural England protected species survey licences. She has worked on projects from a number of sectors including residential, power and infrastructure.

Gary has over 25 years' relevant experience within ecological consultancy, is a competent botanist and ornithologist, holds numerous Natural England protected species survey licences, and is highly experienced in EclA.

Ecology surveys were all undertaken by suitably qualified, licensed and experienced personnel. The habitat survey was undertaken by Hazel Douglas; the GCN eDNA survey was undertaken by Senior Field Ecologist Mr Nick Bell BA QCIEEM (Natural England GCN survey licence number: 2018-37986); and the reptile and bat activity surveys were undertaken by Nick Bell, Senior Field Ecologist Dr Dan Alexander PhD PgCert BSc SCIEEM and Project Ecologist Ms Julia Kozlowksa.

1.5 Relevant Legislation and Policy

Relevant Legislation and National Planning Policy is summarised in Appendix 2. A summary of relevant local planning policy is provided below.

1.5.1 Barnsley Local Plan

Barnsley Local Plan¹, adopted in January 2019, has the following relevant policies related to nature conservation:

Policy CPS 3 Sustainable Drainage Systems

"All developments will be expected to use Sustainable Drainage Systems (SuDS). Only in exceptional circumstances, where it can be demonstrated that all types of SuDS are impractical, will other drainage management systems be permitted."

¹<https://www.barnsley.gov.uk/services/planning-and-buildings/local-planning-and-development/our-local-plan/barnsleys-local-plan/>

Policy GI1 Green Infrastructure

“We will protect, maintain, enhance and create an integrated network of connected and multi-functional Green Infrastructure assets that:

- Provides attractive environments where people want to live, work, learn, play, visit and invest;*
- Meets the environmental, social and economic needs of communities across the borough and the wider City Regions;*
- Enhances biodiversity and landscape character;*
- Improves opportunities for recreation and tourism;*
- Respects local distinctiveness and historical and cultural heritage;*
- Maximises potential economic and social benefits; and*
- Secures and improves linkages between green and blue spaces.*

At a strategic level Barnsley’s Green Infrastructure network includes the following corridors which are shown on the Green Infrastructure Diagram:

- River Dearne Valley Corridor;*
- River Dore Valley Corridor;*
- River Don Valley Corridor;*
- Dearne Valley Green Heart Corridor;*
- Historic Landscape Corridor.*

The network of Green Infrastructure will be secured by protecting open space, creating new open spaces as part of new development, and by using developer contributions to create and improve Green Infrastructure..”

The Site does not fall within the Green Infrastructure Corridor network.

Policy GS1 Green Space

“We will work with partners to improve existing green space to meet the standards in our Green Space Strategy.

Green Spaces are green open areas which are valuable for amenity, recreation, wildlife or biodiversity and include types such as village greens, local open spaces, country parks, formal gardens, cemeteries, allotments, woodlands, recreation grounds, sports pitches and parks.

Proposals that result in the loss of green space, or land that was last used as green space, will not normally be allowed unless:

- An assessment shows that there is too much of that particular type of green space in the area which it serves and its loss would not affect the existing and potential green space needs of the borough; or*
- The proposal is for small scale facilities needed to support or improve the proper function of the green space; or*
- An appropriate replacement green space of equivalent or improved quality, quantity and accessibility is provided which would outweigh the loss.*

In order to improve the quantity, quality and value of green space provision we will require qualifying new residential developments to provide or contribute towards green space in line with the standards set out in the Green Space Strategy and in accordance with the requirements of the Infrastructure and Planning Obligations Policy. The Supplementary Planning Document ‘Open Space Provision on New Housing Developments’ offers

guidance to developers on what will be expected in terms of open space provision in order to achieve those standards.

Where there is a requirement to provide new green space an assessment will be carried out to determine the most appropriate provision, taking into account site characteristics and constraints. In cases where it is deemed unsuitable to make provision for open space within or adjacent to a development site, suitable off-site open space facilities may be acceptable either as new facilities or improvements to those existing. Where appropriate new green space should secure access to adjacent areas of countryside."

Policy BIO1 Biodiversity and Geodiversity

"Development will be expected to conserve and enhance the biodiversity and geological features of the borough by:

- Protecting and improving habitats, species, sites of ecological value and sites of geological value with particular regard to designated wildlife and geological sites of international, national and local significance, ancient woodland and species and habitats of principal importance identified via Section 41 of the Natural Environment & Rural Communities Act 2006 (for list of the species and habitats of principal importance) and in the Barnsley Biodiversity Action Plan.*
- Maximising biodiversity and geodiversity opportunities in and around new developments.*
- Conserving and enhancing the form, local character and distinctiveness of the boroughs natural assets such as the river corridors of the Don, the Dearne and Dove as natural floodplains and important strategic wildlife corridors.*
- Proposals will be expected to have followed the national mitigation hierarchy (avoid, mitigate, compensate) which is used to evaluate the impacts of a development on biodiversity interest.*
- Protecting ancient and veteran trees where identified.*
- Encouraging provision of biodiversity enhancements.*

Development which may harm a biodiversity or geological feature or habitat, including ancient woodland and aged or veteran trees found outside ancient woodland, will not be permitted unless effective mitigation and/ or compensatory measures can be ensured.

Development which adversely effects a European Site will not be permitted unless there is no alternative option and there are imperative reasons of overriding public interest (IROPI)."

Site HS46 Land North of East Street, Goldthorpe Indicative number of dwellings 125

The Local Plan also has the following text relating specifically to the Site housing allocation:

"The development will be expected to:

- Retain and manage habitat at the north-east part of site (grassland, herbs and trees) plus hedgerows on the site."*

1.5.2 Supplementary Planning Document: Biodiversity and Geodiversity

This document², adopted May 2019, expands on policies BIO1, GI1 and GS1, and goes into detail on expectations relating to the Dearne Valley Green Heart Nature Improvement Area (NIA). The Site lies within Dearne Valley Green Heart NIA.

² Barnsley Metropolitan Borough Council (2019) Barnsley Local Plan Supplementary Planning Document: Biodiversity and Geodiversity: Adopted May 2019.

Dearne Valley Green Heart NIA is designed to help restore and enhance the ecological networks of the River Dearne, its floodplain, and its links to habitats on surrounding slopes and hills. At its core will be a 1300 ha reedbed, wet grassland, wet woodland and woodland, with a 2,690 ha buffer area of farmland, amenity grassland, and reclaimed industrial areas where biodiversity value will be enhanced. Priority species for Dearne Valley Green Heart NIA are: lapwing (*Vanellus vanellus*), redshank (*Tringa totanus*), snipe (*Gallinago gallinago*), wintering teal (*Anas crecca*), wintering wigeon (*Mareca penelope*), wintering bittern (*Botaurus stellaris*), barn owl (*Tyto alba*), willow tit (*Poecile montanus*), water vole (*Arvicola amphibius*), brown hare (*Lepus europaeus*), noctule (*Nyctalus noctula*), grass snake (*Natrix helvetica*), dingy skipper (*Erynnis tages*) and wild flowers.

Within Dearne Valley Green Heart NIA specific biodiversity enhancements with developments over and above the minimum mitigation/ compensation measures are required. The Local Planning Authority (LPA) will not support applications that would damage the ecological network and cause a net-loss in biodiversity in line with the NPPF. Compensation is very much a last resort (over avoidance and mitigation). At the time of writing there was no nationally-agreed system for measuring biodiversity compensation however the LPA may choose to adopt such a 'metric' and apply it in cases where compensation works are the only possible solution, in which case a new policy will be produced and publicised. Until such time the LPA will continue to use its best judgement, based on precedents, as to what the appropriate compensation amount, as a monetary value, should be.

1.5.3 Supplementary Planning Document: Trees and Hedgerow

This document³, adopted May 2019, gives further guidance around Tree Preservation Orders, Important Hedgerows and Conservation Areas. Where trees and hedgerows are situated in close proximity to a proposed development a Tree Survey is required, and impacts must be evaluated fully. Development layouts should retain high value trees and hedgerows, and trees must be protected during development.

1.5.4 Barnsley Local Biodiversity Action Plan

Barnsley Biodiversity Action Plan (BAP)⁴ (first published in 2002, revised in 2009, with a further revision currently underway) describes the diversity of habitats and wildlife species found in Barnsley. It sets out those that are a priority for conservation and how this can be achieved.

It contains a series of Habitat Action Plans (HAPs), those of most relevance to the site are: lowland mixed deciduous woodland, hedgerows, lowland meadows and arable field margins.

It also contains a series of Species Action Plans (SAPs), those of most relevance to the site include: hedgehog (*Erinaceus europaeus*), bats, grey partridge (*Perdix perdix*), kestrel (*Falco tinnunculus*), lapwing, barn owl, skylark (*Alauda arvensis*), tree sparrow (*Passer montanus*), great crested newt, dingy skipper and bluebell (*Hyacinthoides non-scripta*).

³ Barnsley Metropolitan Borough Council (2019) Barnsley Local Plan Supplementary Planning Document: Trees and Hedgerows: Adopted May 2019.

⁴ Barnsley Biodiversity Trust (2009) Barnsley Biodiversity Action Plan.

2.0 Methodology

2.1 Scope

This EclA covers the assessment of potential impacts of the proposed residential development upon statutory and non-statutory designated sites and protected and notable habitats and species. The scope of this EclA, i.e. the collection of baseline data, evaluation of ecological resources and description and assessment of the significance of impacts, follows guidelines set out by the Chartered Institute of Ecology and Environmental Management (CIEEM)⁵ and references therein.

The baseline ecological surveys covered all land within the Site; the Site boundary is shown in Drawing 1.

The study area was extended for certain ecological features/ species, as described in Sections 2.2.2 – 2.2.6. Ecological surveys have been based upon the relevant guidance for each species or habitat feature concerned.

2.2 Baseline Data Collection

2.2.1 Desk Study

The data search area lies within the area covered by both Barnsley Biological Records Centre (BBRC) and Doncaster Local Records Centre (DLRC). As such, a desk study was commissioned from both of these local records centres in November 2020, comprising records of protected and otherwise notable species, and non-statutory designated sites for nature conservation, within a 1.5 – 2 km radius of the Site (for BBRC and DLRC respectively). Due to the very large number of species records returned, the raw species data from the records companies has not been appended to this report, however summaries are provided in Section 3.3 of this report. A copy of the raw species data can be provided upon request.

Aerial imagery (Google satellite⁶) for the Site and surrounding area were reviewed, to provide an indication of the broad habitat types within the Site and surrounding area, for context.

An internet-based desk study was also undertaken, whereby the Multi-Agency Geographic Information for the Countryside (MAGIC) website⁷ was searched for statutory designated sites (such as Sites of Special Scientific Interest (SSSI)) within 2 km of the Site (extended to 5 km for internationally designated sites such as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs)), and ancient woodland listed on the Ancient Woodland (England) inventory, priority habitats listed on the Priority Habitats Inventory (England), and European Protected Species (EPS) Licences granted within 1 km of the Site. The local planning portal⁸ was also searched for recent⁹ planning applications within 1 km of the Site, so that any relevant ecological information could be reviewed.

2.2.2 Habitat Survey

A habitat survey was undertaken on the 14th December 2020, which was augmented by an additional visit on the 15th April 2021, by Mrs Hazel Douglas on both occasions.

⁵ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

⁶ <https://www.google.co.uk/maps/>

⁷ <http://magic.gov.uk>

⁸ <https://www.barnsley.gov.uk/services/planning-and-buildings/view-or-comment-on-planning-applications/>

⁹ Planning applications submitted within the last 5 years were reviewed for ecological information using the interactive planning maps.

Habitats within the Site were categorised and mapped following the UK Habitat Classification (UKHab) methodology (Professional Edition, version 1.1¹⁰). Detailed habitat descriptions have been taken in the form of Target Notes (see Appendix 4), and habitat descriptions are summarised in Section 3.2 of this report. UKHab is a unified and comprehensive approach to classifying habitats, developed by a steering group of professional ecologists, suitable for habitat metrics and impact assessment. A Minimum Mapping Unit (MMU) of 25m² was used. Habitats were classified to Level 5 of the Primary Hierarchy where possible, and all mandatory secondary codes were used, along with optional secondary codes where relevant.

A search was made for non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), such as Japanese knotweed (*Fallopia japonica*) and Himalayan balsam (*Impatiens glandulifera*).

2.2.3 Preliminary Protected Species Appraisal

In addition to the habitat survey, habitats and features with the potential to support protected and/ or conservation priority fauna, together with any field signs of such species were searched for.

The Site and a 30m buffer (where accessible) was searched for badger (*Meles meles*) setts and field signs.

Ponds within the Site and a 250m radius were identified using OS mapping, and accessible ponds within this radius (where not separated from the Site by major barriers to dispersal) were subject to a Habitat Suitability Index (HSI) assessment to gauge their potential to support GCN, using standard methodology¹¹.

All buildings within the Site and all trees within or overhanging the Site were subject to a Preliminary Bat Roost Assessment. Trees were searched from the ground for Potential Roosting Features (PRFs); the surveyor was aided with the use of binoculars and a powerful Clulite torch. Buildings were subject to an internal (where accessible, see Section 2.2.7) and external building inspection; the interiors were searched for evidence of bat occupation such as droppings, feeding remains, scratch marks, urine staining or bats themselves. The exterior of the buildings were also inspected for evidence of bat occupation such as droppings on windowsills or walls; potential bat access and egress points were recorded. The trees and buildings were subject to an assessment to gauge their potential to support roosting bats (Negligible, Low, Moderate or High), using criteria within the third edition of the Bat Conservation Trust's Good Practice Guidelines¹² (shown in Table 2-1).

The Site was assessed for its potential to support an invertebrate assemblage of conservation significance. The Site was also assessed for its potential to support nesting birds, and an assemblage of breeding birds of conservation value; incidental bird sightings were recorded. The Site was also assessed for its potential to support reptiles and riparian mammals.

¹⁰ <http://ecountability.co.uk/ukhabworkinggroup-ukhab>

¹¹ Oldham, R.S., Keeble, J., Swan, M.J.S., and Jeffcote, M. (2000) Evaluating the Suitability of Habitat for the Great Crested Newt (*Triturus cristatus*). *Herpetological Journal* 10: 143-155

¹² Collins (2016) Collins, J. (2016) *Bat Surveys for Professional Ecologists. Good Practice Guidelines. Third edition.* Bat Conservation Trust, London.

Table 2-1: Criteria for Assessing Bat Roost Potential of Buildings and Trees

Category (Bat Potential)	Description
Negligible value	Building or tree where surveyor has not identified any suitable potential roosting features, or where those that are present are of such poor quality or condition ¹³ , that bats are highly unlikely to use them.
Low value	Building or tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats.
Moderate value	Building or tree with one or more potential roost site that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but which are unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).
High value	Building or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Adapted from Collins, 2016¹²

2.2.4 Great Crested Newt eDNA Survey

One pond was sampled for the presence of GCN environmental DNA (eDNA), located 150m to the north-west of the Site within Phoenix Country Park (Pond P1 in Drawing 2).

A ditch (D1a-D1c in Drawing 1) was identified immediately north of the Site, and although three sections were found to hold some water in December 2020, the ditch was found to be completely dry when re-inspected in April 2021. The ditch was therefore scoped out of GCN eDNA survey. No further waterbodies were identified within the Site or a 250m radius.

Pond P1 was sampled for the presence of GCN eDNA on the 15th April 2021, within the survey window for the Natural England approved protocol¹⁴. As per the Natural England approved protocol¹⁴, twenty samples were collected from the pond using sterile equipment provided by ADAS, at points evenly spread out along the pond perimeter, such that a minimum of 80% of the margins were sampled. The water at each sampling area was gently stirred using sterile equipment before samples were taken, to mix up DNA which tends to sink, whilst ensuring that sediment on the pond bottom was not disturbed, where historical DNA can persist. Pond P1 was previously sampled in relation to a different scheme, during which ADAS laboratory reported that the samples had formed a white precipitate, which inhibited the DNA analysis process and led to an indeterminate result. This can happen when ponds are polluted. Therefore, following advice from ADAS laboratory, the water samples from pond P1 were passed through a filter which filtered out contaminants from the water that were inhibiting the DNA extraction process.

The samples were then sent to ADAS laboratory for analysis. According to Biggs *et al.* (2014)¹⁴ GCN DNA can be detected within the pond water for up to 21 days after a GCN (including eft) has left the water; a 99.3 % detection rate is achieved when 80 – 90 % of the waterbody margin is sampled.

¹³ For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

¹⁴ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.

In order to avoid contamination, the surveyors avoided entering the water. Latex gloves were worn when sampling and only sterile equipment came into contact with the water.

2.2.5 Reptile Presence/ Absence Survey

The reptile survey method employed was based on good practice guidelines published by the HGBI (1998)¹⁵, Froglife (1999)¹⁶ and Gent and Gibson (2003)¹⁷.

This involved the deployment of 100 artificial refuges (large sections of heavy-duty roofing felt) which, due to their heat retaining characteristics, are attractive to basking reptiles, particularly during the spring or autumn months or the early or later parts of the day during summer. Refuges were deployed at a minimum density of 10 per hectare within suitable habitat. This included rough grassland fields, scrub and woodland edges, and allotments within the Site.

The locations of the refuges are shown in Drawing 3.

Although not specifically deployed to survey for amphibians, refuges can also be used as a place of shelter by amphibians; therefore, where encountered amphibians were also recorded.

The refuges were deployed on 5th March 2021 and then allowed to bed-in for 12 days. They were subsequently inspected seven times between 17th March and 26th April 2021, before being removed.

Each of the reptile refuge inspections were combined with 'passive searching', whereby potentially suitable habitat was searched for reptiles basking on, for example, tufts of grass, or logs. Surveys were only conducted in suitable weather conditions.

2.2.6 Bat Activity Survey

2.2.6.1 Spring Walked Bat Activity Transect Survey

In order to determine the level of bat activity across the Site, the species of bat using the Site, and to identify any areas which have particular value to foraging or commuting bats, a spring season walked bat activity transect survey was undertaken on the 26th April 2021.

Following a daytime walkover to scope the Site for habitats and specific landscape features which could be of importance to bats, a transect route was devised (see Drawing 4), passing through the full range of habitats present on the Site.

The survey commenced at sunset and lasted for 2 hours and 15 minutes. The surveyors walked along the transect route, stopping at 20 pre-defined sample points to record the number of bat passes for a five minute period. The surveyors recorded all observed bat passes; noting the time, the location and, where possible, the direction of flight, species and behaviour of the bat (i.e. commuting, foraging, or social calling, where this was evident).

A 'bat pass' is defined as a single event (for example, a bat flying past a sample point, whilst commuting elsewhere); it may also involve 'repeated passes' by the same bat, for example arising from continuous bat foraging activity. Where bat activity is continuous, a bat pass is defined as being no longer than 10 seconds of constant echolocation; therefore, the maximum number of bat passes that can arise from a single foraging bat per minute, is six.

¹⁵ Herpetofauna Groups of Britain and Ireland (HGBI) (1998) *Evaluating local mitigation/ translocation programmes: maintaining best practice and lawful standards*. HGBI advisory notes for amphibian and reptile groups HGBI c/o Froglife, Halesworth

¹⁶ Froglife (1999) *Reptile Survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10. Froglife, Halesworth.

¹⁷ Gent, T. and Gibson, S. (2003) *Herpetofauna Workers Manual*. JNCC, Peterborough.

Temperature, wind speed/ direction and cloud cover were recorded at the beginning and end of the survey, along with any significant weather changes during the survey (e.g. heavy showers). Surveyors were equipped with a Duet (Batbox Ltd) combined frequency division and heterodyne bat detector, and an Anabat Express (Titely Scientific) static detector recording device.

2.2.6.2 Spring Static Bat Detector Activity Survey

The transect survey was supplemented by the use of static bat detectors, comprising Anabat Express (Titely Scientific) units, which were deployed at six fixed locations within the Site, for 11 consecutive nights of recording between 15th April and 26th April 2021. The sample locations (A – F) are shown in Drawing 4, and were chosen to represent all main habitat types on the Site which could be used by bats. The locations were as follows:

- A (OS grid reference: SE 46730 04745) – dense scrub at the eastern end of the Site;
- B (OS grid reference: SE 46467 04624) – dense hedgerow in the centre of the Site;
- C – (OS grid reference: SE 46549 04624) - scrub and rough grassland mosaic at the southern end of the Site;
- D (OS grid reference: SE 46545 04705) – short grassland field adjacent to defunct hedgerow in the centre of the Site;
- E (OS grid reference: SE 46545 04705) – margin of horse-grazed field in north-west corner of the Site; and
- F (OS grid reference: SE 46410 04740) – woodland edge habitat on northern boundary of the Site.

Bat Call Analysis

Bat recordings were analysed using AnalookW software, for identification (to species level where possible).

The bat species echolocation guides provided by Russ (2012)¹⁸ were used to identify bat calls to species or species group (identifying some bats to species level by call alone is not always possible, with a high degree of certainty). The guides, which are based on the frequency of the call containing maximum energy, were used in conjunction with other features, such as call shape and habitat, to aid species identification.

If calls exhibited echolocation parameters between the ranges for noctule and Leisler's (*Nyctalus leisleri*) bats, the calls were classified as noctule/ Leisler's. *Myotis* bats were not differentiated to species level due to the amount of overlap in echolocation parameters exhibited by the *Myotis* species group.

2.2.7 Limitations

Desk Study

Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that important habitats or protected species not identified during the data search do in fact occur within the vicinity of the Site. Interpretation of maps and aerial photography has been conducted in good faith, using recent imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field study area.

Field Survey

Lack of evidence of a protected species at the time of survey does not necessarily preclude them from being present intermittently, or at a later date.

The initial habitat survey was undertaken in December 2020, outside of the optimal period for botanical survey, however additional habitat notes were gathered in April 2021 within the growing season, therefore this is not considered to be a significant constraint.

¹⁸ Russ, J. (2012) *British Bat Calls: A Guide to Species identification*. Pelagic Publishing, Exeter.

The two small grassland field areas at the western end of the Site were not directly accessible, however these areas could be easily viewed through boundary fencing, and the habitats within these compartments were inspected from the margins, such that it was possible to record and map the habitat types present.

Some areas of the Site contained very dense scrub, such as the bramble scrub at the far eastern end of the Site. This hampered efforts to search for badger setts, however significant effort was deployed searching the Site and margins of the scrub areas for badger field evidence, and it is considered unlikely that a badger sett would have been missed should it be present on the Site.

The use of a filter in the GCN eDNA water sampling process deviates from the Natural England approved methodology¹⁴, as it is not possible to undertake a degradation control test, which tests for the degradation of eDNA between taking the sample and analysing the samples. However, ADAS states that the filter methodology is a frequently used practice within analytical laboratories. The study on the efficacy of eDNA testing¹⁴, on which the Natural England approved method is derived from, did not have any instances of the eDNA within the samples degrading; nonetheless a degradation control is included in the approved methodology as a precaution. Given the results of the eDNA study and the fact that the samples were analysed quickly, the likelihood of obtaining a false negative result due to degradation in the sample is very low. As such, it is considered that the sampling provides a valid result on the presence or absence of GCN eDNA within the pond.

Only spring season bat activity surveys were completed. However, additional survey effort was employed in the spring season survey, which goes above the minimum survey effort recommended within the Bat Conservation Trust guidelines¹² for a site of low value for bats (i.e. additional static detectors and an extended static detector recording period was used). It is considered that sufficient information has been collected to determine the species/ species groups of bats using the Site and identify any key favoured areas for bats within the Site.

Additional bat activity data will be collected in the summer and autumn periods and provided as Supplementary Environmental Information during the determination period, to provide supplementary information on the use of the Site by bats at these times of year.

No significant limitations to the reptile survey were identified.

2.3 Assessment Approach

The ecological evaluation and impact assessment approach used in this report is based on Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland ("CIEEM guidelines")¹⁹.

2.3.1 Important Ecological Receptors

Ecological features can be important for a variety of reasons and the rationale used to identify them is explained in the text. Importance may relate, for example, to the quality or extent of the site or habitats therein; habitat and/ or species rarity; the extent to which such habitats and/ or species are threatened throughout their range, or to their rate of decline.

Determining Importance

The importance of an ecological feature should be considered within a defined geographical context. The following frame of reference has been used in this case, relying on known/ published accounts of distribution and rarity where available, and professional experience:

- International;
- National (i.e. UK/ England);
- Regional (i.e. Yorkshire and the Humber);

¹⁹ CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester

- County (i.e. South Yorkshire); and
- Local (i.e. within *circa* 2 km).

The above frame of reference is applied to the ecological features identified during the desk study and surveys to inform this report.

The value of habitats has been measured against published selection criteria where available. Examples of relevant criteria include: descriptions of habitats listed on Annex 1 of the Habitats Directive; descriptions of habitats of principal importance for biodiversity under Section 41 of Natural Environment and Rural Communities (NERC) Act 2006; Local Wildlife Site Selection Criteria; and Habitat Action Plans (HAPs) contained within Local Biodiversity Action Plans.

In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Reference has therefore been made to published lists and criteria where available. Examples of relevant lists and criteria include: species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive); species of principal importance for biodiversity under Section 41 of the NERC Act 2006 and Birds of Conservation Concern²⁰.

For the purposes of this report ecological features of Local importance or greater and/or subject to legal protection have been subject to detailed assessment. Effects on ecological features of less than local importance and/or not subject to specific legal protection are considered unlikely to be significant in legal or policy terms.

2.3.2 Impact Assessment

The impact assessment process involves the following steps:

- identifying and characterising potential impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

When describing impacts, reference has been made to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process or feature, e.g. the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of wet grassland.

²⁰ Eaton, M.A., Aebischer, N.J., Brown, A., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A., & Gregory, R.D. (2015). Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. *British Birds*, 108: 708-746.

Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area; and
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

2.3.3 Significant Effects

The concept of ecological significance is addressed in paragraphs 5.24 through to 5.28 of the CIEEM guidelines. Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of EclA, a 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/ local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

2.3.4 Cumulative Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed development results in individually insignificant impacts that, when considered in-combination with impacts of other proposed or permitted plans and projects, can result in significant effects. Planning applications within the last five years within a 1 km radius of the Site have been considered in the cumulative effects assessment.

2.3.5 Avoidance, Mitigation, Compensation and Enhancement

When seeking mitigation or compensation solutions, efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved.

Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement.

It is important for the EclA to clearly differentiate between avoidance, mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided, e.g. through the scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact *in situ*;
- Compensation describes measures taken to offset residual effects, i.e. where mitigation *in situ* is not possible; and

Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

3.0 Baseline Ecological Conditions

3.1 Designated Sites

3.1.1 Statutory Designated Sites

There are no locally or nationally designated statutory sites within a 2 km radius of the Site, and there are no internationally statutorily designated sites within a 5 km radius of the Site.

As such, statutory designated sites would not be affected by the development proposals, and are scoped out from further assessment.

3.1.2 Non-Statutory Designated Sites

There are six Local Wildlife Sites (LWSs) within a c. 1.5 km radius of the Site, all of which fall within Doncaster Metropolitan Borough Council boundary, as summarised in Table 3-1. LWS locations and citations are provided in Appendix 3.

Table 3-1: Local Wildlife Sites within 1.5 km of the Site

Site	Location from Site	Description
Hickleton Park LWS	0.95 km south-east	Extensive areas of parkland/ wood pasture, mixed deciduous woodland plantations and more formal ornamental gardens and trees around Hickleton Hall. Designated for its woodland, parkland/ wood pasture, semi-natural grassland and standing water.
Hickleton Golf Course LWS	1.05 km north-east	A golf course with original ridge and furrow, species-rich hedgerows and remnant parts of broadleaved woodland. Designated for its woodland and standing water habitat.
Calf Croft LWS	1.1 km north-east	Small broad-leaved plantation woodland site, designated for its woodland habitat with floristic interest.
Castle Hill, Hickleton LWS	1.4 km north-east	Broad-leaved plantation woodland site, designated for its woodland habitat.
Shrogs Plantation LWS	1.6 km north-east	Small broad-leaved plantation woodland site, designated for its woodland habitat.
Hickleton Spring LWS	1.65 km north-east	Mixed and broad-leaved plantation woodland site, designated for its woodland habitat.

Due to the lack of ecological connectivity, the separation distance of 0.95km or further, and the fact that they are designated for habitat/ botanical reasons (primarily woodland and parkland habitat), the six LWSs listed in Table 3-1 would not be impacted by the proposals, and are scoped out from further assessment.

3.1.3 Ancient Woodland and Priority Habitat Inventory

There is one area mapped as ancient woodland on the Ancient Woodland (England) Inventory within 1 km of the Site, located approximately 0.95 km to the south-east.

There are several areas within 1 km of the Site mapped as deciduous woodland or Open Mosaic Habitat, on the Priority Habitat (England) Inventory, although none of these areas fall within 200m of the Site.

Given their separation distance from the Site, Ancient Woodland and priority habitats within a 1 km radius of the Site are not predicted to be impacted upon by the proposals, and are not discussed further.

3.2 Habitats

The results of the habitat survey is illustrated in map form (Drawing 1), and Target Notes are provided in Appendix 4. A summary of each habitat type is presented below.

3.2.1 Modified grassland (g4)

The majority of the Site comprises species-poor modified grassland, which has been somewhat agriculturally improved, mostly with horse grazing.

The largest field in the north-western part of the Site (Target Note (TN) 1; Plate 1) shows evidence of horse grazing as well as rabbit grazing. It is mostly short-sward (as short as 3 cm) with some slightly longer patches throughout, up to a sward height of 15 cm. Grasses within the sward include perennial ryegrass (*Lolium perenne*), Yorkshire fog (*Holcus lanatus*), cock's-foot (*Dactylis glomerata*) and meadow-grasses (*Poa* spp.). Herbs within the sward were reasonably limited, mostly comprising common agricultural species such as broad-leaved dock (*Rumex obtusifolius*), common nettle (*Urtica dioica*), creeping thistle (*Cirsium arvense*), dandelion (*Taraxacum officinale* agg.), creeping buttercup (*Ranunculus repens*), white clover (*Ranunculus repens*), broadleaf plantain (*Plantago major*) and common ragwort (*Senecio jacobaea*).



Plate 1: Large field of grazed modified grassland in the north-west part of the Site (TN 1), looking east

The central sections of the Site also comprise of primarily horse-grazed species-poor modified grassland, although these are sub-divided into small sections, divided by fences, scrub and defunct hedgerows. The grassland within these smaller sections are mostly heavily horse-grazed and/ or short-sward (TN 2; Plate 2), and in some cases trampled with some bare ground, particularly in front of horse shelters. One section (TN 3) is grazed by ducks. The grassland swards in these smaller fields have a very similar species-poor assemblage to the grassland in the larger northern field.



Plate 2: Example of small heavily horse-grazed field (TN 2)



Plate 3: Duck-grazed compartment in the centre of the Site (TN 3)

Several of the smaller sub-divided central sections do not appear to be regularly grazed/ cut, and appear to be subject to minimal management (TN 4). In these areas, the grassland sward is interspersed with a high proportion of tall ruderal species, primarily common nettle, creeping thistle, mugwort (*Artemisia vulgaris*) and rosebay willowherb (*Chamerion angustifolium*). Scattered scrub is also present within these compartments, with frequent bramble, along with occasional elder and hawthorn (*Crataegus monogyna*) scrub (more dense areas of scrub are described in Section 3.2.3). One of the compartments (TN 5; Plate 4) has reasonably sparse ground where there are high levels of ground disturbance, for example from fires. This compartment is made up almost entirely from tall ruderals, such as common nettle, cleavers (*Galium aparine*), mugwort, common ragwort,

rosebay willowherb and groundsel, along with bramble scrub and occasional grasses such as false oat-grass (*Arrhenatherum elatius*), cock's-foot and red fescue (*Festuca rubra*).

The majority of these smaller central sections have frequent piles of material and rubble such as wood and fence posts, along with caravans, vehicles and other miscellaneous items.



Plate 4: Disturbed ground supporting tall ruderal vegetation (TN 5)

The large southern-most field (TN 6, Plate 5) is an unmanaged species-poor grassland field with a tall sward. It supports frequent cock's-foot, Yorkshire fog, false oat-grass, couch-grass (*Elymus repens*), common bent (*Agrostis capillaris*) and occasional red fescue (*Festuca rubra*) and meadow-grasses (*Poa* spp.).

Herbs are limited to frequent ribwort plantain (*Plantago lanceolata*) along with occasional creeping buttercup, white clover and common chickweed (*Stellaria media*). There is also a high tall ruderal component, particularly along the margins but also in patches in the field interior, with frequent common nettle, creeping thistle, mugwort and occasional hogweed (*Heracleum sphondylium*), common ragwort and burdock (*Arctium* sp.).

The margins, along with some patches in the centre, support bramble scrub along with occasional elder, garden privet (*Ligustrum ovalifolium*) and sycamore (*Acer pseudoplatanus*) saplings. There are several rubble piles and discarded furniture etc. scattered within the field.

The modified grassland is species-poor and ubiquitous within the local landscape, and is therefore assessed as being of less than local ecological importance.



Plate 5: Large unmanaged grassland field at the southern end of the Site (TN 6)

3.2.2 Allotments (u1 910)

A number of the smaller compartments in the eastern part of the Site comprise allotments which are used to grow fruits and vegetables, made up of vegetable plots interspersed with mown grassland strips (TN 7; Plate 6).



Plate 6: Allotment gardens (TN 7)

Given the managed and disturbed nature of the allotment plots, the allotments are assessed as having less than local ecological value.

3.2.3 Dense bramble scrub (h3d), blackthorn scrub (h3a) and mixed scrub (h3h)

The most significant area of dense scrub is at the far eastern end of the Site (TN 8; Plate 7). Here, the majority is made up of very dense bramble scrub. There is also occasional hawthorn, elder and cherry (*Prunus avium*) amongst the bramble, along with some common nettle and rosebay willowherb. Along the northern margin of this section, the scrub is less dominated by bramble and supports cherry, elder, hawthorn, privet and pedunculate oak (*Quercus robur*). This grades into scrubby woodland to the east, as described in Section 3.2.4.

There are also smaller areas of dense scrub in the southern field (TN 1), comprising mainly bramble, along with occasional elder and privet. Bramble scrub also occurs in some unmanaged sections in the centre of the Site, and a small patch of blackthorn (*Prunus spinosa*) occurs on the northern boundary. Scattered elder scrub, indicative of remnant hedgerows, occurs along some of the compartment boundaries in the centre of the Site.



Plate 7: Dense scrub at the eastern end of the Site (TN 8)

The dense bramble scrub and the scattered scrub across the Site is species-poor and assessed as being of less than local ecological importance. The mixed scrub along the north-eastern boundary has a slightly more diverse structure and species mix, and is linked with off-Site scrub and woodland habitat along the A635. The mixed scrub is therefore assessed as being of up to local ecological importance.

3.2.4 Other lowland mixed deciduous woodland (w1f7)

A small area of planted scrubby woodland occurs at the far eastern end of the Site, around the margins of the larger scrub area. The trees are mainly broad-leaved, and comprise a mixture of native and non-native species. Tree and shrub species include cherry, Norway maple (*Acer platanoides*), cypress sp. (*Cupressaceae*), silver birch (*Betula pendula*), sycamore, pedunculate oak, sweet chestnut (*Castanea sativa*), hawthorn and elder. There are a range of tree ages, with several reasonably mature specimens, and some limited pruning/ cutting back appears to have happened recently. The ground flora is reasonably impoverished, with some areas dominated by ivy (*Hedera helix*), and other areas with bramble, common nettle and herb robert (*Geranium robertianum*).



Plate 8: Broad-leaved woodland in the far eastern end of the Site

Scrubby broad-leaved woodland also occurs off-Site to the north (TN 9; Plate 9), between the Site and the A635, set on a bank which mostly slopes up from the Site. The woodland has a large scrub component with frequent hazel (*Corylus avellana*), hawthorn and bramble, with occasional blackthorn, goat willow and rowan (*Sorbus aucuparia*). Canopy species include pedunculate oak, sycamore and silver birch.



Plate 9: Scrubby broad-leaved woodland to the north of the Site (TN 9)

The woodland is assessed as being of local ecological importance.

3.2.5 Hedgerows (h2a and h2b)

The Site contains a number of remnant defunct elder hedgerows which partition the small allotment/ land-holding compartments; these are native hedgerows and therefore qualify as priority habitat (mapped as h2a). Some of the compartment boundaries no longer contain hedgerows, but instead are delineated by fences, and in some cases scattered bramble scrub and very occasional elder scrub; these have been mapped as scattered scrub. There are also several planted garden privet hedgerows; these are mapped as hedgerow (non-priority habitat) (h2b). A description of the hedgerows is provided in Table 3-2.

Table 3-2: Hedgerow descriptions

Hedgerow (Drawing 1)	Description	Photograph
H1	Overgrown defunct species-poor hedgerow c. 5m high x 4m wide, with >50% gaps; very leggy at the base. Dominant hawthorn with occasional holly (<i>Ilex aquifolium</i>). Qualifies as priority habitat.	
H2	Overgrown defunct species-poor hedgerow c. 5m high x 4m wide. Frequent garden privet with occasional elder, hawthorn and holly. Qualifies as priority habitat.	
H3	Overgrown very defunct elder dominated species-poor hedgerow; >70% gaps; c. 5 m high x 4m wide. Qualifies as priority habitat.	
H4	Intact ornamental species-poor garden privet hedgerow, c. 5m high x 4m wide. Non-priority habitat.	

Hedgerow (Drawing 1)	Description	Photograph
H5	Intact ornamental species-poor garden privet hedgerow, c. 5m high x 3-4m wide. Non-priority habitat.	
H6	Overgrown defunct species-poor hedgerow; >20% gaps; c. 4m high x 3-4m wide; contains abundant elder and hawthorn with frequent garden privet and a leylandii tree. Qualifies as priority habitat.	
H7	Defunct species-poor elder hedgerow; 60% gaps; c. 5m high x 3m wide; unmanaged. Qualifies as priority habitat.	
H8	Defunct species-poor elder hedgerow; 10% gaps' c. 4m high x 2m wide. Qualifies as priority habitat.	

The hedgerows do provide some ecological connectivity, however they do not represent high value hedgerows as they are either defunct, species-poor and/ or non-native. However, given the status of the native hedgerows as NERC Act 2006 priority habitats, the native priority hedgerows are assessed as having up to local ecological value and are brought forward for assessment.

3.2.6 Built linear features: fences and walls (u1e)

The compartments within the Site are delineated by a series of fences (a mixture of chain-link, defunct post and wire, and various makeshift fencing such as boards and barbed wire), as well as several smaller lengths of brick or stone wall (for part of the western Site boundary and for a stretch on the north-eastern boundary by the A635). These features have negligible nature conservation interest and are not discussed further.

3.2.7 Line of trees (w1g6) and scattered trees (11)

There is a line of leylandii trees (*Cupressus x leylandii*) forming a continuous boundary feature on part of the western boundary. There are also a small number of scattered individual trees throughout the Site, most of which are semi-mature, comprising leylandii, willow (*Salix* sp.) and sycamore.

Given the predominantly non-native status and lack of mature trees, the line of leylandii trees and scattered trees are assessed as being of less than local ecological importance.

3.2.8 Buildings (u1b5)

There are a large number of garden sheds and horse shelters scattered throughout the Site within the allotment and small land-holding sections. The majority of these are wooden structures with flat roofing felt roofs. There are also several greenhouses, along with several small brick shelters/ sheds with concrete flat roofs. A description and photographs of these structures, along with an assessment of their bat roosting potential, is provided in Section 3.3.6.

The structures have negligible nature conservation value, and are not discussed further (except in relation to bats, see Section 3.3.6).

3.3 Species

3.3.1 Plants

Desk Study Data

DLRC provided 1,620 records of plants, most of which are common and widespread species, predominantly located within the LWSs listed in Table 3-1. Several of the records related to Schedule 9 invasive non-native species, namely: Canadian waterweed (*Elodea canadensis*) and Japanese knotweed, although no records are for the Site itself. There are also several records of native bluebell.

BBRC provided five records for cornflower (*Centaurea cyanus*) within Phoenix Park, and one record for native bluebell within Goldthorpe (exact location information not provided).

Field Survey

A stand of Japanese knotweed, a Schedule 9 invasive non-native species, measuring approximately 10m x 15m, is present on the western boundary of the southern-most field (TN 10).

No rare or protected plant species were recorded on the Site, and the habitats present are generally species-poor and common.

With the exception of Schedule 9 invasive species, plants are therefore scoped out from further assessment.

3.3.2 Invertebrates

Desk Study Data

DLRC and BBRC provided 52 records of insects and four records of molluscs. Notable records include purple hairstreak (*Favonius quercus*), white-letter hairstreak (*Satyrus w-album*), wall butterfly (*Lasiommata megera*), dingy skipper (*Erynnis tages*), cinnabar moth (*Tyria jacobaeae*), and small heath (*Coenonympha pamphilus*). None of these records relate to the Site itself, although some are from the adjacent Phoenix Park.

Field Survey

The Site does not support habitat suitable for any protected invertebrate species such as white-clawed crayfish (*Austropotamobius pallipes*). Although the Site does support a mosaic of habitats which will be used by invertebrates, particularly scrub and hedgerow habitat, the habitats within the Site are generally species-poor

and common, with a lack of rare or notable plant species. The Site is therefore unlikely to support an invertebrate assemblage of high conservation significance. As such, the Site is assessed as being of less than local ecological importance for invertebrates, and invertebrates are scoped out from further assessment.

3.3.3 Amphibians

Desk Study Data

DLRC and BBRC provided six records of GCN, seven records of common toad (*Bufo bufo*), three records of smooth newt *Lissotriton vulgaris*) and ten records of common frog (*Rana temporaria*). Five of the GCN records date from 2011 or 2018 and are from a pond adjacent to Barnburgh Lane, approximately 0.8 km south of the Site. The remaining GCN record dates from 1970 from Barnburgh Hall Pond, located over 2 km from the Site; all GCN records are specified as a single individual.

Field Survey

The Site itself does not contain any ponds or other waterbodies. There is a ditch within the woodland to the north of the Site, which contained some standing water in three discrete sections in December 2020 (shown as D1a, D1b and D1c in Drawing 1), but was completely dry in April 2021. Additionally, a pond/ reedbed was identified in Phoenix Park to the north of the Site (P1 in Drawing 2). Phoenix Park also contains a number of ditches but these are all dry. No further ponds were identified within a 250m radius of the Site.

The results of the HSI assessment to gauge their suitability for GCN is provided in Table 3-3; HSI calculations are provided in Appendix 5.

Table 3-3: Results of HSI Assessments

Pond/ Ditch Ref. (see Drawing 1)	Distance and direction from Site	HSI Score	GCN Suitability	Photograph
D1a	35m north-west	0.58	Below Average	
D1b	30m north	0.49	Poor	

Pond/ Ditch Ref. (see Drawing 1)	Distance and direction from Site	HSI Score	GCN Suitability	Photograph
D1c	8m north	0.47	Poor	
P1	150m north-west	0.86	Excellent	

Pond P1 was subject to an eDNA survey on the 15th April 2021. The ADAS laboratory results are provided in Appendix 6.

Pond P1 tested negative for the presence of GCN eDNA.

Therefore, given the lack of GCN ponds within the Site or a 250m radius, GCN are concluded to be absent from the Site. The Site is unlikely to be important or critical to any other amphibian species. Amphibians are therefore scoped out from further assessment.

3.3.4 Reptiles

Desk Study Data

DLRC provided seven records of grass snake, dating from 1975 – 2012, mostly from the Barnburgh or Hickleton areas, located at least 1.5 km from the Site.

Field Survey

The Site was assessed as having suitability for reptiles, primarily within the less intensively grazed areas of rough grassland, interspersed with scattered and dense scrub, tall ruderals and hedgerows. There are also a number of potential refugias within the Site, such as rubble piles, fence post/ log piles and other debris associated with the allotments and small-holdings.

Reptile refuges were therefore deployed in suitable habitat, the results of which, including the date and time of each survey visit, the weather conditions prevailing during each visit, and the presence of any reptiles or amphibians recorded, is presented in Table 3-4.

Table 3-4: Results of reptile presence/ absence survey

Date	Start time	Temp. start °C	Finish time	Temp. finish °C	Weather	Reptiles	Amphibians
17 th March 2021	14:00	10.5	17:15	11	Partially overcast with sunny intervals, dry, light north-westerly breeze	Nil	Nil
25 th March 2021	10:30	13	12:20	14	Partially overcast with sunny intervals, dry, light south-westerly breeze	Nil	Nil
30 th March 2021	10:20	14	12:15	15	Sunny, dry, calm	Nil	Nil
9 th April 2021	13:35	11	15:25	11	Partially overcast, dry, calm	Nil	Nil
15 th April 2021	12:40	12	15:00	11	Partially overcast, dry, calm	Nil	Nil
19 th April 2021	12:30	14	14:35	14	Sunny, dry, calm	Nil	Nil
26 th April 2021	15:40	13	17:40	12	Partially overcast, dry, light north-westerly breeze	Nil	Nil

No reptiles (or amphibians) were recorded during the presence/ absence survey. As such, reptiles are concluded to be absent from the Site and are not discussed further.

3.3.5 Birds

Desk Study Data

DLRC and BBRC provided 698 bird records. Notable records of most relevance to the Site include mistle thrush (*Turdus viscivorus*), cuckoo (*Cuculus canorus*), starling (*Sturnus vulgaris*), woodcock (*Scolopax rusticola*), song thrush (*Turdus philomelos*), turtle dove (*Streptopelia turtur*), meadow pipit (*Anthus pratensis*), kestrel (*Falco tinnunculus*), bullfinch (*Pyrrhula pyrrhula*), lesser redpoll (*Acanthis cabaret*), skylark, kingfisher (*Alcedo atthis*), yellowhammer (*Emberiza citrinella*), linnet (*Linaria cannabina*), yellow wagtail (*Motacilla flava*), spotted flycatcher (*Muscicapa striata*), redwing (*Turdus iliacus*), fieldfare (*Turdus pilaris*), barn owl, lapwing, willow tit, grey partridge, red kite (*Milvus milvus*), house sparrow (*Passer domesticus*), grasshopper warbler (*Locustella naevia*), hobby (*Falco subbuteo*) and corn bunting (*Miliaria calandra*). Some of the bird records come from Phoenix Park.

Field Survey

The following bird species were recorded incidentally within the Site or close to its margins during the habitat survey:

- Bullfinch (in woodland on the northern boundary) (Amber listed Bird of Conservation Concern²¹);
- Blackbird (*Turdus merula*);
- Great tit (*Parus major*);

²¹ Eaton, M.A., Aebischer, N.J., Brown, A., Hearn, R.D., Lock, L., Musgrove, A.J., Noble, D.G., Stroud, D.A., & Gregory, R.D. (2015). Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man. *British Birds*, 108: 708-746.

- Blue tit (*Cyanistes caeruleus*);
- Wren (*Troglodytes troglodytes*);
- Long-tailed tit (*Aegithalos caudatus*);
- Robin (*Erithacus rubecula*); and
- Jackdaw (*Corvus monedula*).

The grassland habitats within the Site are unlikely to support ground-nesting bird species, due to the high levels of human disturbance and intensive horse-grazing.

The hedgerow, scrub and woodland habitat has suitability for nesting birds, and is likely to support a range of urban-fringe species, as well as some farmland species which are somewhat tolerant to disturbance. The Site has suitability for a number of more common Birds of Conservation Concern such as house sparrow (*Passer domesticus*), starling (*Sturnus vulgaris*) and song thrush (*Turdus philomelos*).

The Site is unlikely to support bird species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended), such as kingfisher (*Alcedo atthis*) or black redstart (*Phoenicurus ochruros*), due to a lack of suitable habitat.

Overall, due to the presence of hedgerows and scrub, the Site is assessed as being of up to local importance for birds, and birds are therefore brought forward for further assessment.

3.3.6 Mammals

Bats

Desk Study Data

BBRC returned three records of an unidentified bat species (dating from 1993 – 2005), six common pipistrelle (*Pipistrellus pipitrellus*) records (dating from 1993 – 2005); and two noctule (*Nyctalus noctula*) records (dating from 2012 to 2016). One of these is a grounded bat (80m west of the Site). Five pipistrelle records relate to a maternity roost 0.8 km north-west of the Site, with a peak count of 187 bats; the final pipistrelle record is a roost of four bats approximately 0.55 km south of the Site. One of the noctule records relates to a roost demolished under licence at Goldthorpe Primary School in 2016 (located approximately 0.27 km south-west of the Site), and the other noctule record is unspecified. The remainder of the bat records are unspecified and are located over 0.7 km from the Site.

DLRC also provided two brown long-eared (*Plecotus auritus*), two whiskered (*Myotis mystacinus*) and two common pipistrelle bat records from the Hickleton Hall area, approximately 1.5 km from the Site.

Field Survey

Preliminary Roost Assessment

All trees and buildings within the Site were assessed for their potential to support roosting bats.

One tree (T1 in Drawing 1), a semi-mature to mature willow, was assessed as having **Low potential for roosting bats**, due to shallow peeling bark and bark fissures. All other trees on the Site were assessed as having Negligible bat roosting potential.



Plate 10: Tree T1, with low bat roosting potential

The results of the building inspection for bats is provided in Table 3-5. Descriptions are grouped where the buildings are very similar in character. No appreciable Potential Roosting Features (PRFs) were identified and no bat evidence was recorded; all of the buildings were assessed as having negligible bat roosting potential.

Table 3-5: Results of Building Inspections for Bats

Building Ref. (see Drawing 1)	Description	PRFs/ Bat Evidence	Bat Roosting Potential	Photograph
B1, B22, B26	Single storey single-skinned brick shelters/sheds, with flat roofs constructed of corrugated sheeting.	None	Negligible	
B2, B3, B4, B5, B6, B7, B10, B11, B12, B13, B14, B15, B16, B17, B18, B19, B21, B23, B24, B25, B27, B28	Single storey single-skinned wooden shelter/shed with flat roof constructed of corrugated sheeting or roofing felt.	None	Negligible	

Building Ref. (see Drawing 1)	Description	PRFs/ Bat Evidence	Bat Roosting Potential	Photograph
B8	Glass greenhouse.	None	Negligible	
B9, B20	Single storey single-skinned brick structure, with flat concrete roof. Access is open leading to two internal rooms, but with no cracks or crevices suitable for roosting bats.	None	Negligible	 

Spring Walked Bat Activity Transect Survey

Weather conditions prevalent during the walked transect survey are provided in Table 3-6.

Table 3-6: Weather conditions during the walked bat activity transect surveys

Date	Time	Temp (°C)	Cloud and Rainfall	Wind Speed	Wind Direction
26 th April 2021	20:28 – 22:42 hrs	13 at start; 9 at end	Dry throughout; 7/8 cloud cover at start; 4/8 cloud cover at end	Light breeze throughout	NW throughout

The results of the evening walked bat transect survey are illustrated in Drawing 5 (showing the number of bat passes per five-minute sample point), and summarised in Figure 3-1. The results are also provided in tabular form in Appendix 7.

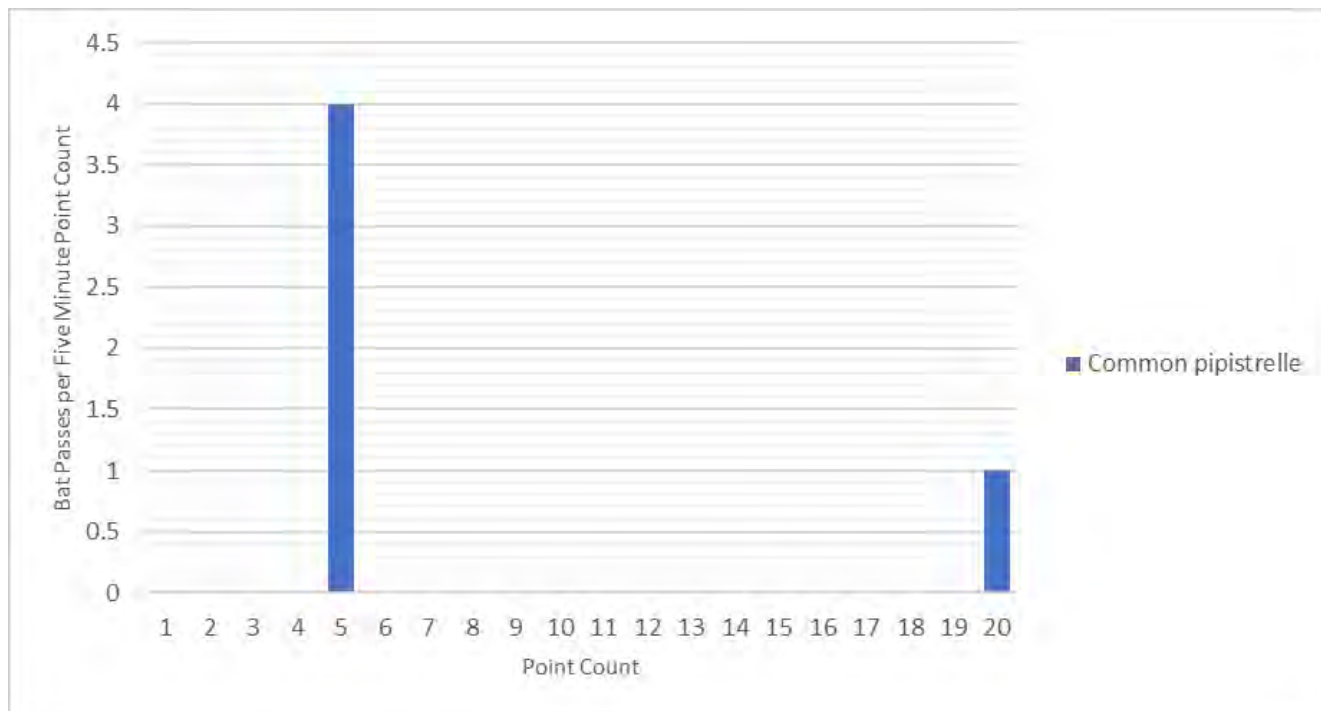


Figure 3-1: Bat passes per five minutes at walked transect point counts

Only one species of bat was recorded during the walked activity transect survey, this being common pipistrelle. Four passes were recorded at Point Count 5, located on the southern margin of the northern-most modified grassland field (see Drawing 5). At this location, two common pipistrelle bats were observed flying from west to east across the field. These bats were recorded 25 minutes after local sunset, suggesting that they are likely to be roosting nearby within the surrounding landscape. A further two common pipistrelle bat passes were recorded at Point Count 20, within scrub habitat at the eastern end of the Site, 2 hours and 8 minutes after local sunset. No further bat passes were recorded during the walked bat activity survey.

Spring Static Bat Detector Activity Survey

The average weather conditions during the static detector monitoring period are summarised in Table 3-7.

Table 3-7: Weather conditions during the static bat detector monitoring period

Sample Period	Mean temp. at sunset (°C)	Mean min. temp (°C)	Mean max. temp (°C)	Mean wind speed (mph)	Mean rain (mm)	Sunset (range)	Sunrise (range)
15 th – 26 th April 2021	9.6	-0.3	14.3	4.6	0.00	20:07 – 20:25	06:03 – 05:41

The results of the static detector bat activity survey are illustrated in Drawing 6 and summarised in Figure 3-2. Tabulated results are also provided in Appendix 8.

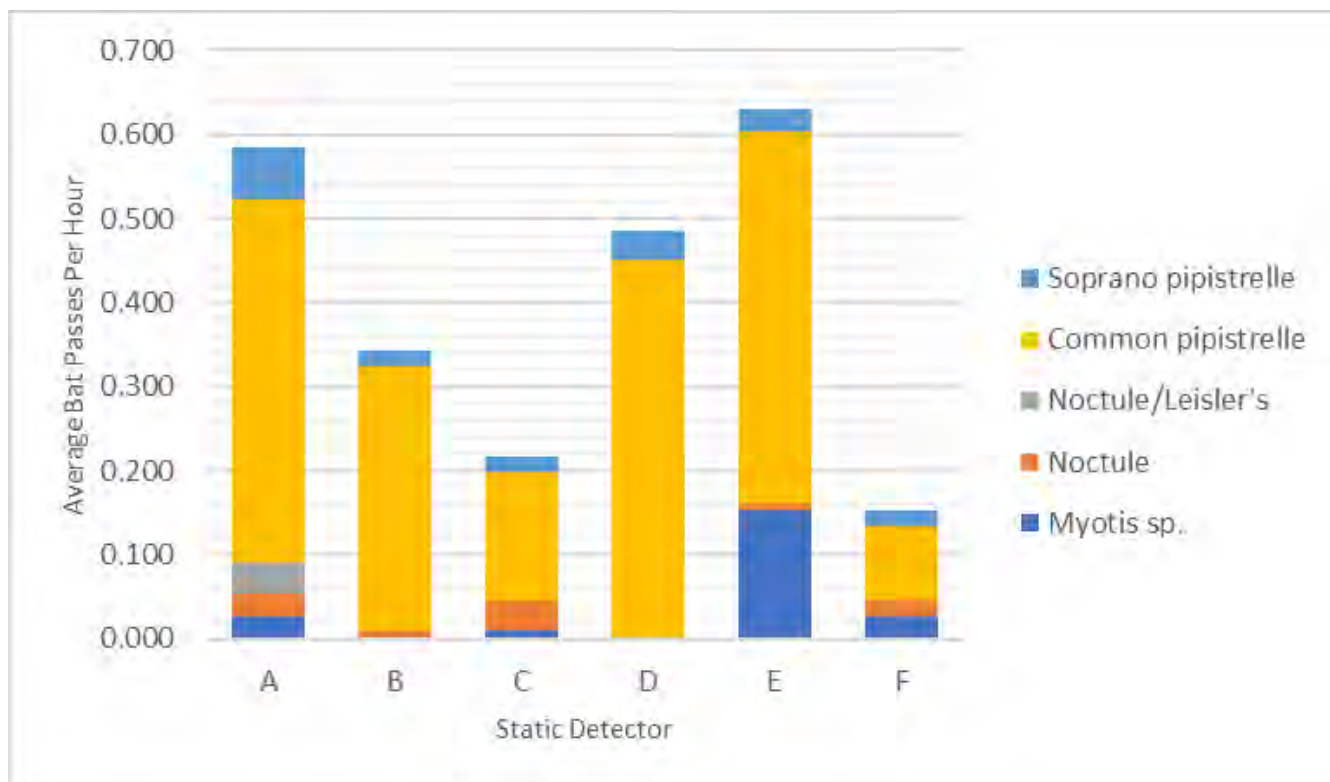


Figure 3-2: Average bat passes per hour during the static detector bat activity survey

At least four bat species were recorded during the static detector sampling.

Common pipistrelle was the most frequently recorded species, accounting for 78% of the total bat activity recorded. Common pipistrelle was recorded at all six static detector locations, with the highest levels of activity recorded at locations D, E and A (at scrub, hedgerow and field boundary habitat), and slightly lower levels of activity recorded at locations F and C (grassland and scrub mosaic, and woodland edge habitat).

Myotis sp. was the next most frequent species group recorded, accounting for 9% of bat activity, with a peak in activity at location E (field edge habitat at the western end of the Site), and occasional passes only at locations A, C and F.

Soprano pipistrelle (*Pipistrellus pygmaeus*) was recorded occasionally at all sample locations, accounting for 7.5% of the total activity. Noctule or noctule/ Leisler's (*Nyctalus leisleri*) was also recorded occasionally, at all sample points apart from location D (a hedgerow in the centre of the Site), accounting for the remaining 5.5% of activity.

Overall, bat activity levels were found to be reasonably low, with less than one bat pass per hour recorded at any sample location, however this is expected given the time of year. The results indicate that all of the main habitat types within the Site are used at least to some degree by foraging/ commuting bats.

Overall, due to the presence of at least four bat species, and the presence of foraging/ commuting bats at multiple habitat types across the Site, the Site is assessed as having up to local importance for bats.

Badger

Desk Study Data

No badger records were provided.

Field Survey

The Site contains suitable habitat for foraging badger and for sett building. However, no badger setts nor other badger field evidence was recorded.

The lack of badger field evidence indicates that the Site is not important for any local badger populations. The Site is therefore assessed as having less than local ecological importance for this species. However, as badgers can build new setts at any time, due to their protected status, badgers are brought forward for further assessment.

Otter

Desk Study Data

One otter (*Lutra lutra*) record was returned from DLRC, at Adwick-on-Deerne, approximately 3 km south of the Site, dating from 2007.

Field Survey

The Site and immediate surroundings do not provide suitable habitat for this species. As such, otter is extremely unlikely to occur on the Site, and therefore would not be affected by the proposals; otter are therefore not discussed further.

Water Vole

Desk Study Data

No records were returned for this species.

Field Survey

The Site does not contain suitable habitat for this species. Water vole would therefore not be impacted, and are scoped out from further assessment.

Other Mammals

Desk Study Data

Records were provided for hedgehog (*Erinaceus europaeus*) and brown hare (*Lepus europaeus*).

Field Survey

The Site is likely to support hedgehog, a NERC Act 2006 species of principal importance for nature conservation, and the Site is assessed as being of up to local importance for this species. Hedgehog is therefore brought forward for further assessment. The Site is considered suboptimal for brown hare.

3.4 Summary of Important Ecological Features

Table 3-8 summarises the important ecological features in need of specific assessment as part of this EclA.

Table 3-8: Summary of important ecological features subject to detailed assessment

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
Undesignated site habitats: hedgerows (priority habitat), mixed scrub and broad-leaved woodland.	Local	Undesignated habitats although some i.e. hedgerows recognised as priorities under NERC Act 2006.
Breeding bird assemblage	Local	All species are protected whilst nesting under the Wildlife and Countryside Act 1981 (as amended) (some species are also protected from disturbance whilst nesting under Schedule 1); some species are NERC Act 2006 Section 41 species of principal importance.
Bat assemblage	Local	European and UK protected species (Habitats Directive and Wildlife and Countryside Act 1981 (as amended)). Some species are NERC Act 2006 Section 41 species of principal importance.
Badger	Less than local	Protected under Protection of Badgers Act 1992.
Habitat suitable for hedgehog	Local (if present)	Not legally protected, but a NERC Act 2006 species of principal importance.
Invasive plant species (Japanese knotweed)	N/A	Listed on Schedule 9 of the Wildlife and Countryside Act which makes introducing or causing the spread of these species in the wild an offence.

4.0 Assessment of Effects and Mitigation Measures

This section describes the predicted effects and proposed mitigation measures, focussing on the important ecological features identified in Table 3-8. Potential direct and indirect effects during the construction phase as well as the operational phase are assessed.

4.1 Embedded Mitigation and Best Practice

The proposed development has been designed to accommodate constraints identified as part of the baseline studies where possible, to reduce environmental effects. With respect to ecology the following “embedded mitigation” has been incorporated into the design to avoid or minimise negative effects:

- Retention of the majority of the boundary woodland and trees in the north-east corner of the Site; and
- Retention of boundary and other intact hedgerows where possible.

Landscaping and habitat creation measures are proposed within the design of the development to minimise loss of biodiversity on-Site and replace lost key habitats²². The landscaping would include hedgerow and tree planting, wildflower grassland seeding, and the creation of a SuDS basins wetland feature, and would incorporate native species of local provenance. Landscaping during operation would include aftercare management to ensure that new habitats are being managed in a way that optimises their biodiversity value. Details on proposed habitat creation are provided in the following sections.

Due to their ability to change distribution quickly, pre-construction surveys for invasive species and badger would be undertaken. The results of pre-construction surveys would inform the need for further mitigation (if required).

Taking the above into account, the principal potential impacts of the proposed development are outlined in the following sections.

4.2 Habitats

4.2.1 Potential Impacts

The majority of habitat lost as a result of the proposed scheme relates to species-poor modified grassland, of low intrinsic nature conservation value. The proposals would also result in the loss of some dense bramble and scattered scrub, of less than local ecological value, and the loss of a small number of trees in the north-eastern corner of the Site.

However, the proposals would also result in the loss of the following habitats of up to local ecological importance:

- Hedgerow (priority habitat): boundary hedgerows and the majority of the intact hedgerow (H5) running through the centre of the Site shall be retained. However, a number of the shorter sections of defunct native hedgerow in the Site interior would be lost;
- Mixed scrub: the majority of the mixed scrub in the north-east corner of the Site would be lost ;and
- The majority of the broad-leaved woodland along the northern margin of the Site would be retained, as would the majority within the north-eastern corner of the Site, however, a small number of trees will need to be removed to facilitate development in the north-eastern corner.

During the construction phase, the proposals also have the potential to indirectly affect the retained habitats, and adjacent habitats such as the woodland beyond the northern boundary, through damage to tree roots.

²² Refer to Rosetta Landscape Design Detailed Landscape Proposals Drawings 3710/2-4, dated August 2021

In the absence of mitigation, habitat loss and damage is assessed as being adverse and significant at the local level.

4.2.2 Proposed Mitigation Measures

To protect retained and bordering vegetation during construction, sturdy protective fencing would be erected around retained/ bordering vegetation for the duration of construction, including the Root Protection Area, as directed by an arboriculturist, and in accordance with the British Standard BS 5837:2012 specification.

Replacement hedgerow and scrub planting would be provided as compensation for the habitats lost. The compensatory hedgerow and scrub creation would be of higher value than the hedgerow and scrub habitat lost, and would include a species-rich mix of native species of local provenance, including a number of fruit and nut-bearing species to provision fauna over the winter. The new hedgerow planting would include standards that are allowed to develop to maturity.

4.2.3 Significance of Residual Effects

There would be a short-term residual impact of habitat loss until the new planting matures, but once the new planting has matured a net increase in ecologically valuable hedgerows would be achieved. There would be a net loss of modified grassland and bramble scrub habitat, although this is assessed as not significant at the local level or beyond, due to their less than local ecological importance.

No adverse significant impact is predicted in the long-term.

4.3 Breeding Birds

4.3.1 Potential Impacts

The potential impacts to breeding birds relate to direct impacts i.e. whilst nesting, and indirect impacts i.e. loss of foraging habitat reducing population fitness or displacement of breeding territories.

The potential for direct impacts to occur (i.e. damage/ destruction of active nests) relate to the removal of vegetation during Site clearance works. This relates to the removal of hedgerow, trees and scrub habitat. The removal of these habitats would also result in the loss of available foraging and nesting resource.

There is also the potential for disturbance of birds within the Site and displacement of breeding territories in the adjacent habitats, during construction, through increased human and machinery activity.

4.3.2 Proposed Mitigation Measures

To avoid the killing/ injury of birds and damage/ destruction of active nests during vegetation clearance and construction, vegetation removal should ideally take place outside of the main bird breeding season (which for most species extends from March to August inclusive). If this is not feasible, a search for active nests would first be undertaken by a suitably qualified ecologist within the 24 hours prior to vegetation clearance. If an active nest was identified, it would be left *in situ* until the breeding attempt was concluded and the young had fledged.

Lost nesting and foraging habitat would be replaced, in the form of new hedgerow, tree and scrub planting, although there will be a delay in the ability of the replacement habitats to provide suitable alternative nesting habitat until it matures. Therefore, nest boxes shall also be erected to provide additional nesting options. Nest boxes shall be erected on retained trees at the eastern end of the Site as well as in 10% of new houses (which will also represent an enhancement). Further details are provided in Section 4.9. Once the replacement planting matures, these boxes will provide an enhancement.

A proportion of residents are likely to set up wild bird feeding stations in their gardens, and some are likely to plant shrubs and trees, and erect nest boxes, which would benefit garden and urban-fringe species.